

ASE-1019 ASE Light Source User's Manual



Revision History

Document Revision	Date	Description
1.0	Feb 2015	Initial Release
1.1	July 2015	Updated several GUI images of optical control/status

Table of Contents

Revision History	2
1.0 Scope	6
2.0 Operational Overview	6
2.1 Default Operational Settings and Non-Volatile Memory	7
3.0 Description of All Items Included in ASE-1019 Packaging	7
4.0 Optical Safety	8
4.1 National Standards	8
4.2 Class 1M Source of Optical Radiation	8
4.3 Connecting Optical Cables	9
4.4 Eye Protection	9
5.0 USB GUI Software Installation and Initial Power-On	9
5.1 USB GUI Installation	9
5.2 USB Connection to ASE-1019 Module and Initial Power-On	11
6.0 Ethernet Based Control/Status Setup and Initial Power-On	12
6.1 Initial Setup for Ethernet Control/Status	12
6.2 IP Address Reset Button (on bottom side of module)	14
7.0 USB GUI Operation	15
7.1 Getting Started with the USB GUI	15
7.2 Main Menu Control and Status Functions	15
7.2.1 Primary Status Display	15
7.2.2 Primary Control Functions	16
8.0 Ethernet Browser GUI Operation	18
8.1 Optical Control/Status	18
8.1.1 Display of Status Parameters	18
8.2 System Status	22
8.3 Ethernet Setup	23
8.4 Revision/Update	24
9.0 Optical and Electrical Specifications	26
10.0 Mechanical Dimensions	27
11.0 Part Numbers for Ordering	28

List of Figures

Figure 2.0-1 - ASE-1019 Functional Block Diagram and Internal Connectivity	6
Figure 3.0-1 - ASE-1019 Packaging Box	7
Figure 3.0-2 - ESD Container with ASE-1019 Inside	8
Figure 3.0-3 - AC/DC Plug Adapter, Ethernet Cable, USB Cable, and CD-ROM with USB GUI and User's Manual	8
Figure 4.2-1 - ASE-1019 Laser Radiation Safety Label for Class 1M Laser Product	9
Figure 5.1-1 - ASE-1019 USB GUI Installation Folder Contents on CD-ROM	10
Figure 5.1-2 - Windows User Account Control Notification	10
Figure 5.1-3 - USB GUI Installation Progress Window	10
Figure 5.1-4 - USB GUI Installation Complete Window	11
Figure 5.2-1 - Example of ASE-1019 USB GUI Main Menu	11
Figure 5.2-2 - Error Message Displayed When ASE-1019 is Not Connected to USB Port	12
Figure 6.0-1 - Two Methods of Using an Ethernet Interface to the ASE-1019 Module	12
Figure 6.2-1 - ASE-1019 IP Address Reset Button Location	14
Figure 7.1-1 - How to Move and Close the Main Menu Window, Open Device Info Window	15
Figure 7.2.1-1 - Critical Status Area of the Main Menu, in both dBm and Watts	16
Figure 7.2.2-1 - Key Control Functions on the Main Menu	16
Figure 7.2.2-2 - ACC Mode with a User Entered Setting of 475 mA for the Bias Current	17
Figure 7.2.2-3 - APC Mode with a User Entered Setting of +18.0 dBm for the Output Power	17
Figure 8.1.1-1 - Type Appropriate IP Address of Module to Access Home Page	18
Figure 8.1.1-2 - Optical Control and Status Page	19
Figure 8.1.1-3 - User Selects Watts to be Used for Displaying Output Power	20
Figure 8.1.1-4 - ACC Mode with a User Entered Setting of 475 mA for the Bias Current	20
Figure 8.1.1-5 - APC Mode with a User Entered Setting of +18.0 dBm for the Output Power	21
Figure 8.1.1-6 - Amplifier Output Disabled by the User	21
Figure 8.1.1-7 - Continuous Update Box Should Remain Checked Under Most Conditions	22
Figure 8.2-1 - System Status Information	22
Figure 8.2-2 - Click to Reset the Automatic Laser Shutdown Condition	23
Figure 8.3-1 - Ethernet Setup Controls with Factory Default IP Address	23
Figure 8.4-1 - Firmware Revision/Update Page, Browse to a File and Click Update to Begin Downloading New Firmware	24
Figure 10.0-1 - ASE-1019 Module Mechanical Dimensions	27

List of Tables

Table 2.1-1 - Default Operational Settings as Shipped from the Factory.....	7
Table 5.1-1 - Step-by-Step Instructions to Install the USB GUI.....	10
Table 6.1-1 - Ethernet Port Setup for Standalone Computer Operation with ASE-1019	13
Table 6.1-2 - ASE-1019 Ethernet Port Setup for Operation with Ethernet Router Using Static IP.....	13
Table 6.1-3 - ASE-1019 Ethernet Port Setup for Operation with Ethernet Router Using Dynamic IP	14
Table 8.3-1 - Ethernet Configuration Description of Parameters.....	24
Table 9.0-1 – ASE Light Source Specifications	26
Table 9.0-2 – Typical Output Spectrum at 25°C Over Entire Wavelength Range	26
Table 9.0-3 - Optical Power Meter Specifications	27
Table 9.0-4 - Electrical, Mechanical, and Environmental Specifications.....	27

1.0 Scope

This ASE-1019 User's Manual gives an overview of the hardware and software design and describes module installation, configuration, alarms, and operator control and status capability.

2.0 Operational Overview

The ASE-1019 is an ASE light source providing a typical output power of +19 dBm. It is one of the series of amplifier/light source modules which are designed as user-friendly, compact, portable, cost-effective solutions for use in a variety of applications. A detailed block diagram showing the internal hardware connectivity of this chassis is shown in Figure 2.0-1.

An Ethernet communications hardware interface is provided to allow the ASE-1019 to be controlled via a 10/100BaseT link using either Static or Dynamic IP addressing. In this configuration, a standard HTML browser (e.g. Firefox, Chrome, Internet Explorer) provides the user interface and the various control and status HTML pages are integrated into the microcontroller's firmware. A +5V AC/DC adapter is provided to power the module.

In addition to the Ethernet GUI, the ASE-1019 can be connected directly to a Windows based computer which runs the USB graphical user interface (GUI) software. This GUI also provides complete control and status of all amplifier and optical power monitoring functions.

The output optical power level is measured using a 1% tap to minimize insertion loss. An onboard temperature sensor allows the power monitoring circuitry to be calibrated during production test to provide measurement resolution of 0.01 dB and linearity (relative accuracy) of 0.1 dB over an operating temperature range of 0°C to 40°C.

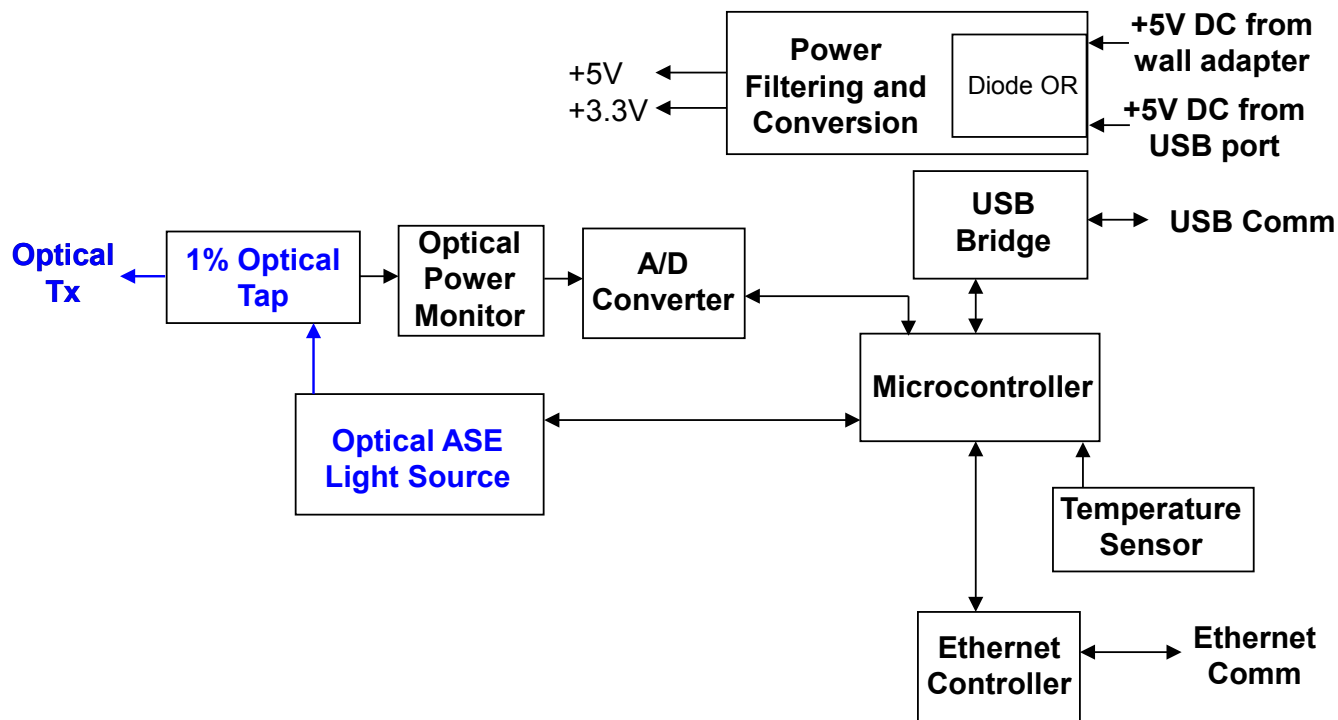


Figure 2.0-1 - ASE-1019 Functional Block Diagram and Internal Connectivity

The GUI application has an additional optional feature which allows the user to perform time stamped data logging. This option includes capturing the input and output optical power levels as

well as the corresponding amplifier bias current, operating modes, temperature, LOS level and alarms, and writing this information to a .csv file.

2.1 Default Operational Settings and Non-Volatile Memory

The ASE-1019 module always saves the last operational state in non-volatile memory regardless of whether the USB GUI or the Ethernet interface is used for control and status. All changes to any control parameters are automatically saved in non-volatile memory and recalled whenever the module is powered on.

The ASE-1019 module is shipped from the factory with the default settings given in Table 2.1-1. This module is setup to be “ready for operation” as soon as it is powered on with the bias current set to achieve the advertised output power so the module can be placed directly into service without changing any parameters if desired.

Table 2.1-1 - Default Operational Settings as Shipped from the Factory

Control Function	Default Setting	Description
Bias Current	~ 450 mA	Set for advertised output power (+19 dBm), so slightly different for every amplifier
Output Power	+19 dBm	Set for advertised output power, used when set to APC mode
Auto Control Mode	Auto Current Control	Automatic current control mode
Amplifier Output	Enabled	Amplifier output is enabled
Optical Power Display	dBm	Power is displayed in dBm
Ethernet Mode	Static	Static IP address mode
IP Address	192.168.1.234	Default IP address
IP Subnet	255.255.255.0	Default IP subnet
IP Gateway	192.168.1.1	Default IP gateway

3.0 Description of All Items Included in ASE-1019 Packaging

The photos below show all the items which are included with the ASE-1019. There is an Ethernet cable, a USB cable, and an AC/DC power adapter along with a CD-ROM containing the USB GUI installation files and user’s manual.



Figure 3.0-1 - ASE-1019 Packaging Box

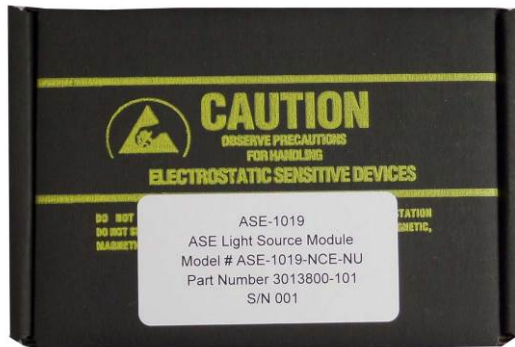


Figure 3.0-2 - ESD Container with ASE-1019 Inside



Figure 3.0-3 - AC/DC Plug Adapter, Ethernet Cable, USB Cable, and CD-ROM with USB GUI and User's Manual

4.0 Optical Safety

4.1 National Standards

United States Government safety requirements for lasers and laser amplifiers are described in the DHHS/CDRH radiation performance standards, 21 CFR 1040.10 and 1040.11. International safety standards for lasers and laser amplifiers are described in the IEC-60825-1:2007 document.

4.2 Class 1M Source of Optical Radiation

The ASE-1019 delivers invisible laser radiation with fiber-coupled output power of up to 135 mW (21.3 dBm) and as such are Class 1M sources of optical radiation. This module includes the warning information as shown in Figure 4.2-1 as part of its label to make it easily identifiable as a Class 1M source. Internally, the module contains one 980-nm laser-diode pump.



Figure 4.2-1 - ASE-1019 Laser Radiation Safety Label for Class 1M Laser Product

ASE-1019 Safety Specifications:

- 1) Wavelength range: 1520 to 1620nm (invisible, infrared region).
- 2) Beam size: The beam is normally safely confined within a single-mode optical fiber with a mode-field diameter of about 10-um.
- 3) Beam divergence: If the beam is allowed to escape into free space (e.g. by not connecting an optical cable to the input or output connectors, with the dust caps removed), the beam divergence is given by the numerical aperture of the optical fiber, typically 120mrad (half angle).
- 4) Maximum power: The maximum output power (in the form of amplified spontaneous emission (ASE)) of this module, in the absence of an optical input, is less than the Class 1M limit of 135 mW (21.3 dBm). This power can be emitted from the output connector (ASE power emitted from the input connector does not exceed Class 1 limits.). With a saturating input signal of 0 dBm (1mW), the maximum output power of the module is also less than 135 mw (21.3 dBm).

4.3 Connecting Optical Cables

Optical connections to the module are made via FC connectors. The supplied dust caps should always be left on the connectors when not in use. These dust caps not only keep the connectors clean, but they also protect the user from any optical radiation that may emanate from these connectors.

4.4 Eye Protection

Under normal operating conditions, with an optical cable connected to the output, or with the dust caps on both FC connectors, there is no optical radiation emitted into free space. Therefore, no special eye protection is required. It is recommended that optical connection or disconnection to the module be carried out only with the optical output disabled using the GUI.

5.0 USB GUI Software Installation and Initial Power-On

This paragraph describes the USB GUI installation and power-on procedure so if only the Ethernet interface is planned to be used, please skip to paragraph 6.0.

5.1 USB GUI Installation

Before initially powering on the ASE-1019 module, the USB GUI should be installed onto a Windows 7, XP, or 8 computer. The included CD-ROM contains all of the required installation files. Proceed to install the USB GUI by following the instructions in Table 5.1-1. Several screen captures of the installation process are shown in the figures below.

The installation procedure will install the ASE-1019 GUI application program as well as the National Instruments Run Time Engine and all USB drivers needed to communicate with the ASE-1019 module. Therefore, no additional driver or software installation is necessary.

Table 5.1-1 - Step-by-Step Instructions to Install the USB GUI

Step #	Description
1	Insert the disk into the Windows computer's DVD drive, navigate into the USB GUI folder and verify the file structure of the CD-ROM looks as shown in Figure 4.1-1.
2	Double click on the Install_ASE10XX GUI file and the Windows User Account Control message shown in Figure 4.1-2 will appear. Click Yes to continue to install the software.
3	While the installation is in progress for approximately 4 minutes, the small window shown in Figure 4.1-3 will appear to indicate the installation process is in progress.
4	Once installation is complete, the window in Figure 4.1-4 will be shown to remind the user to restart the computer at the earliest convenience. The user can click OK to continue, the computer will not restart until the user specifically commands a Windows restart.
5	Whenever convenient, restart the computer.
6	Proceed to paragraph 5.2 of this document to continue the setup procedure.

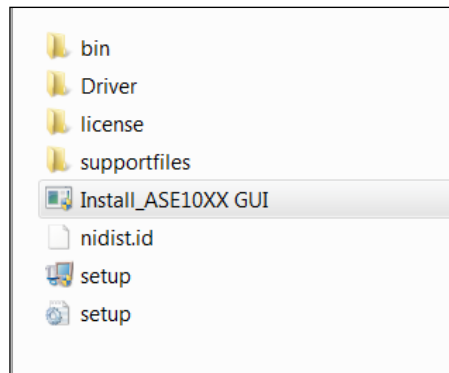


Figure 5.1-1 - ASE-1019 USB GUI Installation Folder Contents on CD-ROM

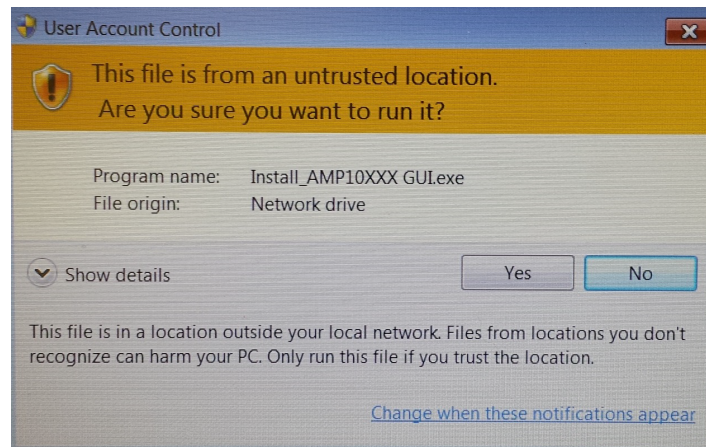


Figure 5.1-2 - Windows User Account Control Notification

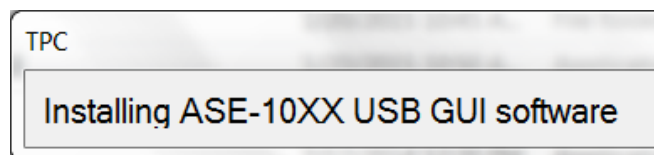


Figure 5.1-3 - USB GUI Installation Progress Window

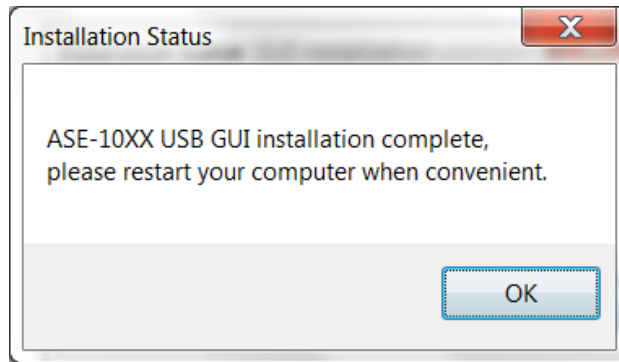


Figure 5.1-4 - USB GUI Installation Complete Window

5.2 USB Connection to ASE-1019 Module and Initial Power-On

Provide power to the module by plugging the +5V AC/DC adapter into a standard 120 VAC wall outlet then into the module's DC port. The LED on the top side of the module should illuminate to a green color indicating that DC power is being supplied to the module. If the LED does not illuminate, it is an indication that DC power is not being supplied to the module. Plug the included USB cable into the computer and into the ASE-1019 module's USB port. After a few seconds, the computer should indicate it recognizes the module with the typical Windows USB connection sound.

Open the GUI application by clicking on the **Windows Start** icon, **All Programs**, **TPC** folder, and finally the **ASE_10XX** application. The GUI will open and the main menu window will display and look similar to that shown in Figure 5.2-1. At this point the module is ready to be controlled and the ASE light source output signal is available at the optical FC connector labeled "OUT". Please go to paragraph 7.0 in order to obtain more details regarding specific operation of the USB GUI application.

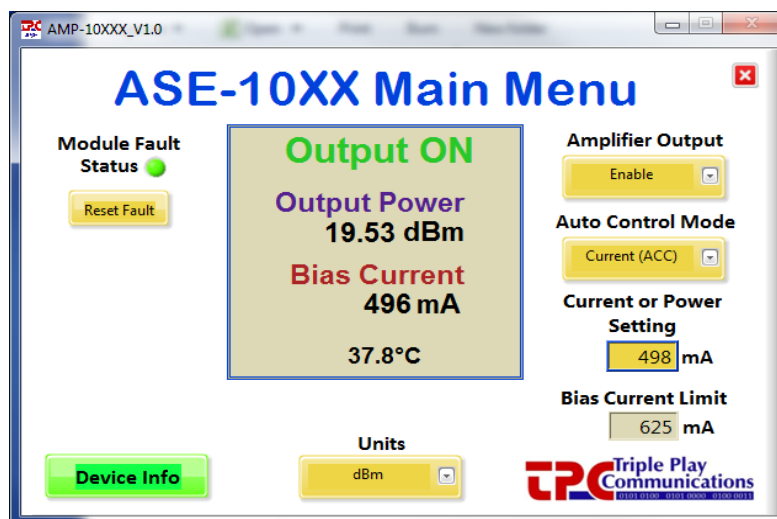


Figure 5.2-1 - Example of ASE-1019 USB GUI Main Menu

If the GUI application is opened when no ASE-1019 module is connected to the USB port, the error message shown in Figure 5.2-2 will appear. In this case, close the GUI, connect an ASE-1019 to the USB port, then re-open the GUI application.

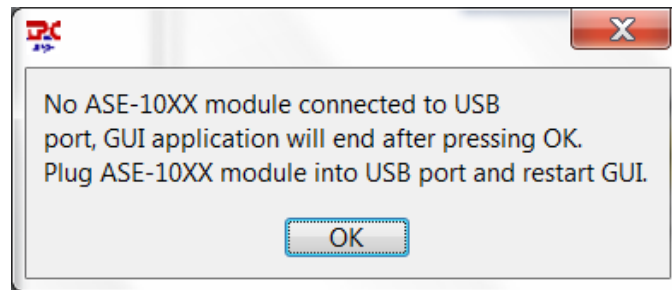


Figure 5.2-2 - Error Message Displayed When ASE-1019 is Not Connected to USB Port

6.0 Ethernet Based Control/Status Setup and Initial Power-On

An external computer with a 10/100BaseT Ethernet port is required to provide control and status for the ASE-1019 module using a standard HTML browser (Chrome, Firefox, Internet Explorer) based GUI. When using Ethernet communications to control/status the ASE-1019 module, there is no other special software required, the browser (Chrome, Firefox, Internet Explorer) is sufficient.

There are two primary ways to configure the hardware connection between the external computer and the ASE-1019 module, both are shown in Figure 6.0-1. Use the included Ethernet cable and setup the hardware connection in either of the two ways shown in the figure.

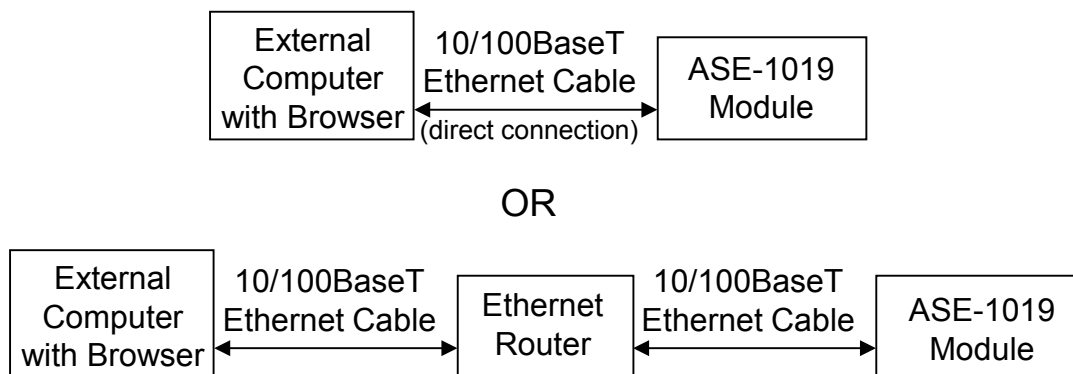


Figure 6.0-1 - Two Methods of Using an Ethernet Interface to the ASE-1019 Module

Provide power to the module by plugging the +5V AC/DC adapter into a standard 120 VAC wall outlet then into the module's DC port. The LED on the top side of the module should illuminate to a green color indicating that DC power is being supplied to the module. If the LED does not illuminate, it is an indication that DC power is not being supplied to the module.

6.1 Initial Setup for Ethernet Control/Status

The ASE-1019 module is shipped in Static IP address mode to allow communication via a direct connection to a standalone computer as shown in the upper block diagram of Figure 6.0-1. In order to initially communicate with the ASE-1019, setup the Ethernet port of the standalone computer as given in Table 6.1-1.

Table 6.1-1 - Ethernet Port Setup for Standalone Computer Operation with ASE-1019

#	Description
1	Set up the properties of your computer's LAN Ethernet connection by navigating as follows: <ul style="list-style-type: none"> - Select Start, Control Panel, Network and Internet, Network and Sharing Center, then click on Change adapter settings on the left side - Right click on your Local Area Connection and select Properties - Click on Internet Protocol Version 4 (TCP/IPv4) and select Properties - Click on Use the following IP address: type IP address 192.168.1.235, Subnet Mask 255.255.255.0, Default Gateway (leave blank) - Click on Use the following DNS server addresses: Preferred DNS Server (leave blank), Alternate DNS server (leave blank) - Click OK to exit all the windows
2	Connect the Ethernet cable from your computer directly to the module
3	Open a Chrome, Firefox, or Internet Explorer browser window
4	In the browser's URL window, type 192.168.1.234 and wait for the ASE-1019 main screen to appear.
5	Click on the menu for Optical Control/Status

If desired, the ASE-1019 can be fully controlled using only a standalone computer and its HTML browser. If that is the desired method of control, please proceed to paragraph 8.0 which describes the various screens, control, and status capable of being implemented with the HTML browser.

In order to connect the ASE-1019 module to an Ethernet router for remote control and status, setup the module as described in Table 6.1-2 if a Static IP address is desired, or as described in Table 6.1-3 if a Dynamic IP address is desired.

Table 6.1-2 - ASE-1019 Ethernet Port Setup for Operation with Ethernet Router Using Static IP

#	Description
1	Click on Ethernet Setup at the top menu bar.
2	Select Static for the Ethernet Mode drop down menu.
3	Type in the new, desired IP Address, IP Subnet , and IP Gateway settings which are to be used with your Ethernet Router.
4	Once all the desired settings are correct, click Apply Settings . Please note that once Apply Settings is clicked, you will no longer be able to communicate with the module until it is connected to the Ethernet Router on which the new settings are appropriate. If there are ever problems accessing the module, the ASE-1019 can always be placed back into its factory default state for the Ethernet Settings using the IP Address Reset button on the bottom side of the module. See paragraph 6.2 for more details.
5	Connect the Ethernet cable from the Ethernet Router directly to the ASE-1019 module.
6	Using a computer which can also access this Ethernet Router, open a Chrome, Firefox, or Internet Explorer browser window.
7	In the browser's URL window, type the newly entered Static IP address of the module and wait for the ASE-1019 main screen to appear.
8	Proceed to paragraph 8.0 which describes the various screens, control, and status capable of being implemented with the HTML browser.

Table 6.1-3 - ASE-1019 Ethernet Port Setup for Operation with Ethernet Router Using Dynamic IP

#	Description
1	Click on Ethernet Setup at the top menu bar.
2	Select DHCP for the Ethernet Mode drop down menu. It is not necessary to change the IP Address , IP Subnet , and IP Gateway settings.
3	Click Apply Settings . Please note that once Apply Settings is clicked, you will no longer be able to communicate with the module until it is connected to the Ethernet Router setup for Dynamic IP addressing. If there are ever problems accessing the module, the ASE-1019 can always be placed back into its factory default state for the Ethernet Settings using the IP Address Reset button on the bottom side of the module. See paragraph 6.2 for more details.
4	Connect the Ethernet cable from the Ethernet Router directly to the ASE-1019 module.
5	There are two ways in which to determine the dynamic IP address once it has been assigned to the module. The first is to use the Admin function of the Ethernet Router and determine the Dynamic IP address which has been assigned to the ASE-1019 module. The second is to connect to the USB port of the module and open the USB GUI. Click on the Device Info box and the Device Information window will display the current IP address.
6	Using a computer which can also access this Ethernet Router, open a Chrome, Firefox, or Internet Explorer browser window.
7	In the browser's URL window, type the newly found Dynamic IP address of the module and wait for the ASE-1019 main screen to appear.
8	Proceed to paragraph 8.0 which describes the various screens, control, and status capable of being implemented with the HTML browser.

6.2 IP Address Reset Button (on bottom side of module)

The IP address reset button is located on the bottom side of the module, see Figure 6.2-1, and is recessed so it is not possible to inadvertently reset the IP address. The tip of an ordinary ball point pen can be used to press this reset button. Pressing and holding the IP Address Reset button for at least 1 second reconfigures the 10/100BaseT Ethernet port to its default state which is: Static IP address mode, IP address = 192.168.1.234, Subnet mask = 255.255.255.0, Default gateway = 192.168.1.254. During the execution of this command, the optical communications link is not interrupted.

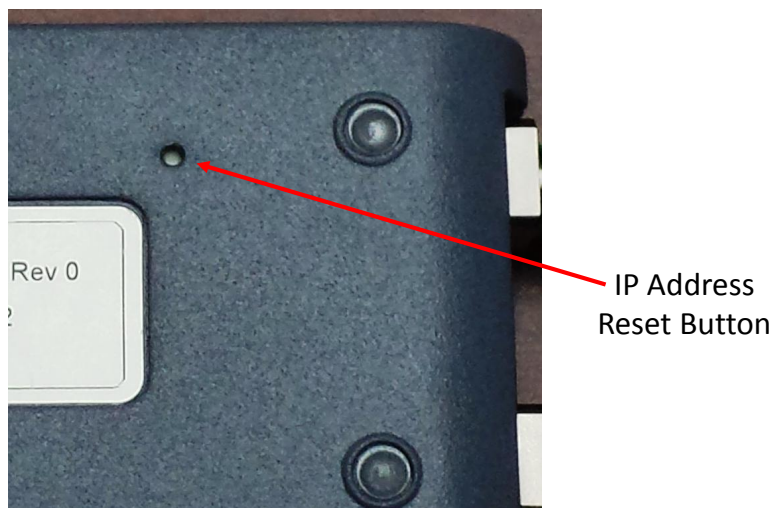


Figure 6.2-1 - ASE-1019 IP Address Reset Button Location

7.0 USB GUI Operation

7.1 Getting Started with the USB GUI

Once the USB GUI application has been started using the steps described previously in paragraph 5.2, the ASE-1019 Main Menu will appear. This window remains visible until the application is closed by clicking the “X” inside the red box in the upper right area of the Main Menu or by removing the USB cable from the ASE-1019 module. This GUI application can only be active and running when an ASE-1019 is physically connected to the computer using a USB cable. Otherwise, the application will automatically close if no module connection is detected.

The Main Menu window can be moved and repositioned on the screen by clicking the bar at the top of the window and dragging it to a different location. The size of this window cannot be changed.

By clicking on Device Info, a new window is opened to show specific module information such as the model number, part number, serial number, firmware and GUI revisions. This window cannot be repositioned and is closed by clicking the red box in the upper right corner.

Figure 7.1-1 shows an example Main Menu window with several key areas highlighted.

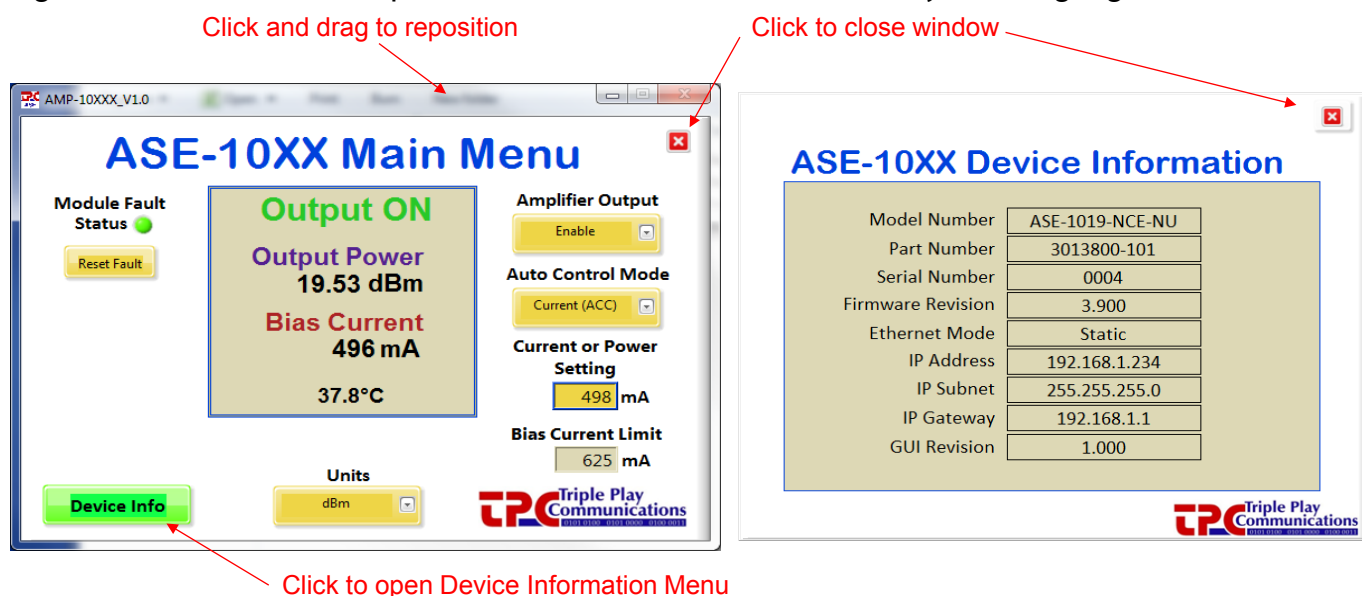


Figure 7.1-1 - How to Move and Close the Main Menu Window, Open Device Info Window

7.2 Main Menu Control and Status Functions

7.2.1 Primary Status Display

All of the critical status information from the ASE-1019 module is shown in the central area of the Main Menu as highlighted in Figure 7.2.1-1.

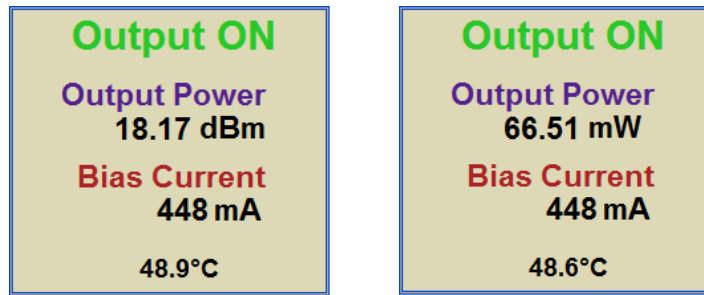


Figure 7.2.1-1 - Critical Status Area of the Main Menu, in both dBm and Watts

The key ASE-1019 module parameters of output status, output power, bias current, and temperature are obtained from the module (by the external computer) and displayed in prominently in this central area of the window.

The optical output power is monitored using a 1% tap to minimize insertion loss. The calculated value is displayed in its designated location and can be shown in either dBm or Watts based on the user's selection of Units. It should be noted that if the output is disabled, the output power monitor will display -35 dBm.

A temperature sensor is mounted on the PCB and its value in degrees Celsius is continuously updated on the display.

7.2.2 Primary Control Functions

The key control functions of the ASE-1019 module are highlighted on the Main Menu shown in Figure 7.2.2-1.

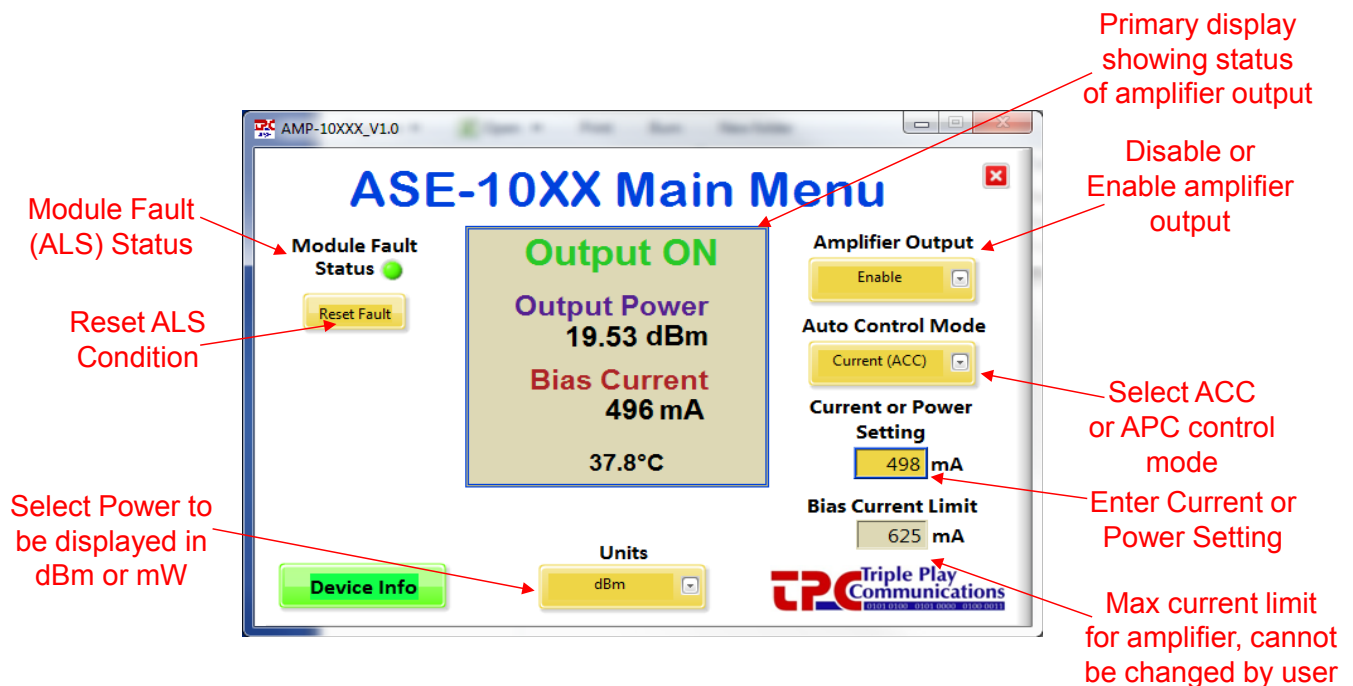


Figure 7.2.2-1 - Key Control Functions on the Main Menu

The user can manually Enable or Disable the amplifier output with the dropdown menu at the top-right of this window.

This amplifier module can operate in either Automatic Current Control (ACC) or Automatic Power Control (APC) mode as selected by the user from the appropriate dropdown menu. When ACC is selected, the user must enter the target bias current setting which ranges from 0 mA to the Bias Current Limit shown in the lower-right corner. Once the user types in the target bias current and presses Enter, the module is commanded to provide that specific bias current to the amplifier as shown in Figure 7.2.2-2. The internal amplifier has a bias current setting accuracy of $\pm 10\%$ so the bias current displayed in the main menu can have a variation of up to $\pm 10\%$ compared to the user entered bias current setting.

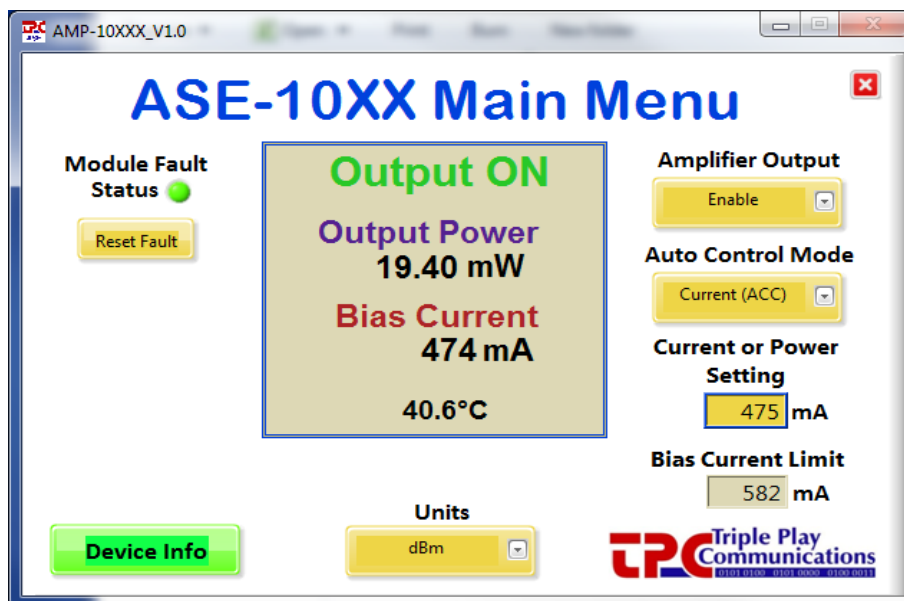


Figure 7.2.2-2 - ACC Mode with a User Entered Setting of 475 mA for the Bias Current

When APC mode is selected the user must enter the target output power setting in units of dBm. An example of APC mode is shown in Figure 7.2.2-3, in this case the user has entered a target output power of +18.0 dBm.

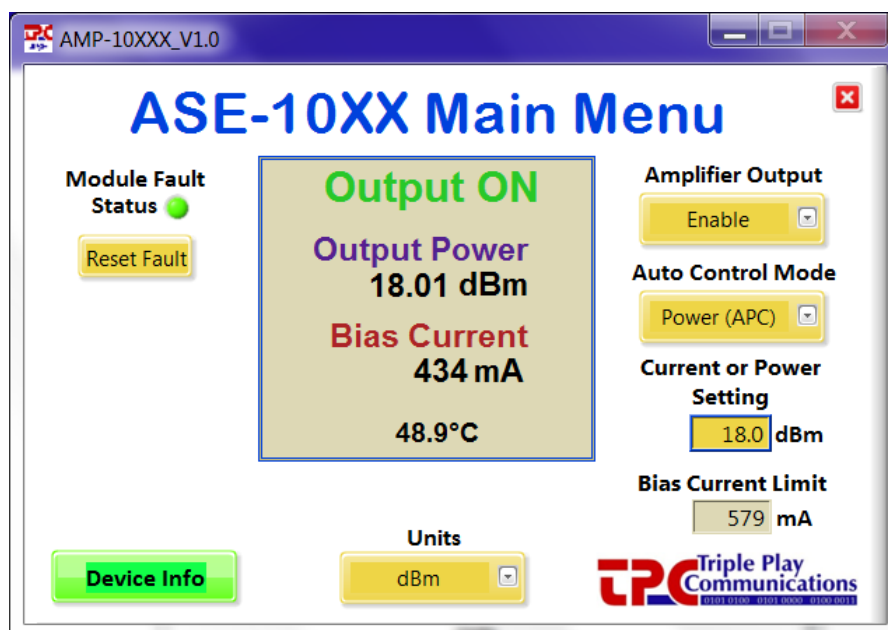


Figure 7.2.2-3 - APC Mode with a User Entered Setting of +18.0 dBm for the Output Power

The Module Fault Status indication is shown in the GUI window as well as the LED located on the top side of the module. The Module Fault Status is a logical OR of several alarms which are laser bias current exceeds the maximum current limit, laser pump temperature out of valid operating range, laser driver current limit reached, and laser driver junction temperature limit reached. If any of these conditions occur, the Module Fault Status indication will alarm (Red). These four conditions indicate a problem with the laser and will cause an automatic laser shutdown (ALS). To clear an ALS condition, the user must click the Reset Fault button. If the fault condition will not clear, please contact us (TPC) since a hardware failure may have occurred.

8.0 Ethernet Browser GUI Operation

As mentioned previously, the ASE-1019 module includes embedded web pages as part of its internal microcontroller's firmware. Standard HTML browsers such as Chrome, Firefox, and Internet Explorer can be used to provide control and status of the module. After completing the Ethernet port setup for operation with a standalone local computer or with an Ethernet Router (Tables 5.1-1, 5.1-2, or 5.1-3), the ASE-1019 module can be controlled and monitored using the steps described in paragraphs 8.1 through 8.4.

8.1 Optical Control/Status

8.1.1 Display of Status Parameters

Use a standard browser such as Chrome, Firefox, or Internet Explorer to communicate with the ASE-1019 module by typing the appropriate IP address (e.g. 192.168.1.234) in the URL window of the browser as shown in Figure 8.1.1-1.

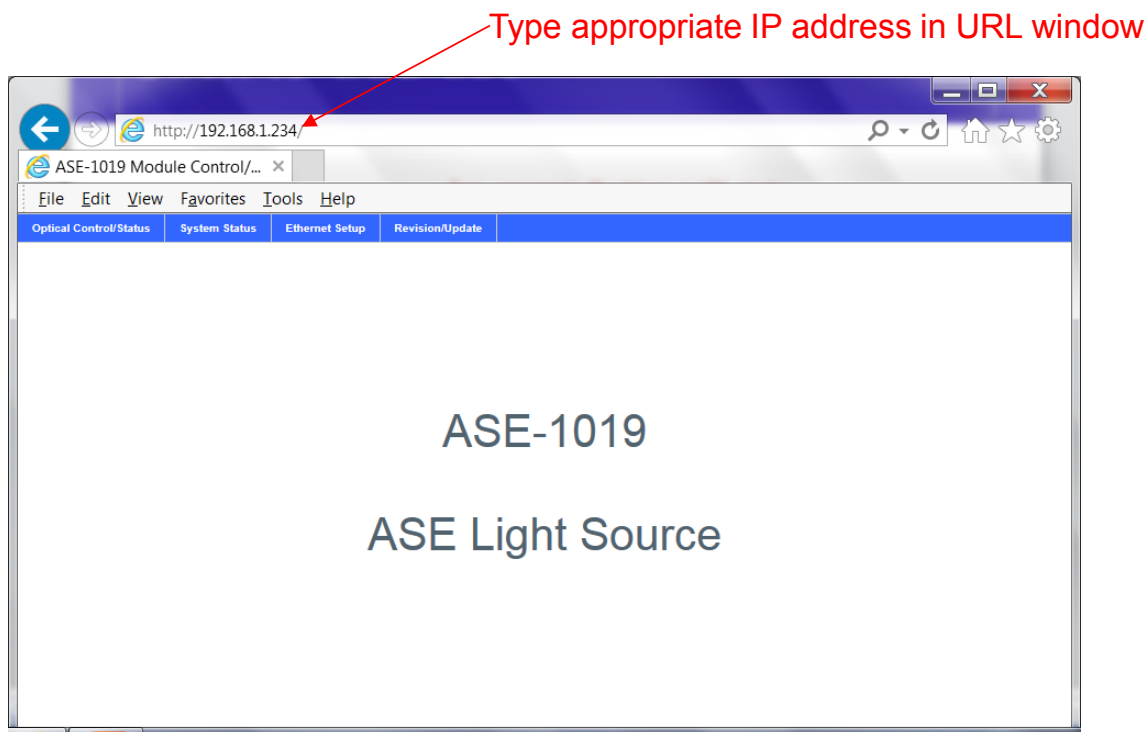


Figure 8.1.1-1 - Type Appropriate IP Address of Module to Access Home Page

Click on the **Optical Control/Status** area of the menu bar to access the page which shows all the real time status parameters and allows for control of optical functions. An example of the Optical Control and Status window is given in Figure 8.1.1-2.

Optical Control/Status	System Status	Ethernet Setup	Revision/Update																								
<p>Status</p> <table border="1"> <thead> <tr> <th>Status Parameter</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Bias Current (mA)</td> <td>497</td> </tr> <tr> <td>Bias Current Limit (mA)</td> <td>625</td> </tr> <tr> <td>Output Power</td> <td>19.62 dBm</td> </tr> <tr> <td>Temperature (°C)</td> <td>34.5</td> </tr> </tbody> </table> <p><input checked="" type="checkbox"/> Continuous Update</p> <table border="1"> <thead> <tr> <th>Control Function</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Desired Bias Current (mA)</td> <td><input type="text" value="498"/></td> </tr> <tr> <td>Desired Output Power (dBm)</td> <td><input type="text" value="19.3"/></td> </tr> <tr> <td>Auto Control Mode</td> <td>ACC ▼</td> </tr> <tr> <td>Amplifier Output</td> <td>Enabled ▼</td> </tr> <tr> <td>Optical Power Display</td> <td>dBm ▼</td> </tr> <tr> <td>Reset Fault Alarm</td> <td><input type="button" value="Reset"/></td> </tr> </tbody> </table>				Status Parameter	Status	Bias Current (mA)	497	Bias Current Limit (mA)	625	Output Power	19.62 dBm	Temperature (°C)	34.5	Control Function	Setting	Desired Bias Current (mA)	<input type="text" value="498"/>	Desired Output Power (dBm)	<input type="text" value="19.3"/>	Auto Control Mode	ACC ▼	Amplifier Output	Enabled ▼	Optical Power Display	dBm ▼	Reset Fault Alarm	<input type="button" value="Reset"/>
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Auto Control Mode	ACC ▼																										
Amplifier Output	Enabled ▼																										
Optical Power Display	dBm ▼																										
Reset Fault Alarm	<input type="button" value="Reset"/>																										

Figure 8.1.1-2 - Optical Control and Status Page

The key ASE-1019 module status parameters of bias current, maximum bias current limit, output power, and temperature are obtained from the module and displayed in prominently in the upper area of this window.

The total optical output power is monitored using a 1% tap to minimize insertion loss. The calculated value is displayed in its designated location and can be shown in either dBm or Watts based on the user's selection of Units. Figure 8.1.1-3 shows Watts being selected by the user and the appropriate output power level being displayed.

Optical Control/Status	System Status	Ethernet Setup	Revision/Update														
ASE-1019 Optical Control and Status																	
<table border="1"> <thead> <tr> <th>Status Parameter</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Bias Current (mA)</td> <td>427</td> </tr> <tr> <td>Bias Current Limit (mA)</td> <td>579</td> </tr> <tr> <td>Output Power</td> <td>63.0734618 mW</td> </tr> <tr> <td>Temperature (°C)</td> <td>39.0</td> </tr> </tbody> </table>		Status Parameter	Status	Bias Current (mA)	427	Bias Current Limit (mA)	579	Output Power	63.0734618 mW	Temperature (°C)	39.0	<p>Power is displayed in Watts</p>					
Status Parameter	Status																
Bias Current (mA)	427																
Bias Current Limit (mA)	579																
Output Power	63.0734618 mW																
Temperature (°C)	39.0																
<input checked="" type="checkbox"/> Continuous Update																	
<table border="1"> <thead> <tr> <th>Control Function</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Desired Bias Current (mA)</td> <td><input type="text" value="325"/></td> </tr> <tr> <td>Desired Output Power (dBm)</td> <td><input type="text" value="18.0"/></td> </tr> <tr> <td>Auto Control Mode</td> <td>APC</td> </tr> <tr> <td>Amplifier Output</td> <td>Enabled</td> </tr> <tr> <td>Optical Power Display</td> <td>Watts</td> </tr> <tr> <td>Reset Fault Alarm</td> <td><input type="button" value="Reset"/></td> </tr> </tbody> </table>		Control Function	Setting	Desired Bias Current (mA)	<input type="text" value="325"/>	Desired Output Power (dBm)	<input type="text" value="18.0"/>	Auto Control Mode	APC	Amplifier Output	Enabled	Optical Power Display	Watts	Reset Fault Alarm	<input type="button" value="Reset"/>	<p>User selects Watts</p>	
Control Function	Setting																
Desired Bias Current (mA)	<input type="text" value="325"/>																
Desired Output Power (dBm)	<input type="text" value="18.0"/>																
Auto Control Mode	APC																
Amplifier Output	Enabled																
Optical Power Display	Watts																
Reset Fault Alarm	<input type="button" value="Reset"/>																

Figure 8.1.1-3 – User Selects Watts to be Used for Displaying Output Power

If the output is disabled, the output power monitor will display -35 dBm. A temperature sensor is mounted on the PCB and its value in degrees Celsius is continuously updated on the display.

This amplifier module can operate in either Automatic Current Control (ACC) or Automatic Power Control (APC) mode as selected by the user from the appropriate dropdown menu. When ACC is selected, the user must enter the target bias current setting which ranges from 0 mA to the Bias Current Limit shown in the second row of status. Once the user types in the target bias current and presses Enter, the module is commanded to provide that specific bias current to the amplifier as shown in Figure 8.1.1-4. The internal amplifier has a bias current setting accuracy of $\pm 10\%$ so the bias current displayed in the first row of status can have a variation of up to $\pm 10\%$ compared to the user entered bias current setting.

Optical Control/Status	System Status	Ethernet Setup	Revision/Update														
Status																	
<table border="1"> <thead> <tr> <th>Status Parameter</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Bias Current (mA)</td> <td>473</td> </tr> <tr> <td>Bias Current Limit (mA)</td> <td>582</td> </tr> <tr> <td>Output Power</td> <td>19.37 dBm</td> </tr> <tr> <td>Temperature (°C)</td> <td>43.7</td> </tr> </tbody> </table>		Status Parameter	Status	Bias Current (mA)	473	Bias Current Limit (mA)	582	Output Power	19.37 dBm	Temperature (°C)	43.7	<p>User selects ACC from dropdown menu, enters desired bias current, 475 mA in this case, then presses Enter</p>					
Status Parameter	Status																
Bias Current (mA)	473																
Bias Current Limit (mA)	582																
Output Power	19.37 dBm																
Temperature (°C)	43.7																
<input checked="" type="checkbox"/> Continuous Update																	
<table border="1"> <thead> <tr> <th>Control Function</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Desired Bias Current (mA)</td> <td><input type="text" value="475"/></td> </tr> <tr> <td>Desired Output Power (dBm)</td> <td><input type="text" value="19.3"/></td> </tr> <tr> <td>Auto Control Mode</td> <td>ACC</td> </tr> <tr> <td>Amplifier Output</td> <td>Enabled</td> </tr> <tr> <td>Optical Power Display</td> <td>dBm</td> </tr> <tr> <td>Reset Fault Alarm</td> <td><input type="button" value="Reset"/></td> </tr> </tbody> </table>		Control Function	Setting	Desired Bias Current (mA)	<input type="text" value="475"/>	Desired Output Power (dBm)	<input type="text" value="19.3"/>	Auto Control Mode	ACC	Amplifier Output	Enabled	Optical Power Display	dBm	Reset Fault Alarm	<input type="button" value="Reset"/>		
Control Function	Setting																
Desired Bias Current (mA)	<input type="text" value="475"/>																
Desired Output Power (dBm)	<input type="text" value="19.3"/>																
Auto Control Mode	ACC																
Amplifier Output	Enabled																
Optical Power Display	dBm																
Reset Fault Alarm	<input type="button" value="Reset"/>																

Figure 8.1.1-4 - ACC Mode with a User Entered Setting of 475 mA for the Bias Current

When APC mode is selected the user must enter the target output power setting in units of dBm. An example of APC mode is shown in Figure 8.1.1-5, in this case the user has entered a target output power of +18.0 dBm in the second row of control functions.

Optical Control/Status	System Status	Ethernet Setup	Revision/Update
ASE-1019 Optical Control and Status			
Status Parameter		Status	
Bias Current (mA)		426	
Bias Current Limit (mA)		579	
Output Power		17.99 dBm	
Temperature (°C)		39.2	
<input checked="" type="checkbox"/> Continuous Update			
Control Function		Setting	
Desired Bias Current (mA)		325	
Desired Output Power (dBm)		18.0	
Auto Control Mode		APC	
Amplifier Output		Enabled	
Optical Power Display		dBm	
Reset Fault Alarm		Reset	

User selects APC from dropdown menu, enters desired output power, 18.0 dBm in this case, then presses Enter

Figure 8.1.1-5 - APC Mode with a User Entered Setting of +18.0 dBm for the Output Power

The user can manually Enable or Disable the amplifier output with the dropdown menu in the fourth row of the control functions as shown in Figure 8.1.1-6. Whenever the user selects Disable, the amplifier output will be turned off and the Bias Current status will display 0 mA as given in the figure.

Optical Control/Status	System Status	Ethernet Setup	Revision/Update
ASE-1019 Optical Control and Status			
Status Parameter		Status	
Bias Current (mA)		0	
Bias Current Limit (mA)		579	
Output Power		-35.00 dBm	
Temperature (°C)		39.5	
<input checked="" type="checkbox"/> Continuous Update			
Control Function		Setting	
Desired Bias Current (mA)		325	
Desired Output Power (dBm)		18.0	
Auto Control Mode		APC	
Amplifier Output		Disabled	
Optical Power Display		dBm	
Reset Fault Alarm		Reset	

User chooses to turn off the amplifier output by selecting Disabled from the control dropdown menu

Figure 8.1.1-6 - Amplifier Output Disabled by the User

The default configuration of the status display is to continuously update all status so the Continuous Update box is checked by default, see Figure 8.1.1-7. The user can select to uncheck

that box which will halt the updates such that the browser page must be refreshed in order to get an update. Under most conditions, the Continuous Update box should remain checked.

Optical Control/Status System Status Ethernet Setup Revision/Update

ASE-1019 Optical Control and Status

Status Parameter	Status
Bias Current (mA)	426
Bias Current Limit (mA)	579
Output Power	17.99 dBm
Temperature (°C)	39.5

☒ Continuous Update

Control Function	Setting
Desired Bias Current (mA)	325
Desired Output Power (dBm)	18.0
Auto Control Mode	APC
Amplifier Output	Enabled
Optical Power Display	dBm
Reset Fault Alarm	Reset

Continuous Update box should remain checked in most cases

Figure 8.1.1-7 - Continuous Update Box Should Remain Checked Under Most Conditions

8.2 System Status

Clicking on the **System Status** area of the menu bar provides specific module information such as the part number, model number, and serial number, see Figure 8.2-1. Additionally, a Module Fault Status indication is shown. The Module Fault Status indication is shown in this window as well as in the LED located on the top side of the module. The Module Fault Status is a logical OR of several alarms which are laser bias current exceeds the maximum current limit, laser pump temperature out of valid operating range, laser driver current limit reached, and laser driver junction temperature limit reached. If any of these conditions occur, the Module Fault Status indication will alarm (Red). These four conditions indicate a problem with the laser and will cause an automatic laser shutdown (ALS). To clear an ALS condition, the user must click the Reset Fault button which is located on the bottom row of the Control Functions as shown in Figure 8.2-2. If the fault condition will not clear, please contact us (TPC) since a hardware failure may have occurred.

Optical Control/Status System Status Ethernet Setup Revision/Update

ASE-1019 System Status

Parameter	Value
Module Fault Status	OK
Model Number	ASE-1019-NCE-NU
Part Number	3013400-103
Serial Number	0001

☒ Continuous Update

Figure 8.2-1 - System Status Information

Optical Control/Status	System Status	Ethernet Setup	Revision/Update
ASE-1019 Optical Control and Status			
Status Parameter		Status	
Bias Current (mA)		426	
Bias Current Limit (mA)		579	
Output Power		18.03 dBm	
Temperature (°C)		39.6	
<input checked="" type="checkbox"/> Continuous Update			
Control Function		Setting	
Desired Bias Current (mA)		<input type="text" value="325"/>	
Desired Output Power (dBm)		<input type="text" value="18.0"/>	
Auto Control Mode		APC	
Amplifier Output		Enabled	
Optical Power Display		dBm	
Reset Fault Alarm		<input type="button" value="Reset"/>	

Click the Reset button if an Auto Laser Shutdown failure occurs

Figure 8.2-2 - Click to Reset the Automatic Laser Shutdown Condition

8.3 Ethernet Setup

The **Ethernet Setup** menu allows the user to issue a software reboot command to the internal microcontroller and to adjust all Ethernet settings as shown in Figure 8.3-1. The software reboot/reset command should not be necessary unless, as a last resort, the user believes the module cannot recover to normal operation. It should be noted that Figure 8.3-1 shows the factory default setup configuration for the Ethernet port. Also, if the recessed button on the bottom side of the module is pressed, the Ethernet mode and IP address will be reset to this default configuration.

Optical Control/Status	System Status	Ethernet Setup	Revision/Update
ASE-1019 Ethernet Setup			
Function		Setting	
Software Reset		<input type="button" value="Reboot"/>	
Ethernet Mode		Static	
IP Address		192.168.1.234	
IP Subnet		255.255.255.0	
IP Gateway		192.168.1.1	
Apply Ethernet Settings		<input type="button" value="Apply Settings"/>	

Figure 8.3-1 - Ethernet Setup Controls with Factory Default IP Address

The Ethernet Mode can be set to Static or Dynamic (DHCP) depending on how the user wants to configure the module for Ethernet communication. If the user is connecting directly to a local, standalone computer, a Static IP address should be used. Similarly, if the user wants to assign a specific IP address, subnet mask, and gateway for connection to an Ethernet Router, the Static configuration must be used. The Dynamic (DHCP) IP addressing mode is used when it is sufficient to allow the Router to assign the IP address. It is important to note that after each of the items (Ethernet Mode, IP Address, IP Subnet, IP Gateway) have been modified, the user must click Apply

Settings for the changes to take effect. Table 8.3-1 provides summary details for each of the entries.

Table 8.3-1 - Ethernet Configuration Description of Parameters

Parameter	Description	Valid Range
Ethernet Mode	Selects whether the Ethernet port is configured as a Static IP address or a Dynamic IP address. This command must be selected after the desired IP Address, IP Subnet, and IP Gateway have been entered. Once the user clicks "Apply Changes" the Ethernet configuration is immediately changed using the newly entered IP Address, IP Subnet, and IP Gateway.	Static, Dynamic (DHCP)
IP Address	If the Ethernet port is configured as a Static address, this field is used to enter the full IP Address. If Dynamic is selected, this field is not used.	xxx.xxx.xxx.xxx
IP Subnet	If the Ethernet port is configured as a Static address, this field is used to enter the full IP Subnet. If Dynamic is selected, this field is not used.	xxx.xxx.xxx.xxx
IP Gateway	If the Ethernet port is configured as a Static address, this field is used to enter the full IP Gateway. If Dynamic is selected, this field is not used.	xxx.xxx.xxx.xxx

8.4 Revision/Update

The Revision/Update menu, shown in Figure 8.4-1, allows the user to view the internal microcontroller's firmware revision and also provides the capability to download new firmware when desired. Any new firmware updates must be initiated by first choosing the file, provided by TPC, from the computer then clicking Update to start the file transfer. The download and update process will take approximately 1 minute after which the user can verify the new firmware is running by reading the Firmware Revision which should now be updated to match the newly downloaded version.

The screenshot shows a web interface for firmware management. At the top, there's a navigation bar with four tabs: 'Optical Control/Status', 'System Status', 'Ethernet Setup', and 'Revision/Update'. The 'Revision/Update' tab is active. Below the navigation bar, the page title is 'ASE-1019 Firmware Revision and Update'. The main content area is divided into two sections. The first section, 'Firmware Revision', has a blue header and displays 'Firmware Revision' with the value '3.732'. The second section, 'Firmware Update', also has a blue header and contains the instruction 'Select file, then press "Update" button below'. This section includes a 'Module' label, an 'Update' button, and a 'Browse...' button for file selection.

Figure 8.4-1 - Firmware Revision/Update Page, Browse to a File and Click Update to Begin Downloading New Firmware

When updating the Firmware Revision, once the download has completed the user must click a confirmation window to perform a software reset of the module. After the confirmation has been clicked, the user must close the browser window by clicking the "X" in the upper right hand corner of the browser, wait 30 seconds for the chassis to reboot, then open a new browser window to restart communications.

If an error occurs during the download process, the user will be notified with a Failed indication. The user must then execute the same Firmware download procedure again to correct the failure.

9.0 Optical and Electrical Specifications

Table 9.0-1 – ASE Light Source Specifications

Parameter	Minimum	Typical	Maximum
Wavelength Range	1528 nm		1564 nm
Total Output Power	18.2 dBm	19 dBm	
Spectral Width at 5.5 dB	36 nm		
Spectral Width at 20 dB		50 nm	
Output Return Loss	35 dB		
Output Optical Isolation	40 dB		
Power Stability after 60 minute warm-up	-0.1 dB		+0.1 dB

The ASE-1019 output spectrum shown below, with no gain flattening filter, shows the module's typical output power curve at 25°C over the entire wavelength range. A gain flattening filter can be added to this module so please contact TPC if gain flattening is required.

Table 9.0-2 – Typical Output Spectrum at 25°C Over Entire Wavelength Range

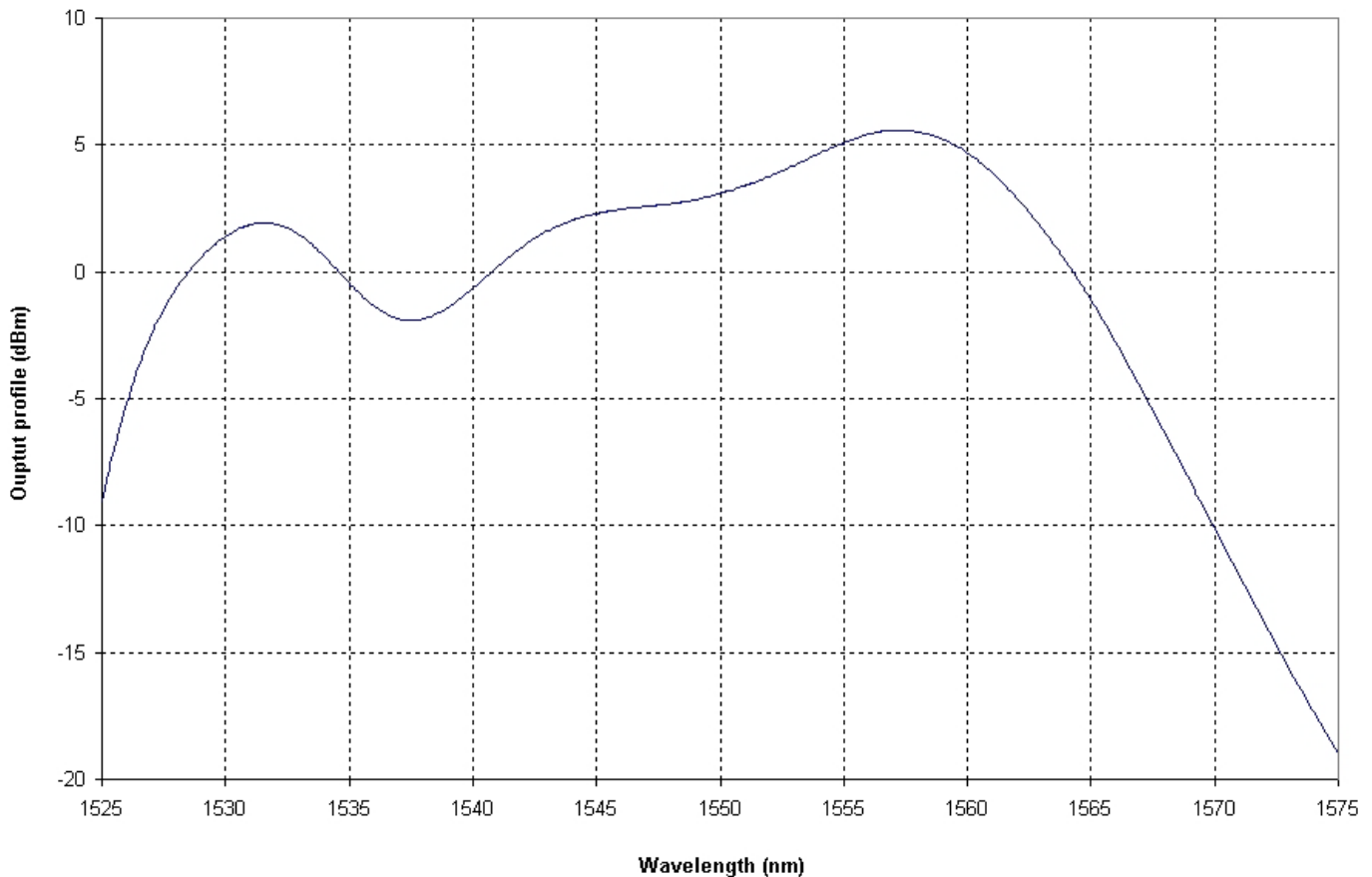


Table 9.0-3 - Optical Power Meter Specifications

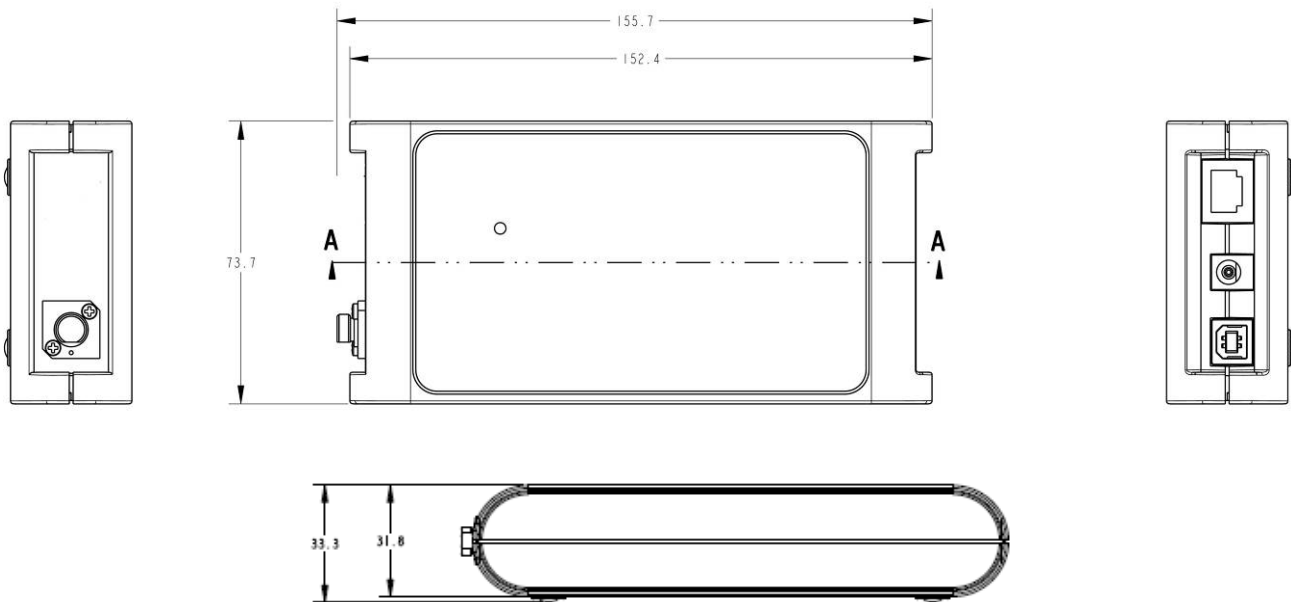
Parameter	Minimum	Typical	Maximum
Optical Output Dynamic Measurement Range	+5 dBm		+25 dBm
Resolution	±0.01 dB		
Relative Accuracy/Linearity	±0.1 dB		
Absolute Accuracy	±1.0 dB		

Table 9.0-4 - Electrical, Mechanical, and Environmental Specifications

Parameter	Minimum	Typical	Maximum
Power Supply Voltage		+5V	
Power Supply Interface		AC/DC Adapter	
Operating Current		740 mA	800 mA
Ethernet Communications Interface ¹		10/100BaseT	
USB Communications Interface		USB 2.0	
Ethernet User Interface (ex. Chrome, Firefox, IE)		HTML Browser	
USB User Platform		Windows GUI	
Optical Connector (others available)		FC/PC	
Operating Temperature Range	0 °C		40 °C
Storage Temperature Range	-40 °C		85 °C
Dimensions		6" x 2.5" x 1.25"	

Note 1: The software Interface Control Document can be provided so a custom control/status interface can be developed if desired

10.0 Mechanical Dimensions

**Figure 10.0-1 - ASE-1019 Module Mechanical Dimensions**

11.0 Part Numbers for Ordering

Description	Part Number
ASE-1019 ASE Light Source	ASE-1019-□□□-□□
Includes Gain Flattening Filter: G , No Gain Flattening Filter: N	_____
C band: C	_____
USB and Ethernet control/status interface: E	_____
Data logging: D , No Data logging: N	_____
FC/UPC: U , FC/APC: A	_____

Ordering Information:



800 Village Walk #316
Guilford, CT 06437
Ph: 203-401-8093

Email orders to: sales@xsoptix.com
Fax orders to: 800-878-7282