



Getting started with the PRZM RFoF Set

The PRZM T1 & R1 modules can be controlled and configured using the RFoF configuration software. It is designed to work on PC/Laptops having Windows 7, 8 or 10 operating system versions. The RFoF software does not operate on previous operating system versions such as Windows XP.

Power requirements for the T1/R1 modules

T1 & R1 Chassis Connector: XLR4 (M)

Power Adapter Connector: XLR4 (F) *Pin1 (-) / Pin4 (+)*

Included Power Adapter: 110/220VAC to 5VDC converter

The RFoF modules require an AC/DC Power converter: 110/220VAC to 5VDC converter rated at 3W or higher. The modules are designed to operate from any regulated DC power supply with voltage between 4.5VDC and 12VDC.

Connecting Coax and Fiber Cables

The T1 & R1 feature 50ohm BNC connectors and ST/UPC fiber connectors.

For use as a wireless mic *receive antenna* link: The T1 is placed close to the antenna location and connected to the antenna with a 50ohm coax cable. The R1 is placed near the microphone receiver or RF distribution unit. The T1 and R1 are connected with single mode ST-ST simplex fiber cable.

For use as a wireless IEM/IFB *transmit antenna* link: The R1 is placed close to the antenna location and connected to the antenna with a 50ohm coax cable. The T1 is placed near the IEM/IFB transmitter base. The T1 and R1 are connected with single mode ST-ST simplex fiber cable. Attenuation must be applied to the T1 in the configuration software. Once the signal is converted back to RF at the R1, the signal will need to be reamplified with a transmit line amp (sold separately).

- *Do not connect a signal over 20dBm to the input of the T1. External BNC attenuators might also be required for use with high power transmitters (such as Lectrosonics T4).*
- *Do not exceed 2 RF carriers per RFoF link.*

USB control interface of the T1/R1 modules

The configuration software must be opened first, then connect the USB to the T1 or R1 module(s). The connection to PC/Laptop requires a Micro USB cable (included). Please make sure that the Micro USB plug is mechanically stable in the RFoF Micro USB socket. Multiple modules can be connected at the same time.

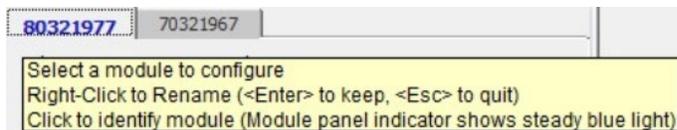
Panel LED indicators of the T1/R1 modules

Normal Factory configured LED status indications for powered RFoF modules are:

- If the optical fiber is disconnected, the panel LED of the Tx is Green and the panel LED of the Rx is Red.
- If the optical fiber is connected between Tx and Rx units, the panel LEDs of both Tx and Rx are Green.

RFoF Configuration Tool Screen

The elements of the App window are highlighted below for a Transmitter module. Receiver modules display a subset of these elements. The App features on screen tips which display when the pointer hovers over any of the controls for a few seconds. The following sample shows the tip for the module Name Tab header which is discussed below.



Control and information elements

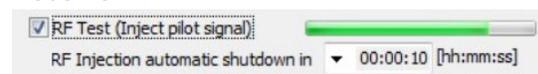
- **Module Name Tab header** - The module name is set to the serial number of the module by default. An Asterisk is appended to the module name whenever there is an unsaved (As default) modification to the module settings.
 - A module can be renamed by right-clicking on the name field. A new name (32 characters maximum) can be saved by pressing the [Enter] key. Alternately use the [Esc] key to leave the name unchanged.
 - A modified name is only used for the current session of the App. Use the 'Set as Default' to preserve the name for future sessions.
 - Click on the module name field to make the panel LED indicator of the module show steady blue light for a couple of seconds to positively identify the active module with which the RFoF configuration App is communicating. When several modules are connected by USB, the application will display each module in a separate tab with the active module showing a light background while other tabs are grayed out. Click on one of the gray tabs to select a different active module.

- **Module information, Module Type** - These lines show the module type (Transmitter or Receiver), part number (P/N), module Serial number (S/N) and Revision.
- **LNA On** - The checkbox option is only available for Transmitter modules. When active it adds an LNA gain block at the input of the module. The gain of the LNA is fixed. The additional gain improves the noise performance of the module at the expense of the maximum signal level.
- **Attenuation** - The Attenuation value can be adjusted between 0dB and 31.5dB using the up/down arrows. The attenuator is placed after the LNA and before the Laser driver. Use this adjustment to equalize the link gain among several links or set the performance preference of noise versus the maximum signal.
- **Optical power** - Sensor reading of the output optical power in a Transmitter module or the input optical power of a Receiver module. Note that the Optical power is affected by the RF signal and may vary considerably when the RF signal power is high.
- **Self-test** - Button that activates the BIT capability of the module. This test is automatically done on module power up and when a module USB port is connected. The result of the test is displayed in the Status line and by an Icon next to the button.
- **Reset / disconnect** - Button that causes the module to reset to its default power on configuration. It is equivalent to cycling the DC power supply to the module (turning the power Off and back On). This is particularly useful when the module power line is inaccessible. A warning message will be displayed if any changes were made and were not saved to make sure that they are not lost with the Reset operation.
- **Set as Default** - Button that stores the current configuration settings as the Power On default state of the module.
- **Restore Factory Setup** - Button that restores the module settings to the factory configuration. All user modifications are overwritten. The updated setup will remain in effect as long as the module is powered and is not Reset. To preserve the factory settings as the power on defaults use the 'Set as Default' button.
- **Show RF level** - When selected this option activates an RF power sensor that is integrated at the output of the module. The App displays the measured signal RF power and refreshes it once a second while connected by USB and monitored with the RFoF configuration App. The RF power is also displayed automatically if the RF Link Test option is activated.
- **RF Link Test (T1 Transmitter) or RF Test (R1 Receiver)** - When selected this option activates an RF pilot signal injection into the input of the module and enables an RF power sensor that is integrated at the output of the module. Together these two provide an indication for the signal pass-through within the module. While the test signal is active the color of the panel indicator LED will change to Cyan to indicate that RF signal is being injected.

Transmitter:



Receiver:



When a link consisting of a transmit module, fiber cable, and receive module is connected and the 'RF Link Test' option is activated at the transmit module, it is possible to use the 'Show RF Level' option at the receive module to verify the signal pass-through through the entire RFoF link. The power of the RF signal that is injected at the input of the transmitter will register at the output of the transmitter and at the output of the receiver of that link.

The 'RF Link Test' pilot injection is limited to a selectable time interval. The RF pilot signal is automatically discontinued after the selected interval. This automatic shutdown insures that the pilot test signal would not remain active inadvertently which could interfere with desired signals. The RF pilot signal may be stopped at any time by clicking off the 'RF Link Test' option. The RF pilot interval is controlled by the module and is independent from the software App. Therefore, the RF pilot injection will proceed for the prescribed time even if the module is disconnected from the software App.

- **RF injection automatic shutdown** - This selection box defines the time interval for the RF pilot injection. The RF signal is discontinued after the expiration of the selected interval. Interval selections are offered from few seconds up to 6 hours. An associated indicator shows the remaining interval while the RFoF configuration App is attached to the module.
- **Status line** -The status line displays messages concerning the App state and module
- **Status LED** -Shows the state of the modules panel LED during normal operation. The LED is Green when all is ok, Steady blue for module identification and blinking blue during firmware update. It blinks in red when there is a loss of optical power.
- **Reset / Disconnect button** -Resets the module. This is a software equivalent to power cycling of the module. The module reverts to its default settings.
- **Attenuation** -Sets the 0-31.5dB attenuator of the module. Note that a minimum of 2dB is recommended to allow the module some positive gain correction based on the operating temperature in the 'Active control' mode.
- **Set as Default button** -Saves the module settings as the Defaults. Saved defaults will be restored if the module is Reset or power to the module is cycled.
- **Restore Factory Setup**-Restore the factory configuration parameters of the module.
- **Quit / Exit button** -Quits the configuration App. Any changes made for each module and were not saved will remain in effect until the DC power of the module is recycled.

RFoF Configuration Tool window

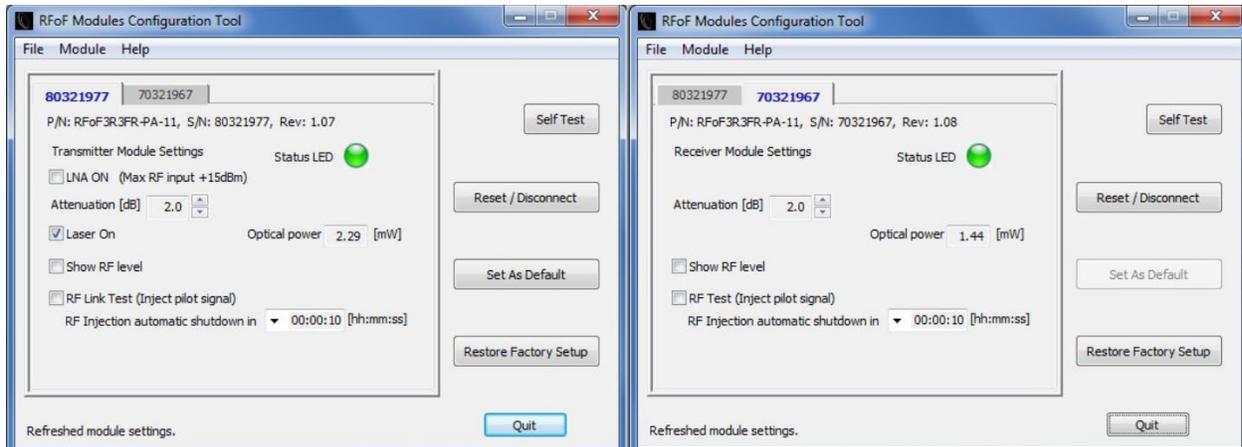
Module identification

The App window displays properties of RFoF modules which are powered up and attached by USB cable. The App automatically identifies the type and identity of the module including: Type Transmitter or Receiver, Serial number, Part number and Production data. When a module is connected to a host (PC, tablet or Laptop) the panel indicator flashes blue to indicate that a USB connection was made. Note that a special driver is not required for this application. When a Host identifies the RFoF module it will automatically activate a stock Plug-and-Play Operating System driver.

Module data

The App reads the current configuration parameter values of the module as well as the operational conditions. These parameters are displayed in a Tab for each connected module. Module operating parameters and attenuation settings. Additionally, for Transmitter modules the Laser state (On/Off), and LNA state are shown. Module operating conditions include the optical power level and optionally the RF level and RF test signal status.

Screenshots of the App for Transmitter and Receiver modules:



Built-In-Test diagnostics

Diagnostic features can be activated by the Self-test button that activates the BIT capability of the module. It reads the current state of the module and verifies that the module is operating within specifications. The test is initiated, and results are reported for the selected module.

RF signal diagnostics

The Show RF level and RF Test options provide RF signal level diagnostics. They respectively activate features that can measure the output RF signal of the module and can Inject RF pilot signal at the input of the module. Together these two features enable module level signal pass through verification as well as overall RFoF Link signal pass through verification when the RF pilot is injected into the transmitter module and measured at the receiver module of the same link. When RF pilot signal is active it is normal to notice a change in Optical power reported by the App. This is true also if strong RF signal levels are present at the input of the transmitter module.

The RF Link test is limited to a user selected time interval after which it is discontinued automatically. This automatic shutdown insures that the pilot test signal would not remain active inadvertently which could interfere with desired signals. By clicking Off the RF Link Test option the RF pilot signal injection may be discontinued immediately. The interval of RF pilot

signal injection is controlled by the RFoF module. Therefore, the countdown will not be affected by a disconnection of the USB cable or by quitting the App.

Setup

Buttons on the right enable the redefinition of the Power On default state of the module and can restore the module setup to the factory settings. A Reset/Disconnect button provides a software equivalent to power cycling the module for those cases where the module power plug is inaccessible.

Troubleshooting T1/R1 modules and RFoF control software

Module(s) fail to register in the RFoF control software

When powered RFoF modules are connected to a host PC/Laptop and the RFoF configuration software tool is running, the modules would be automatically detected and added in separate tabs to the software. If a module is not automatically identified by the software or if the "**RFoF module is not connected. Check USB and Power connections**" notice is displayed on the bottom (status line) of the software window the problem may be easily corrected by following a simple set of troubleshooting steps. In most cases the failure to register is caused by one or more of these reasons:

- Power is not connected to the RFoF module.
- USB to Micro USB cable is damaged or not connected firmly to the RFoF module.
- RFoF configuration Software is not running or not running properly due to an incompatible operating system such as Windows XP.
- Generic HID driver problem or USB hub problem.
- RFoF module failure.

Troubleshooting steps

RFoF Config software must be opened first, then connect module(s) with USB cable.

1. Connect the RFoF module to the power, and verify that the module is powered:
 - If the LED on the RFoF panel is 'On' (any color), then the module is getting power.
 - If LED is not lit, then check for a problem with the DC power supply or its connection to the module.

In all the following tests it is assumed that the RFoF module is powered and LED is 'On' and the PC software is running.

2. Connect each of the T1 and R1 modules one at a time with the same USB cable.

- If you do not receive the Notice (i.e. **"RFoF module is not connected. Check USB and Power connections"**) for either T1 or R1 module than the issue was caused by bad USB cable or USB connection and is now resolved.
- If the Notice is received with only one module the problem might be in that module.
- If the Notice is received with both RFoF modules, go to Step #3.

3. Change the Micro USB/USB cable, and re-check both T1 and R1 modules - this clarifies if a problem exists on the PC, or the module/USB cable:

- If the Notice disappears and Software recognizes all the connected modules, then the issue is resolved, and the former USB cable was bad.
- If the Notice is still received, then go to Step #4.

4. While software is running on PC and the USB cable is connected between the RFoF module and PC – disconnect power to the module and reconnect power after 10 seconds. That should allow the computer to “forget” the RFoF module, so when it reconnects the RFoF module should re-register in the software.

- If the Notice disappears and Software is registered, then the issue is resolved.
- If the Notice is still received, then USB cable may be the problem, or PC USB HID driver may be problematic- see Step #5.

5. Check the HID driver which provides the USB interface on the PC: Disconnect the USB cable from the RFoF module. Open Computer->Properties->Device Manager and look at the list of Human Interface Devices (HID), remember the number of USB items in the list. Now reconnect the USB cable, verify that a new HID device was added to the list of HID devices.

- If a new device was added, then the HID driver of the computer is good, and the problem lies with the software or the module. The problem can be traced further by examining the HID device properties and by using the RFoF Logfile trace (contact RFOptic for more information).
- If device was not added, then the problem lies in the USB communication with the computer USB driver. You may want to try to use the RFoF PC software on a different computer