Fiber to the Premises (FTTP) Single Wire Return Device (SWRD) Installation Instructions

Overview

Introduction

In certain deployed Fiber to the Premises (FTTP) markets, Cisco has used an Ethernet network in the home to send bi-directional traffic to and from an Ethernet enabled Digital Home Communications Terminal (DHCT). This allows the DHCT to send and receive Internet Protocol (IP) data over the Ethernet, and run in two-way communication mode, but requires an additional cable for each DHCT.

The FTTP Single Wire Return Device (SWRD) is used for those markets requiring a single wire solution. The SWRD is a stand-alone data conversion device that has two 10/100 Ethernet ports and two RF ports, and is powered from the Optical Network Terminal (ONT) via an Ethernet cable or by an external power supply connected via an RF cable. This product has immediate application for FTTP customers and reduces the amount of special cabling required inside the home or business.

Purpose

This document provides operating and installation instructions for the SWRD. The document also describes the device's features and functions.

Audience

This document is intended for FTTP cable installers and field service technicians installing the SWRD.

Related Publications

Refer to the following publication for more information. You should familiarize yourself with this publication to help you implement the FTTP SWRD.

- ONT Manufacturer's Installation Manual

Document Version

Revision	Description
A	First release of the SWRD with RF port powering only.
B	Second release added Power-over-Data (POD) capability with Ethernet port powering.

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Important Rules for Safe Operation

Read and Retain Instructions

Carefully read all safety and operating instructions before operating this equipment, and retain them for future reference.

Follow Instructions and Heed Warnings

Follow all operating and use instructions. Pay attention to all warnings and cautions in the operating instructions, as well as those that are affixed to this equipment.

Explanation of Warning and Caution Icons

Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions.

The following warning and caution icons alert you to important information about the safe operation of this product:

You may find this symbol in the document that accompanies this product. This symbol indicates important operating or maintenance instructions.

You may find this symbol affixed to the product. This symbol indicates a live terminal where a dangerous voltage may be present; the tip of the flash points to the terminal device.

You may find this symbol affixed to the product. This symbol indicates a protective ground terminal.

You may find this symbol affixed to the product. This symbol indicates a chassis terminal (normally used for equipotential bonding).

You may find this symbol affixed to the product. This symbol warns of a potentially hot surface.

You may find this symbol affixed to the product and in this document. This symbol indicates an infrared laser that transmits intensity-modulated light and emits invisible laser radiation or an LED that transmits intensity-modulated light.

Terminology

The terms defined below are used in this document. The definitions given are based on those found in safety standards.

Service Personnel – The term *service personnel* applies to trained and qualified individuals who are allowed to install, replace, or service electrical equipment. The service personnel are expected to use their experience and technical skills to avoid possible injury to themselves and others due to hazards that exist in service and restricted access areas.

User and Operator – The terms *user* and *operator* apply to persons other than service personnel.

Ground(ing) and Earth(ing) - The terms *ground(ing)* and *earth(ing)* are synonymous. This document uses ground(ing) for clarity, but it can be interpreted as having the same meaning as earth(ing).

Electric Shock Hazard

Because of the potential for higher humidity, the presence of moisture, the proximity to ground potential and the possibility that hazardous voltages may be present on network connected cables, there is a greater risk of electric shock when working with electronic equipment in the outdoor environment.

To minimize the likelihood and effect of electric shock, follow the instructions in this warning and the precautions below.

⚠ WARNING!

To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. Refer all servicing to qualified service personnel only.

- Do not work in rain, fog or snow conditions
- Ensure equipment and cables are dry
- Wear shoes with soles made of insulated material e.g. rubber, vinyl, etc.
- When making electrical connections, work with one hand in your pocket and avoid accidental contact with grounded surfaces
- Use insulated tools to make electrical connections
- Make all other connections before connecting power to the equipment

Installation

This equipment should be installed by qualified service personnel and should comply with national and local requirements.

Note to the Installer

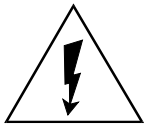
Note to CATV System Installer

This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC (Section 54, Part I of the Canadian Electrical Code), that provides guidelines for proper grounding and, in particular, specifies that the CATV cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

CAUTION: To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNING

TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.



This symbol is intended to alert you that uninsulated voltage within this product may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this product.

This symbol is intended to alert you of the presence of important operating and maintenance (servicing) instructions in the literature accompanying this product.

Equipment Placement

⚠ WARNING:

Avoid personal injury and damage to this equipment. An unstable mounting surface may cause this equipment to fall.

To protect against equipment damage or injury to personnel, comply with the following:

- Place this equipment close enough to a mains AC outlet to accommodate the length of this equipment's power cord.
- Route all power cords so that people cannot walk on, place objects on, or lean objects against them. This may pinch or damage the power cords. Pay particular attention to power cords at plugs, outlets, and the points where the power cords exit this equipment.
- Make sure the mounting surface or rack is stable and can support the size and weight of this equipment.

Outdoor Equipment Placement

Cisco equipment intended for outdoor installation is designed to be water-resistant, not water-proof. To protect against equipment damage or injury to personnel, install outdoor equipment so that it is:

- Protected from rain or accumulations of snow as much as possible
- Not subject to direct water jets from sprinkler systems or garden hoses
- Not subject to flooding
- Positioned with cable connectors on the underside to minimize water entry by gravity

Outdoor Equipment Cabling

> ⚠ **WARNING:**
> **Special requirements apply to outdoor cabling for the protection of people and property. Ensure outdoor cable installations comply with National Codes, Regulations or Standards applicable to the installation site**

To protect outdoor equipment cables, comply with the following:

- Units installed outdoors shall be installed with cables that are suitably rated and listed for outdoor use
- Protect cables from chaffing and sharp edges when routing them through building walls or around corners
- Provide adequate support for cables to prevent strain or sagging
- Provide a low loop in the cable close to its connection point to the equipment to minimize water ingress and to provide strain relief for the connector
- Seal outdoor cable/connector joints against moisture ingress using silicone caulk or outdoor sealing tape.
- Separate outdoor cabling from power cables and lightning conductors

Ventilation

> ⚠ **WARNING:**
> **Avoid electric shock and fire hazard! Never push objects through the openings in this equipment. Foreign objects can touch dangerous voltage points or cause electrical shorts that can result in electric shock or fire.**

This equipment may have openings for ventilation that protect it from overheating. To ensure the reliability of this equipment, do not obstruct the openings

- Do not place other equipment, lamps, books, or other objects on top of this equipment.

- Do not place this equipment in any of the following locations.
  - On a bed, sofa, rug, or similar surface
  - Over a radiator or a heat register
  - In an enclosure, such as a bookcase or equipment rack, unless the installation provides proper ventilation

Handling Precautions

When moving a cart that contains this equipment, check for any of the following possible hazards:

⚠ WARNING: **Avoid personal injury and damage to this equipment! Move any equipment and cart combination with care. Quick stops, excessive force, and uneven surfaces may cause this equipment and cart to overturn.**

Cleaning the Equipment

Before cleaning this equipment, unplug it from the electrical outlet. Use a damp cloth to clean this equipment. Do not use a liquid cleaner or an aerosol cleaner. Do not use a magnetic/static cleaning device (dust remover) to clean this equipment.

Object and Liquid Entry

Never push objects of any kind into this equipment through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Do not expose this equipment to liquid or moisture. Do not place this equipment on a wet surface. Do not spill liquids on or near this equipment.

Overloading

Do not overload electrical outlets, extension cords, or integral convenience receptacles, as this can result in a risk of fire or electric shock. For equipment that requires battery power or other sources to operate, refer to the operating instructions for that equipment.

Lightning and Power Surges

To protect this equipment against damage from lightning storms and power-line surges, do the following:

- Disconnect the power cord from the grounded mains electrical outlet and disconnect the antenna or cable system under the following circumstances.
  - During lightning storms, or
  - When you are not using this equipment for an extended period
- Ground your antenna system to provide some protection against voltage surges and built-up static charge.

Power Sources

> ⚠ **WARNING:**
>
> **Avoid electric shock and fire hazard! Do not overload electrical outlet and extension cords. For equipment that requires battery power or other sources to operate, refer to the operating instructions for that equipment.**

- A label on this equipment indicates the correct power source for this equipment. Operate this equipment only from an electrical outlet with the voltage and frequency indicated on the equipment label.
- If this equipment plugs into an outlet, the outlet must be near this equipment, and must be easily accessible.
- This equipment may have two power sources. Be sure to disconnect all power sources before working on this equipment.
- If this equipment **does not** have a main power switch, the power cord connector serves as the disconnect device.
- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Unplug this equipment if it will be unused for long periods of time.
- If you are uncertain of the type of power supply to your home or business, consult your local power company.

Grounding

This section provides instructions for verifying that the equipment is properly grounded.

Safety Plugs (USA Only)

This equipment is equipped with either a 3-terminal (grounding-type) safety plug or a 2-terminal (polarized) safety plug. The wide blade or the third terminal is provided for safety. Do not defeat the safety purpose of the grounding-type or polarized safety plug.

To properly ground this equipment, follow these safety guidelines:

- **Grounding-Type Plug** - For a 3-terminal plug (one terminal on this plug is a protective grounding pin), insert the plug into a grounded mains, 3-terminal outlet.

  Note: This plug fits only one way. If this plug cannot be fully inserted into the outlet, contact an electrician to replace the obsolete 3-terminal outlet.

- **Polarized Plug** - For a 2-terminal plug (a polarized plug with one wide blade and one narrow blade), insert the plug into a polarized mains, 2-terminal outlet in which one socket is wider than the other.

  Note: If this plug cannot be fully inserted into the outlet, try reversing the plug. If the plug still fails to fit, contact an electrician to replace the obsolete 2-terminal outlet.

Grounding Terminal

If this equipment is equipped with an external grounding terminal, attach one end of an 18-gauge wire (or larger) to the grounding terminal; then, attach the other end of the wire to a ground, such as a grounded equipment rack.

Safety Plugs (European Union)

- **Class I Mains Powered Equipment –** Provided with a 3-terminal AC inlet and requires connection to a 3-terminal mains supply outlet via a 3-terminal power cord for proper connection to the protective ground.

  Note: The equipotential bonding terminal provided on some equipment is not designed to function as a protective ground connection.

- **Class II Mains Powered Equipment –** Provided with a 2-terminal AC inlet that may be connected by a 2-terminal power cord to the mains supply outlet. No connection to the protective ground is required as this class of equipment is provided with double or reinforced and/or supplementary insulation in addition to the basic insulation provided in Class I equipment.

  Note: Class II equipment, which is subject to EN 50083-1, is provided with a chassis mounted equipotential bonding terminal. See the section titled **Equipotential Bonding** for connection instructions.

Equipotential Bonding

If this equipment is equipped with an external chassis terminal marked with the IEC 60471-5020 chassis icon (), the installer should refer to CENELEC standard EN 50083-1 or IEC standard IEC 60728-11 for correct equipotential bonding connection instructions.

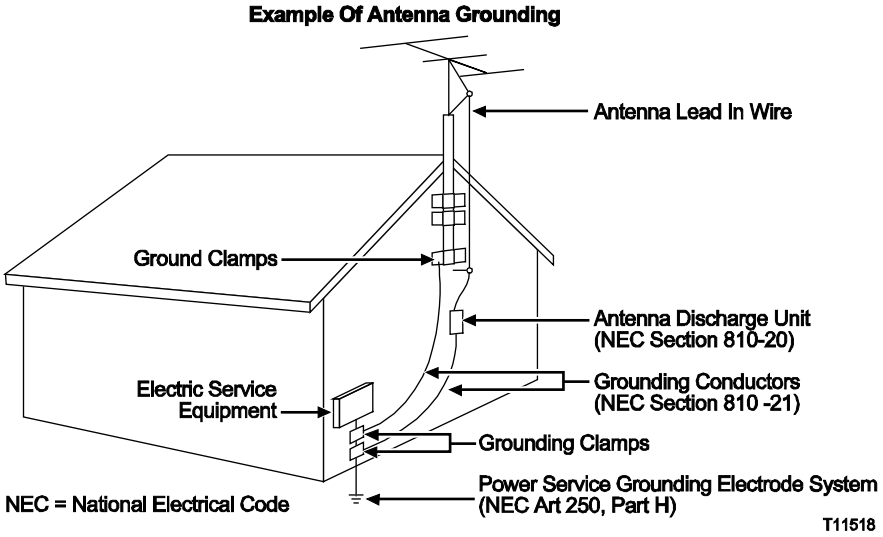
Outdoor Grounding System

If this equipment connects to an outdoor antenna or cable system, be sure the antenna or cable system is grounded. This provides some protection against voltage surges and built-up static charges.

Section 810 of the National Electric Code (NEC), ANSI/NFPA No. 70-1999, provides the following information:

- Grounding of the mast and supporting structure
- Grounding the lead-in wire to an antenna discharge unit
- Size of the grounding conductors
- Location of the antenna-discharge unit
- Connection to grounding electrodes
- Requirements for the grounding electrodes

For European Union countries, refer to CENELEC standard EN 50083-1 for grounding information.



Servicing

> ⚠ **WARNING:**
>
> **Avoid electric shock! Opening or removing the cover may expose you to dangerous voltages.**

Do not open the cover of this equipment. Refer all servicing to qualified personnel only. Contact Cisco for instructions.

Damage that Requires Service

For damage that requires service, unplug this equipment from the electrical outlet. Refer service to qualified service personnel when any of the following occurs:

- There is damage to the power cord or plug
- Liquid enters the equipment
- A heavy object falls on the equipment
- Operation is not normal (the instructions in this manual describe the proper operation)
- If you drop this equipment, or damage the cabinet of this equipment
- If this equipment exhibits a distinct change in performance

Upon completion of any service or repairs to this equipment, ask the service technician to perform safety checks to determine that the equipment is in proper operating condition.

> ⚠ **CAUTION:**
>
> **Avoid damage to this equipment! Adjust only what the operating instructions describe. Improper adjustment of controls may result in damage that may require extensive corrective work by qualified service personnel.**

Replacement Parts

When replacement parts are required, be sure the qualified service personnel has used parts specified by the Cisco or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

Safety Check

Upon completion of any service or repairs to this equipment, ask the service technician to perform safety checks to determine that this equipment is in proper operating condition.

Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. Refer to this equipment's data sheet for details about regulatory compliance approvals. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections, except the power source, when installing this equipment.

- Ensure compliance with cable/connector specifications and associated installation instructions where given elsewhere in this manual.

Otherwise, comply with the following good practices:

- Multi-conductor cables should be of single-braided, shielded type and have conductive connector bodies and backshells with cable clamps that are conductively bonded to the backshell and capable of making 360° connection to the cable shielding. Exceptions from this general rule will be clearly stated in the connector description for the excepted connector in question.
- Ethernet cables should be of single-shielded or double-shielded type.
- Coaxial cables should be of the double-braided shielded type.

EMC

Where this equipment is subject to USA FCC and/or Industry Canada rules, the following statements apply:

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment to an outlet that is on a different circuit from the receiver
- Consult the dealer or an experienced radio/TV technician for help

Industry Canada – Industrie Canadienne Statement

Industry Canada ICES-003: This apparatus complies with Canadian ICES-003.

Industrie Canadienne ICES-003: Cet appareil est conforme à la norme NMB-003 du Canada.

Modifications

This equipment has been designed and tested to comply with applicable safety, laser safety, and EMC regulations, codes, and standards to ensure safe operation in its intended environment. Refer to this equipment's data sheet for details about regulatory compliance approvals.

Do not make modifications to this equipment. Any changes or modifications could void the user's authority to operate this equipment.

Modifications have the potential to degrade the level of protection built into this equipment, putting people and property at risk of injury or damage. Those persons making any modifications expose themselves to the penalties arising from proven non-compliance with regulatory requirements and to civil litigation for compensation in respect of consequential damages or injury.

Accessories

Use only attachments or accessories specified by the manufacturer.

> ⚠ **CAUTION:**
>
> **Maintain electrical safety! Power-operated equipment or accessories that you connect to this equipment should bear the UL listing mark or CSA certification mark on the accessory itself, and should not be modified so as to defeat the safety features. This will help avoid any potential for electric shock or fire. If in doubt, contact qualified service personnel.**

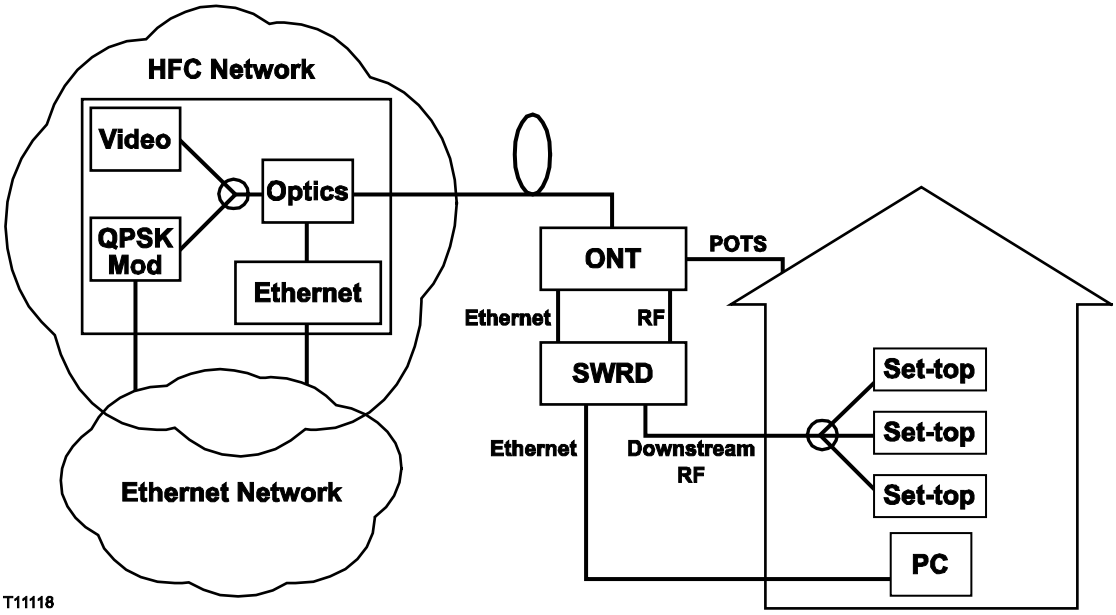
Mounting Accessories

> ⚠ **CAUTION:**
>
> **Use this equipment only with a cart, stand, bracket, table, or other mounting accessories that meet Cisco specifications. Carefully follow all instructions for proper mounting.**

Diagram of the FTTP SWRD

Introduction

This is a block diagram of a typical SWRD.



Features and Benefits of the FTTP SWRD

Introduction

This section describes the features and benefits of the SWRD.

Features and Benefits

- Small physical size, similar to the current Drop Amplifier dimensions.
- Low power dissipation.
- The RF input port is capable of accepting a DC input to allow for convenient powering of the device at distances of up to 50 feet.
- The SWRD ONT Ethernet port is capable of accepting a DC input to allow for convenient powering of the device at distances of up to 50 feet. Referred to as Power-over-Data (POD), not compliant with IEEE 802.3aF.
- Industrial temperature operating range of -40°C to +60°C (-40°F to 140°F).
- Capable of being installed in non-temperature controlled environments.
- Water resistant, but not waterproof. External enclosure recommended for outdoor installations.
- Video forward path pass-through with minimal insertion loss.
- Coax reverse path QPSK demodulator operating at 18.5 MHz with a maximum bit rate of 3.088 Mbps.
- Cisco proprietary data protocol to ensure error-free data conversion.
- High-performance internal Ethernet switch enables line rates up to 100 Mbps.
- Compliant with Ethernet IEEE 802.3 and TCP/IP standards.

Operating Environment

Overview

Before operating the SWRD, make sure the operating environment is set according to the given standards.

Temperature Range

The temperature requirements for the SWRD are as follows:

- Ambient temperature range may vary between -40°C and +60°C* (-40°F to 140°F). The ambient temperature may remain constant for long periods of time or may vary at a rate as high as 2°F per minute.
- External operating temperature range of -40°C and +60°C* (-40°F to 140°F).
- External storage temperature range of -40°C and +60°C* (-40°F to 140°F).

* Equivalent to 41°C solar loading.

Transportation and Storage

The SWRD meets the requirements of Bellcore GR-63-CORE Transportation and Storage criteria for Low and High Temperature Exposure and Thermal Shock.

Equipment Handling

The SWRD meets the requirements of Bellcore GR-63-CORE Packaged and Unpackaged Equipment Shock Criteria. Completion of a packaged/unpackaged drop test will demonstrate compliance with this requirement.

Installing the FTTP SWRD

Overview

The SWRD is designed to operate in conjunction with an ONT. The ONT must either have a compatible POD Ethernet port or power terminals that are compatible with the SWRD power inserter in order to power the SWRD. This section provides instructions for installing the SWRD.

General Installation Notes

Keep the following in mind when installing the SWRD.

- Units must be supplied by a UL listed Limited Power Source power supply output rated minimum 12 V DC, 0.50 A.
- The SWRD has no power switch. Power is on when the Power inserter is connected to the ONT or the SWRD ONT Ethernet RJ-45 port is connected to the ONT.
- The power "on" state is indicated by the LEDs lighting on the SWRD.
- A standard length of RG-6 coaxial cable is required for installation
- CAT-5 cable is required for installation (without boots)
- Units have not been evaluated for use with external wiring in excess of 140 feet.

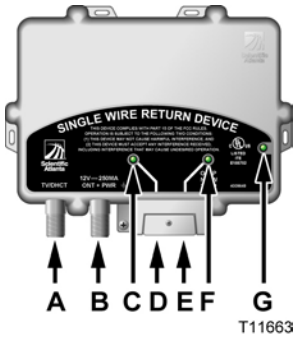
Required Tools/Hardware

The following tools are needed to install the SWRD.

- Coax Crimper Set
- RJ-45 Crimper Set
- Water sealing F-connector boots or shrink tubing
- Coaxial Cable and Coax F-connectors
- Two # 6 Installation Screws (#8 maximum)
- Cat-5 cable and RJ-45 connectors

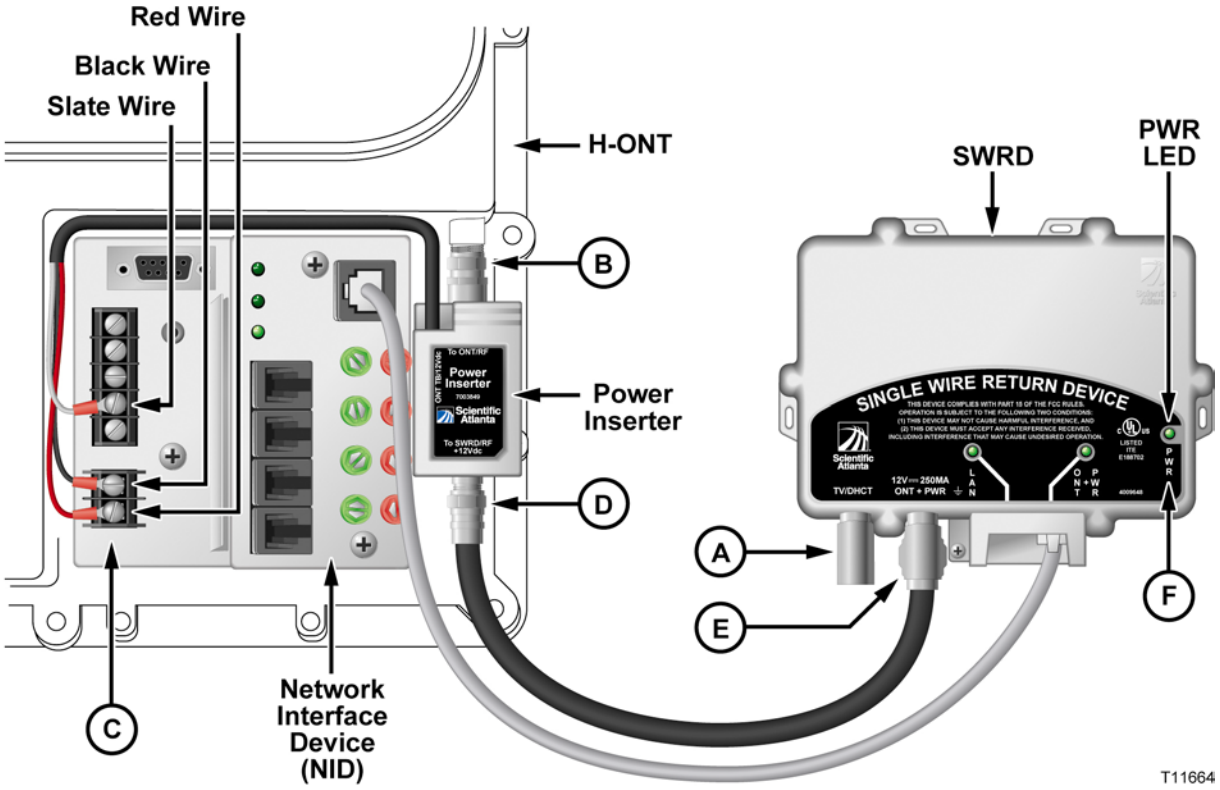
Installing the SWRD and Enabling Power Using the ONT Power Inserter

The following table shows the contents of the kit (part number 4004362) used for powering the SWRD using the ONT power inserter.

Part	Illustration	Function
FTTP SWRD		**A: TV/DHCT Port** Starting at the home, set-tops connect to the data network via the SWRD's TV/DHCT port. **B: ONT/PWR Port** Downstream video and power from the ONT. **C: LAN LED** Indicates Ethernet connection to the home computer network/LAN. **D: LAN Connection Port** Data connection for computer network. **E: ONT Connection Port** Data connection to the ONT and power from the ONT. **F: ONT LED** Indicates Ethernet/Data connection to the ONT. **G: Power LED** Indicates power is applied to the unit.
Power Inserter		The power inserter is connected to the ONT and provides power to the SWRD.

Use the connection diagram and follow the steps below to install the SWRD and enable power using the ONT power inserter.

Note: This installation requires water sealing F-connector boots or shrink tubing.



1. Position the SWRD near the ONT.
2. Mount the SWRD to a stud or wall using the appropriate screws (not included).
3. Place water sealing F-connector boots or shrink tubing (not provided) on the cable connections of the SWRD. Ⓐ
4. Open the Telco access door of the ONT.
5. Screw the power inserter's male F-connector labeled *To ONT/RF* to the ONT's female F-connector Ⓑ and tighten from 20 in-lb to 25 in-lb (2.3 Nm to 2.8 Nm).

> ⚠ **WARNING:**
>
> **Avoid possible electrical shock and damage to the ONT. Make sure the power inserter is oriented as shown in the diagram.**

6. Attach the three power inserter wires (located on the side of the power inserter) to the locations on the ONT's Network Interface Device (NID) listed below. To attach the wires, loosen the terminal screws (2-3 turns as to not remove the screws completely) with a flat-head or Philips-head screwdriver. Insert the spade nut under the screw and tighten from 9 in-lb to 10 in-lb (1.12 Nm to 1.13 Nm). Ⓒ

   Important: If ONT terminal wires are in place, the power inserter wires should be placed below the ONT terminal wires.

   - Connect the red wire to the location labeled RED on the NID. This is the 12 V DC connection point.
   - Connect the black wire to the location labeled BLK on the NID. This is the ground connection point.
   - Connect the slate wire to the location labeled SLT. This is the DC sense line connection point.

7. Connect one end of coaxial cable to the power inserter's female F-connector port (located on the bottom of the power inserter). Ⓓ

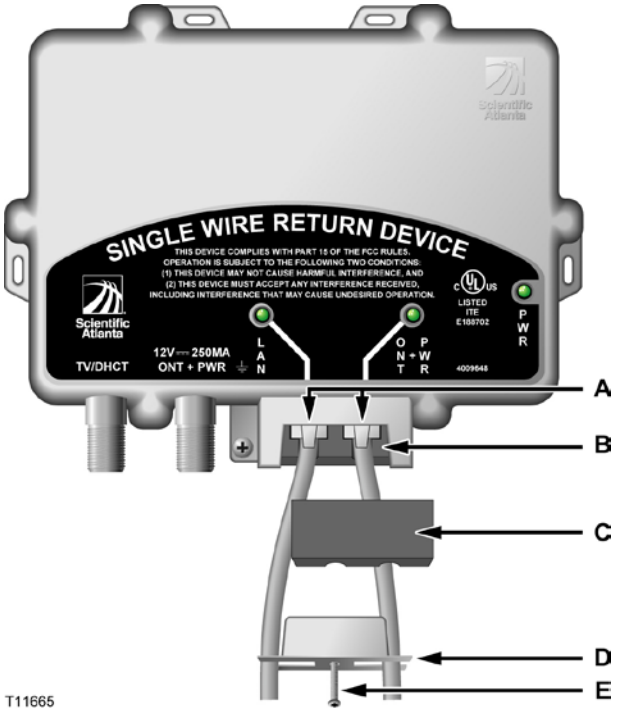
8. Attach the other end of coaxial cable to the SWRD's *ONT + PWR* port. Ⓔ

9. Once power is supplied, check to make sure that the SWRD's PWR LED is lit. This indicates the power on state. Ⓕ

   Note: The LAN LED and ONT LED will flash in one second intervals until the IP address is received. Once received, the LED indicates an Ethernet link with a steady on light and Ethernet activity with a fast blinking light.

Network Connections

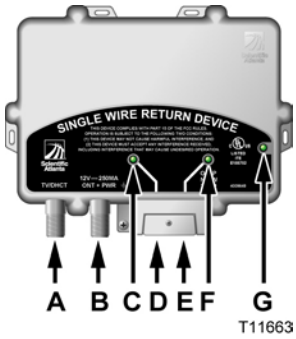
Use the connection diagram and follow the procedures below to set-up the network connections for the SWRD.



1. Using coaxial cable, connect the TV/DHCT port of the SWRD to the set-top network inside the home.
2. Remove the rubber weather seal assembly from the LAN/ONT Ethernet connection port.
3. Using Cat-5 cable, connect the ONT port of the SWRD to the data port of the ONT. For cable routing instructions, refer to the ONT Manufacturer's Installation Manual.
4. Using CAT-5 cable, make the LAN connection to the in-home computer network.
5. Install RJ-45 connectors into the Ethernet jacks. Ⓐ
6. Insert the first rubber seal below the RJ-45 connectors. Ⓑ
7. Insert the second rubber seal above the RJ-45 connectors. Ⓒ
8. Align the cable plate over the rubber seals. Ⓓ
9. Using a #2 Philips-head screwdriver, insert the screw through the cable plate and tighten from 4 in-lb to 5 in-lb (0.45 Nm to 0.68 Nm). Ⓔ

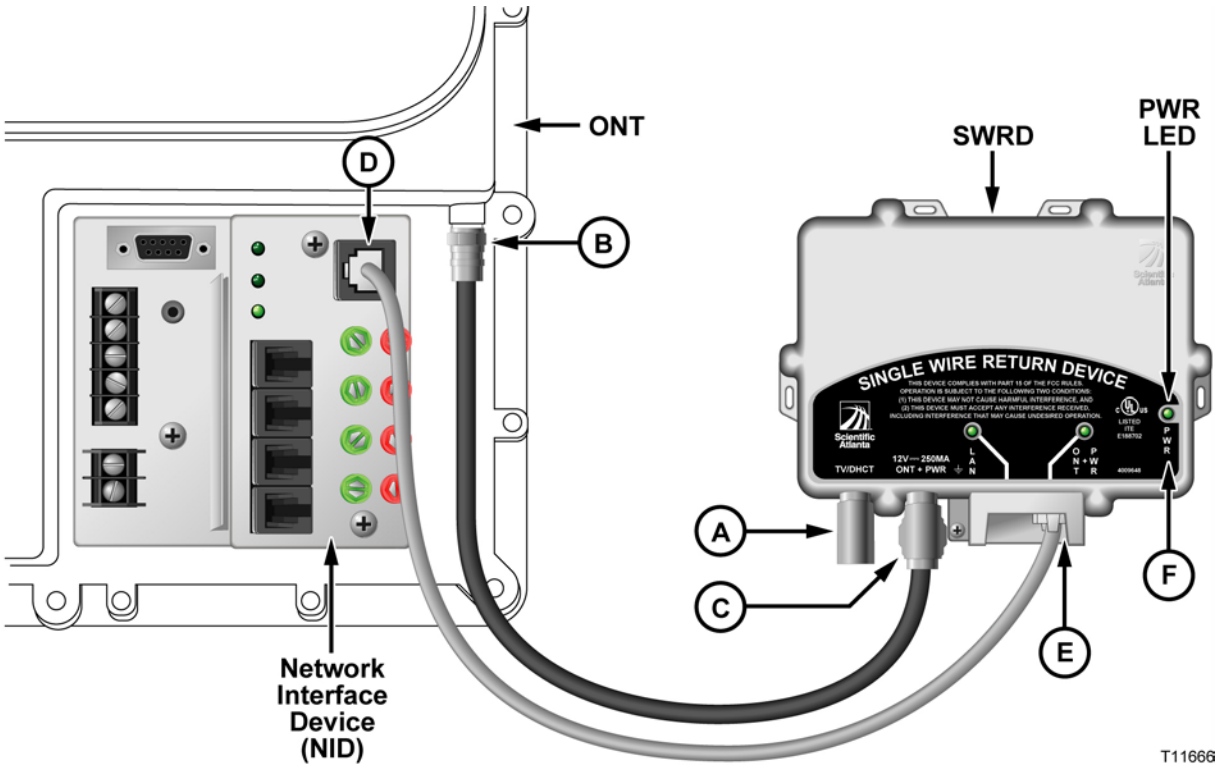
Installing the SWRD and Enabling Power Using the ONT Power-over-Data (POD) Source

The following table shows the contents of the kit (part number 4007878) used for powering the SWRD using the ONT POD source.

Part	Illustration	Function
FTTP SWRD		**A: TV/DHCT Port** Starting at the home, set-tops connect to the data network via the SWRD's TV/DHCT port. **B: ONT Port** Downstream video and power from the ONT. **C: LAN LED** Indicates Ethernet connection to the home computer network/LAN. **D: LAN Connection Port** Data connection for computer network. **E: ONT Connection Port** Data connection to the ONT and power from the ONT. **F: ONT LED** Indicates Ethernet/Data connection to the ONT. **G: Power LED** Indicates power is applied to the unit.

Use the connection diagram and follow the steps below to install the SWRD and enable power using the ONT POD source.

Note: This installation requires water sealing F-connector boots or shrink tubing.



1. Position the SWRD near the ONT.
2. Mount the SWRD to a stud or wall using the appropriate screws (not included).
3. Place water sealing F-connector boots or shrink tubing (not provided) on the cable connections of the SWRD. Ⓐ
4. Open the Telco access door of the ONT.
5. Connect one end of coaxial cable to the ONT's female F-connector port. Ⓑ
6. Attach the other end of coaxial cable to the SWRD's *ONT* port. Ⓒ
7. Connect one end of the CAT-5 cable to the ONT's POD Ethernet port. Ⓓ
   For cable routing instructions, refer to the ONT Manufacturer's Installation Manual.

8. Attach the other end of the CAT-5 cable to the SWRD's ONT RJ-45 port. Ⓔ

> ⚠ **CAUTION:**
>
> **To avoid damage to the equipment, be careful to plug the POD CAT-5 cable into the correct Ethernet port.**

9. Once power is supplied, check to make sure that the SWRD's PWR LED is lit. This indicates the power on state. Ⓕ

   Note: The LAN LED and ONT LED will flash in one second intervals until the IP address is received. Once received, the LED indicates an Ethernet link with a steady on light and Ethernet activity with a fast blinking light.

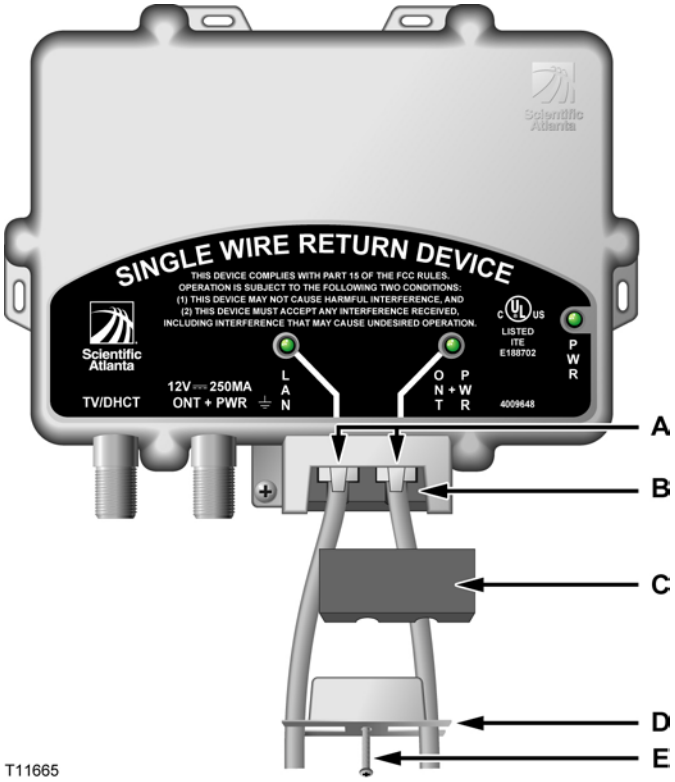
RJ-45 Pinouts

The following table shows the RJ-45 pinout for the SWRD's ONT port.

Conductor	Signal
1	Tx+
2	Tx-
3	Rx+
4	Power Supply Pos: +12VDC
5	Power Supply Pos: +12VDC
6	Rx-
7	Power Supply Return: GND
8	Power Supply Return: GND

Network Connections

Use the connection diagram and follow the procedures below to set-up the network connections for the SWRD.



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1. Using coaxial cable, connect the TV/DHCT port of the SWRD to the set-top network inside the home.
2. Using CAT-5 cable, make the LAN connection to the in-home computer network.
3. Remove the rubber weather seal assembly from the LAN/ONT Ethernet connection port.
4. Install RJ-45 connectors into the Ethernet jacks. Ⓐ
5. Insert the first rubber seal below the RJ-45 connectors. Ⓑ
6. Insert the second rubber seal above the RJ-45 connectors. Ⓒ
7. Align the cable plate over the rubber seals. Ⓓ
8. Using a #2 Philips-head screwdriver, insert the screw through the cable plate and tighten from 4 in-lb to 5 in-lb (0.45 Nm to 0.68 Nm). Ⓔ

For Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

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