

Zhone zNID 27xx Series Hardware Installation Guide

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Z H O N E®

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ABOUT THIS GUIDE

This guide is intended for use by installation technicians, system administrators, or network administrators. It explains how to install the zNID 27xx series enclosure, electronics and cabling.

Style and notation conventions

This document uses the following conventions to alert users to information that is instructional, warns of potential damage to system equipment or data, and warns of potential injury or death. Carefully read and follow the instructions included in this document.



Caution: A caution alerts users to conditions or actions that could damage equipment or data.

Précaution : Une mention Précaution avertit les utilisateurs au sujet d'états ou d'actions qui pourraient endommager le matériel ou les données.



Note: A note provides important supplemental or amplified information.

Remarque : Une remarque fournit des informations supplémentaires ou amplifiées importantes.



Tip: A tip provides additional information that enables users to more readily complete their tasks.

Conseil : Un conseil fournit une information supplémentaire qui permet aux utilisateurs de réaliser leurs tâches plus facilement.



WARNING! A warning alerts users to conditions or actions that could lead to injury or death.

AVERTISSEMENT ! Un avertissement avertit les utilisateurs au sujet d'états ou d'actions qui pourraient entraîner des blessures voire la mort.



WARNING! A warning alerts users to conditions or actions that could lead to injury caused by a laser.

AVERTISSEMENT ! Un avertissement avertit les utilisateurs au sujet d'états ou d'actions qui pourraient entraîner des blessures causées par un laser.



WARNING! This icon warns the user that metal surfaces can become hot to touch. Avoid contact or use caution when touching these surfaces.

AVERTISSEMENT ! Cette icône prévient l'utilisateur que les surfaces métalliques peuvent devenir chaudes au toucher. Evitez le contact ou soyez prudent lorsque vous touchez ces surfaces.

Typographical conventions

The following typographical styles are used in this guide to represent specific types of information.

Bold	Used for names of buttons, dialog boxes, icons, menus, profiles when placed in body text, and property pages (or sheets). Also used for commands, options, parameters in body text, and user input in body text.
Fixed	Used in code examples for computer output, file names, path names, and the contents of online files or directories.
Fixed Bold	Used in code examples for text typed by users.
Fixed Bold Italic	Used in code examples for variable text typed by users.
<i>Italic</i>	Used for book titles, chapter titles, file path names, notes in body text requiring special attention, section titles, emphasized terms, and variables.
PLAIN UPPER CASE	Used for environment variables.

Related documentation

Refer to the following publication for additional information:

- zNID Quick Installation Instructions for the zNID you are installing. These instructions are shipped with the zNID, but are also available on the Zhone website.
- *zNID Configuration Guide* — explains how to use the zNID web interface and describes the system commands and parameters.

Refer to the release notes for software installation information and for changes in features and functionality of the product (if any).

Acronyms

The following acronyms are related to Zhone products and may appear throughout this manual:

Table 1: Acronyms and their descriptions

Acronym	Description
Active E	Active Ethernet, also known as Gigabit Ethernet
APC	Angled physical contact (for fiber connector)
Coax	Coaxial cable
CNI	Comfort Noise Insertion
CPE	Consumer Premises Equipment
DHCP server	Dynamic host configuration protocol server
EZ touch™	Zhone's implementation for managing CPEs and zNIDs
GigE	Gigabit Ethernet
GPON	Gigabit passive optical network
HPNA	Home phone line networking alliance
IPTV	Internet protocol TV
LED	Light-emitting diode
MALC	Multi-access line concentrator
MDU	Multiple Dwelling Unit
MIB	Management information bases
MoCA	Multimedia over Coax Alliance
OLT	Optical Line Terminator
ONT	Optical Network Terminator

Table 1: Acronyms and their descriptions (Continued)

Acronym	Description
ONU	Optical Network Unit
PoE	Power over Ethernet
PPPoE	Point-to-point protocol over Ethernet
QoS	Quality of service
RF	Radio Frequency
RFoG	Radio Frequency over Glass
SC adaptor	Subscriber connector adaptor
SIP	Session initiation protocol
SNMP	Simple network management protocol
T1/E1	T1 is Trunk line 1 (or DS 1, digital signal level 1). E1 is the European equivalent, though there are a number of differences between the North American T1 and the European E1.
UPC	Ultra physical contact (for fiber connector)
Wi-Fi	Wireless local area network (trademark of Wi-Fi alliance)
VAD	Voice Activity Detection
VOIP	Voice over IP
zNID	Zhone Network Interface Device
ZMS	Zhone Management System

Contacting Global Service and Support

Support for this product is provided by your Internet service provider

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 of the following measures:

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

FCC Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no co-location statement.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Déclaration FCC

Ce matériel a été testé et il a été conclu qu'il est conforme aux limites imposées aux appareils numériques de Classe B, conformément à la Partie 15 des Règles FCC. Ces limites sont établies pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Ce matériel génère, utilise et peut irradier de l'énergie de fréquence radio et s'il n'est pas installé en conformité avec les instructions, il

pourrait provoquer des interférences nuisibles avec les communications radio. Toutefois, il n'y a pas de garantie que des interférences ne se produiront jamais dans aucune installation. Si ce matériel provoque des interférences nuisibles à la réception de radio ou de télévision, ce qui peut être déterminé en éteignant et en rallumant l'appareil, nous recommandons à l'utilisateur d'essayer de corriger l'interférence via l'une des solutions suivantes :

- Réorienter ou déplacer l'antenne de réception.
- Augmenter l'écart entre l'appareil et le récepteur.
- Raccorder l'appareil à une prise sur un circuit différent de celui sur lequel le récepteur est connecté.
- Consulter le détaillant ou un technicien de radio/télévision pour obtenir de l'aide.

Précaution FCC : Tous les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient rendre nul le droit d'usage de l'appareil par l'utilisateur.

Ce dispositif est conforme à la Partie 15 des Règles FCC. L'utilisation est sujette aux deux condition suivantes : (1) cet appareil ne doit pas causer d'interférences nuisibles, et (2) cet appareil doit accepter toute interférence reçue, y compris des interférences pouvant provoquer un fonctionnement indésirable.

CE

CE compliance certifications has been obtained for the following equipment:

- ZNID-GPON-2726A1
- ZNID-GPON-2726H1
- ZNID-GPON-2727A1
- ZNID-GPON-2728A1
- ZNID-GE-2726A1
- ZNID-GE-2726H1
- ZNID-GE-2728A1

The equipment named above is confirmed to comply with the requirements setout in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (2004/108/EC), Low-voltage Directive (2006/95/EC) and R&TTE (1999/5/EC). The equipment passed the test which was performed according to the following European standards:

- ETSI EN 301 489-17 V2.1.1: 2009
- ETSI EN 301 489-1 V1.8.1: 2008
- ETSI EN 300 328 V1.7.1: 2006

- EN 62311: 2008
- EN 60950-1: 2006+A11 2009

Important Safety Instructions

Read and follow all warning notices and instructions marked on the product and included in the manual.

Veillez lire et respecter toutes les notices d'avertissement et les instructions indiquées sur le produit et incluses dans le manuel.

Laser Safety Instructions

Zhone equipment and associated optical test sets use laser sources that emit light energy into fiber cables. This energy is within the red (visible) and infrared (invisible) regions of the electromagnetic spectrum.

Laser products are subject to federal and state or provincial regulations, and local practices. Regulation 21 CFR 1040 of the U.S. Bureau of Radiological Health requires manufacturers to certify each laser product as Class I, II, III, or IV, depending upon the characteristics of the laser radiation emitted. In terms of health and safety, Class I products present the least hazard (none at all), while Class IV products present the greatest hazard.

Although Zhone optical products have a Class I certification, hazardous exposure to laser radiation can occur when fibers connecting system components are disconnected or broken.

Certain procedures carried out during testing require the handling of optical fibers without dust caps and therefore increase the risk of exposure. Exposure to either visible or invisible laser light can damage your eyes under certain conditions.

Read and observe the following precautions to decrease the risk of exposure to laser radiation.



WARNING! Risk of eye damage. At all times, when handling optical fibers, follow the safety procedures recommended by your company.



WARNING! Avoid direct exposure to fiber ends or optical connector ends. Laser radiation may be present and can damage your eyes.



WARNING! Never look into an active optical fiber or an optical fiber connector opening of an active or powered-up unit.

Note: When working with optical fibers, take these precautions:

- Wear safety glasses when installing optical fibers.
- Clean hands after handling optical fibers. Small pieces of glass are not always visible and can cause eye damage. Get medical assistance immediately for any glass that comes into eye contact.

- Prevent direct exposure to optical fiber ends or optical connector ends where laser signals are directly accessed. Do not handle pieces of optical fiber with fingers. Use tweezers or adhesive tape to lift and discard any loose optical fiber ends.
- Wear rubber gloves to clean optical connectors. The gloves prevent direct contact with the isopropyl alcohol and prevent contamination of the ferrules with skin oils.
- Place all optical fiber clippings in a plastic container provided for that purpose.
- Handle optical fibers with caution. Place the optical fibers in a safe location during installation.
- Follow the manufacturer instructions when using an optical test set. Incorrect calibration or control settings can create hazardous levels of radiation.

Instructions de sécurité relatives au laser

Le matériel de Zhone et les ensembles de tests optiques associés utilisent des sources de laser qui émettent de l'énergie lumineuse dans les câbles optiques. Cette énergie se situe entre les régions rouge (visible) et infrarouge (invisible) du spectre électromagnétique.

Les produits laser sont sujets à des réglementations fédérales et étatiques ou provinciales, ainsi que des pratiques locales. La Réglementation 21 CFR 1040 du U.S. Bureau of Radiological Health oblige les fabricants à certifier chaque produit laser selon les Classes I, II, III, ou IV, en fonction des caractéristiques de la radiation laser émise. En termes de santé et de sécurité, les produits de Classe I présentent le moins de danger (aucun), alors que les produits de Classe IV présentent les plus grands dangers.

Bien que les produits optiques de Zhone disposent d'une certification de Classe I, une exposition dangereuse aux radiations laser peut se produire lorsque les composants du système de connexion des fibres sont déconnectés ou cassés.

Certaines procédures réalisées lors des essais nécessitent la manipulation de fibres optiques sans capuchons antipoussière et augmentent donc le risque d'exposition. L'exposition à la lumière laser visible ou invisible peut endommager vos yeux dans certaines conditions.

Lisez et observez les précautions suivantes pour diminuer le risque d'exposition aux radiations laser.



WARNING! AVERTISSEMENT ! Risque de blessure aux yeux.
Lors de la manipulation de fibres optiques, suivez en permanence les procédures de sécurité recommandées par votre société.



WARNING! AVERTISSEMENT ! Evitez l'exposition directe aux extrémités des fibres ou aux embouts des connecteurs optiques.
Le laser pourrait vous irradier et blesser vos yeux.



WARNING! AVERTISSEMENT ! Ne regardez jamais dans une fibre optique active ou une ouverture de connecteur de fibre optique d'un appareil actif ou sous tension.

Remarque : Lorsque vous travaillez avec des fibres optiques, prenez ces précautions :

- Portez les lunettes de protection lorsque vous installez des fibres optiques.
- Lavez-vous les mains après avoir manipulé des fibres optiques. De petites pièces de verre ne sont pas toujours visibles et peuvent provoquer des affections oculaires. Obtenez une assistance médicale immédiatement pour tout morceau de verre entrant en contact avec les yeux.
- Évitez l'exposition directe aux extrémités des fibres optiques ou aux extrémités des connecteurs optiques où les signaux laser sont directement accessibles. Ne manipulez pas de parties de fibres optiques avec les doigts. Utilisez des pinces typographiques ou du ruban adhésif pour lever et éliminer des extrémités lâches de fibres optiques.
- Portez des gants de caoutchouc pour nettoyer les connecteurs optiques. Les gants protègent du contact direct avec l'alcool isopropylique et évitent la contamination des ferrules avec les huiles de peau.
- Placez toutes les rognures de fibre optique dans un récipient en plastique fourni à cet effet.
- Manipulez les fibres optiques avec précaution. Placez les fibres optiques dans un endroit sûr lors de l'installation.
- Suivez les instructions du fabricant lors de l'utilisation d'un ensemble de test optique. Un étalonnage ou des paramètres de contrôle incorrects peuvent provoquer des niveaux dangereux de radiation.

General Instructions

Other precautions to take before installing or servicing the product are as follows:

- Never install telephone wiring during a lightning storm.
- Never touch uninsulated telephone wires or terminals unless the telephone line has first been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Only authorized service technicians can service this product. Unauthorized service to this product can cause exposure to dangerous high-voltage points or other risks and may result in injury or damage to the unit and void all warranties.
- Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the buyer.

- When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
- Install the zNID in accordance with national and local electric codes in order to meet all applicable requirements. Consult a qualified electrical consultant.

Instructions générales

Les autres précautions à prendre avant l'installation ou l'entretien du produit sont les suivantes :

- N'installez jamais un câblage téléphonique pendant un orage.
- Ne touchez jamais de bornes ou de câbles téléphoniques non isolés à moins que la ligne téléphonique ait été déconnectée depuis l'interface réseau auparavant.
- Soyez prudent lors de l'installation ou de la modification des lignes téléphoniques.
- Seuls les techniciens d'entretien autorisés peuvent entretenir ce produit. L'entretien non autorisé de ce produit peut provoquer une exposition à des points de haute tension dangereux ou à d'autres risques et peut entraîner des blessures ou des dommages à l'appareil et rendre nulles toutes les garanties.
- Les câbles spéciaux, qui peuvent être demandés par l'autorité d'inspection réglementaire pour le site d'installation, sont de la responsabilité du client.
- Lorsqu'il est installé et dans sa configuration finale, le produit doit se conformer aux normes de sécurité et exigences réglementaires applicables du pays dans lequel il est installé. Si nécessaire, consultez les agences réglementaires et autorités d'inspection appropriées afin d'assurer la conformité.
- Installez le zNID conformément aux codes sur l'électricité national et local afin de satisfaire à toutes les exigences applicables. Consultez un conseiller en produits électriques qualifié.

EMI Precautions

Canada

This Class B digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du règlement sur le matériel brouilleur du Canada.

1

zNID 27xx SERIES

This chapter describes the 27xx series of zNID. It includes the following sections:

- [Overview, page 17](#)
- [zNID 27xx series features, page 21](#)
- [zNID 27xx models, page 22](#)
- [zNID 27xx series specifications, page 23](#)
- [zNID 27xx series dimensions, page 29](#)
- [zNID 27xx series indicators, page 30](#)
- [Logging in to the 27xx series zNID, page 33](#)

Overview

Introducing the newest mix of style and technology - the Zhone 27XXA1/H1 Series Indoor GPON ONT. Dual-band 802.11ac WiFi capability combines with a stylish table-top finish to bring next-generation connectivity and best-of-class performance to Fiber-to-the-Home/Hotel deployments.

The zNID 2728 has seven internal high-gain antennas which enable two concurrent dual-band (2.4 and 5.8GHz) WiFi radios to independently connect multiple users and devices simultaneously, including older 802.11b/g/n devices. Its 3x3 and 4x4 MIMO antenna design provides superb WiFi throughput and coverage. The latest technology combined with 802.11ac (5.8GHz) makes delivering reliable Multicast IPTV services over WiFi a reality.

For the zNID 2726 and 2727 five internal high-gain antennas enable two concurrent dual-band (2.4 and 5.8GHz) WiFi radios to independently connect multiple users and devices simultaneously, including older 802.11b/g/n devices.

The 27xx Series zNIDs are ideal for providing WiFi coverage in large homes, home theaters, and hotel guest and conference rooms facing a variety of laptops and mobile devices.

The zNID 27xx Series sits upright and its attractive, modern enclosure requires a small footprint making it equally at home on a living room bookshelf or as a polished accessory in high-end commercial

accommodations. An easy to use wall-mounting bracket is included. Simplified and easy-to-read indicators allow for quick troubleshooting when the Internet has gone to avoid unnecessary cable-pulling and power-cycling. Hospitality installations will appreciate the guest-friendly indicator modes (Day, Night, Off). Extensive diagnostics in the ONT (run locally on the ONT or remotely from the NOC) reduce service call disruptions.

The zNID 27xx Series (Zhone Network Interface Device) is a family of indoor residential GPON ONTs which are standards based Consumer Premises Equipment (CPE) designed for advanced triple-play deployments in campus and business environments. The indoor models in Zhone's zNID product line of ONT's provide a lower cost alternative to outdoor ONT solutions.

The 27xx series Single Family Unit (SFU) ONTs provide the same voice features found on the 9xxx and 42xx series of outdoor residential ONTs. SIP-PLAR signaling is supported for connection via Zhone's Voice Gateway to traditional Class 5 TDM switches, while both MGCP and SIP are supported for direct connection to a VoIP Softswitch. This flexibility allows Zhone's 42xx, 9xxx, 24xx, 26xx, 27xx and 28xx series ONTs to work in nearly all Telco networks, with interoperability support for a broad array of Softswitches.

The GE LAN ports can be separated into different services allowing the configuration of dedicated ports for IP video and data for one or more customers. Unique VLANs may be configured per customer to ensure full isolation of each customer's data traffic.

The 27xx Series ONTs can be either be placed freestanding on a desktop or wall mounted using the included bracket. UPS (uninterruptable power source) battery backup options are available for maintaining lifeline services during AC power outages.

The zNID 27xx series may be managed by

- Unified Service Provisioning (USP)
- Zhone Management System (ZMS)
- Web (HTTP)
- EZ Touch (Zhone's CPE and zNID management application)
- Command Line Interface (CLI/Telnet/SSH)
- SNMP

More information about management capabilities see the *zNID Configuration Guide*.

zNID 27xx series components

The zNID 27xx series indoor ONTs provide a variety of interfaces for triple play deployments.

Figure 1: The interfaces and buttons on the rear of the zNID 27xx

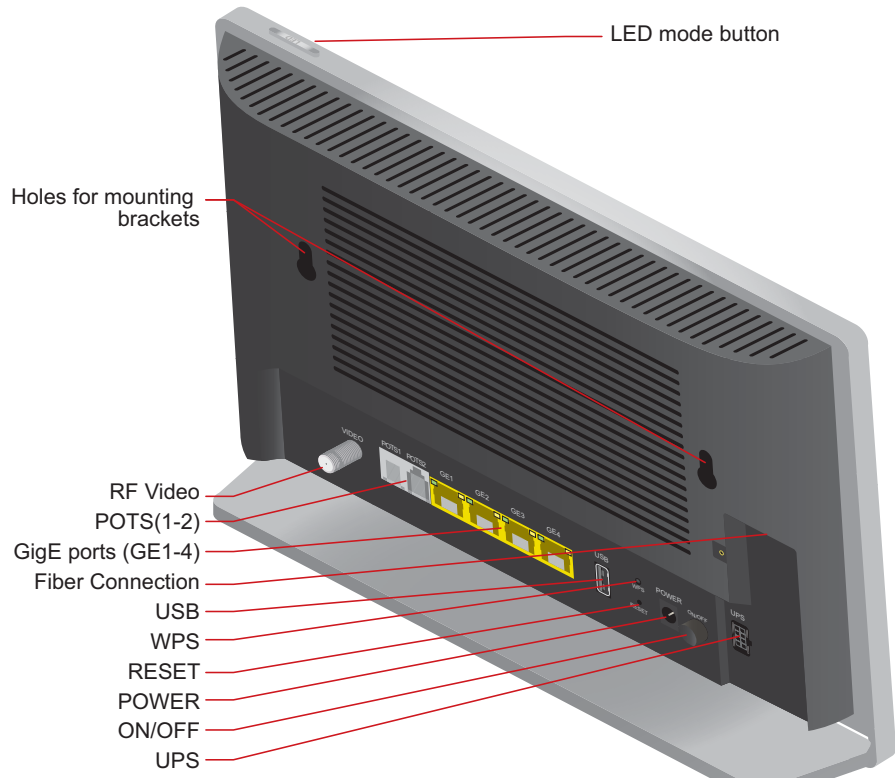


Figure 2: The front panel indicators on the zNID 27xx series

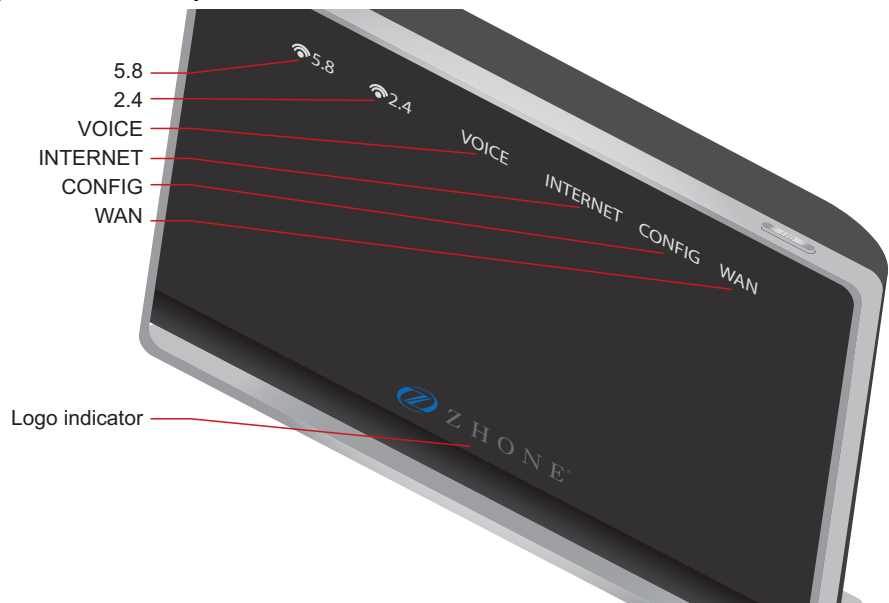
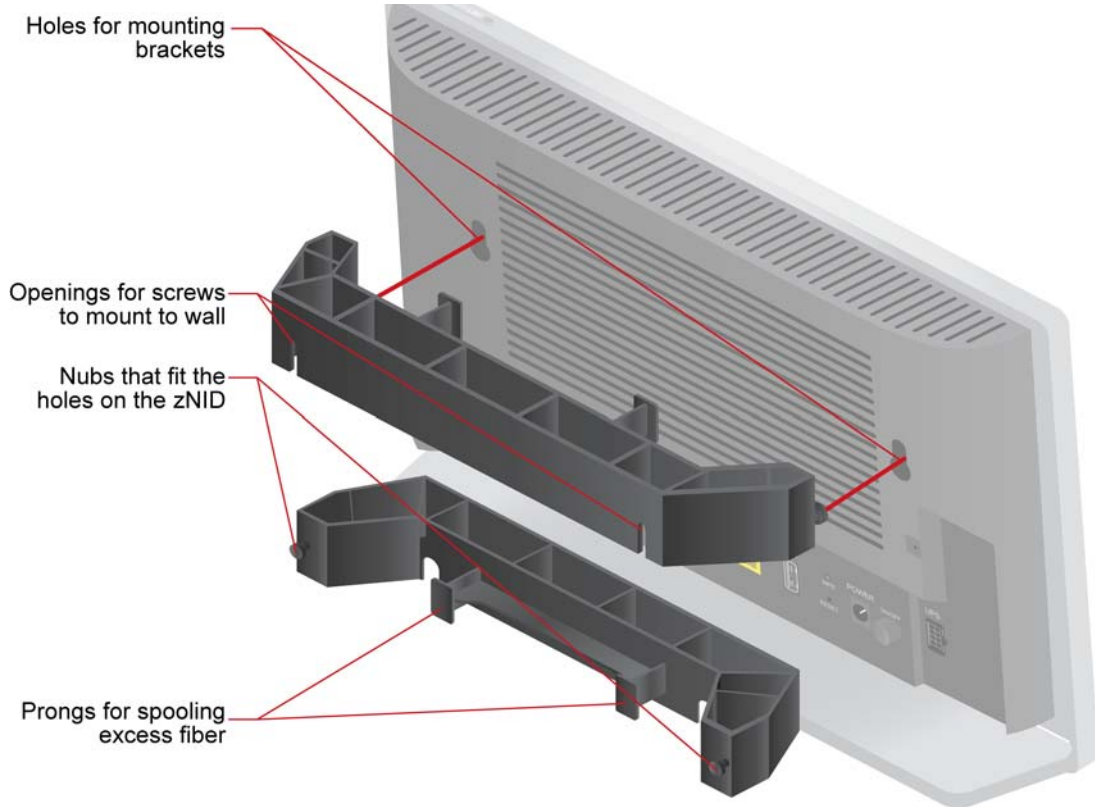


Figure 3: Wall mounting bracket features



zNID 27xx series features

Under ideal circumstances, GPON can reach up to 20 or 30 km, however the practical limit is 12 km (about eight miles). Reach is dependent on the configuration of the optical distribution network (ODN).

All 27xx series ONTs are designed for indoor use.

The 27xx series of zNIDs share a common SW architecture with the 24xx, 26xx, 28xx, 42xx, and 9xxx series of zNIDs, including the same intuitive Web interface and command line interface. The zNID is also managed by the Zhone Network Management System (ZMS), using SNMP or via OMCI (ONT Management Control Interface). Software upgrades and configuration backups can be handled automatically by the ZMS using the EZ Touch management feature.

This section covers:

- [zNID 27xx models](#)
- [zNID 27xx series specifications](#)
- [zNID 27xx series dimensions](#)

The zNID enables service providers to provide voice, data, and video services along with advanced IP and data support.

zNID 27xx models

GPON models

The zNID 27xx series GPON models have the following interfaces:

Model	Description
ZNID-GPON-2726A1	GPON Uplink, 2 POTS, 4 GigE, 2x2 2.4GHz WiFi (11b/g/n), 3x3 5GHz WiFi (11ac), USB
ZNID-GPON-2726H1	GPON Uplink, 2 POTS, 4 GigE, 2x2 2.4GHz WiFi (11b/g/n), 3x3 5GHz WiFi (11ac), HPNA/C Coax, USB
ZNID-GPON-2727A1	GPON Uplink, 2 POTS, 4 GigE, 2x2 2.4GHz WiFi (11b/g/n), 3x3 5GHz WiFi (11ac) USB, RF Video Coax, USB
ZNID-GPON-2728A1	GPON Uplink, 2 POTS, 4 GigE, 3x3 2.4GHz WiFi (11b/g/n), 4x4 5GHz WiFi (11ac), Quantenna function, USB

Gigabit Ethernet models

The zNID 27xx series Gigabit Ethernet models have the following interfaces:

Model	Description
ZNID-GE-2726A1	GE Uplink, 2 POTS, 4 GigE, 2x2 2.4GHz WiFi (11b/g/n), 3x3 5GHz WiFi (11ac), USB
ZNID-GE-2726H1	GE Uplink, 2 POTS, 4 GigE, 2x2 2.4GHz WiFi (11b/g/n), 3x3 5GHz WiFi (11ac), HPNA/C Coax, USB
ZNID-GE-2728A1	GE Uplink, 2 POTS, 4 GigE, 3x3 2.4GHz WiFi (11b/g/n), 4x4 5GHz WiFi (11ac), Quantenna function, USB

zNID 27xx series specifications

The possible interfaces and number of interfaces depend on the specific model, see [zNID 27xx models on page 22](#) for a list of models and their interfaces.

Table 2: zNID 27xx specifications

Specifications	Values
Dimensions:	<p>zNID 2726, 2727 models</p> <ul style="list-style-type: none"> • Main Body <ul style="list-style-type: none"> – Height: 6.7 in (170mm) – Width: 11.0 in (280mm) – Thickness: 1.4 in (35mm) • Desktop Footprint Depth <ul style="list-style-type: none"> – 2.4 in (60mm) <p>zNID 2728 model</p> <ul style="list-style-type: none"> • Main Body <ul style="list-style-type: none"> – Height: 7.5 in (190mm) – Width: 11.8 in (300mm) – Thickness: 1.4 in (36mm) • Desktop Footprint Depth <ul style="list-style-type: none"> – 2.4 in (60mm)
Weight:	28 oz (0.8 kg)
Operating temperature:	<ul style="list-style-type: none"> • Operating Temperature: 0°C to +40°C • Storage Temperature: -20°C to +85°C • Relative Humidity: 0 to 95%, non-condensing
Power	<ul style="list-style-type: none"> • 12VDC, 2.0A max • 12VDC Power Supply: 100-240VAC, 50/60 Hz, 36W out • Round barrel-type connector for power input • 2x4 Molex-type connector for optional BBU power input with alarm reporting

Table 2: zNID 27xx specifications (Continued)

Specifications	Values
WAN Interfaces	<ul style="list-style-type: none"> • GPON: SC/APC connector <ul style="list-style-type: none"> - Tx: <ul style="list-style-type: none"> - Upstream data rate 1.25 Gbps - 1310 nm optics - DFB transmitter - Launch Power: +0.5 to +5 dBm - Rx: <ul style="list-style-type: none"> - Downstream data rate: 2.5 Gbps - 1490 nm optics - APD/TIA receiver - Receiver Sensitivity: -28 dBm - Input power overload: -8 dBm - Input power damage: +5 dBm - Class B+ optics - G.985 wavelength blocking filter - GPON Type B redundancy support • GE: SC/UPC connector <ul style="list-style-type: none"> - 1490 nm Rx (Downstream) - Fixed SFF optics - Tx Data Rate 1.0 Gbps - Tx Launch Power: -2 to +8 dBm - Rx Data Rate: 1.0 Gbps - Rx Receiver Sensitivity: -23 - Rx Input Power Overload: -2 dBm - 1310 nm Tx (Upstream)

Table 2: zNID 27xx specifications (Continued)

Specifications	Values
Customer facing interfaces (Depends on model)	<ul style="list-style-type: none"> • Gig E interfaces (RJ45 - 10/100/1000Base-T Ethernet) <ul style="list-style-type: none"> – Auto-MDI-X crossover control – Auto-Speed or manual selection • FXS POTS interfaces (RJ11) <ul style="list-style-type: none"> – 5 REN per line – Battery voltage: -48VDC – Max loop current: 40mA – Ringing voltage: 48Vrms @ 20/25 Hz • WiFi - 802.11b/g/n <ul style="list-style-type: none"> – 2.4 GHz band – 2x2 MIMO (2726, 2727) 3x3 MIMO (2728) – Two +3dBi internal antennas (three for 2728) – Channel width: 20 MHz, 40 MHz – Max WiFi Connect (Phy) Rates: 54Mbps (g); 300Mbps (n) • WiFi - 802.11ac <ul style="list-style-type: none"> – 5 GHz band – 3x3 MIMO (2726, 2727) 4x4 MIMO (2728) – Three +2dBi internal antennas (four for 2728) – Channel width: 20 MHz, 40 MHz, 80 MHz – Max WiFi Connect (Phy) Rate: 1.3 Gbps • RF Video Output Port (F-Type coaxial connector) <ul style="list-style-type: none"> – RF output impedance: 75 ohms – RF passband: 47 to 1000 MHz – RF output level: 17 dBmV minimum (550 MHz, 3.5% OMI per channel) • RF Video Rx <ul style="list-style-type: none"> – 1550nm optics – Usable input power range: -8 dBm to +2 dBm – Input power overload: +2 dBm – Input damage level: +5 dBm • USB <ul style="list-style-type: none"> – USB 2.0 port – 3G dongle support for uplink fallback

Table 2: zNID 27xx specifications (Continued)

Specifications	Values
Wireless Support	<ul style="list-style-type: none"> • SSIDs: Up to 8 • Max number of subscribers: 64 • Max Tx power: 250 mW (US models) • Max Tx power: 100-200 mW (other models) • Authentication Security: WEP, WPA-PSK, WPA2, WPA2-PSK, 802.1x • WEP (64-bit, 128-bit), AES, TKIP+AES • WPS modes: push-button, API PIN, STA PIN • RADIUS Server support • MAC address filtering • Access Point and Wireless Bridge modes
Voice Support	<ul style="list-style-type: none"> • SIP (RFC 3261) • SIP-PLAR • MGCP • Codec: G.711 (u-law and A-law), G.729B, G726 • DTMF dialing • 5 REN (total) per ONT • Echo cancellation • Voice Activity Detection (VAD), Comfort Noise Insertion (CNI) • Caller ID, Call Waiting, Call Forwarding, Call Transfer, Three Way Calling, Distinctive Ringing. • G.711 fallback for FAX • T.30 and T.38 Fax • DHCP client or static IP configuration
Standards Support	<ul style="list-style-type: none"> • ITU-T G.984 compliant • IEEE 802.3 Ethernet • IEEE 802.1p/q VLANs • IEEE 802.3u Fast Ethernet • IEEE 802.3ab 1000Base-T

Table 2: zNID 27xx specifications (Continued)

Specifications	Values
Protocol Support	<ul style="list-style-type: none"> • GPON uplink <ul style="list-style-type: none"> – Fully ITU-T G.984 compliant framing – 32 T-CONTs per device – 32 GEM Ports per device – 1:1 mapping of GEM ports into T-CONTS with priority queue based scheduling – Activation with automatic discovered SN and password in conformance with ITU-T G.984.3 – Mapping of GEM Ports into a T-CONT with priority queues based scheduling – AES-128 Decryption with key generation and switching – 802.1p mapper service profile on U/S – Support for Multicast GEM Port – FEC (Forward Error Correction) – Dying Gasp support • QoS <ul style="list-style-type: none"> – Ethernet bridging/switching per IEEE802.1d/802.1q – Traffic shaping – bandwidth management and rate limiting – QoS with support for IEEE 802.1p + DSCP VLANs • VLANs <ul style="list-style-type: none"> – Per port IEEE 802.1q VLAN ID processing – All VLAN IDs supported – VLAN tagging/untagging – VLAN Stacking (QinQ) – VLAN Switching • IPTV <ul style="list-style-type: none"> – IGMP v3 Snooping – VLAN support
Bridging, ISO Layer 2	<ul style="list-style-type: none"> • 802.3n flow control • Automatic MAC learning and aging • Unlimited # of MAC addresses for OMCI-configured flows (GPON only) • Support for up to 4,096 MAC addresses for RG traffic flows • Broadcast storm control • LLDP-MED

Table 2: zNID 27xx specifications (Continued)

Specifications	Values
IP Routing and Firewall	<ul style="list-style-type: none"> • PPPoE • NAT/NAPT • port forwarding • DHCP server • DNS Proxy • UPnP
IPv6	<ul style="list-style-type: none"> • IPv4 and IPv6 Dual-Stack-lite • Bridged Mode (transparent pass-thru of IPv6 frames) • IPv6 Support for BRouted, and PPPoE-Bridged VLANs • DHCPv6 client and server • Router Advertisement on LAN- side interfaces of BRouted and PPPoE-Bridged VLANs • SLAAC for automatic acquisition of WAN-side IPv6 address and Gateway • CLI and HTTP management via IPv6 address • TR-069 management via IPv6 address
Management	<ul style="list-style-type: none"> • Zhone Management System (ZMS) <ul style="list-style-type: none"> – EZ Touch – CPE Manager • USP (Unified Service Provisioning) • OMCI (GPON only) • Web UI • Command Line Interface (CLI) • SNMP • TR-069
Regulatory Compliance	<ul style="list-style-type: none"> • CE • UL/CSA • FCC Part B • 21 CFR 1040.10, 1040.11 • RoHS 2011/65/EU

zNID 27xx series dimensions

Figure 4: zNID 2726, 2727 dimensions

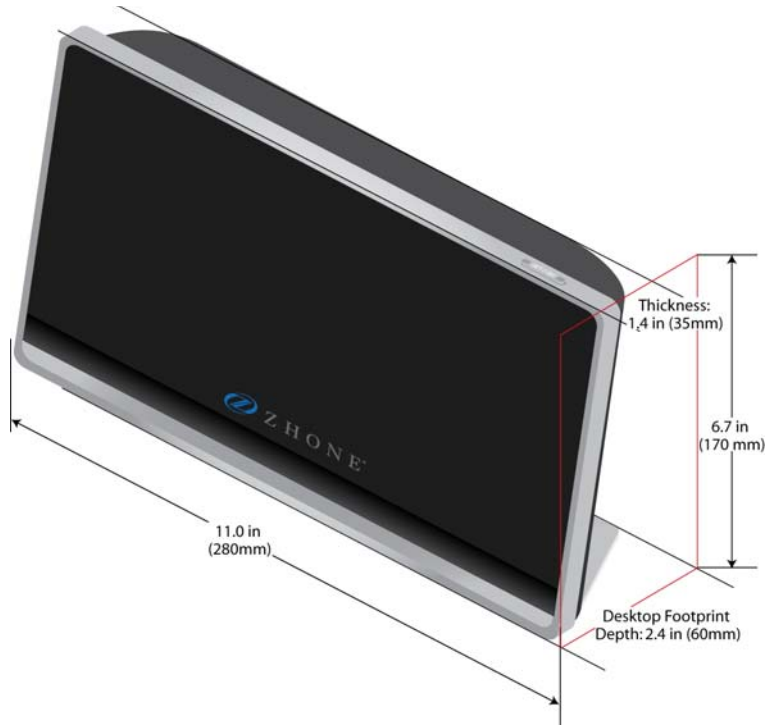
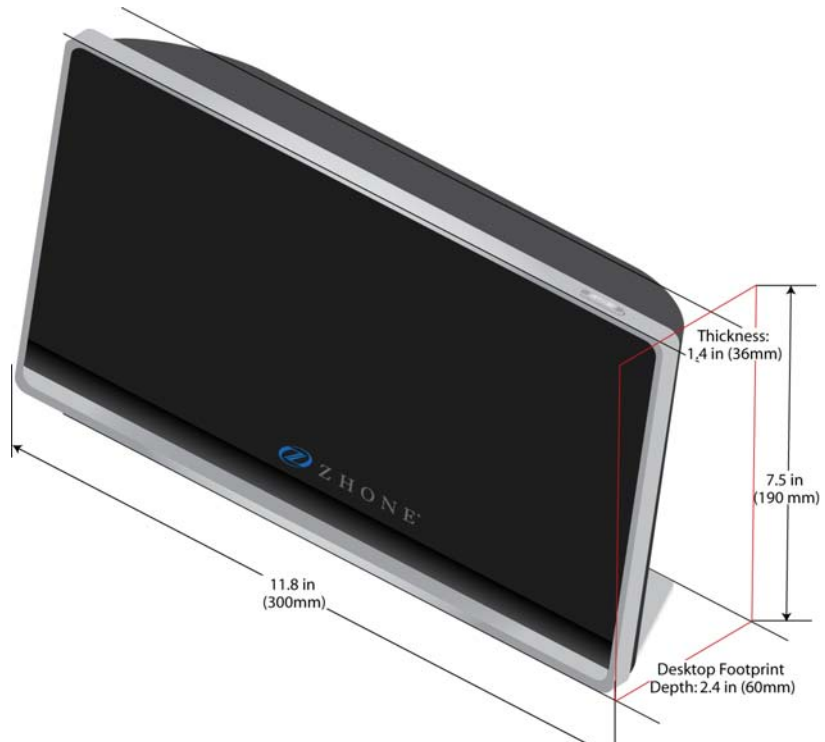


Figure 5: zNID 2728 dimensions



zNID 27xx series indicators

The indicators vary depending on the model of zNID. See [zNID 27xx models on page 22](#) for a complete list of zNID models.

Front panel indicators

A momentary push-button switch on the top edge of the ONT towards the right side of the unit (when viewed from the front) that allows the operator reduce the number of indicators displayed when less lighting disturbance is desired.

Figure 6: zNID 27xx LED Mode Switch on top edge



Pressing and holding this switch for 2-3 seconds will change the LED indicator mode from Mode 1 to Mode 2, or from Mode 2 to Mode 3, or from Mode 3 back to Mode 1. The three modes are:

- Day Mode — normal mode — all Indicators are enabled
- Night Mode — only INTERNET, VOICE and LOGO Indicators are enabled
- Off Mode — all Indicators are disabled

Note that the selected indicator mode is stored in a special portion of non-volatile memory and is retained over a reboot, power cycle, or reset to Factory Defaults.

Table 3: LED indicator modes

Indicator	Mode 1 (Day)	Mode 2 (Night)	Mode 3 (Off)
Logo	Enabled	Enabled	Disabled
WAN	Enabled	Disabled	Disabled
CONFIG	Enabled	Disabled	Disabled
INTERNET	Enabled	Enabled	Disabled
VOICE	Enabled	Enabled	Disabled
2.4	Enabled	Disabled	Disabled
5.8	Enabled	Disabled	Disabled

Figure 7: zNID 27xx front panel indicators

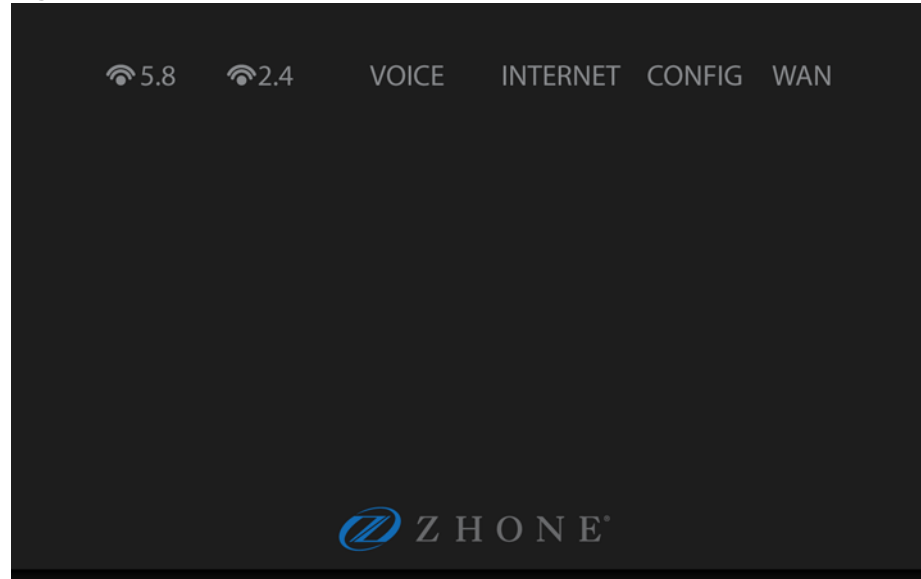


Table 4: zNID-GPON-27xx indicators

Indicator	Behavior	Indicates
Logo	Steady on	ONT is powered on and ready for use.
	Blinking (1/sec)	ONT is powered on but not yet ready for use.
	Off	ON/OFF Switch is Off, or no power supply connected, or power supply not plugged in.
WAN	Steady on	Ranged successfully
	Slow blink (1/sec)	Ranging in progress
	Off	Not ready for ranging or not provisioned
CONFIG	Steady on	OMCI provisioning is complete
	Rapid blink (10/sec)	OMCI provisioning is in progress
	Blinking (1/sec)	SNMP provisioning in progress.
	Off	No OMCI provisioning
INTERNET	Steady on	Internet service is available.
	Off	Internet service is unavailable (no response from DNS server).

Table 4: zNID-GPON-27xx indicators

Indicator	Behavior	Indicates
VOICE	Steady on	VoIP Registration successfully completed.
	Blinking (1/sec)	At least one attached phone is off-hook.
	Off	No calls active, no phones are off-hook.
2.4	Steady on	WiFi service is enabled on ONT.
	Blinking (1 per sec)	WiFi data passing between ONT and connected device.
	Off	WiFi service is disabled on ONT.
5.8	Steady on	WPS pairing completed successfully.
	Blinking (1 per sec)	WPS pairing in progress.
	Off	WPS is disabled on ONT.

Ethernet interface LEDs

Figure 8: zNID 27xx Ethernet interface LEDs

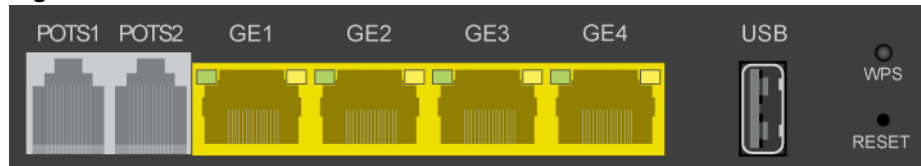


Table 5: zNID 27xx Ethernet interface LEDs

LED Name	Color/Behavior	Indicates
Right LED (SPEED)	Off	10 BaseT
	Yellow	100 BaseT
	Green	1000 BaseT
Left LED (LINK/ACTIVITY)	Off	Link Down or Port Disabled
	Solid yellow	Link up, no activity
	Blinking yellow	Link up and activity
	Solid green	Link up, no activity, power present
	Blinking green	Link up, activity and power present

Logging in to the 27xx series zNID

The zNID 27xx series may be managed locally using Web UI or CLI. This section describes logging into the zNID locally using the subscriber facing LAN port, GE1.

Figure 9: Log into GE port 1 to reach the Web UI or CLI on the zNID



To login with a browser:

- 1 Connect an Ethernet cable from your computer to GE1 on the zNID.
- 2 Launch a browser and point it to 192.168.1.1.
- 3 Enter the username and password.

The default username/password is admin/zhone.

To login with a telnet session:

- 1 Connect an Ethernet cable from your computer to LAN1 on the zNID
- 2 Launch a telnet session and point it to 192.168.1.1.
- 3 Enter the username and password.

The default username/password is admin/zhone.

2

zNID 27xx INSTALLATION

This chapter can be used as separate installation instructions. This chapter explains how to unpack the zNID 27xx and install the zNID 27xx hardware. It includes the following sections:

- [Install the zNID 27xx, page 35](#)
- [Overview of zNID 27xx series installation, page 36](#)

Install the zNID 27xx

This section describes the procedures for installing the zNID. The overview procedure provides options for wall mounting or placing the zNID on a surface with or without the optional fiber tray.

This section contains the following topics:

- [Overview of zNID 27xx series installation on page 36](#)
- [Installation precautions on page 37](#)
- [Mount the zNID on page 38](#)
- [Manage the optical cable on page 42](#)
- [Fiber handling on page 42](#)
- [Testing optical power on page 42](#)
- [Optical fiber cable placement with the zNID mounting bracket on page 43](#)
- [Connect to network on page 44](#)
- [Connect power on page 46](#)
- [Connecting phone terminals on page 47](#)
- [Connecting Ethernet ports on page 48](#)
- [Complete the zNID installation on page 50](#)

Overview of zNID 27xx series installation

1 Select the location

Ensure that the environment is free of dust and excessive moisture and has sufficient ventilation.

The zNID may be installed on a desktop. The zNID should be placed in a clean dry place as is appropriate for electronic equipment

Installation precautions on page 37

Install the system in reasonable proximity to all equipment or rooms where the TV or computer reside for straightforward connections.

2 Mount the zNID.

Mount the zNID on page 38

3 Install service fiber to the zNID.

Connect to network on page 44

4 Connect AC power and/or UPS

Connect power on page 46

5 Connect the subscriber facing services

a Connect telephone (POTS) service

See *Connecting POTS on page 47*.

b Connect Ethernet service

See *Connect Ethernet ports on page 48*.

c Connect Video service

See *Connect RF coaxial port on page 49*.

6 Complete

Checking the indicators on page 50

Installation precautions

Maximum operating temperature should not exceed the range of 0° C to 40° C (32° F to 104° F).

Ensure that proper cable grades are used for all system and network connections. For best results, use the cables and connectors recommended in this document.

Connect the system to the power supply circuit as described in this document.

Before making fiber connections, be sure that the optical cable fiber tips and components are clean and free of dust and debris. Follow established cleaning procedures if required.



Note: Sharp bends in fiber cables create undesirable optical attenuation or loss. The zNID fiber tray provides fiber spools and hooks to avoid sharp bends in the fiber cable. A minimum bend radius of 30 mm (1.2 in) is recommended for stripped fiber.

La température maximum de fonctionnement ne doit pas dépasser le plage de 0° C à 40° C (32° F à 140° F).

Assurez-vous que les rangs de câbles corrects sont utilisés pour tous les raccordements du système et du réseau. Pour les meilleurs résultats, utilisez les câbles et connecteurs recommandés dans ce document.

Raccordez le système au circuit d'alimentation comme décrit dans ce document.

Avant de réaliser les raccordements des fibres, soyez sur que les embouts de fibre des câbles optiques et les composants sont propres et libres de poussière et autres débris. Suivez les procédures de nettoyage établies si nécessaire.



Note: Remarque : Les courbes serrées dans les câbles optiques créent une atténuation ou une perte optique indésirable. Le plateau de fibres zNID fournit des bobines et des crochets de fibre afin d'éviter les courbes serrées dans le câble optique. Un rayon de courbure minimum de 30 mm (1,2 po) est recommandé pour la fibre dénudée.

Mount the zNID

The zNID enclosure can be mounted on a vertical surface (wall) or placed on a horizontal surface such as a desktop or shelf.



Caution: To prevent damage to the enclosure, use screws appropriate to the mounting surface.

Précaution : Afin d'éviter d'endommager l'enceinte, utilisez des vis adaptées à la surface de montage.



Caution: Install the zNID fiber tray a proper height from the floor.

Précaution : Installez le plateau de fibres zNID à une hauteur correcte par rapport au sol.

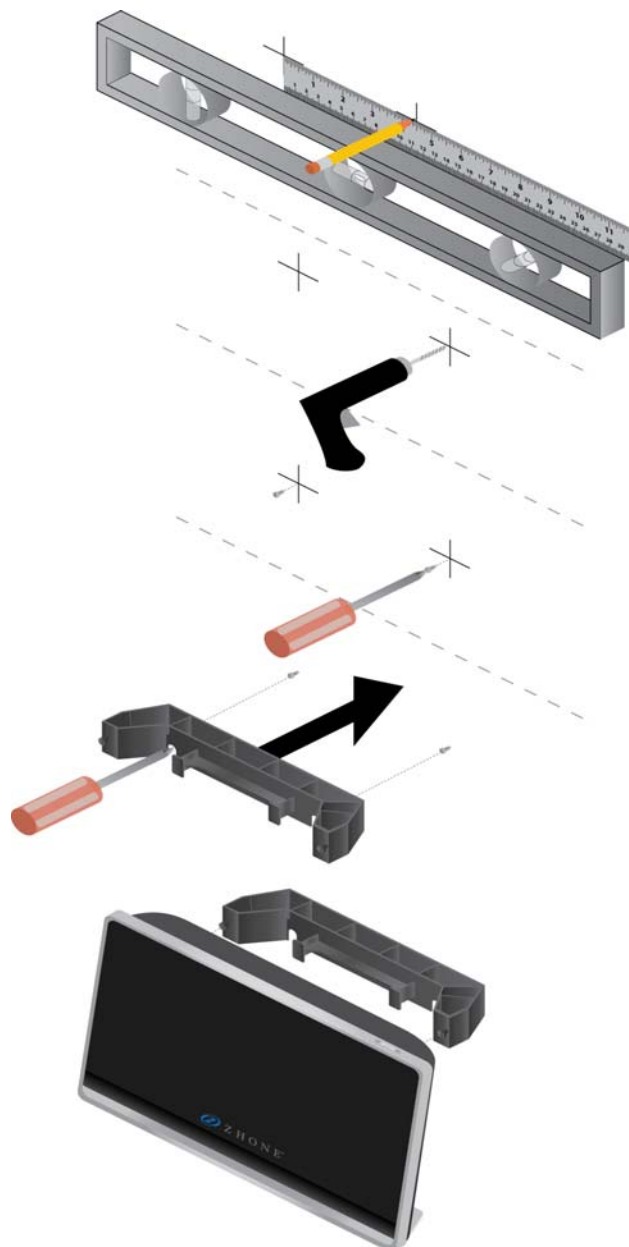


Caution: The zNID should always be mounted in a vertical orientation.

Précaution : Le zNID doit toujours être monté en orientation verticale.

Mounting the zNID with the wall mount

Figure 10: Installing the 27xx ONT on a wall



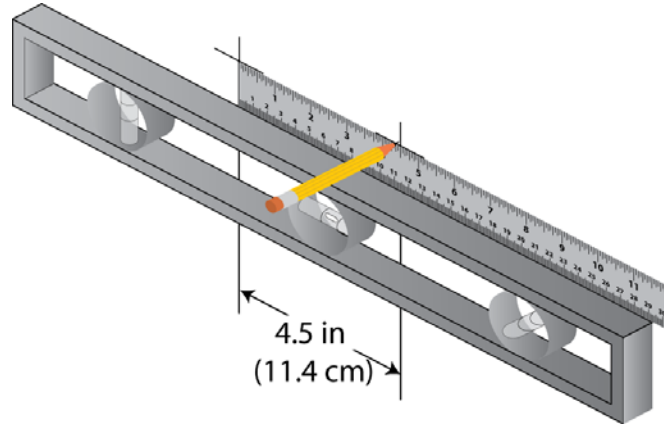
To mount the zNID 27xx directly on a wall:

- 1 Prepare the surface for mounting.

2 Mark the hole positions.

The holes for the fiber tray are 17.4 cm apart (about 6 7/8 inches) on the horizontal axis.

Figure 11: Mark on a level line



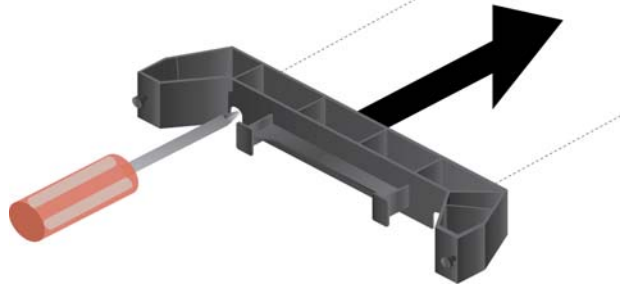
3 Drill the holes.

4 Attach the screws, leaving enough of the screw to slide on the mounting bracket.

Use screws appropriate for the type of surface to which the unit is mounted (i.e. wood, brick, CB, etc.).

5 Put the mount on the screws, then tighten the screws.

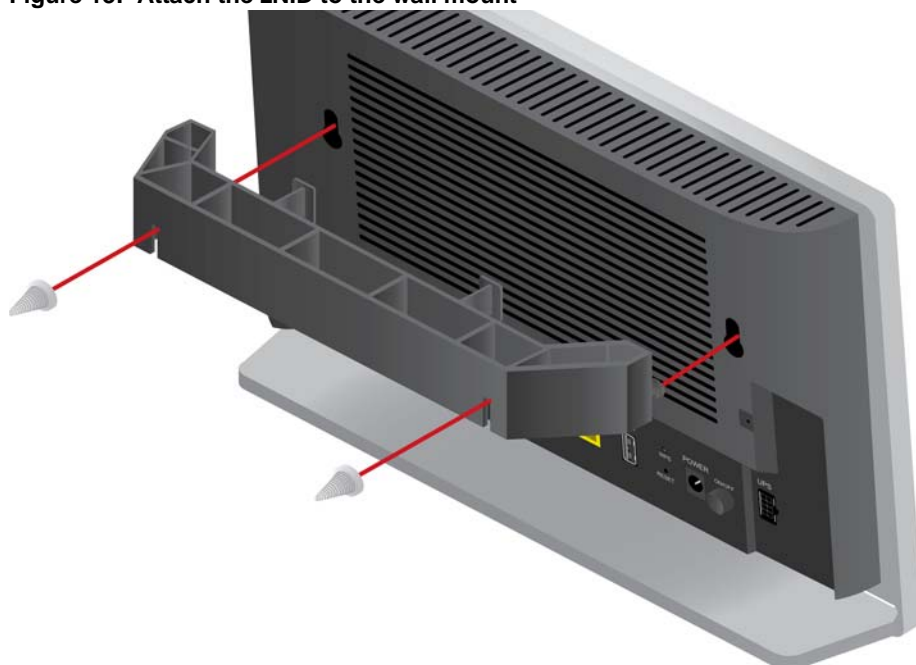
Figure 12: Attach the mount to the screws, then lightly tighten the screws.



The screws should leave enough space from being flush with the wall for the zNID legs to hold the unit firmly against the wall.

- 6 Attach the zNID to the nubs on the wall mount.

Figure 13: Attach the zNID to the wall mount



Note that the wall mount includes two prongs for wrapping fiber.

Manage the optical cable

When making a fiber optic connection, avoid touching the fiber cable ends to the outside of the mating connector. Touching can contaminate the connectors.

Fiber handling

Before making any connections, be sure that the optical cable fiber tips and components are clean and free of dust and debris.

The zNID fiber tray provides fiber spools and hooks to avoid sharp bends in the fiber cable. A minimum bend radius of 30 mm is recommended for stripped fiber and larger fiber needs a larger bend radius to guarantee the specified system performance.



Note: Sharp bends in fiber cables create undesirable optical attenuation or loss.

Testing optical power

Table 6 specifies how much laser power to expect on the fiber.

Table 6: Optical values for zNID-GPON-27xx


Parameter	1490 nm (Data Downstream)	1550 nm (RF Downstream)
Damage Level	+5 dBm	+5 dBm
Optical Overload	-8 dBm	+2 dBm
Maximum Usable	—	+2 dBm
Minimal Optical Signal	-28 dBm	-8 dBm
Mid Range Optical Value	-17 dBm	-4 dBm

Table 7: Optical values for zNID-GE-27xx

Parameter	Active Ethernet
Damage Level	+5 dBm
Optical Overload	-2 dBm
Minimal Optical Signal	-23 dBm
Mid Range Optical Value	-12 dBm

Optical fiber cable placement with the zNID mounting bracket

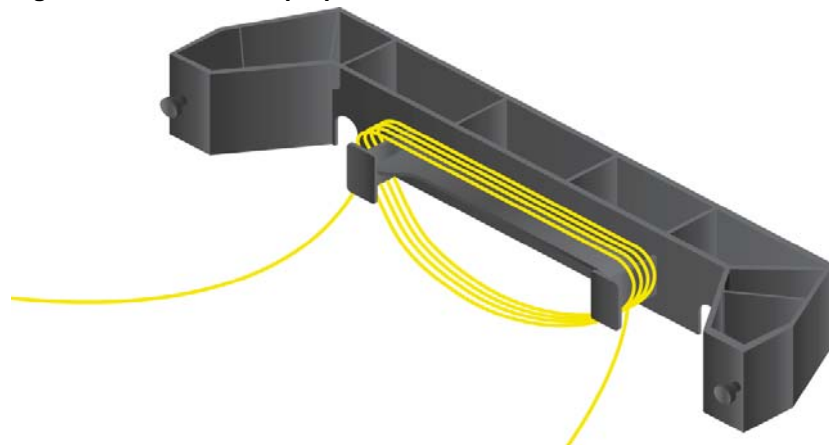
Using a fiber tray involves routing the optical fiber around the prongs, then physically to the SC connector in the zNID 27xx .

 **Note:** Sharp bends in fiber cables create undesirable optical attenuation or loss. The zNID enclosure provides fiber spools and hooks to avoid sharp bends in the fiber cable. A minimum bend radius of 30 mm (1.2 in) is recommended for stripped fiber.


To place the fiber cable in the fiber tray:

- 1 Inspect and clean the fiber connector to ensure it is free of impurities.
- 2 Make sure the fiber segment is properly installed in the fiber tray, excess cable is wrapped around fiber reels without having improper bends leaving enough loose cable so that it will not take too sharp of a bend to connect to the zNID.

Figure 14: Maintain the proper bend radius in the fiber



- 3 Test the fiber cable to verify clean signals.

 **Note:** It is recommended that the fiber cable be tested before finishing.

Connect to network

Connecting the SC connectors

Connect the SC connector from the electronics module to the SC connector in the zNID enclosure.

Observe the necessary precautions to decrease the risk of exposure to laser radiation.



WARNING! Risk of eye damage. At all times when handling optical fibers, follow the safety procedures recommended by your company.

AVERTISSEMENT ! Risque de blessure aux yeux. Lors de la manipulation de fibres optiques, suivez en permanence les procédures de sécurité recommandées par votre société.

Although Zhone optical products have a Class I certification, hazardous exposure to laser radiation can occur when fibers are connected, disconnected or broken. Handling of optical fibers without dust caps increases the risk of exposure. Exposure to either visible or invisible laser light can damage your eyes under certain conditions.

- 1 Remove the fiber service cover by removing the fiber service screw and then pull the fiber service cover forward.

Figure 15: Fiber service cover

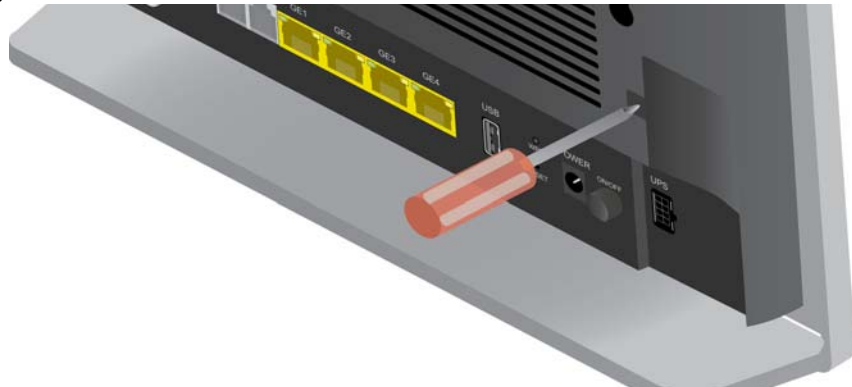


Figure 16: zNID-GPON-27xx models use SC/APC connector (green)



Figure 17: zNID-GE-27xx models use SC/UPC connector (blue)



- 2 Remove the dust covers from the SC optical connectors.
Clean the connector if necessary.
- 3 Plug in the fiber connector to connect the zNID to the network.



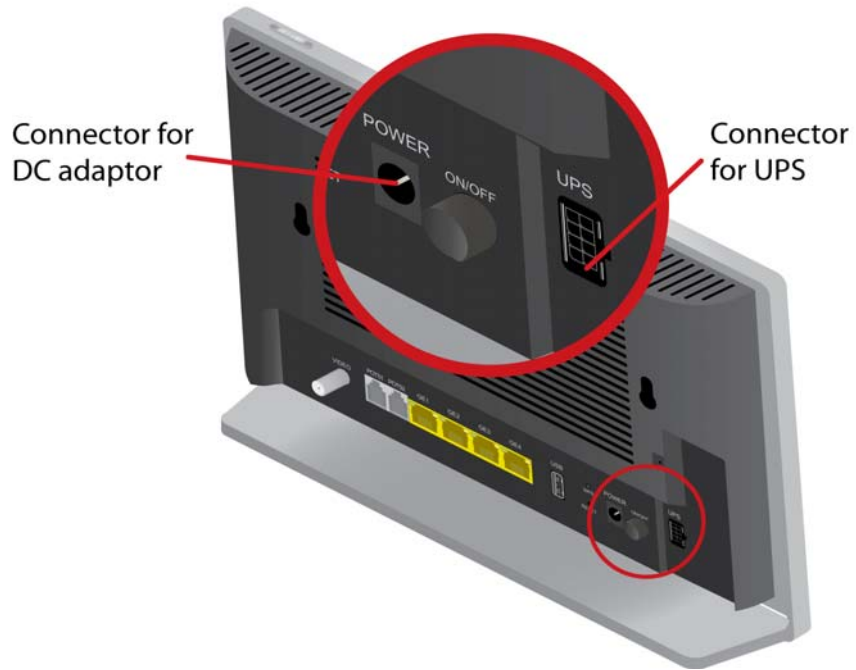
Note: To function properly the optical strength to the zNID should be with the limits shown in *Optical values for zNID-GPON-27xx* or *Optical values for zNID-GE-27xx* on page 42.

- 4 Reattach the fiber service cover onto the zNID including the fiber service screw.

Connect power

The zNID is powered by 12VDC using the power supply which is shipped with the unit. An optional uninterruptable power supply may also be used. The zNID 27xx has a round power port that accepts the barrel connector of the 12VDC power supply, and a UPS input port for connecting to a BBU.

Figure 18: The zNID 27xx power connections



Note: The Power input and the UPS input must not be used at the same time.

For pinout information for the UPS connector, see [UPS pinouts and alarms](#) on page 58.

Connecting phone terminals

Connecting POTS

The zNID 27xx models have the ability to connect POTS via RJ-11 connector.

The terminal connections are shown in [Figure 19](#).

- 1 Locate the subscriber's telephone wire pair.

Figure 19: Connect phone lines



- 2 If the wire pair is not terminated, follow local practices to attach an RJ-11 connector.
- 3 Plug the wire pair with RJ-11 connector into one of the zNID RJ-11 phone jacks.
- 4 Repeat steps 1-3 as needed to connect additional phone lines.

For pinout information for the POTS connector, see [POTS pinouts on page 52](#).

Connecting Ethernet ports

The zNID provides RJ-45 eight-pin modular jacks.

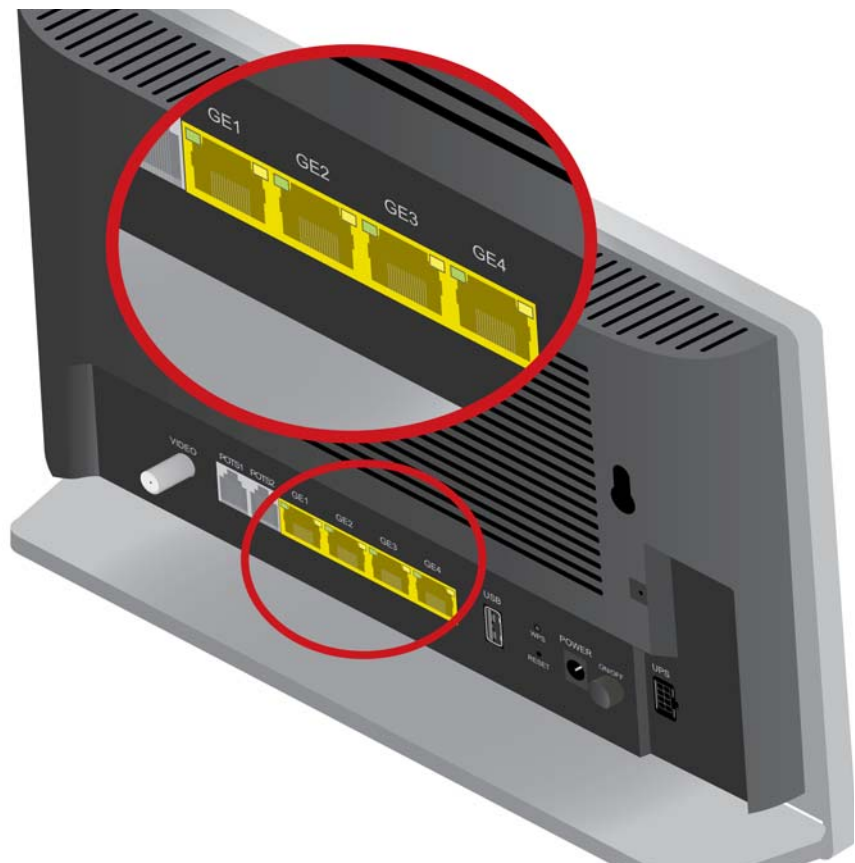
Connect Ethernet ports

The zNID provides RJ eight pin modular jacks (RJ45) for Ethernet connections. Ethernet connections can be used to deliver any packet services including IPTV, data, and VoIP.

For Ethernet services, connect a Category 5 or a Category 6 cable to an RJ45 interface as shown in [Figure 20](#).

- 1 Locate the Ethernet LAN cable.
- 2 If the cable is not terminated, follow local practices to attach an RJ-45 connector.
- 3 Plug the Ethernet cable into the appropriate RJ-45 Ethernet port.

Figure 20: The RJ-45 Ethernet ports.



- 4 Repeat steps 1-3 as needed to connect additional Ethernet cables.
- For pinout information for the Gigabit Ethernet connector, see [Gigabit Ethernet pinouts](#) on page 51.

Connecting RF video coaxial port

Connect RF coaxial port

Some models of the zNID provide a coaxial connector for RF video connections.

For RF video, connect a coaxial cable as shown in [Figure 21](#).

- 1 Locate the premises' coaxial cable.
- 2 If the cable is not terminated, follow local practices to attach a coaxial connector.
- 3 Screw the coaxial connector to the VIDEO coaxial port and tighten by hand.

Figure 21: The coaxial video port.



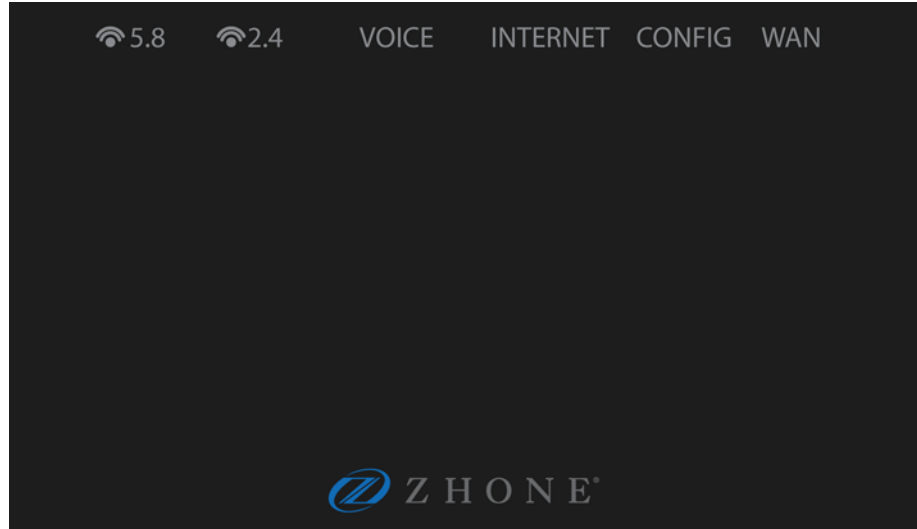
Complete the zNID installation

After making the physical connections, complete the installation by checking the indicators.

Checking the indicators

Check the logo indicator to verify that power is working.

Figure 22: Front of the zNID. The logo is also an indicator



The logo is an indicator that the unit is powered on and ready for use. For more information, see the [zNID 27xx series indicators on page 30](#).

3

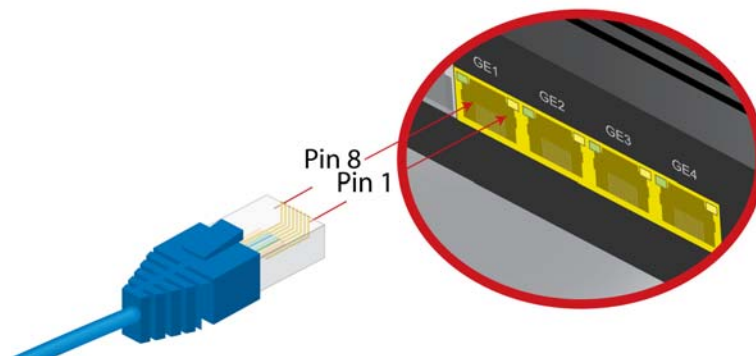
APPENDIX: PINOUTS

This appendix provides the following pinouts

- [Gigabit Ethernet pinouts on page 51](#)
- [POTS pinouts on page 52](#)
- [UPS pinouts and alarms on page 53](#)

Gigabit Ethernet pinouts

Figure 23: The Gigabit Ethernet ports use an RJ45 connector



The PoE zNID 27xx models are considered a “PSE Endspan” devices, integrating data and power on the same wires following the IEEE 802.3af (at) 'Alternative A' pinout, which is the industry standard for “active” PoE.

Note that other than the PoE power variation, the pinouts for PoE and non-PoE Ethernet ports is the same.

Table 8: Pinout for the GigE RJ45

Pin	Name	Description	For PoE Models
1	TX_D1+	Transceive data +	Vport Positive (pair 1)
2	TX_D1-	Transceive data -	Vport Positive (pair 1)
3	RX_D2+	Recieve data +	Vport Negative (pair 2)
4	BI_D3+	Bi-directional data +	
5	BI_D3-	Bi-directional data -	

Table 8: Pinout for the GigE RJ45

Pin	Name	Description	For PoE Models
6	RX_D2-	Receive data -	Vport Negative (pair 2)
7	BI_D4+	Bi-directional data +	
8	BI_D4-	Bi-directional data -	

POTS pinouts

Figure 24: The POTS ports use an RJ11 connector

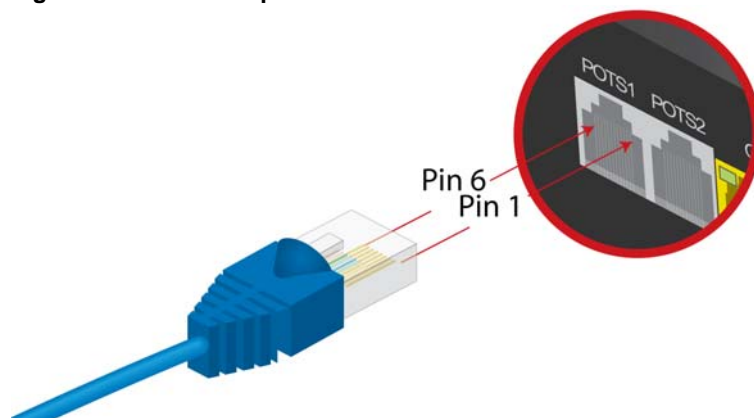


Table 9: Pinout for the POTS RJ11

Pin	Description
1	N/C
2	Tip2
3	Ring1
4	Tip1
5	Ring2
6	N/C

UPS pinouts and alarms

Figure 25: Pin out layout for the UPS connector

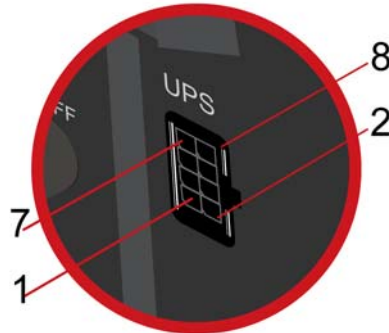


Table 10: Pin out descriptions for the UPS connection

Pin	Signal	Alarm description/Comments
1	+12V	UPS in
2	GND	UPS return. Connected to Signal GND on ONT
3	On battery	Open signal when on battery power
4	Signal return	Connected to Signal GND on ONT
5	Missing battery	Open signal when battery not detected
6	Replace battery	Open signal when battery should be replaced
7	GND	Connected to Signal GND on ONT
8	Low Battery	Open signal when battery is low

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