



Northern Light Technologies



N-Connex

Networks for harsh environments



- Plug n' play, high speed modular network with pre-terminated fibre eliminates splicing underground
- Turnkey data and voice communications solution featuring rapid deployment and easy maintainance
- Data networking via a gigabit backbone for monitoring and control systems
- Video surveillance and monitoring includes personnel and vehicle tracking plus emergency management, alarms and optimized ventilation
- Install the modules you need now and add more in the future as required

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Disclaimer

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NLT Networks is a proud industry expert in the design and installation of flexible communication, networking, monitoring and tracking systems for the underground mining and tunneling industries. Our solutions are used every day on roadways, subways, railways, mines, hydro and other harsh industries. N-Connex is simple, reliable and rugged.

Our engineers will work with you to design a solution that's based on your individual needs and requirements – we offer the industry's most reliable and durable communication solutions. The goal for every project is to help maximize the safety, productivity and profitability of our customers.

NLT Networks can also provide turn-key solutions to cover voice communications, tracking and visualization solutions. Our powerful software package is user friendly and designed for monitoring environmental conditions, emergency management and control functionality. N-Connex is the backbone that enables these proven solutions.



N-Connex

N-Connex is NLT Network's award-winning rugged, modular, IP67-rated networking solution for harsh environments.

From underground hard rock mines to process plants, from tunnels to heavy industry, N-Connex will provide a fit-for-purpose Wi-Fi and Ethernet solution like no other. As your demand for data, communications and IoT grows, N-Connex's fully modular system ensures your network will grow with you.

N-Connex enables a range of solutions that make use of Wi-Fi (802.11) and Ethernet connectivity.

Choose the functions and network configuration that meet your needs. Additional modules can easily be added to an existing installation to support growth.

Our award-winning design makes installation and maintenance easy. The modules hook easily onto an expandable custom rail system and then lock in place using a thumb screw. Units can also be mounted in a stand-alone configuration.

N-Connex modules simply "plug & play" using Power over Ethernet (PoE) and pre-terminated CAT6 Ethernet and fibre cables.

Range

- Distribution 2.0 Module
- Power 2.0 Module
- Battery Module
- Analog I/O Module
- Digital I/O Module
- Alarm Module
- Evacuation Module
- Bolt 2.0
- Lightning Bolt
- Extender
- Tracking Tags
- CAT6 & Fibre Cables

Distribution 2.0 Module



The distribution module is the core N-Connex component that delivers a highly reliable Gigabit Ethernet network. It supports many advanced network standards to optimize network performance, ease maintenance issues and secure network safety.

With the inclusion of eight managed PoE ports, two non-POE ports and four single mode fibre ports, it enables a range of solutions and network topologies. When combined with the N-Connex Bolt Access Points, strong and reliable Wi-Fi coverage in underground mines, tunnels and heavy industrial facilities is achievable.



Key Features

- Eight (8) 1-/100/1000 Mbps RJ45 POE ports
- Two (2) 1-/100/1000 Mbps RJ45 non-POE ports
- Four (4) fibre optic single mode ports
- Total PoE budget of 200W at 25°C or 160W at 40°C
- 52 Gbps switching capacity
- Optional battery backup power
- Network management capabilities
- IP67 protected enclosure



Power 2.0 Module

The Power Module provides power to the Distribution Module of the N-Connex system, the Power Module connects to a single phase 110-240 VAC source and supplies an output load of 48 VDC at approximately 5 Amps.

Adding the optional (recommended) Battery Module will provide the Power Module with an Uninterrupted Power Supply (UPS) function. The Power Module will also provide a dedicated connection for the Battery Module.

Key Features

- Selectable AC Input Voltage 110/240 VAC, 47 - 63 Hz
- Total power output of 200W at 25°C
- Status indicators
- IP67 protected enclosure
- UPS functionality (optional)
- Up to 8 hours backup with the optional Battery Module
- Standalone or quick-fit rail mounting

Edge Module



The Edge Module provides connectivity to a Gigabit Ethernet backbone. The standard module includes six (6) managed PoE ports to enable a range of solutions. Optionally, the Edge can include two (2) single-mode or multi-mode fibre ports.

As with all N-Connex modules, the Edge is fit-for-purpose and designed for harsh environments. The module can be mounted on NLT's proprietary quick-fit frame or mounted as a standalone device.

Combined with the N-Connex Bolt Access Point, strong and reliable Wi-Fi coverage can be achieved in underground mines, tunnels and heavy industrial facilities.

The Edge can be connected to the Battery Module for continued operation during power outages.

NLT's pre-terminated, rugged Ethernet cable connects multiple Edge modules to form a redundant network topology.

A wide range of advanced network standards are supported by the Edge module to improve performance, ease maintenance, and enhance security. The Edge and Distribution modules can work concurrently to provide robust solutions for large-scale networks.



Key Features

- Six (6) 10/100/1000 Mbps RJ45 PoE ports
- Two (2) fibre optic single/multi mode ports (optional)
- Max power per port 30W IEEE 802.3 af/at
- Network management capabilities L2+ and L3
- Security: Anti-DoS attack, IP-MAC-VLAN-Port binding, ARP inspection
- QoS: Flow-based redirection and rate limiting, Queue Scheduling Algorithm (SP, WRR, SP+WRR), Diff-Serv QoS
- Spanning Tree: STP (IEEE802.1d), RSTP (IEEE802.1w), MSTP (IEEE802.1s)
- 52 Gbps switching capacity
- Optional battery backup power
- IP67 protected enclosure



Battery Module



The Battery Module is designed specifically to provide backup power when the main 120/240 VAC power source is shut down.

The Battery Module connects with the Power Module to provide an uninterruptable power supply (UPS).

The Battery Module will provide 48VDC and will typically last for eight (8) hours (actual time depends on the overall load – determined by the number and type of PoE devices connected).



Key Features

- Nominal 48VDC to support active PoE
- Status indicator
- Vented, aluminum enclosure provides durability and efficient thermal management
- Recharges automatically via the Power Module
- Weatherproof IP67 enclosure
- Up to 8 hours backup



I/O Modules Digital & Analogue

The IO module allows sensor and instrumentation integration into the N-Connex network, which enables the monitoring and control of a wide range of systems.

The IO is compatible with any PLC or control network using Modbus TCP. When paired with NLT Network's flagship software Digital Mine, the display of gas sensors, fan speeds, paste instrumentation or any other compatible device is made possible.

Analogue I/O Key Features

- Six (6) analog inputs
- Two (2) analog outputs
- Two (2) Digital inputs
- Two (2) Digital outputs
- IP65 Protection

Digital I/O Key Features

- Eight (8) Digital inputs
- Eight (8) Digital outputs
- IP65 Protection

Alarm 2.0 Module



The Alarm Module provides an emergency warning solution for the N-Connex Network. It features a high-intensity strobe light, a 110db siren and an illuminated emergency push button.

The module is powered by PoE and is designed to be connected to N-Connex Distribution modules via CAT6 cables. Combined with NLT Networks Ethernet extenders, it may be positioned up to 300m away from the Distribution Module.



Key Features

- Remote trigger via Digital Mine or Modbus/TCP
- Local trigger via illuminated push button
- Weatherproof IP67 enclosure
- 110dB siren and high-intensity strobe
- Compatible with third party PoE equipment



Evacuation 2.0 Module

The Evacuation Module is an enhanced Alarm module that has similar functionality to the Alarm Module but includes an additional yellow/amber strobe and siren arrangement.

This second strobe/siren can be used for warning or testing purposes, leaving the primary red alarm/strobe to be used for true emergencies.

Features include a mute button so that the sirens can be momentarily muted to allow for voice communications.

Key Features

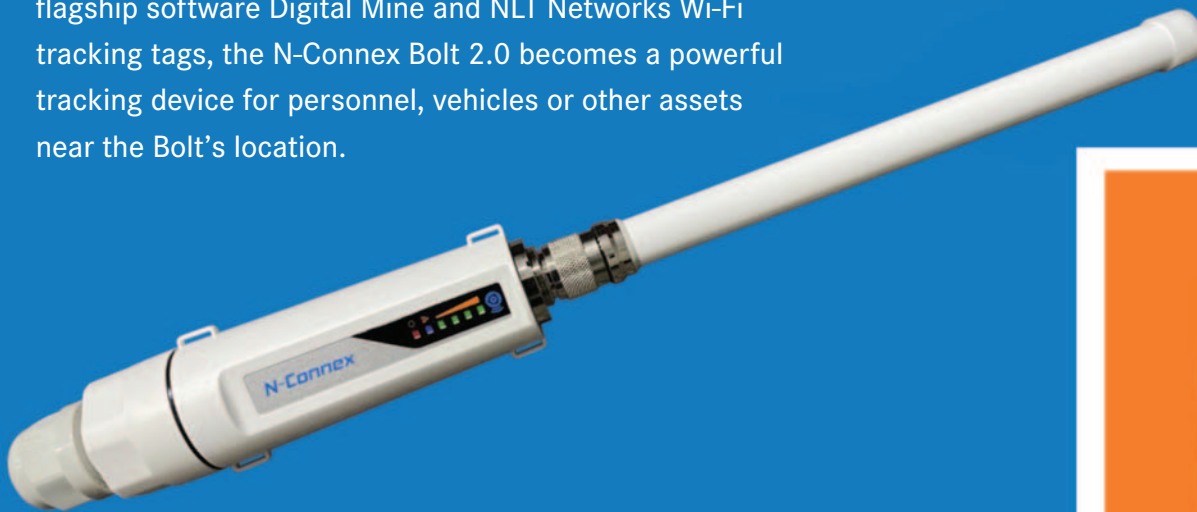
- Remote trigger via Digital Mine or Modbus/TCP
- Local trigger via illuminated push button
- Weatherproof IP67 enclosure
- Two 110dB sirens
- High-intensity strobe
- Compatible with third party PoE equipment

Bolt 2.0

The N-Connex Bolt 2.0 is a compact 2.4 GHz outdoor and underground wireless access point. It is equipped with an N-Type antenna connector to fit an assortment of industry standard antenna options.

Powered by PoE, a single Cat6 cable provides network connectivity and power, making installation easy and intuitive.

The secret power of the N-Connex Bolt 2.0 is the built-in Wi-Fi tracking function. When paired with NLT Network's flagship software Digital Mine and NLT Networks Wi-Fi tracking tags, the N-Connex Bolt 2.0 becomes a powerful tracking device for personnel, vehicles or other assets near the Bolt's location.



Key Features

- 802.11 B/G/N
- IP67 enclosure
- Up to four (4) SSIDS
- VLAN capable
- PoE powered
- N-Type antenna connector



Lightning Bolt

The Lightning Bolt is a compact dual-band outdoor and underground wireless access point. It is equipped with two N-Type antenna connectors to fit an assortment of industry-standard antenna options.

Powered by gigabit PoE, a single Cat6 cable provides network connectivity and power, making installation easy and intuitive. Additionally, the low power design ensures 802.11AC Wi-Fi can be achieved at up to 300m from the NLT Networks Distribution Module when paired with NLT Network's Cat6 extenders.

The secret power of the Lightning Bolt is the built-in Wi-Fi tracking Function. When paired with NLT Network's Digital Mine software and NLT Networks Wi-Fi tracking device, it is capable of tracking personnel, vehicles or other assets that are in the proximity of the Bolt.

Key Features

- 2.4/5 GHz Wi-Fi access point
- IP67 enclosure
- PoE+ gigabit Ethernet
- Dual-stream MU-MIMO
- Web-based management
- Ethernet extender support (up to 300M)
- Rugged N-Type antenna connectors
- * Bluetooth® on board

Extender



The NLT Networks Ethernet Extender provides a convenient system for extending Ethernet beyond the 100-meter Cat6 limit. The extender uses an active PoE connection to self-power and extend the Cat6 Ethernet connection up to an additional 100 meters.

A maximum of 3 extenders can be used in a daisy chain configuration to extend the connection up to 400 meters, while still providing up to 4 watts of power to PoE peripherals.

When combined with a N-Connex Bolt wireless access point, Wi-Fi coverage can be provided for an entire site. The Extenders are fitted with IP67 Cat6 receptacles to ensure waterproof and dust-free connections when using NLT Networks Cat6 pre-terminated Cables.



Key Features

- 10/100/1000 Mbps
- LED power indicator
- 100M Extended range
- 15/30W PoE Power
- Rugged metal enclosure
- Easy installation
- IP67 Ingress Protection



Industrial Switch

The NLT Networks Industrial Switch is designed to seamlessly integrate with various data acquisition systems, including SCADA and HMI systems. It supports MEF service delivery and offers timing over packet solutions, such as IEEE 1588 and synchronous Ethernet.

With its robust construction and small footprint, the NLT Industrial Switch is an ideal choice for critical applications that require reliable and secure networking capabilities.

Key Features

- Eight (8) 10/100/1000 MPPS PoE ports
- Two (2) 10/100/1000 MBPS NON-PoE ports
- Four (4) fibre optic single mode ports
- Total PoE budget of 240W
- L2+ features
- Support for spanning tree STP, RETP, MSTP
- Optional UPS monitoring
- DIN rail mount
- 52 GBPS switching capacity

Vehicle Tag



The Wi-Fi Vehicle Tag is the market's leading tracking tag, with more units deployed than any other tag of its kind. These rugged battery-powered tags can be attached to a variety of vehicles such as light vehicles, trucks or loaders.

Tagged vehicles can be accurately located in real-time in any environment. Wi-Fi Vehicle Tracking Tag beacons are received and processed by NLT's Wi-Fi access points, keeping infrastructure costs low and installation simple. Optionally, a beacon can be forced using a tag reader where high resolution tracking is required.

Key Features

- Rugged design
- IP65 Protection
- Vehicle powered
- Wi-Fi tracking
- Customizable beacon rate
- Optimised for Digital Mine software suite



Wi-Fi Tracking Tag

The Wi-Fi Tracking Tag is the market's leading tag, with more units deployed than any other tag of its kind. These IP65 rugged, battery-powered tags can be attached to people and a variety of equipment types, such as tools, containers, manufacturing equipment and vehicles. This enables tagged items to be accurately located in real-time and in any environment.

Wi-Fi Tracking Tag messages are received and processed by NLT Network's Wi-Fi access points, keeping infrastructure costs low and installation simple.

As with all tags, location determination is performed through a unique beaconing method that keeps network impact low and ensures scalability and long battery life.



Key Features

- Long life
- Rugged design
- Motion sensor
- Wi-Fi tracking
- Customizable beacon rate
- Optimized for Digital Mine software suite
- IP65 Ingress Protection

Kiosk



The NLT Kiosk is an intuitive touchscreen station that connects with Digital Mine. It assigns NLT cap lamps and tracking tags to personnel, contractors and guests. The Kiosk is NLT's solution for rapid and convenient assignment of safety equipment by removing the administrative burden and allowing devices to be used by multiple people.

The touch-enabled interface and exciter technology allows mine staff to quickly assign a tracking and safety device to their user credentials at the beginning of their shift. Powered by NLT's Digital Mine tracking Software and the N-Connex mine industrial network, the Kiosk helps ensure accurate tracking data, enhancing mine safety with efficiency.

The Kiosk may also be outfitted with an RFID card reader to be integrated with a mine's existing security or HR Systems, simplifying the assignment of tracking tags and lamps to personnel. Once assigned, the lamp or tag can remain assigned to a worker for a pre-configured period, ensuring operational policies are observed.



Key Features

- Touch screen
- Windows 10
- Optional card reader
- IP55 protection
- Intuitive interface
- Quickly assign personnel, vehicles or assets
- Digital Mine software integration

Fibre Patch Cable



NLT Network's Fibre Patch Cables provide backbone connectivity to our range of network devices. Pre-terminated lengths are available for ease of installation and custom lengths can be supplied for special applications.

Stainless Steel armor ensures the fibre cables are protected from crushing, cuts and abrasion. Rugged IP68 connectors are supplied on the network devices and fibre cables to enable quick, simple connections in harsh construction environments.

Key Features

- Pre-terminated for ease of use
- High chemical resistance
- Halogen free
- Crush resistant
- UV protected for outdoor use
- High tensile strength
- Abrasion and cut resistant
- Armored stainless steel Axial tube cable
- IP68 Rating



CAT6 Cable

The pre-terminated N-Connex CAT6 cables enable simple connection and maintenance for the Ethernet backbone of the N-Connex network solution.

The cables come pre-terminated in a variety of lengths and are fitted with a captive screw-on connector which mates with the RJ-45 connector on the Distribution Module of the N-Connex system.

The pre-terminated CAT6 makes installation simple, maintenance easy and stocking more manageable.



Key Features

- Rugged RJ-45 connectors
- IP65 with N-Connex products
- 23 AWG
- Low smoke zero halogen

Digital Mine suite of software applications



NLT has been developing cutting-edge software for over a decade. Our software applications cover productivity, safety, control and monitoring solutions and fully complement our line of rugged mine network equipment. From sending a private message to a miner underground to enabling Ventilation on Demand, from managing an evacuation to providing a graphical history of a gas level – we have an application that is fit for purpose and industry proven. The simple, user-friendly graphical interface is accessible to any authorized user.

DIGITAL MINE APPLICATIONS

TRACKING

NLT's solution for viewing & recording the location of personnel, vehicles and assets in real time, Tracking allows users to view the zones and historical records in the underground environment through a map-based interface.

ENVIRONMENT

The Environment application is NLT's solution for recording and viewing sensor conditions in real-time. Through a map-based interface, the application allows a user to view the status and historical record of an unlimited number of sensors (monitors), manage devices, send commands to third party equipment and trigger alarms.

MESSAGING

Through a text-based interface, the application allows a user to communicate their status or update progress on a task to teams or individuals over various platforms.

EMERGENCY

The Emergency application is NLT's solution for initiating warnings and evacuations at the module, zone or site-wide level in real-time. Through a map-based interface, the application allows a user to view the status and trigger alarming functions of N-Connex Alarm and Evacuation Modules.

REPORTING

NLT's solution for reporting on different variables in the mine, the application allows a user to create, schedule and export reports on the recorded status of multiple operations in the mine.

NLTV

NLTV enables safety and productivity in mines by providing live asset (personnel, vehicles or fixed assets) and job-specific information to personnel underground, on the surface or at other operating areas.

VOICE & AUDIO COMMUNICATIONS



In the tunnel and on the surface, NLT Networks provides wireless coverage for voice

WLAN Transceiver Handheld

The Wi-Fi signal allows WLAN transceiver handhelds to be used. These units are equivalent to standard two-way radios but offer significant advantages. The WLAN transceiver handheld that is shown can have up to 50 different “talk groups” (Channels) programmed.

Simply select the appropriate talk group and press the Push-To-Talk (PTT) button. The unit also supports sending and receiving short messages.



RADIO SYSTEM INTEGRATION

Where a tunnel has an incumbent VHF or UHF radio system, NLT can easily integrate our Digital Network to re-broadcast any voice communications over both the existing radio system and the new Digital Wi-Fi network.

The RoIP gateway allows you to bridge almost any modern communications system to Icom’s universe of Network products and more. Interconnect a variety of radio protocols from Icom’s IDAS™ conventional/trunking systems, wireless LAN, analog, P25, DMR systems and even SIP phones. Enhance and ensure communication for any operation.

INDUSTRIAL NETWORK CAMERAS



NLT Dahua cameras combine great value, high performance and advanced features. Additionally, they are compatible with your existing CCTV system (ONVIF-compliant). A wide range of AI features are offered, including face detection / recognition, auto-tracking and smart motion detection.

A Video Monitoring solution is easy to install when the NLT N-Connex network is operational. The N-Connex Distribution module provides up to eight (8) Power Over Ethernet (PoE) ports and two standard Ethernet ports. These can all be used to connect IP Network cameras. The Gigabit fiber backbone of N-Connex is sufficient to carry a significant number of video signals to the Network Video Recorder (NVR).

Here are four of NLT's most popular IP cameras and the NVR that can meet almost any surveillance need.



4MP/8MP Vari-focal Bullet

- 4MP (2560 × 1440) @25/30 fps, max. supports 4MP (2688 × 1520) @20 fps
- Built-in IR LED, max IR distance: 60 m
- Smart H.265+ & Smart H.264+
- Intelligent detection: Intrusion, tripwire
- IP67 protection, IK10 protection



Panoramic 4-Directional Dome (4 × 5 MP)

- 5MP (2592×1944) @25/30fps
- Max. IR LEDs Length 30m
- H.265&H.264 dual stream encoding
- Micro SD memory, IP67, IK10, PoE+



8MP 40X PTZ AI Speed Dome

- 8MP-4K (3840 × 2160) @ 25/30 fps
- Powerful 40x optical zoom
- Smart H.265+
- Smart wiper
- IP67



4MP 4X PTZ Dome

- 4MP (2560 × 1440) @25/30 fps
- Powerful 4x optical zoom
- Smart H.265+ & Smart H.264+
- IP66 protection, IK10 protection



NVR 2U 8HDDs (16/32/64 CH)

- AI by recorder: 2-CH face detection and recognition, 4-CH perimeter protection, and 8-CH SMD Plus
- Smart H.265+/H.265/Smart H.264+/H.264/MJPEG decoding
- Max. 384 Mbps incoming/recording/outgoing bandwidth
- Support Raid 0/1/5/6/10