norphonic

Heavy Duty VoIP Telephones

Application Guide:
Mining Telephone / Mine Phone
Underground Mining Communications

This document considers how Heavy Duty VoIP Telephones can be used in underground mining areas to improve communications and safety. It will also look at critical issues to consider when installing an effective telephone system in an underground Mine.

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VoIP Mining Telephone / VoIP Mine Phone

This article considers how VoIP Mining Telephone / Mine Phone Systems can be used to improve mining production and safety whilst reducing costs. It will also look at critical issues to consider when installing an effective underground mining communications system.

A challenge for the Mining industry
Mining operators are faced with three key objectives: 1. Increase production output from the mine, 2. Reduce operational costs, and 3. Improve safety.

In order to increase production, a mine site owner has to focus his/her attention on speeding up the drilling/ boring, whilst removing bottle-necks when it comes to delivering the metals quicker to the surface. A mine site owner is also tasked with reducing operational costs associated with the mine operation. This can be achieved in numerous ways, such as installing automated systems or evaluating other ways of saving money on fixed outgoings such as maintenance bills. Finally, a mine site owner need to be focused on safety at all times, minimising the risk for injuries and fatalities.

Safety has long been a controversial issue in the mining business. While mining today is substantially safer than it was in the previous decades, mining accidents are still relatively frequent and are often very high profile, such as the Quecreek Mine Rescue saving 9 trapped Pennsylvania (USA) coal miners in 2002 or the Copiapó Chile mining accident in 2010 when 33 miners became trapped underneath the surface. The constant threat of technology failure and mining accidents remains a significant concern for many miners throughout the world, including Indonesia, South Africa, Chile, Brazil, Peru, Russia, China, Mongolia, USA, Canada and Australia.

Accidents can easily happen in sub-surface mines, both in terms of failures in construction as well as un-intended exposure to harmful gases, oxygen starvation, heat and dust. An example of a challenging environment, is the TauTona mine in South Africa, which began operation in 1962. By 2008, the mine reached some 3.9 km underground, making it the deepest mine in the world, employing some 5,600 miners. Air conditioning equipment is used to reduce the heat from 55 centigrades down to a bit more bearable 28 centigrades, but even so, the mine remains an extremely dangerous place to work and an average of five miners die in accidents each year. In the 2008 financial year, four employees were killed at the TauTona mine.

The Answer
The success of any mining operation depends on effective two-way communications. From maximising production and preventing disruptions to ensuring life safety of mining workers, an effective communications tool is one of the most important installations in a subsurface mine.
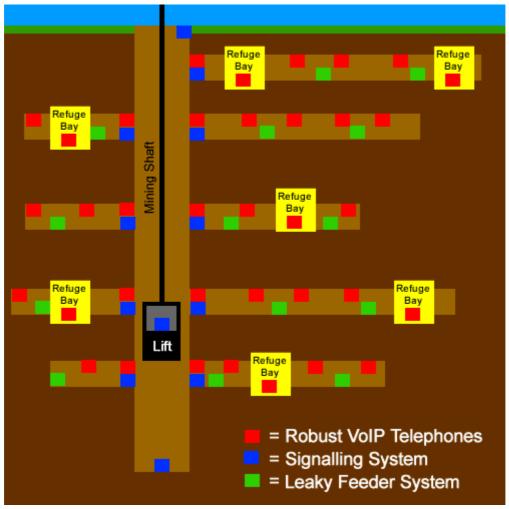
VoIP mining telephones are essential in order to prevent damage, reduce down-time and to increase production. An IP-based mining telephone / mine phone system is also important for mine site rescue efforts, to deal with injuries, fatalities and entrapment situations. A VoIP telephone installation can also help reduce cost, by virtue of converging voice & data networks and by eliminating large telecom bills.

Norphonic has a history of delivering Heavy Duty VoIP telephones into some of the world's most challenging areas, ensuring essential voice communications when it is most needed. In the remaining part this article we shall look at some of the issues that needs to be addressed when selecting an effective telephone solution in your underground mining application.

A Typical Underground Mining Communications System

The below figure shows a typical Heavy Duty VoIP Telephone installation within a sub-surface mining environment. Telephones can either be connected in a circle formation to provide a redundant network or in a line to connect directly to a PBX. The distance between telephones can differ greatly in various environments, but it is usually recommended that organisations do not extend beyond 150 meters between telephones for safety reasons.

The above schematic shows a mine shaft going down into the underground mine. Such mining shafts can sometimes be 12 stories deep and reach 3-4 kilometers below the surface. There are usually many horisontal "arms" shooting off the main mining shaft. These horisontal tunnels can be many kilometers long.

In the above schematic there are 3 underground communication systems installed: a robust VoIP telephone system; a signaling system; and a leaky feeder system. There are a number of reasons why a mining company may need several communications solutions installed. First, local governments often legally require mining companies to have at least two different communication systems in case of a critical system failure. Secondly, there are practical / operational reasons why a company may opt to have more than one communication system installed.

In the example schematic drawing above, Robust VoIP Telephones (marked in **RED**) are installed at regular intervals on the fiber optic network running along the mining tunnels. This allows miners to communicate with each other or with the central control room at surface level. These VoIP telephones are also installed in the Refuge Bays (marked in **YELLOW**). Refuge Bays are specifically constructed underground evacuation rooms stocked with drinks, foods and medical supplies for miners in case of emergency evacuation. A signalling system is also installed close to the mining shaft (marked in BLUE), allowing miners to call for the elevators (lift) and robust VoIP telephones are installed next to the signaling system devices to allow clear communication with the elevator operator at surface. In the example, a leaky feeder communications system is also installed (marked in **GREEN**) which consists of a coaxial cable which emits and receives radio waves. The cable is leaky in that it has gaps or slots in its outer conductor to allow signal to leak into or out of the cable along its entire length.

VoIP vs. Analogue Mining Telephones / Shaft phones?

VoIP telephones (VoIP is an acronym for "Voice over Internet Protocol") allows users to make telephone calls using their existing data networks rather than from the traditional analogue land line service. These calls can be made from one computer to another or to landlines as well. There are a number of important reasons why most organisations now are converting their system into a VoIP telephone systems. This includes both economical and practical safety reasons:

First, since the VoIP telephone uses IP fiber networks to carry voice communications, a mine site operator can converge his voice and data network which means that it is considerably cheaper to maintain and operate one VoIP / fiber network instead of two separate systems for data vs voice.

Second, Norphonic VoIP mining telephones have in-built software features which makes this VoIP telephone very attractive in terms of reducing cost underground mining applications in particular. For example, all Norphonic Heavy Duty VoIP telephones comes with a self monitoring and fault check function as standard. This is a highly useful feature, as it allows central control room staff to automatically know if the telephones is working at any given time. The control room can also get information about the telephone components, if the telephone hook is left in an on/off position etc. This is obviously an important safety feature in many underground applications as, by comparison, there is no way of knowing if a comparable analogue telephone will work until you actually try to use it.

Third, with Norphonic robust VoIP mining telephones, the control room staff can use the Remote Management Feature to upload software updates from a central location, switch the telephone on/off, or control other telephone components remotely, thereby slashing the maintenance costs usually encountered with comparable analogue systems.

Fourth, since a VoIP telephone can use the existing LAN / IP data networks to carry voice, it offers much lower installation and operating costs than traditional analogue telephones. There are no hard-increments to worry about and you do not need to send down and electrician to install IP technology. A benefit with the Norphonic Mining Telephone is that it is based on open SIP standards. This means that you can use the Norphonic SIP function and transfer the calls to any IP PBX free of charge over your IP network.

Fifth - and finally - IP is the future of all industrial comms. All modern system today runs on IP technology (ventilation fans, fire detection, surveillance cameras, access control, gas detection etc) and it is only natural to use that same network for telecoms. Not to mention saved calling cost by using your existing data network for telecom purposes.
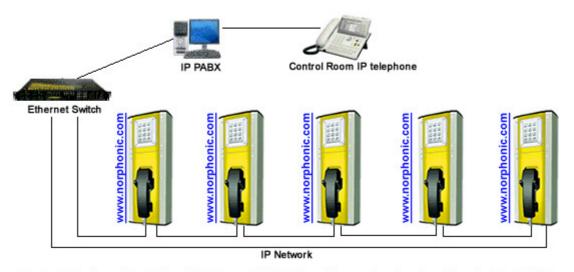
The Norphonic VoIP Mining Communications System

The Norphonic Heavy Duty VoIP Mining Telephone is a robust, weather resistant telephone built to withstand extreme temperatures, humid and dirty environments. It is perfectly suited to underground mining areas with an overall weather resistance to IP65. The unit is manufactured in a durable aluminium casing, resistant to rust, condensation and corrosion. The hookswitch has no moving parts, making the telephone ideal for use in mining environments exposed to high levels of dust or grime. It comes complete with a 80 dB ringer as standard and an optional visual Flashing Light Beacon, ideal for use in noisy areas where a ring may not easily be heard.

A key feature is the Quality of Service (QoS) functionality, which enables optimal priorisation of network traffic and impeccable transfer of voice and data. The telephone can be maintained and upgraded from a remote location, thereby slashing maintenance costs associated with conventional telephone systems. A Self Monitoring and Fault Check function is also included, ensuring maximum up-time and further saving maintenance costs.

The Norphonic Heavy Duty VoIP Mining Telephone solution is typically connected to an IP based Public Branch Exchange (PBX) on a fiber / Ethernet network as shown in the example below:

Example: Norphonic VoIP Mining Telephone Solution

IP PABX   Control Room IP telephone

Ethernet Switch

www.norphonic.com   www.norphonic.com   www.norphonic.com   www.norphonic.com   www.norphonic.com

IP Network

(Norphonic has two optional integrated single mode 100Mbit type LC connectors for redundant networking - RSTP)

Self-Monitoring and Fault Check Functions

To further reduce maintenance costs and improve overall uptime, Norphonic offers automatic health-checks and fault sensing on all VoIP mining models. This valuable feature gives the control room staff an immediate notification if there is a connectivity or function fault, thereby ensuring timely repair and maintenance of your mine site communications system. This function offer surveillance capabilities of:

- Hook sensing (ie: hook off/on)
- Audio Self Test (microphone / headset check)
- Fiberport 1 status (link check)
- Fiberport 2 status (link check)
- RJ 45 port status (link check)
- Firmware version and firmware update status

The audio self-test involves testing the function of the SIP software, audio circuits and the handset by playing and recognizing a set of DTMF tones in the handset at pre-configured time intervals. The alarms are reported over the fiber-optic or cat5 Ethernet (where applicable). The phone can provide Modbus UDP, Modbus TCP or SNMP traps for the self test and on-hook / off-hook event. Fiber link failure does not generate a trap but it can be polled. The advantage of using SNMP or Modbus protocols is that these are standardised tools for monitoring other network equipment, including switches, routers, PBX systems, VoIP gateways and pretty much anything you want to monitor inside your mining environment.

SCADA or Business Process Management Integration

The inclusion of Modbus TCP, UDP and SNMP open standard protocols in all Norphonic VoIP telephone models mean that it easy to integrate Norphonic mining telephones with your existing supervisory control and data acquisition (SCADA) system.

Norphonic Heavy Duty VoIP Telephones can therefore easily integrate with existing IT infrastructure such as business process management, SCADA systems or surface-based control equipment. This provides unique flexibility when integrating process-reported alarms.
Ethernet Networks are Ideal for Underground Communications

Modern and efficient mining facilities utilise improved control methods and increased mechanisation to achieve optimum productivity. Ethernet / Fiber optic networks have a proven track record within underground areas to monitor, analyse and control both equipment and facilities, increasing both safety and production efficiency.
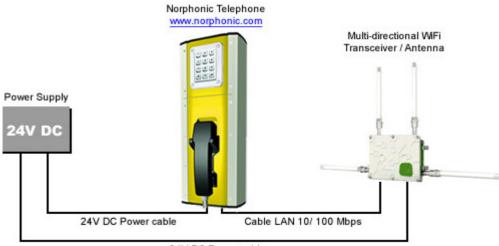
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Fiber Optic / Ethernet networks are today used to manage, control and interconnect a wide range of technology in underground mining environments, including:

- VoIP Telephone systems
- Conveyor Belt, and Ventilation Control systems
- SCADA systems
- Interlocks, and Access Control systems
- Fire Detection systems
- Remote Video Monitoring systems

Considering a Wireless / WiFi VoIP Mining Telephone Solution?

Although the Norphonic VoIP mining telephones are typically interconnected to the Ethernet network using fiber cables, Norphonic IP telephones can also be connected to an external WiFi tranceiver / antenna in order to transmit and receive signals, thereby providing a Wireless solution for mining areas. See the example schematic below.

Example: Wireless Emergency / Industrial Telephone Solution

The flexibility of the Norphonic VoIP Mining Telephones therefore means that it could be used on a fixed fiber cable layout or in a wireless VoIP environment. There are no particular barriers to installing Wireless / WiFi solutions, but the network designer should be aware of potential voice quality pit-falls and plan for these. Some key things to be aware of in terms of voice quality when designing your network layout:

- *Latency* - delay from data is transmitted until it is received. Noticeable in conversations if latency goes above 100ms.
- *Jitter* - variances in latency between packets. High jitter means large variance in packet latency and degrades speech quality.
- *Out of order data-packets* - degrades speech quality, is often caused by jitter

IP Telephony through Leaky Feeder ("Line-of-Sight" / IP - TCP Solution)

Though Norphonic is most frequently connected via fiber cable to the Ehternet Network, it can also be interconnected using a Leaky Feeder system. As mentioned earlier, a leaky feeder underground communications system consists of a coaxial cable which emits and receives radio waves.

In cases where the end user wants to use this for VoIP communications, the Norphonic telephones can be connected to a "two-way" leaky feeder system via an external smart amplifier to provide high speed TCP / IP data transfer. These external amplifiers are inserted at regular intervals, typically every 350 to 500 meters, to boost the signal. Such Leaky Feeder Amplifier systems make use of industry

standard modem technology to provide wired and wireless Ethernet applications such as computer networking, IP cameras and Norphonic VoIP Telephones in underground hotspots.

However, it is important to be aware that these Leaky Feeder systems are limited because of the high frequency they use. Leaky Feeder transmissions cannot pass through solid rock, which limits the system to "line-of-sight" applications only. This is particularly important to be aware of when installing telephones in underground refuge rooms where the doors may also limit the signal. Additionally, it is important to keep in mind that the Leaky Feeder system have to be able to send and receive signals (two way leeky feeder / transceiver) as the VoIP telephone need to send and receive data (voice).

Another limitation of Leaky Feeder solutions is the noise level in these networks. Because the signal is amplified and picked up at other points, there is easy for other machines and equipment to cause inference with the signal. This means that, the miner can be very difficult to hear due to inherent network noise caused by LOS (line of sight) and other signal amplification limitations. For this reason, it is usually recommended that mining organisations install an ethernet fiber calbe network even if they already have a leaky feeder network installed. This is both for redundancy reasons but also for emergency communications needs, inside emergency rooms where leaky feeder systems can not operate due to line of sight limitations.

What to look for in a VoIP Mining Telephone?

There are many issues that needs to be addressed prior to commissioning an IP mining telephone, such as evaluating the installation environment, functionality and temperature ranges. Below are some key pointers to look at when choosing your underground communication system:

- *Can the system work with your existing systems and infrastructure?* The key thing to look for in this regard, is to examine if the telephone is built on Open Standard SIP technology. Norphonic Heavy Duty VoIP systems are built on Open Standard SIP technology, and tested to be compatible with all major PBX and network systems (Alcatel, Cisco, Asterisk, Broadsoft etc).

- *Is the system future proof? Can the system be upgraded or changed in the future without having to change all the telephones and the entire network?* All Norphonic Heavy Duty telephones can be changed with other network equipment (PBX, switches etc) without loss or differentiation to the level of service.

- *Is the telephone dust and water proof?* Underground mines are some of the most challenging areas in the world, exposed to extreme levels of dust and water. The highest level of dust protection is essential. The ingress IP rating to IP65 is therefore recommended in all mining applications. See definition of Ingress Protection in the below Glossary for further information.

- *Is the telephone condensation proof?* –This can otherwise lead to severe problems in operation as water can easily form inside the unit, affecting performance.

- *Does the hookswitch contain moving parts?* All Norphonic Heavy Duty VoIP telephones do not contain moving parts, and can therefore operate in extreme areas where dust or exposure to grime is a challenge for traditional telephone systems.

- *Can the system work in extreme temperatures?* Underground mines can be notoriously hot and/or cold, so a wide operating temperature functionality is recommended, from –20 up to +55 celcius degrees.

- *Does the telephone incorporate VSQ - Voice Sound Quality?* This is a standard feature in all Norphonic telephone systems, ensuring loud and clear sound, even in noisy ambiance areas.

- *Does the VoIP telephone incorporate a QoS – Quality of Service functionality?* This feature, found in all Norphonic telephones, guarantees a certain level of performance in a data flow, ensuring impeccable delivery of voice communications in an IP Network.

- *Is the telephone body, keypad, cord and handset able to withstand corrosion from the geothermal gases?* Norphonic has a coated Aluminium body designed for underground mining and can withstand geothermal gases up to 20% sulphur and 3% hydroperoxid. The corrosion-resistant Norphonic telephone can therefore be installed in all mineral mine-sites, including copper, gold, platinum, iron ore, nickel, diamond or zinc mines.

- ***Is the telephone colored in such a way that it is easily identified by users?*** The Norphonic Heavy Duty VoIP comes in a bright yellow color as standard. Colors can also be customised depending on the user needs and order volumes.

- ***Is the system easy to install and to maintain?*** Norphonic Heavy Duty VoIP telephones are easy to install and have in-built status monitoring and fault check functions. This means that the status of the telephones can be monitored from a remote location, saving you considerable maintenance costs.

- ***Is the telephone CE approved?*** CE marking means that the product is certified to meet EU consumer safety, health or environmental requirements. End users should be aware that some telephones use the intentionally confusing term "CE" for "China Export", and the only way consumers can check this is to closely examine the CE mark/ logo as the two logos are very similar.

- ***Can you obtain local service in case you need replacement parts or installation support?*** Norphonic has a global service partner network and can deliver local service and replacement in key mining areas such as South Africa, Australia, United States, Canada, Mexico, Chile, Indonesia and Russia. Contact Norphonic today to obtain a quote for a mining telephone solution for your mine.

Important Copyright Notice

GLOSSARY – Definition of Relevant Terms

Access Control Telephone
Often used as a part of a larger Access Control system to communicate with a central control room at door entrance points and access gates.

Armoured Stainless Steel Cord
Vandal proof telephone cord

ATEX Telephone / Eex Telephone / Ex Tele
The ATEX directive consists of two EU (European Union) directives describing what equipment and work environment is allowed in an environment with an explosive atmosphere. ATEX derives its name from the French title of the 94/9/EC directive: "Appareils destinés à être utilisés en ATmosphères EXplosibles". As of July 2006, organisations in EU must follow the directives to protect employees from explosion risk in areas with an explosive atmosphere. Employers must classify areas where hazardous explosive atmospheres may occur into zones. The classification given to a particular zone, and its size and location, depends on the likelihood of an explosive atmosphere occurring and its persistence if it does. The aim of directive 94/9/EC is to allow the free trade of 'ATEX' equipment and protective systems within the EU by removing the need for separate testing and documentation for each member state. See the ATEX Directive for further information.

Autodial on handset lift
The telephone will automatically dial a number when the handset is lifted, thereby eliminating the need for the user to remember a telephone number when in distress.

BPDU
Bridge Protocol Data Unit. Data packets which are sent from STP, RSTP and MSTP switches to share information about the switches.

Braille
The Braille system is a method that is widely used by blind people to read and write, invented by Luis Braille in 1822 and used on many telephone keypads worldwide

CE mark / CE approved Telephone
CE approval / marking means that the product is certified to meet EU consumer safety, health or environmental requirements. End users should be aware that some telephones use the intentionally confusing term "CE" for "China Export", and the only way consumers can check this is to closely examine the CE mark/ logo as the two logos are very similar.

Door Telephone
Used to communicate with a central control room to facilitate the control and access to closed sites such as utility power factories

Elevator Telephone
Used to call for help in case of emergencies including entrapment or fire.

Emergency Roadside Call System (ERCS)
See definitions under "ERT -Emergency Roadside Telephone" and "Emergency Telephone"

Emergency Roadside Telephone (ERT)
Emergency Roadside Telephones (ERT) are typically used in "SOS" Call Boxes alongside public highways, inside tunnels and on bridges. Emergency Roadside Telephones (ERT) are often referred to as: RET - Roadside Emergency Telephone, RT - Roadside Telephone, ERCS - Emergency Roadside Call System or ETS - Emergency Telephone System.

Emergency Telephone
Often referred to as a SOS telephone or Emergency Callbox. This is a common generic term for a telephone which is used in emergency situations, to notify a central control room about a fire, evacuation or entrapment. Emergency Telephones are often used in places where people may feel vulnerable or unsafe at night, such as University Campuses, Underground Car Parking Facilities, Public Swimming Pools or along the Coastline where the public may wish to report swimmers or boats in danger at sea.

Emergency Telephone System (ETS)
See definitions under "ERT -Emergency Roadside Telephone" and "Emergency Telephone"

Ex Telephone / Eex Telephone
An "EX telephone" is a general term for a telephone that is approved to be used in potentially explosive areas or environments also known as "unsafe areas" (including Gas refineries, Oil rigs or deep coal mines) where a combination with sufficient oxygen and fuel in gas, mist, vapor or dust form, can cause an explosion. Methane, hydrogen or coal dust are examples of possible fuels. See also relevant definitions under "ATEX Telephone" and "Unsafe Area" and "intrinsically safe"

FPSO
Floating Production Storage Offloading (FPSO) - a term used on the Norphonic website to describe the vessels used to store and offload oil & gas.

Heavy Duty Telephone
Generic term for industrial and emergency telephones used in challenging environments. For example telephones that that are exposed to high levels of air humidity, dust, vibration, shock, extreme temperatures, rain, seawater or attempted vandalism. Heavy duty telephones is used in many applications including transport, offshore, production floors, chemical processing sites, mines, transit tunnels, university campuses and other public places.

Industrial Telephone
General term for a telephone used in challenging areas, for example production floors, wind turbines, machinery or other industrial environments

Intrinsically Safe Telephone
Intrinsically Safe Telephones are telephones that are approved for use in chemical plants, refineries, coal mines, grain elevators and any other environment where volatile gases and dust are a major consideration.

IP Rating / Ingress Protection Rating /
The IP rating classifies the degrees of protection provided against the intrusion of solid objects, dust, accidental contact, and water in electrical enclosures. The standard aims to provide users more detailed information than vague marketing terms such as "waterproof". The standard consists of the letters IP followed by two digits and an optional letter: for example, the Norphonic Heavy Duty VoIP telephone have been approved to the highest rating against dust "dust proof" (6) and can be sprayed with water by a water jet from any direction without any harmful effects (5). Therefore, in this case, the Norphonic Heavy Duty VoIP telephone has a rating of "IP65".

Jitter
Jitter is a term used in VoIP data communications and refers to variances in latency between data packets. High jitter means large variance in packet latency and degrades speech quality. See also Latency, QoS (Quality of Service), ToS (Type of Service), MOS (mean opinion score) and Out of order data packets.

LAN - Local Area Network
A LAN connects network devices over a relatively short distance. A networked office building, school, or home usually contains a single LAN, though sometimes one building will contain a few small LANs (perhaps one per room), and occasionally a LAN will span a group of nearby buildings. In addition to operating in a limited space, LANs are also typically owned, controlled, and managed by a single person or organization.

Latency
Latency is a term used in connection with VoIP signals or data packets. It refers to the delay from when data is transmitted until it is received. This Latency is noticable in conversations if latency goes above 100ms. See also QoS (Quality of Service), ToS (Type of Service), MOS (mean opinion score), Jitter and Out of order data packets.

Leaky Feeder
A leaky feeder is a communications system used in underground mining and other tunnel environments. It consists of a coaxial cable running along the tunnels which emits and receives radio waves. The cable is leaky in that it has gaps or slots in its outer conductor to allow signal to leak into or out of the cable along its entire length. Because of this leakage of signal, line amplifiers are required to be inserted at regular intervals, typically every 350 to 500 meters, to boost the signal back up to acceptable levels.

Level Crossing Telephone
Used for emergency calls or information access at platforms and railway crossings

Managed Switch
Managed switch, a type of Ethernet switch, allows the administrator to take control of the network, allows ports to talk to other ports or none at all. For example, a managed switch may have the option to run VLAN (virtual local area network), which means that you in theory could shut down all data traffic apart from the emergency communications, or in other ways control the switch / data signals. Also, a management switch allows better network security, ie: control ability over network in case of hacker attack. Network Security is getting ever more important for large constructions and industrial manufacturing places. Generally, therefore, a Managed switch is considered a better investment than an Un-Managed switch (see also Un-Managed Switch / opposite term).

Maritime VoIP Telephones
See definitions under "Offshore Telephones", "Seaproof Telephones" and "VoIP".

Mining Telephone / Mining Phone
Generic term describing a robust heavy duty telephone used in sub-surface mining applications. Typically, mining telephones need to be dust and waterproof (See Ingress Protection) and resistant to condensation and corrosion effects. Mining telephones also need to be able operate in extreme temperatures.

Modbus
Modbus is a serial communications protocol published by Modicon in 1979 for use with its programmable logic controllers (PLCs). It has become a de facto standard communications protocol in industry, and is now the most commonly available means of connecting industrial electronic devices. Modbus is a standard feature found in all Norphonic Heavy Duty Telephones and refers to the Modbus UDP and Modbus TCP open protocols which enables remote access for status monitoring and control. Examples of telephone status monitoring include: link status, condition of telephone components, microphone check, etc.

MOS
Numerical measure of the perceived audio quality of a telephone connection. The MOS is expressed as a single number in the range 1 to 5, where 1 is lowest perceived audio quality, and 5 is the highest perceived audio quality

MSHA
"MSHA" is the abbreviation for the US-based "Mine Safety and Health Administration" which is the Federal enforcement agency responsible for the health and safety of miners working in the United States of America. The related term "MSHA Approval" relates to MSHA's Approval and Certification Center which approves and certifies certain mining products for use in underground coal and gassy underground metal mines. See also the related listings under ATEX Telephone, EX Telephone.

MSTP
Multiple Spanning Tree Protocol

Noise Reduction
Process of reducing noise in a communications signal.

Norphonic
A leading manufacturer of heavy duty VoIP telephones that are used in a wide variety of applications worldwide, including transport (air, sea, road, rail), industry, mining, public places and emergency areas.

Norphonic Heavy Duty VoIP Telephone
The Norphonic Heavy Duty VoIP Telephone is a robust, weather resistant telephone built to withstand extreme temperatures, humid and dirty environments.

Norphonic Remote Management
"Norphonic Remote Management" is a software program which delivers all of the features that are necessary for administrators to access, view, control, manage and modify remote Norphonic Heavy Duty VoIP Telephones from a central web-browser interface. Norphonic Monitoring is a total solution for integrated control and monitoring of your Norphonic Heavy Duty VoIP Telephone system.

Offshore Telephone
Typically used to describe a rugged telephone which is waterproof & immune to corrosion by seawater. See also seaproof telephone.

OLE
Object Linking and Embedding

OSPF
OSPF stands for Open Shortest Path First. OSPF is a dynamic routing protocol.

Out of order datapackets
Out of order datapackets - a term used in VoIP voice communications and refers to incidents which degrades speech quality, is often caused by jitter. (see also Jitter)

Outdoor Telephone
Used in public places such at at train terminals, car parks, university campuses, at bridges, alongside public beaches and other public places

PA/VA Telephone
Public Address / Voice Alarm telephone is used as part of a larger PA/VA system to transfer voice, data and/or images to a Central Station

PABX / PBX / EPABX
A private automatic branch exchange (PABX) is a telephone exchange that serves a particular business or office, as opposed to one that a common carrier or telephone company operates the general public

PABX hotline / Hot-line
Describes the feature where a hotline is immediately connected when the handset is lifted.

Platform Telephone / Station
Used by operators to convey information at metro, underground or railway stations and/or platforms

Point to Point Communication Telephone
Used to communicate between two points, often installed in large lifting machinery, cranes, underground mines and wind power systems. Usually, point to point communication telephones are hooked up directly with each other, eliminating the need to go through a private automatic business exchange (PABX) or a common telephone carrier.

PSTN
The Public Switched Telephone Network (PSTN) is the network of the world's public circuit-switched telephone networks, in much the same way that the Internet is the network of the world's public IP-based packet-switched networks. Originally a network of fixed-line analog telephone systems, the PSTN is now almost entirely digital and includes mobile as well as fixed telephones.

Public Emergency Telephone / SOS Telephone
Used in places where people may feel vulnerable or unsafe at night, such as University Campuses, Underground Car Parking Facilities, Public Swimming Pools or along the Coastline where the public may wish to report swimmers or boats in danger at sea.

Public Information Telephone
Used in "call-for-assistance" type applications, for example in large shopping centres, airports, car parks or transport terminals

QoS
Quality of Service (QoS) is a feature found in all Norphonic telephones and refers to the ability to provide different priority of voice and data flows, or to guarantee a certain level of performance to a data flow, ensuring impeccable delivery of voice communications in an IP network.

Refuge Bay Telephone
Refuge Bays usually refers to specifically constructed underground evacuation rooms in mining environments. These rooms usually contain an emergency telephone system as well as drinks, foods and medical supplies for miners in case of emergency evacuation. Refuge bays can also be found in other underground tunnel environments, including road and train tunnels.

RIO
Remote Input Output. Device for control of digital input and digital outputs.

Robust Maritime VoIP Telephones
"Robust Maritime VoIP Telephones" is often used in the maritime industry to describe "Norphonic Heavy Duty VoIP Telephones". The term usually refers to the phone's ability to withstand seawater, ice, grime and extreme temperatures encountered in maritime areas such as onboard Oil & Gas Rigs, Floating Production Storage Offloading (FPSO) ships, Cargo Ships, Tankers, Bulk Carriers, Container Ships, Passenger Ships, Shipbuilding Yards, Offshore Machine Rooms, Ports, Docks and other maritime areas. See also "Seaproof Telephones".

RoHS Compliant Telephone
"RoHS compliant" means that the product is tested against, and does NOT contain: lead, mercury, cadmium, hexavalent chromium, poly-brominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

RSTP
Stands for Rapid Spanning Tree Protocol is a faster variant of "STP", which is a protocol implemented in switches to stop logical loops of data.

RTP
Real Time Protocol

Safe Area
Typically refers to an area which is safe from explosions or areas that do not contain ignitable gases, fumes or substances. Safe areas typically do not need explosion proof telephones (see also "ATEX Telephone / Eex Telephone / Ex Tele").

SCADA
SCADA stands for "Supervisory Control and Data Acquisition" system. It generally refers to industrial control systems: computer systems that monitor and control industrial, infrastructure, or facility-based processes. In the telephone-world, the SCADA system would be used to control and manage the telephones (communication failure, off-hook sensing, alarm handling etc).

Seaproof Telephone
The term Seaproof telephone is usually used to describe a rugged telephone unit which is immune to seawater and waterproof. Typically used onboard vessels, oil rigs and other maritime areas. See also IP / Ingress Protection.

Seawater Resistant Telephone
Telephones that are resistant to corrosion from seawater, often metal coated with a protective solution paint

Self Monitoring and Fault Check
is a feature in Norphonic telephones, allowing the telephone to carry out automatic health-check and fault sensing and communicate this, thereby improving uptime and performance whilst reducing maintenance work

Service Telephone
Used by service engineers and maintenance personnel to communicate with a central control room

Signal Telephone / Trackside Telephone
Used at railway signal stations and along railway tracks

SIP
Session Initiation Protocol (SIP) is an IETF-defined signaling protocol, which is the most widely used protocol for controlling multimedia communication sessions such as voice and video calls over Internet Protocol (IP).

SMCP
Standard Marine Communication Phrases (SMCP) is a set of key phrases in the English language (which is the internationally recognised language of the sea), supported by the international community for use at sea and developed by The International Maritime Organization (IMO). An example of SMCP is the message: "I have developed stability problems, heavy icing. Request ice breaker assistance".

SNMP
Simple Network Management Protocol, is used in network management systems to monitor network-attached devices for conditions that warrant administrative attention.

SOS Telephone / SOS Callbox
See definition under "Emergency Telephone".

STI
Speech Transmission Index, short STI is a measure of speech transmission quality. The STI measures some physical characteristics of a transmission channel (a room, electro-acoustic equipment, telephone line, etc.), and expresses the ability of the channel to carry across the characteristics of a speech signal. STI has a numeric representation measure whose value varies from 0 = bad to 1 = excellent.[4] On this scale, an STI of at least .5 is desirable for most applications.

STP
Spanning Tree Protocol, a slower form of RSTP / see definition under "RSTP"

Type of Service (ToS)
Type of Service (ToS) is a feature found in all Norphonic telephones, delivering packet precedence (i.e., priority) in network traffic, thereby ensuring low delay, high throughput and high reliability.

Un-managed Switch
Un-managed switch, a type of Ethernet Switch, is sometimes also referred to as a "dumb" switch, with resulting data network called a "dumb-hub". -This is because the switch will do nothing apart from simply allowing traffic to go through your network, leaving you with little or no control over your data network. See also "Managed Switch" / opposite term.

Unsafe Area
Typically refers to an area which is unsafe when it comes to potential explosions or areas that contain easily ignitable gases, fumes or substances. Examples include oil rigs, deep coal mines and petrochemical production environments. See also "ATEX Telephone / Eex Telephone / Ex Tele".

Vandal Proof Telephone
Vandal proof telephone is a generic term describing a robust heavy duty telephone handset, cord or telephone casing that is resistant to vandalism or sabotage attempts. Telephones placed in public areas are often prone to vandalism and therefore need to feature a vandal proof cord, keypad and/or handset.

VLAN
Virtual Local Area Networks

Voice Sound Quality (VSQ)
Voice Sound Quality (VSQ) is an unique feature found in Norphonic telephones, treating the sound so that it is heard extremely clearly even in noisy ambient areas.

VoIP
Voice over Internet Protocol is a general term for delivery of voice communications (voice, facsimile and voice-messaging applications) over an IP network, rather than the public switched telephone network (PSTN). Other related terms frequently encountered and synonymous with VoIP are IP telephony, Internet telephony, voice over broadband (VoBB), broadband telephony, broadband telephone and SIP telephone (see separate definition of SIP- Session Initiation Protocol".

VRRP
VRRP stands for "Virtual Router Redundancy Protocol" and is a protocol that enables two routers to share one common IP address. If the master router fails, then the slave router will inherit the IP address.

WAN - Wide Area Network
As the term implies, a WAN spans a large physical distance. The Internet is the largest WAN, spanning the Earth. A WAN is a geographically-dispersed collection of LANs (see LAN -Local Area Network). A network device called a router connects LANs to a WAN. In IP networking, the router maintains both a LAN address and a WAN address. A WAN differs from a LAN in several important ways. Most WANs (like the Internet) are not owned by any one organization but rather exist under collective or distributed ownership and management.

Water proof telephone
A generic term for a telephone which is resistant to water ingress. See also "IP Rating / Ingress Protection Rating".

Weather proof telephone
A generic term for a telephone which can handle extreme temperature ranges and bad weather. See also "IP Rating / Ingress Protection Rating".

WLAN - Wireless Local Area Network
A Wireless Local Area Network is a LAN (see "Local Area Network") based on WiFi wireless network technology