



Consultant Datasheets- Clock Systems

Sales & Service

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Simplex Ethernet Clock Model ONT4BK-S

STANDARD FEATURES

- Red seven-segment LED display with 4-inch numerals that are visible at over 150 feet.
- Power over Ethernet technology lets you deploy a digital clock system without the cost of installing AC outlets, using your existing Ethernet LAN and the same network components as IP phones.
- Time is automatically set by Simple Network Time Protocol (SNTP) — no master clock or serial connection required.
- A standard Telnet session provides complete control over IP configuration, SNTP server address, time zone configuration, display format (12/24 hour) and clock status reporting.
- UL 1950, ETL Listed, CE Marked



POWER OVER ETHERNET OPERATION:

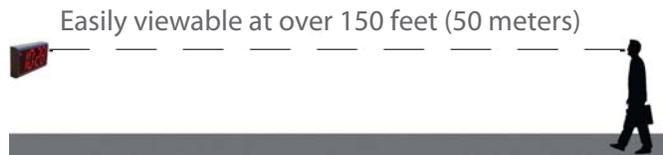
Power over Ethernet (PoE) is a network standard based on IEEE 802.3af that provides a means of delivering DC power to Ethernet connected devices. This technology eliminates numerous wall transformers, allows centralized UPS backup, and is fully compatible with powered and non-powered 10/100BaseT Ethernet devices. Adding PoE to a network can be accomplished by placing simple multiport midspan solutions in a switch room or endpoint without replacing the switch or hub. Midspan PoE power injectors are available from most network equipment vendors.

DESCRIPTION:

Simplex introduces the revolutionary OnTime™ Digital Clock. OnTime clocks plug into an Ethernet jack on your local area network. No AC plug is required, so installation is inexpensive and it's easy to move clocks around. Power is supplied over standard Cat-5 cabling using the IEEE 802.3af Power over Ethernet standard, the same power source as Voice-over-IP telephones.

The OnTime clock is highly accurate and gets time updates automatically over the network. It requires no specialized software to control one or hundreds of clocks from any PC on the network with a simple Telnet session. OnTime clocks will find an existing Simple Network Time Protocol server on your network, or you can set up a new one.

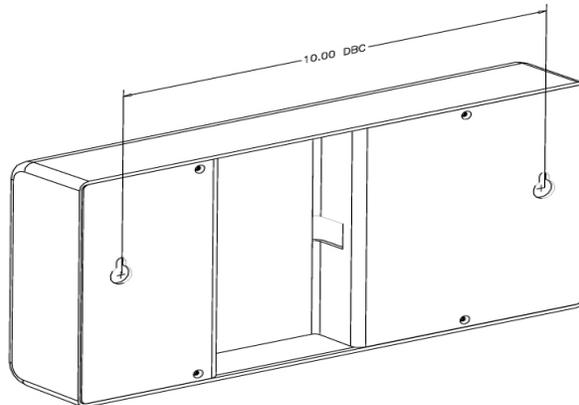
VISIBILITY CHART:



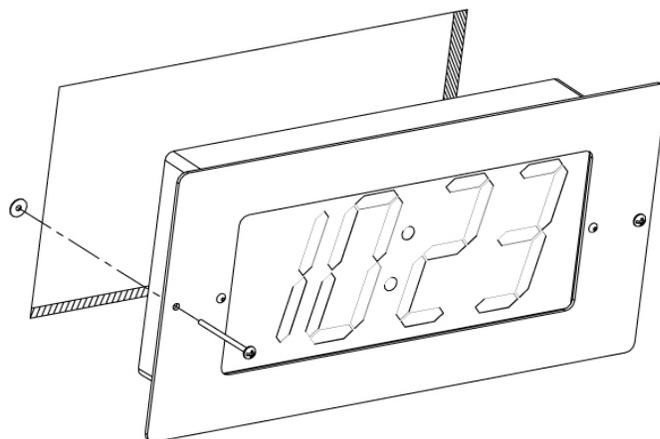
Specifications	
Display	4-Digit, Red 7-Segment
Viewing Distance	150+ feet (50+ meters)
Cabinet Dimensions	12"L x 6"H x 2.2"D (30 cm x 15 cm x 5.6 cm)
Weight	2 lbs (.9 kg)
Accuracy	+/- approximately 200 milliseconds
Operating Temperature	32° to 104° F (0° to 40° C)
Operating Humidity	95% maximum, non-condensing
Cabinet Finishes	Black
Mounting Options	Surface, Pendant, Cantilever, Flush Inset, Double Sided

The **Simplex Ethernet Clock** is available in a variety of mounting configurations. Please consult the appropriate procedure for your installation requirements.

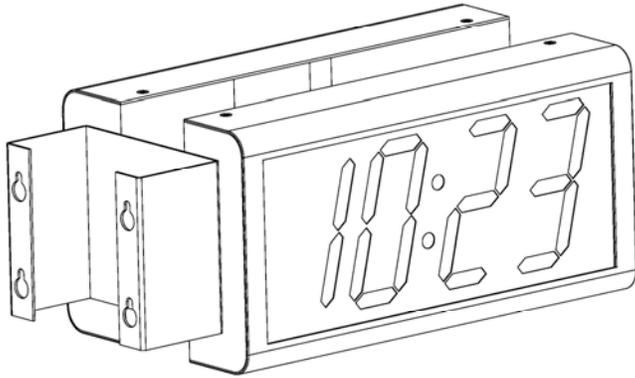
Surface Mount – Keyhole



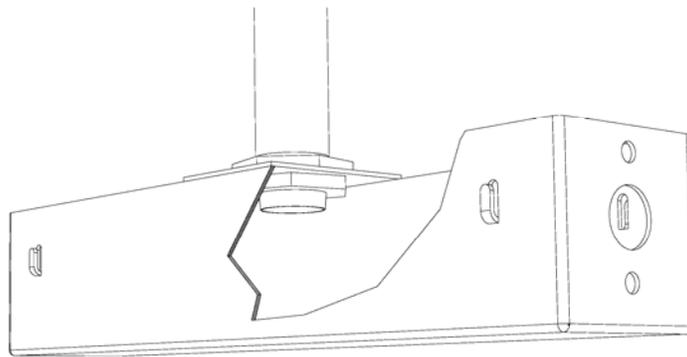
Flush Mount



Cantilever Mounting – Single or Double

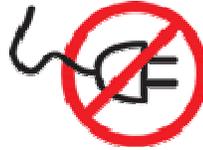


Pendant Mounting – Single or Double



Simplex Ethernet Clock

Model ONT6BK-S



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VISIBILITY CHART:

Easily viewable at over 150 feet (50 meters)

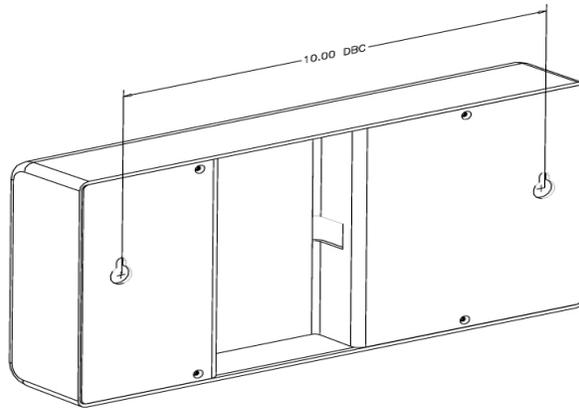


Specifications

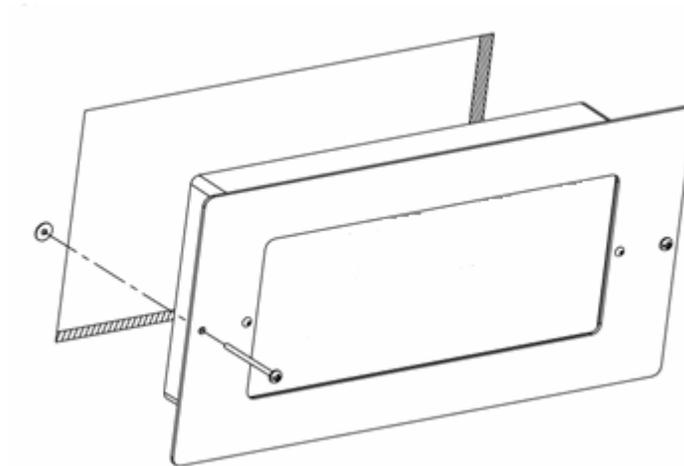
Display	6-Digit, Red 7-Segment
Viewing Distance	150+ feet (50+ meters)
Cabinet Dimensions	17.5"L x 6"H x 2.2"D (44.5 cm x 15 cm x 5.6 cm)
Weight	Painted Cabinet: 2.5 lbs (1.1 kg)
Accuracy	+/- approximately 200 milliseconds
Operating Temperature	32° to 104° F (0° to 40° C)
Operating Humidity	95% maximum, non-condensing
Cabinet Finishes	Black
Mounting Options	Surface, Pendant, Cantilever, Flush Inset

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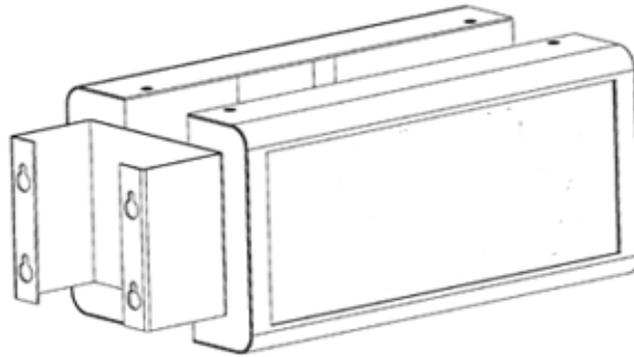
Surface Mount – Keyhole



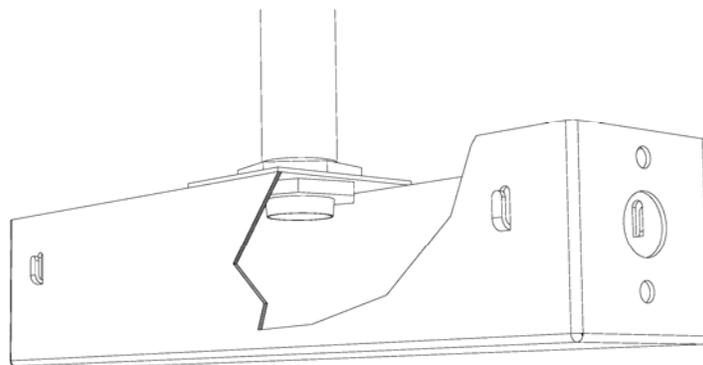
Flush Mount



Cantilever Mounting – Single or Double



Pendant Mounting – Single or Double



Simplex OnTime™ Analog Clock

Synchronised time has never been this simple

The Importance of Accurate, Synchronized Time

Consistent and accurate time across an organization keeps things running smoothly. Schools and universities rely on accurate timekeeping to efficiently transition students from one class to the next. In healthcare facilities, synchronized time is critical to daily operations, whether its checking on patients or delivering medications.

In a corporate environment, time wasted on waiting for co-workers to arrive at a meeting translates directly into lost productivity. Synchronized time in manufacturing environments promotes schedule adherence, helping the entire team meet productivity goals. The integration and coordination of security systems in all organizations depends on synchronized time.

Analog Clocks Powered by your Network

Simplex OnTime™ clocks provide accurate, synchronized time throughout a facility in a sleek analog format. Visible at over 100 feet, these clocks keep everyone on the same schedule.

OnTime clocks utilize cutting-edge Power over Ethernet (PoE) technology, a superior power source for analog clocks because it eliminates the need for AC receptacles, individual batteries and allows for centralized UPS backup.

The clocks plug directly into a standard Ethernet jack and draw both time updates and power from the network. No AC outlets are needed – eliminating cost and complexity from system deployment. Since PoE devices consume significantly less power than AC-powered devices, they are widely regarded as energy-efficient and environmentally-friendly.

Features

- Power over Ethernet (PoE) technology derives power and synchronized time updates from your existing network
- Highly visible at over 100 feet
- Energy-efficient design
- No master clock or serial connection required
- Analog and digital formats available
- Made in the USA
- Telnet control for IP configuration, SNTP server address, time zone and daylight savings time configuration, and status reporting



Simplex
TIME SOLUTIONS

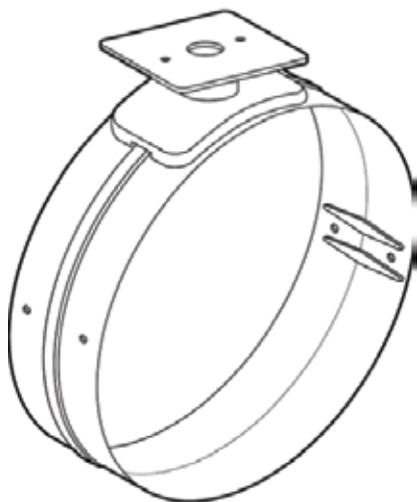
Simplex OnTime™ Specifications

Dimensions	13 3/8" diameter, 2" deep
Viewing Distance	100+ feet
Accuracy	+/- approximately 0.5 seconds
Operating Temperature	32° to 104° F (0° to 40° C)
Operating Humidity	95% maximum, non-condensing
Power Consumption	3 watts
Mounting Options	2.04 lbs.
Cabinet	Plastic
Certifications	UL/CSA 60950-1, RoHS compliant

Note: Specifications and design are subject to change without notice.

Mounting Options

OnTime analog clocks come standard with rear mounting hardware. Also available are round double dial brackets (shown on right) which allows for back to back installation of clocks for visibility from two directions. Round double dial brackets are used to mount the clocks on a wall or ceiling, and can be converted for use with single clocks as well.



The PoE Advantage

Power over Ethernet is a network standard that delivers both data and power from your existing network servers. Devices powered by the network offer a lower cost of installation and operation, and eliminate the need for electrical outlets. Additionally, the option of centralized UPS backup allows PoE devices to continue running even in the event of a power failure. PoE is fully compatible with both powered and non-powered 10/100BaseT Ethernet devices, and is specifically designed to prevent damage to existing Ethernet equipment.

Along with the OnTime analog clock, PoE powers other Simplex products, such as the as Simplex OnTime digital clocks (shown on left), OnAlert™ emergency notification systems, and OnTrack™ LED displays.

Visit www.simplextime.com.au for details.

Contact Us

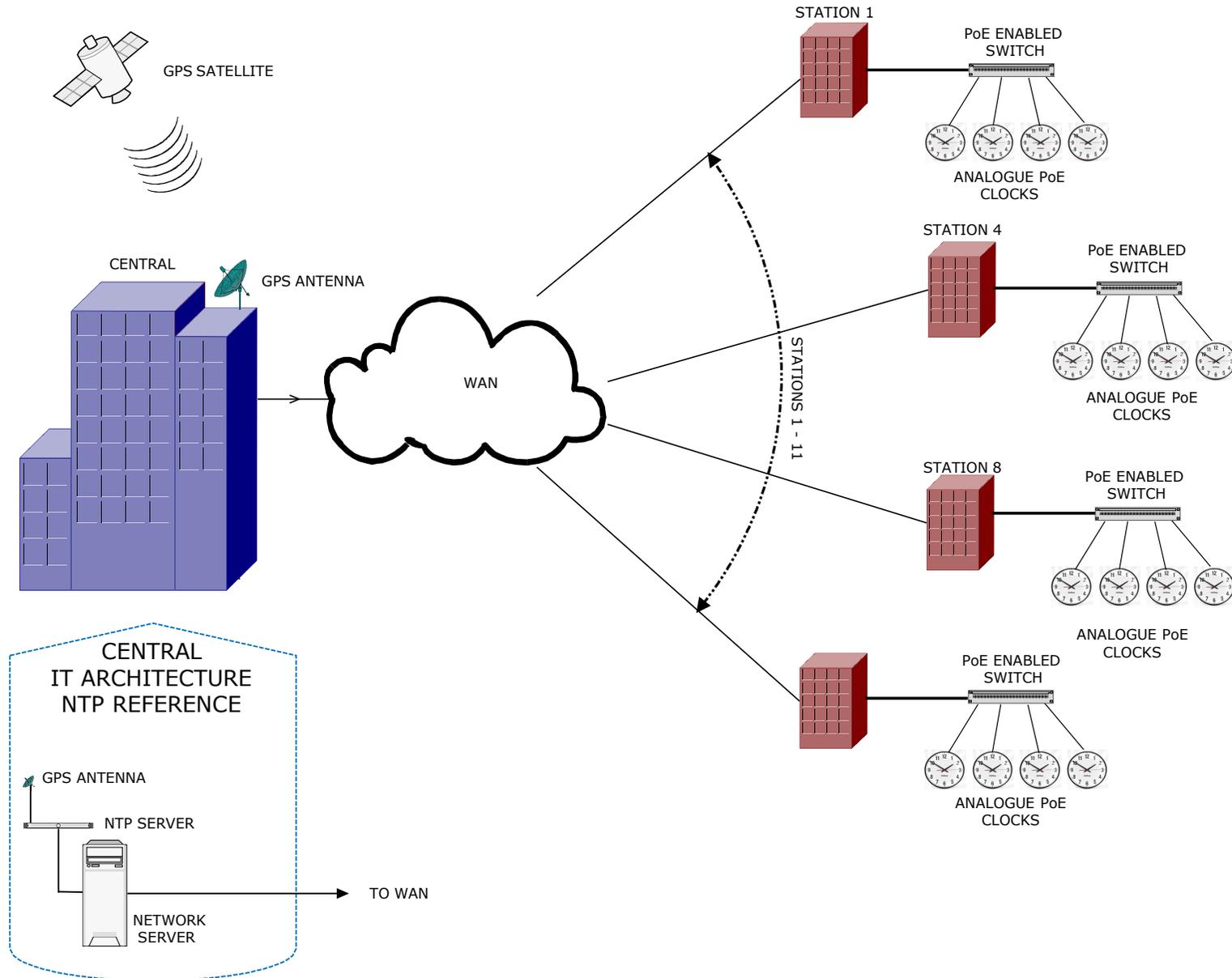
Phone 131 491

Fax 1800 659 025

Email simplextime.au@tycoint.com

Website www.simplextime.com.au

GPS TIME REFERENCE SYNCHRONISED PoE ANALOGUE CLOCK SYSTEM



	NTP [Network Time Protocol]
<i>Unit 4, 2-8 South St Rydalmere, NSW 2116 T: 13 14 91 F: 1800 659 025 W: www.simplextime.com.au</i>	<i>NTP definition & Application</i>

NTP FAQ & Resources

Q: How can NTP clock installations save time and money?

A: If your site has an existing or planned LAN/WAN infrastructure then the Ethernet clocks using NTP protocol can simply be added as extra nodes ^{*2}.

The alternative to using the existing LAN infrastructure is to run power and control cables to each and every clock from the Master Clock Locations(s). This can be a costly exercise when signal repeaters and installation labour costs are considered.

By using an existing LAN as a means to synchronize the clock system there can be substantial installation savings in installing clock systems. If you have a Local Area Network then the infrastructure is already in place to access accurate ^{*1} NTP Time at every LAN/WAN node.

Having all the clocks on a WAN/LAN now allows the installation engineers and maintenance staff to quickly check clock status without necessarily having to visit each installed location and possibly disrupt business activities or processes in that location. This then opens up the possibility to monitor and detect faults automatically if suitable software is made installed.

Existing IT or computer knowledgeable maintenance staff can maintain and support the clocks with little training, alternately the maintenance function can be outsourced to Simplex.

New or replacement Ethernet clocks can be installed by suitably qualified staff ^{*3}. Electricians should only be required when installing additional mains power outlets.

Note:

1. NTP does not affect Day Light Saving or Time Zone settings which need to be configured for each clock.
2. The Ethernet clocks power must be derived from:
 - a. Local Battery
 - b. Local Mains Power
 - c. Power over Ethernet PoE (i.e. NTP + Power)
3. Local Government legislation may require telecommunications handling licenses for installers.

If you have a Local Area Network already installed or planned then the infrastructure exists to deliver accurate ^{*1} NTP Time at every TCP/IP port in your organization. This allows NTP based time clocks to utilize this existing LAN/WAN infrastructure.

The maintenance of UTC time is now automatic and does not require manual update.

	NTP [Network Time Protocol]
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The ability to monitor and configure NTP clocks from one computer workstation means less visual inspection and a real time saving by maintenance personnel.

If your organization spreads across multiple sites or buildings and has an existing Wide Area Network (WAN) cost savings can be realized by not having to install site wide hard wired control cabling and Master clocks.

Note:

1. The accuracy of the NTP at the end device is dependant on the device itself, the speed of the network and accuracy, the stratum of the chain of NTP servers, and version of the NTP protocol and supporting latency correction algorithms. Typically the error is less than 500 milliseconds or 0.5 seconds.
2. When the LAN is not available NTP devices generally keep running but only synchronise with a time source when they can access the configured NTP server through the LAN.
3. It choosing an NTP clock solution you may need additional LAN access points to service each NTP clock device. This is an IT matter

Q: What is NTP?

A: Network Time Protocol (NTP) is a protocol that provides a reliable way of propagating the current time over TCP/IP based networks. The time that is published over NTP is the UTC time. UTC time is referenced as the time at Greenwich Mean Time without any form of Day Light Saving or Time Zone adjustment.

The NTP protocol compensates for the transmission delay experienced between connected NTP strata nodes to maintain accurate time.

NTP protocol has evolved and improved in accuracy since its inception in 1985. These improvements have brought about the need for new compliance standards. As such there are a few versions of NTP in use. Care needs to be taken when selecting NTP products to ensure version compatibility. The newer version NTP protocols have been designed to accommodate the older NTP version end devices.

It has become the de facto standard for synchronising Internet computers and other networked devices to Universal Coordinated Time (UTC), which is accomplished by having these devices reference a common time source – i.e., an atomic clock or a network time server.

NTP uses TCP/IP Port 123 for communication. It is essential that the LAN/WAN firewall or router to permit transmission on Port 123 to ensure proper communication with the NTP server(s).

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Q: What is SNTP?

A: Simple Network Time Protocol (SNTP) is a simplified version of NTP Protocol, that is used for less time critical end use devices.

SNTP uses the same packet format as NTP but does NOT compensate for the transmission delay between the SNTP device and the connected NTP server.

Assuming the NTP server side can maintain reasonably accurate time, then the inherent transmission delay on the local network between the SNTP Client and the local NTP Server is reasonably negligible^{*1}.

SNTP Client devices that can only display time to the nearest second should not experience any noticeable delay as the expected delay induced by SNTP clients would be under 500 milliseconds (this is an average value and not for every case).

It is essential to have a hierarchy of NTP server for strata 0 - n of the network to maintain highly accurate time, and only use SNTP clients at strata n+1.

If the SNTP client connected to the local NTP Server is on a reasonably fast or light traffic network then the delay between SNTP client requests and NTP server responses will be minimal, and as such time received at the SNTP device will be contain only slight errors.

Note:

1. If the local TCP/IP network experiences high traffic or happens to be a slow network, then the delay experienced from the time of the NTP time packet transmission and its receipt at the SNTP client will affect the overall time accuracy at the SNTP client device.

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Q: How can NTP be delivered?

NTP can be delivered in the following ways:

- a) Internet can be used by local Time servers to obtain UTC time (there are many free NTP reference sites)
- b) Satellites and GPS receivers propagate time within their positioning data stream and are used to synchronize NTP Time Servers and Master Clocks.
- c) Set up an existing LAN Server to be an NTP Server (or proxy server) and synchronize this local NTP server to the internet time service.
- d) SNTP Client sync Synchronize the time in Simplex Master Clocks, for existing sync. wired clock installations
 - a. Using SNTP 6*00-3500 Client device
- e) Synchronize Ethernet clocks directly

Q: Why is NTP Important?

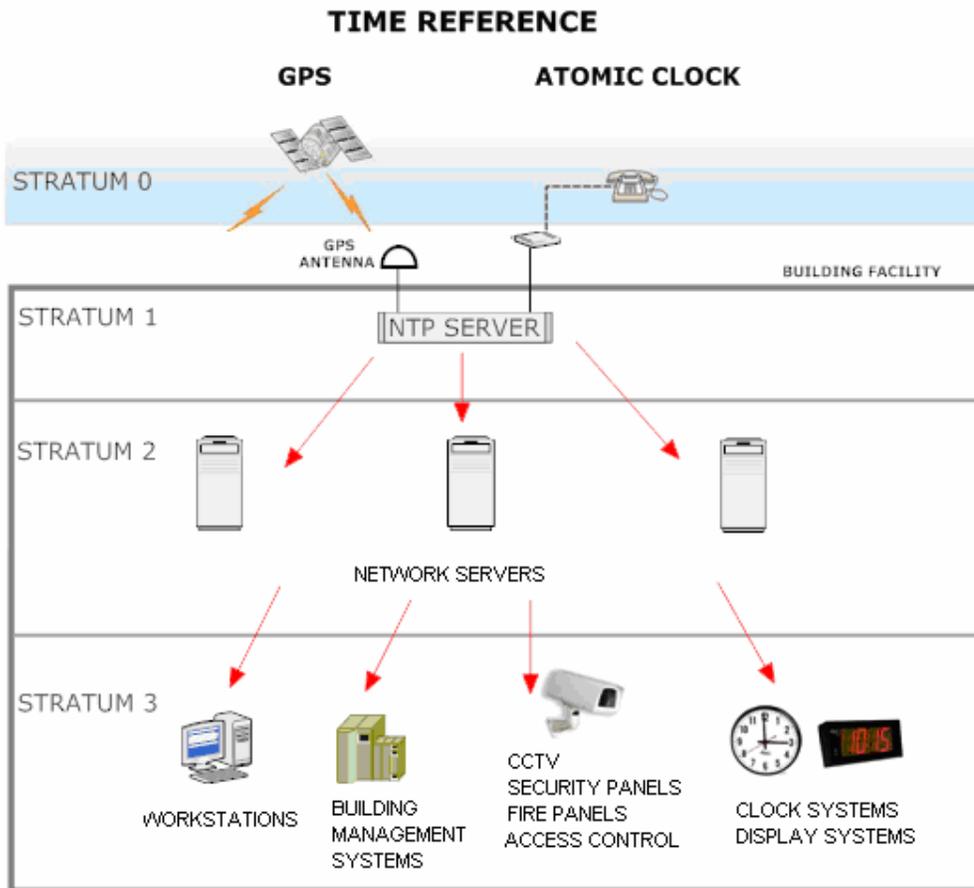
A: In a commercial environment, accurate time stamps are essential to everything from maintaining and troubleshooting equipment and forensic analysis of distributed attacks, to resolving disputes among parties contesting a commercially valuable time-sensitive transaction. Within law enforcement, they are essential for correlation of distributed communication events, forensic analysis, and potential evidentiary use in criminal proceedings.

In essence, all debugging, security, audit, and authentication is founded on the basis of Sequence of Event (SOE) correlation (knowing exactly what happened in what order, and on which side), and that depends on good time synchronization.

Once you have a local accurate time source all devices have the potential to synchronize as long as they have some means of interfacing to the LAN and NTP protocol.



Q: What is Clock Strata?



NTP is organised in a hierarchical client-server model. In the top of this hierarchy there are a small number of machines known as *reference clocks*. A reference clock is known as *stratum 0* and is typically a cesium clock or a Global Positioning System (GPS) that receives time from satellites. Attached to these machines there are the so-called *stratum 1* servers (that is, stratum 0 clients), which are the top level time servers available to the Internet, that is, they are the best NTP servers available.

Note: in the NTP lingo measure for synchronisation distance is termed as stratum: the number of layers that an NTP device is removed from a primary time source.

Following this hierarchy, the next level in the structure are the *stratum 2* servers which in turn are the clients for *stratum 1* servers. The lowest level of the hierarchy is made up by *stratum*

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16 servers. Generally speaking, every server synchronised with a *stratum n* server is termed as being at *stratum n+1* level. So, there are a few stratum 1 servers which are referenced by stratum 2 servers, which in turn are referenced by stratum 3 servers, which are referenced by stratum 4 and so on.

Q: What is a Network Hub?

A: A Network Hub is an intelligent device that simply connects all ports to allow intercommunication. Hubs operate all ports at the same common speed. Not all hubs can change network speed. If the hub can select a speed (10/100/1000MHz) it will choose a speed that suites the slowest device connected.

Example: A network hub with 4 computers A/B/C/D. Computer A and B can communicate together, and Computer C and D can communicate together but they need to share the network lines. And effectively take turns, making the throughput of data less efficient and create bottle necks. A good analogy is a 4 lane two way motorway that gets reduced down to a 1 lane one way side street, things bottle up, and slow everything down.



Q: What is a Network Switch?

A: A Network Switch or Network Bridge is an intelligent device allows intercommunication between devices connected. It differs from a Network hub as it allows each port to set a speed optimal for the connected device. As an example it is conceivable some devices will be operating at 10MHz, 100MhZ, 1GHz and 10GHz.

The network switch will only pass essential data traffic down each port. The switch is like a postman. A switch can therefore have several private data conversations happening at the same time.

Example: A switch with 4 computers A/B/C/D. Computer A and B can communicate in isolation. Computer C and D can communicate in isolation. A simple analogy is that each of the 4 motorway lanes continues from source to destination without having share the lane with anyone else.

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Q: What is PoE?

A: Power over Ethernet is a communications network standard, called IEEE802.3af, introduced in 2003. It extends existing Ethernet standards, and offers the first truly international standard for power distribution and data distribution on the same cable.

Delivering both data and power over one set of wires simplifies installation, saves space and eliminates the need for separate electrical and data outlets.

The voltage supply distributed over the cable is between 36–57 VDC, nominally 48VDC. The maximum load power 15.4W. The power source can be configured to current limit between 10-400mA.

The PoE will experience a voltage drop on long cable runs and is therefore limited to 100 meter runs.

Q: How can PoE installations save money?

A: The data/power cable combination is economical per meter. PoE eliminates the need for costly and cumbersome AC outlets at every device.

There is no need for annual battery replacement or battery maintenance, Daylight Savings Time configuration can be done from a Computer terminal on the network. A network administrator can easily control one or hundreds of clocks individually from any PC on the network with a simple Telnet session. The option of centralized integrating a UPS backup into the PoE network provides for a greater level of uptime and reliability.

Q: What Do I Require to Support PoE?

A: There are two ways to provide PoE.

Option1: In the switch room, existing rack switches can remain and additional midspan power injector racks need to be installed to inject power at the server location.

Option2: Insert a single power injector near the end device on long cable runs.

It is advisable to label all PoE ports to visually identify them and differentiate between normal ports, otherwise PoE devices may not operate when connected to normal ports. Existing cabling can be retained.

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PoE is fully compatible with both powered and non-powered 10/100BaseT Ethernet devices, featuring a "discovery process" specifically designed to prevent damage to existing Ethernet equipment.

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Q: What applications can use NTP [Network Time Protocol] & PoE [Power over Ethernet]?

Schools

Schools and universities depend on accurate timekeeping to efficiently transition students from one class to the next. When teachers and students are on the same schedule, they can make the most of valuable class time and minimize lost productivity due to late starts.

Healthcare

In healthcare facilities, synchronized time is critical to daily operations, whether it's checking on patients or delivering medications. When shift workers' schedules are in sync, patients can count on uninterrupted care whenever they need it.

Manufacturing

Synchronized time in manufacturing environments promotes schedule adherence, helping the entire team meet productivity goals. When shift workers' schedules are in sync, your organization can count on increased efficiency of manufacturing processes. Simplex Solutions' revolutionary network clocks are designed to effortlessly put everyone on the same time.

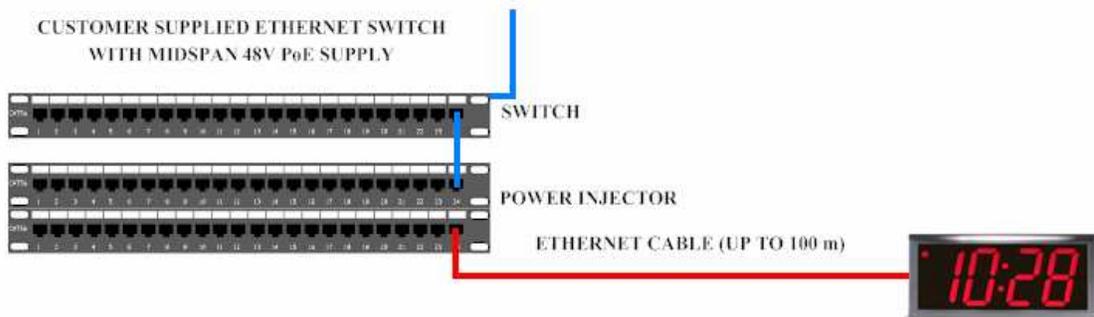
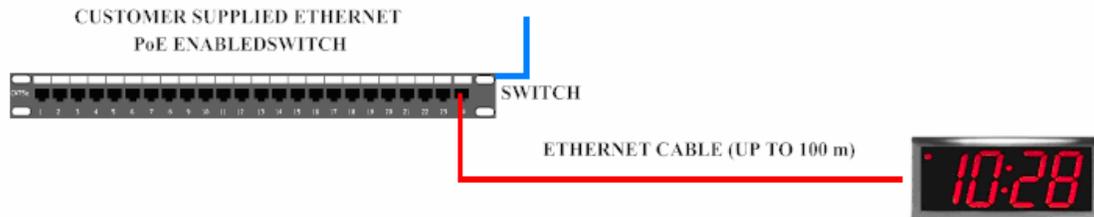
Government/Fire/Police

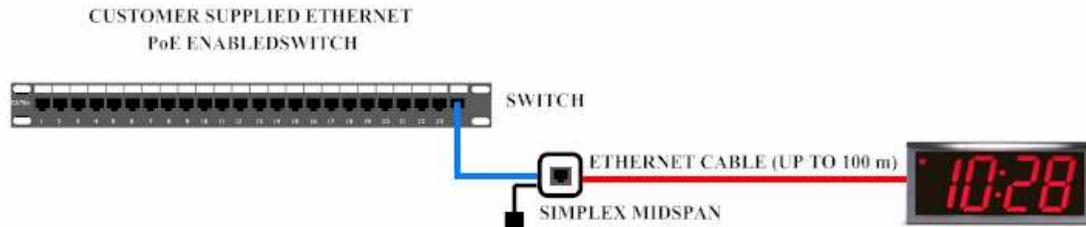
Synchronized time in Government Buildings environments including police Stations and Fire stations will make recording information including emergency call outs accountable.

The schematics below shows how PoE is applied in a Network environment.

Colour Key:

- **red** indicates PoE Ethernet Cable
- **blue** indicates normal Ethernet cable





Q: *What time synchronization technology should I use?*

Ethernet NTP:

Advantages:

- uses existing infrastructure for UTC time propagation, minimizing install costs
- sufficiently accurate time source to drive clocks with 1 second resolution

Disadvantages:

- Requires existing LAN/WAN to be feasible against hard wired installations
- Still require power to clock from local mains supply
- IT skill level for maintenance

Ethernet (NTP + PoE):

Advantages:

- Power delivered to the clock over the Ethernet cable (PoE Type)
- Does not require separate wiring of local power. Power comes through injectors
- Uses existing infrastructure for UTC time propagation, minimizing install costs
- sufficiently accurate time source to drive clocks with 1 second resolution
- No electrician services required for clock installations

Disadvantages:

- May require upgrading of Cat5 Ethernet cable to suite PoE
- Requires additional hardware to inject power onto the LAN, and rules for injector placement need to be adhered to.
- Requires existing LAN to be feasible against hard wired installations
- IT skill level for maintenance

Hardwired:

Advantages:

- minimal interference from wireless devices
- independent system that will not go down when other infrastructure goes down, as long as power is available

Disadvantages:

- Depending on type of sync. technology, potential high voltages required
- Running of cables from master clock to each device
- Cost of master clock
- Clocks can take a number of hours to resynchronize after a time error occurs

