

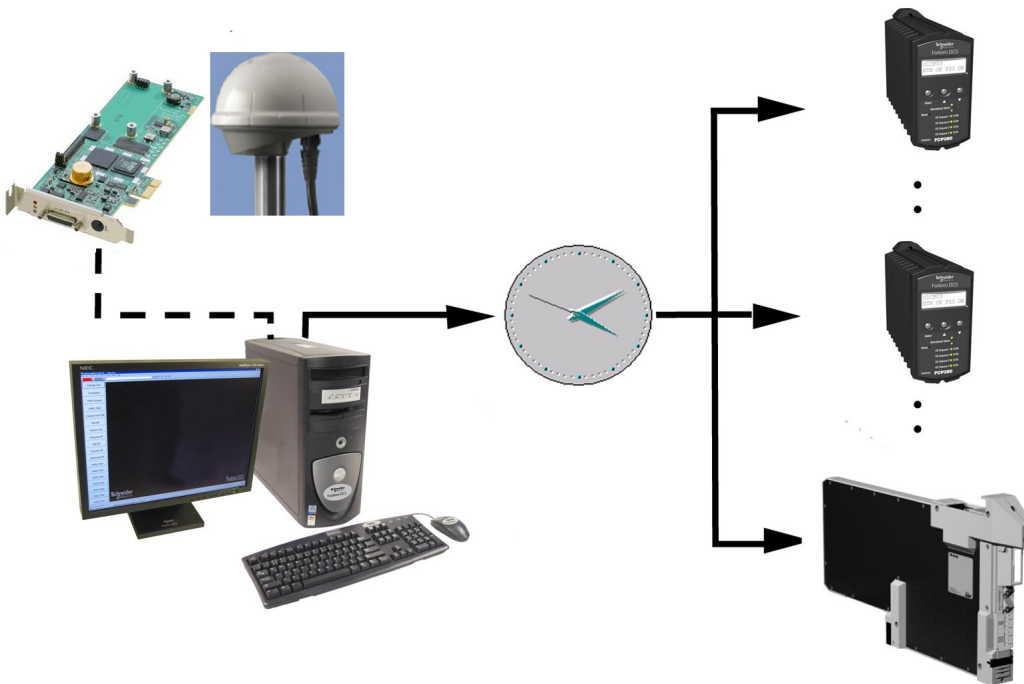
## Foxboro™ DCS

### Time Synchronization Equipment

#### PSS 41H-4TIMESNC

##### Product Specification

December 2019



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# Overview

The Time Synchronization Equipment receives the date and time from the Global Positioning System (GPS) and distributes a time strobe pulse to sync pulsed stations.

The Global Positioning System (GPS) is the source of the time and time strobe pulse. A Master TimeKeeper (MTK) workstation or server maintains the time source and distributes an accurate time strobe pulse to control stations on the application network. The MTK station, using the EcoStruxure Foxboro DCS Control Network (the control network), informs the distributed control and other stations what the time will be when the station receives the next time strobe. The hardware modules can be used in a nonredundant or redundant time strobe network.

The hardware modules are:

- GPS Antenna/Receiver
- Time Strobe Generator (PCIe card)
- MTK modem
- Time Strobe Converter (TSC) (with single-mode or multi-mode fiber optic cable inputs)
- GPS Fiber Optic Isolator (optional)
- Time Strobe extender (optional - with single-mode or multi-mode fiber optic cable outputs).

# Features

- Synchronizes Master TimeKeeper (MTK) station to Global Positioning System (GPS) time
  - MTK sends “time at the next pulse” message via the control network every minute
  - Time strobe network distributes the time strobe pulse to control processors and other communications modules
  - Foxboro DCS Field Control Processors (EcoStruxure™ Foxboro DCS FCP280 and FCP270) and Z-module Control Processors (ZCP270) receive the time strobe and “time at the next pulse” message
  - Fieldbus Communications Module (FCM100Et) receives current time of day message from the ZCP270 and time strobe from a Time Strobe Converter, and then calculates the time at next time strobe
  - Synchronizes concurrent events to within a one—to—three ms time difference depending on your configuration for every:
    - EcoStruxure™ Foxboro™ DCS Transient Data Recorder (TDR)
    - EcoStruxure™ Foxboro™ DCS Transient Data Analyzer (TDA)
    - EcoStruxure™ Foxboro™ DCS Sequence of Events' (SOE)
    - EcoStruxure™ Foxboro™ Fieldbus Modules (FBMs)
- Refer to the section on “Timestamp Accuracy and Precision of SOE Data” in *Time Synchronization User's Guide* (B0700AQ).
- Selected control stations can be synchronized in a Foxboro DCS system
  - Time strobe network can be installed as a single or redundant network.

## GPS Antenna/Receiver (K0204AX/K0204AY/K0204BB)

The source of the time strobe signal are GPS satellites from which the GPS antenna/receiver obtains the time information.

**Figure 1 - GPS Antenna/Receiver**



The GPS receiver uses an omni-directional antenna to obtain synchronized pulses from multiple satellites to determine time and position. The GPS receiver decodes the time signals simultaneously from up to 8 GPS satellites (minimum of 4 satellites). The GPS antenna/receiver are housed in a single unit and have to be mounted outdoors with an unobstructed view of the sky.

## Time Strobe Generator (K0204AZ)

The Time Strobe Generator is a PCIe card that resides in the MTK. It receives the antenna system's output, provides time data to the station and passes a time strobe to the MTK modem. Time is obtained and distributed in Coordinated Universal Time (UTC) format. Therefore, the same time (and date) is received in every part of the control network, regardless of the local time zone.

The PCIe card (Time Strobe Generator) can maintain the stream of time strobe signals even if it does not receive signals from the GPS antenna system. It reverts to a highly accurate ( $2 \times 10^{-7}$ ) internal clock if the GPS signals are not available.

**Figure 2 - Time Strobe Generator (PCIe Card)**

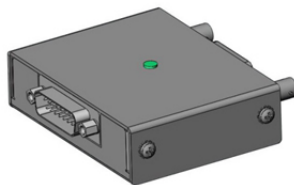


## Master TimeKeeper Modem (RH972SB)

The Time Strobe Generator generates and transmits a periodic time pulse using RS-422 signal levels. The MTK modem converts the time strobe pulse into fiber optic signals. Time Strobe signals are connected to the Time Strobe Converter located in an enclosure or to the optional Time Strobe extender for transmission throughout the plant locations.

Fiber optic cable is used for the transmission of the time strobe signals from the MTK modem to the Time Strobe Converter (TSC) modules or Time Strobe extenders, or between TSC modules.

**Figure 3 - Master TimeKeeper Modem**



## Time Strobe Converter (RH972KA/RH973BW)

The Time Strobe Converter (TSC) provides the conversion of the accurate time strobe pulse from a Master TimeKeeper station to the controller stations. The TSC module transforms the time strobe signal from a fiber optic cable to eight RS-422 differential output signals.

The TSC module (Figure 4) can be mounted on a DIN rail or tray within an enclosure containing the controller stations. A non-redundant MTK system can have a single TSC module to provide time strobe signals for up to eight control stations/baseplates within a single enclosure.

Two types of TSCs are available. One accepts multi-mode fiber optic (MMF, RH972KA) inputs for connections from the MTK modem or an MMF-compatible extender, with cable lengths of up to 2 km (6562 ft) per segment. The second type accepts single-mode fiber optic (SMF, RH973BW) inputs for connections from a SMF-compatible extender, with cable lengths of up to 10 km (6.2 mi) per segment. The latter is optimal for an expansive plant, where time is needed to be distributed to small clusters apart from the central control room.

Both types of TSCs also provide a multi-mode fiber optic (MMF) output for continuation of the time strobe signal, if needed, to the next MMF-compatible TSC module or MMF-compatible Time Strobe extender.

Up to fifty (50) TSCs can be interconnected using the same power supply connections. However, additional TSCs can be linked together to communicate with one another.

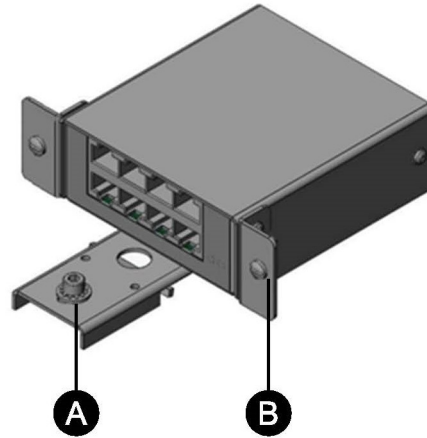
Time strobes can be selectively connected to any FCP280, FCP270, FCM100Et, or ZCP270 in the system. TDR/TDA and SOE FBMs receiving concurrent time messages from an FCP280, FCP270, or FCM100Et are synchronized to within a one—to—three ms time difference depending on your configuration.

**NOTE:** AC signals coming into SOE points cannot be synchronized to 1 millisecond in the same manner as DC based points can. The AC SOE points will have a delay of ~8-20 milli-second due to the 50 or 60 Hz AC wave form. If 1 millisecond synchronization is vital when time synchronization is needed, avoid the use of AC inputs.

For more details on the one-to-three ms synchronization and on collecting SOE data from ac signals, refer to the section on “Timestamp Accuracy and Precision of SOE Data” in *Time Synchronization User’s Guide* (B0700AQ)

In a system with ZCP270s, both the ZCP270 and its associated FCM100Ets have to receive a time strobe signal.

**Figure 4 - Time Strobe Converter (TSC)**



Legend	
A	DIN Rail Mount
B	Rack Mount

## MTK Modem Power Kit (RH100NJ)

This kit provides power to the Time Sync MTK Modem. It includes the following:

- Power Adapter to Time Sync MTK Modem (RH100NG)
- Input Plug for Power Adapter to Time Sync MTK Modem (RH100NH)

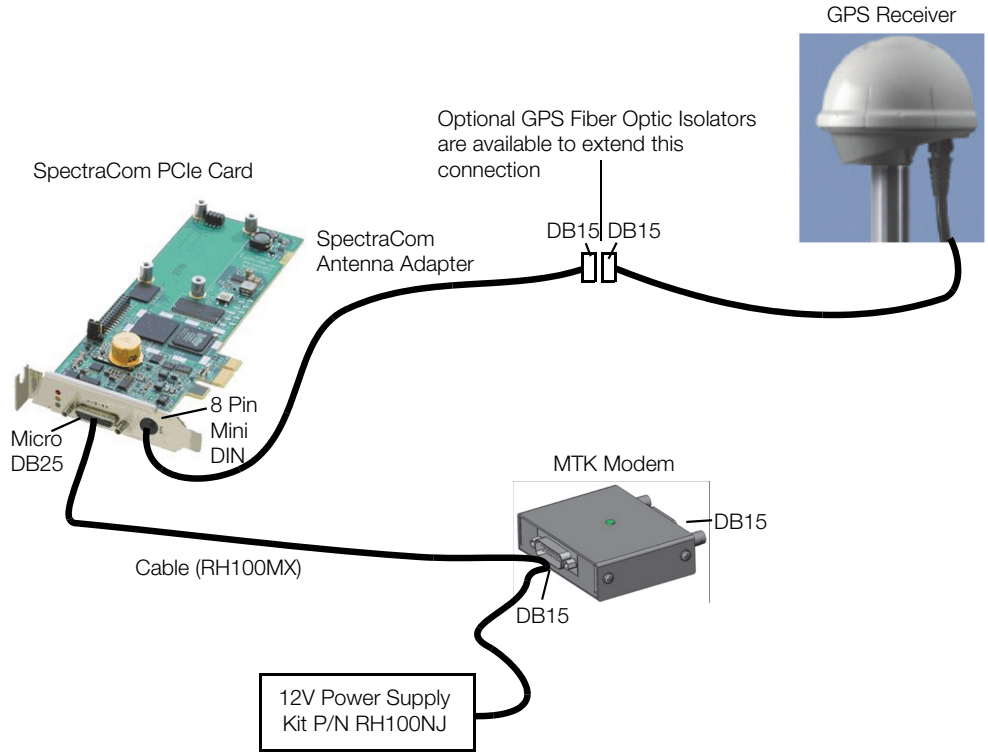
## GPS PCIe Connection Cable (RH100MX)

The Time Sync cable for the Spectracom TSync-PCIe card connects this card to the MTK modem. This cable also connects to the Time Sync IRIG cable when IRIG signals are needed and no modem is in place.

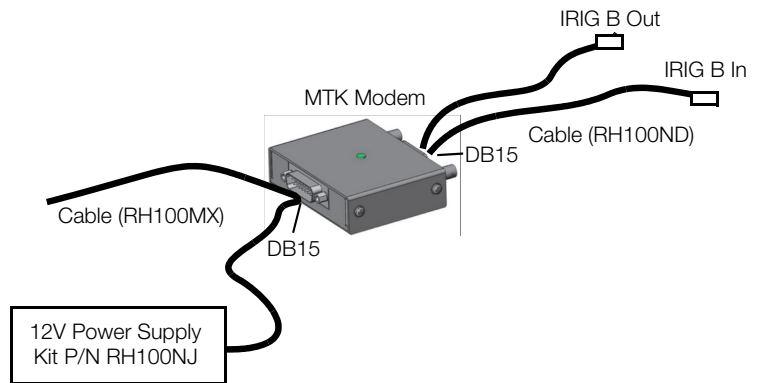
# Time Sync IRIG Cable (RH100ND)

The Time Sync cable for the IRIG In/Out connection connects the MTK modem or the Time Sync PCIe card to another time source via IRIG Out.

**Figure 5 - Time Synchronization Connections**



**Figure 6 - MTK Modem Connections with IRIG B Input/Output**

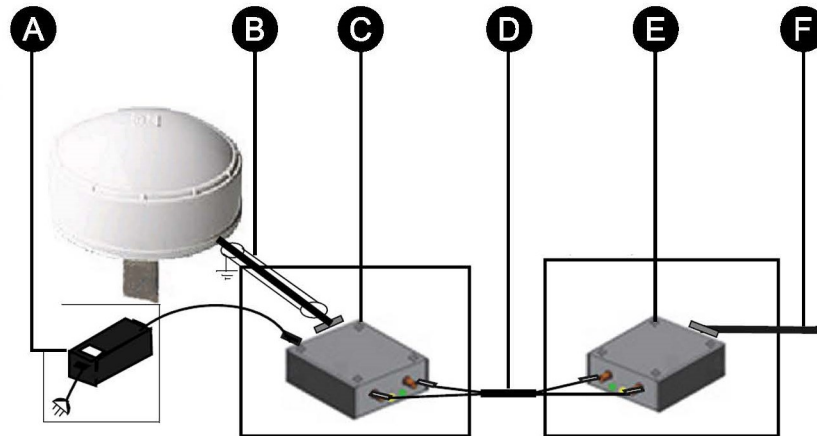




## GPS Fiber Optic Isolator (P0972VZ, Optional)

Fiber optic transmission extends the distance of the MTK host computer to the GPS antenna (see the figure below) up to 2 km (6562 ft). This hardware provides electrical isolation in addition to extending the cabling distance. A Transmitter Unit (copper-to-fiber converter) and a Receiver Unit (fiber-to-copper converter), at the MTK host computer end, converts the signals to its native electrical signals. A 12 V dc source of power is provided by the Power Supply to the GPS antenna. The optional GPS Fiber Optic Isolator modules are shelf- or enclosure-mounted. When using the GPS Fiber Optic Isolator, the cable from the antenna/receiver has to be run in grounded conduit.

**Figure 7 - GPS Fiber Optic Isolator (Optional)**



Legend	
A	Power Supply
B	Copper Cable 30m (100ft) in Conduit
C	Transmitter Unit (Copper-to-Fiber Converter)
D	Multi-mode Fiber Cable with ST Connectors Up to 2 km (6562 ft)
E	Receiver Unit (Fiber-to-Copper Converter)
F	To/From MTK Modem

## Time Strobe Extender (RH100AM/RH100AN, Optional)

**Figure 8 - MMF Time Strobe Extender (Optional)**



Two types of optional 7-port Time Strobe extenders are available for distributing the time strobe signal. The MMF-compatible extender (RH100AM) receives the GPS time pulse from the MTK modem or other TSCs or from other MMF extenders, and distributes it to enclosures containing MMF-compatible TSCs, or to other MMF-compatible extenders.

The SMF-compatible extender (RH100AN) receives the GPS time pulse from the MTK modem or from MMF extenders and distributes it to up to six SMF-compatible TSCs. This extender has one MMF-compatible input port and six SMF-compatible output ports.

Depending on the choice of extender, the Time Strobe extenders use either single-mode or multi-mode fiber optic output cables to send their long distance transmission to the enclosures in various plant locations, which house the controller stations. MMF cable supports lengths of up to 2 km (6562 ft) per segment, while SMF cable supports lengths of up to 10 km (6.2 mi) per segment.

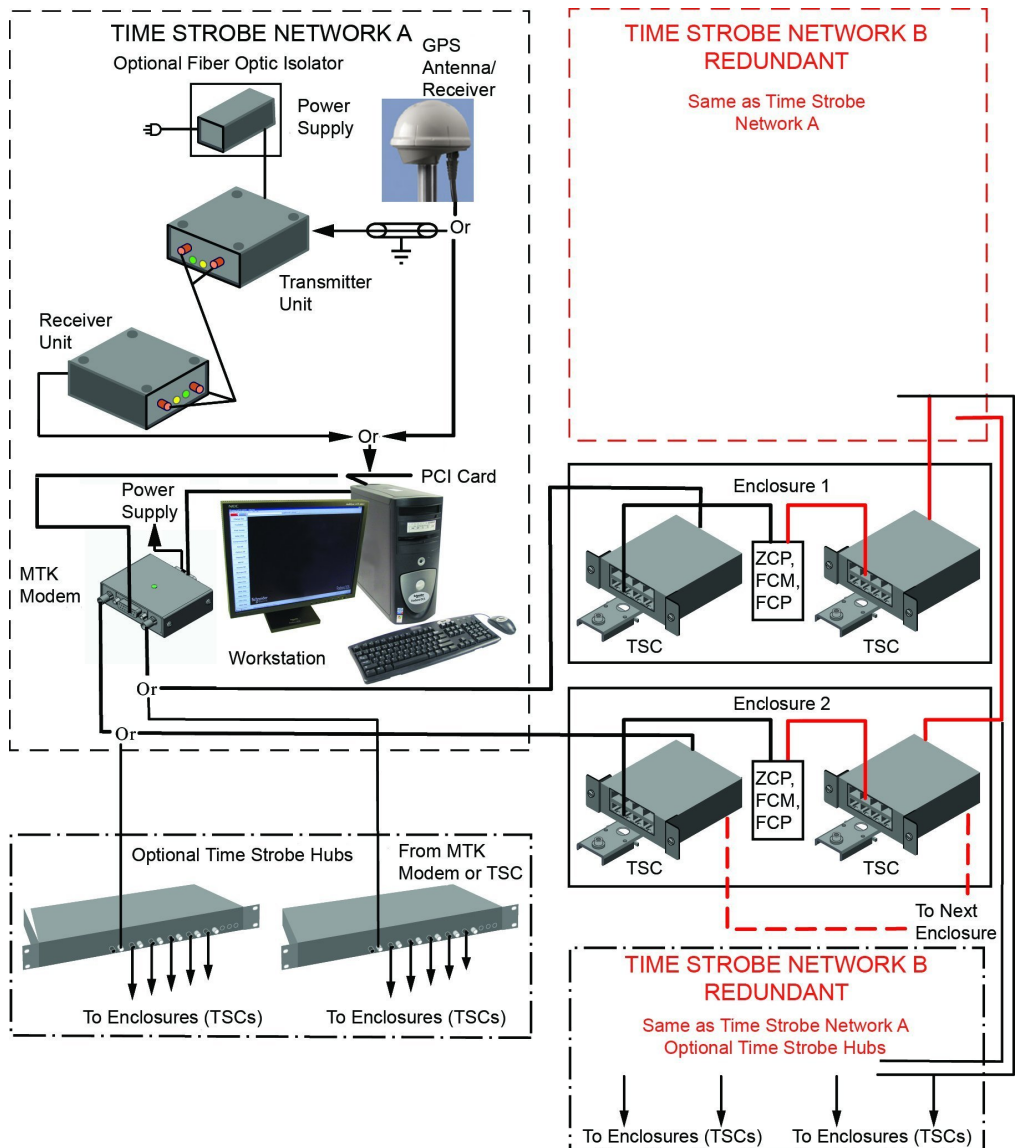
One Time Strobe extender can distribute the time strobe signal to up to six TSCs. The Time Strobe extenders can be daisy-chained allowing distribution of the time strobe throughout the entire plant.

## Redundant Time Synchronization Systems

In redundant Time Synchronization systems (see *Time Strobe Network Equipment (Redundant)*, page 11), two Master TimeKeepers are needed, primary and backup (optional redundant MTK functionality), each providing their time strobe signals to the controller modules. Two GPS antenna/receivers, Time Strobe Generator PCIe cards, MTK modems, and TSC modules are used for connecting controller stations to primary and backup MTK stations. In a redundant time strobe distribution system, any module can be removed without affecting the other path of the time strobe signal to the controller stations. Each module can be withdrawn/replaced while the remainder of the system is under power.

For additional information describing the Time Synchronization system, refer to the *Time Synchronization Overview Product Specification (PSS 41H-1TIME)*.

**Figure 9 - Time Strobe Network Equipment (Redundant)**



# GPS Antenna/Receiver Functional Specifications

Number of Satellites	Up to 8
Acquisition Time (cold start)	5 minutes typical, 15 minutes maximum
Re-acquisition Time	Less than 1 minute at the same physical location unless the antenna is powered down for longer than 14 days. After 14 days, it behaves as a cold start.
Frequency	1575 MHz (receive only)
Sync to UTC	Within $\pm 1.0$ us maximum (antenna in stationary position).
IRIG-B Output	<ul style="list-style-type: none"> <li>• Code Format: IRIG-B (B122)</li> <li>• Amplitude (Mark): 2.6 V p-p (type)</li> <li>• Modulation Ratio: 3:1</li> <li>• Output Impedance: 600 ohms</li> </ul>
Time Output	<ul style="list-style-type: none"> <li>• Output: RS-422 strobe compatible</li> <li>• Wave Shape: Pulse</li> <li>• Pulse Width: 1 ms (also, see Note in <i>Master TimeKeeper Modem, page 5</i>)</li> <li>• Pulse Polarity: Negative</li> <li>• Square Wave: 45 to 55%</li> <li>• Timing: Falling edge on-time pulse</li> <li>• Range: 65.53 s to 2 ms (500 Hz to 0.0152543 Hz)</li> <li>• Power-on Default Rate: 1 pps</li> </ul>
Power Requirements	Input Voltage Range: 12 V dc +5%, -10%

# GPS Antenna/Receiver Environmental Specifications

	<b>Operating</b>	<b>Storage</b>
<b>Temperature</b>	-30 to +70°C (-22 to +158°F)	-55 to +100°C (-67 to +212°F)
<b>Altitude</b>	0 m to +18000 m (0 to 59,005 ft)	0 m to +18000 m (0 to 59,005 ft)
<b>Salt Fog</b>	MIL-STD-202F, Method 101D, Condition B	MIL-STD-202F, Method 101D, Condition B
<b>Water Resistant</b>	Submersion to 1 m (39 in)	Submersion to 1 m (39 in)

## GPS Antenna/Receiver Physical Specifications

Mounting (Pole Mount)	1.00 in I.D., 14 turns/inch straight thread (not tapered)
Dimensions - Nominal	<ul style="list-style-type: none"> <li>• Diameter: 147 mm (5.8 in)</li> <li>• Height: 100 mm (3.9 in)</li> </ul>
Weight — Approximate	475 g (16.5 oz)
Antenna Cable	<ul style="list-style-type: none"> <li>• Type: Copper</li> <li>• Length: 30.5 m <math>\pm</math> 0.2m (100 ft <math>\pm</math> 8 in)</li> <li>• Cable Size: 9mm (0.35 in) O.D.</li> <li>• Cable to Optional Transmitter Unit: Cable from antenna has to be installed in grounded conduit when a Fiber Optic Isolator is used</li> <li>• Connector Size: <ul style="list-style-type: none"> <li>◦ Antenna End: 12-pin round connector, 20 mm (0.79 in) O.D. to antenna</li> <li>◦ MTK Modem or Optional Transmitter Unit End: DB-15 connector, 46 mm (1.80 in) O.D.</li> </ul> </li> </ul>

# Time Strobe Converter (TSC) Functional Specifications

Outputs	<ul style="list-style-type: none"> <li>Electrical Signal Characteristics: RS-422</li> <li>Number: 8</li> <li>Protection: Helps to protect from shock waves</li> </ul>
Inputs	<ul style="list-style-type: none"> <li>Multi-Mode Fiber Compatible TSC (From MTK, MMF-Compatible Extender or Another TSC): One 62.5/125 micron, simplex multi-mode Fiber Optic input</li> <li>Single-Mode Fiber Compatible TSC (From SMF-Compatible Extender): One 9/125 micron, simplex single-mode Fiber Optic input</li> </ul>
Output Ports	One 62.5/125 micron, simplex multi-mode Fiber Optic output
Propagation Delay	<ul style="list-style-type: none"> <li>TSC: 1 us per TSC</li> <li>Fiber Cable: 5 us per km</li> </ul>
Power Requirements	<ul style="list-style-type: none"> <li>Input Voltage Range: 21 to 42 V dc</li> <li>Input Power Terminal Blocks: 2 — one for power input, one for power output to next TSC within same enclosure</li> <li>Consumption: 3.3 W at 24 V dc with each of the 8 outputs used 4.1 W at 39 V dc with each of the 8 outputs used</li> </ul>

# Time Strobe Converter (TSC) Environmental Specifications

	<b>Operating</b>	<b>Storage</b>
<b>Temperature</b>	0 to +60°C (32 to +140°F)	-40 to +70°C (-40 to +158°F)
<b>Relative Humidity</b>	5 to 95% (noncondensing)	5 to 95% (non condensing)
<b>Vibration</b>	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz
<b>Contamination</b>	Class G1 (Mild) as defined in ISA Standard S71.04	Class G1 (Mild) as defined in ISA Standard S71.04



## Time Strobe Converter (TSC) Physical Specifications

Mounting	<ul style="list-style-type: none"> <li>DIN Rail: Accommodates multiple DIN styles including 32 mm (1.26 in) and 35 mm (1.38 in)</li> <li>Rack: 19 in rack on a special designed shelf</li> </ul>
Dimensions - Nominal	<ul style="list-style-type: none"> <li>Height: 38 mm (1.5 in)</li> <li>Width: 102 mm (4.0 in)</li> <li>Depth: 89 mm (3.5 in)</li> </ul>
Weight — Approximate	681 g (1.5 lb)
Indicator	Green is power. Yellow is dual purpose; yellow on is link and yellow flashing is time pulse signal output.
Cable Type	<p>Fiber Optic Cable</p> <ul style="list-style-type: none"> <li>Multi-Mode Fiber Compatible TSC: One 62.5/125 micron, simplex multi-mode Fiber Optic input and output</li> <li>Single-Mode Fiber Compatible TSC: One 9/125 micron, simplex single-mode Fiber-Optic input. One 62.5/125 micron, simplex multi-mode Fiber Optic output</li> </ul> <p>Copper Cable</p> <ul style="list-style-type: none"> <li>Cat 5 STP cable</li> </ul>
Cable Lengths	<p>Input and Output Fiber Cables</p> <ul style="list-style-type: none"> <li>Multi-Mode Fiber Optic Cable: 3 m to 2 km (10 to 6562 ft) Greater than 50 m (160 ft); customer supplied</li> <li>Single-Mode Fiber Optic Cable: 3 m to 10 km (6.2 mi) Customer-supplied</li> </ul> <p>To Controller/Baseplates (Copper Cables)</p> <ul style="list-style-type: none"> <li>0.5 m (1.6 ft) to 3 m (10 ft) within same enclosure</li> </ul>
Cable Connectors	<ul style="list-style-type: none"> <li>Fiber Optic Input /Output Connectors (2): One input and one output connector, ST Type</li> <li>Copper Strobe Output Connectors (8): RJ-45</li> </ul>

# MTK Modem Functional Specifications

Input Electrical Signal Characteristics	RS-422
Outputs (to TSC or Extender)	2 outputs for two physical directions of time strobe pulse
Propagation Delay	100 ns
Power Requirements	<ul style="list-style-type: none"><li>• Input Voltage Range (From Stations): 12 V dc +5%, -10%</li><li>• Output Voltage Range (To Antenna): 12 V dc +5%, -10%</li><li>• Consumption: 1 W</li></ul>

# MTK Modem Environmental Specifications

	<b>Operating</b>	<b>Storage</b>
<b>Temperature</b>	0 to +50°C (-4 to +122°F)	-40 to +70°C (-40 to +158°F)
<b>Relative Humidity</b>	5 to 95% (noncondensing)	5 to 95% (non condensing)
<b>Vibration</b>	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz
<b>Contamination</b>	Class G1 (Mild) as defined in ISA Standard S71.04	Class G1 (Mild) as defined in ISA Standard S71.04

## MTK Modem Physical Specifications

Mounting	Free Standing: Shelf or desktop (customer supplied)
Dimensions - Nominal	<ul style="list-style-type: none"> <li>• Height: 26 mm (1.0 in)</li> <li>• Width: 64 mm (2.5 in)</li> <li>• Depth: 58 mm (2.25 in)</li> </ul>
Weight — Approximate	Less than 454 g (1 lb)
Connectors	<ul style="list-style-type: none"> <li>• Antenna or Fiber-to-Copper Receiver to MTK Modem: DB-15, male</li> <li>• Fiber Optic Output Connectors (2): ST Type</li> </ul>
Indicator	Dual purpose; yellow on is link and yellow flashing is time pulse signal.
Cables	<p>MTK to PCIe Board in Station</p> <ul style="list-style-type: none"> <li>• Length: 0.3 m (1 ft)</li> <li>• Type: 15-pin (DB-15) Male Connector</li> </ul> <p>MTk Outputs (2)</p> <ul style="list-style-type: none"> <li>• Length: 3 m to 2 km (10 to 6562 ft)</li> <li>• Type: Single multi-mode fiber, 62.5/125 micron</li> </ul>

# GPS Fiber Optic Isolator (Optional) Functional Specifications

Transmitter Unit	<ul style="list-style-type: none"> <li>• Input Voltage Range (From Power Supply): 12 V dc, 600 mA</li> <li>• Output Voltage (To Antenna): 12 V dc, 600 mA</li> <li>• Input Through DB-15 Connector (From Antenna): RS-422 GPS Data and RS-422 1PPS</li> <li>• Fiber Optic Output Connectors (2): ST Type</li> <li>• Multimode Cable <ul style="list-style-type: none"> <li>◦ Attenuation: Less than 3.85 db/km at 860 nm</li> <li>◦ Propagation Delay: 5 microseconds/km</li> </ul> </li> </ul>
Receiver Unit	<ul style="list-style-type: none"> <li>• Input Voltage Range: 12 V dc +5%, -10% (from DB-15 connector, which connects to MTK modem)</li> <li>• Propagation Delay: Total propagation delay is 80 ns plus 6 ns per meter of fiber optic cable</li> <li>• Output Through DB-15 Connector: RS-422 GPS Data and RS-422 1PPS</li> <li>• Fiber Optic Input Connectors (2): ST Type</li> </ul>
Power Supply (for Transmitter Unit)	<ul style="list-style-type: none"> <li>• Input Voltage Range: 94 to 264 V ac, 50 Hz to 60 Hz</li> <li>• Output Voltage Range: 12 V dc, 600 mA</li> </ul>

# GPS Fiber Optic Isolator (Optional) Environmental Specifications

	<b>Operating</b>	<b>Storage</b>
<b>Temperature</b>	0 to +50°C (-4 to +122°F)	-40 to +70°C (-40 to +158°F)
<b>Relative Humidity</b>	5 to 95% (noncondensing)	5 to 95% (non condensing)
<b>Vibration</b>	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz
<b>Contamination</b>	Class G1 (Mild) as defined in ISA Standard S71.04	Class G1 (Mild) as defined in ISA Standard S71.04
<b>Location</b>	Indoors	Indoors

# GPS Fiber Optic Isolator (Optional) Physical Specifications

Transmitter Unit (Copper-to-Fiber Converter)	<ul style="list-style-type: none"> <li>• Indoor Mounting: Free Standing: Shelf or enclosure (customer supplied)</li> <li>• Weight (Approximate): 460 g (1 lb)</li> <li>• Dimensions (Nominal) <ul style="list-style-type: none"> <li>◦ Height: 34 mm (1.3 in)</li> <li>◦ Width: 89 mm (3.5 in)</li> <li>◦ Depth: 115 mm (4.5 in)</li> </ul> </li> <li>• Cable</li> </ul>
Dimensions - Nominal	<ul style="list-style-type: none"> <li>• Height: 26 mm (1.0 in)</li> <li>• Width: 64 mm (2.5 in)</li> <li>• Depth: 58 mm (2.25 in)</li> </ul>
Weight — Approximate	Less than 454 g (1 lb)
Connectors	<ul style="list-style-type: none"> <li>• Antenna or Fiber-to-Copper Receiver to MTK Modem: DB-15, male</li> <li>• Fiber Optic Output Connectors (2): ST Type</li> </ul>
Indicator	Dual purpose; yellow on is link and yellow flashing is time pulse signal.
Cables	<p>MTK to PCIe Board in Station</p> <ul style="list-style-type: none"> <li>• Length: 0.3 m (1 ft)</li> <li>• Type: 15-pin (DB-15) Male Connector</li> </ul> <p>MTK Outputs (2)</p> <ul style="list-style-type: none"> <li>• Length: 3 m to 2 km (10 to 6562 ft)</li> <li>• Type: Single multi-mode fiber, 62.5/125 micron</li> </ul>

## 7-Port Time Strobe Extender (Optional) Functional Specifications

Standards Supported	ISO 8802/3, IEEE 802.3, Ethernet 10Base-FL
Power	<ul style="list-style-type: none"><li>• AC Input Power: 100 V ac to 240 V ac</li><li>• Power Consumption: 50 to 60 Hz - 8 VA</li><li>• Fuse: 1 A</li></ul>



# 7-Port Time Strobe Extender (Optional) Environmental Specifications

	<b>Operating</b>	<b>Storage</b>
<b>Temperature</b>	0 to +50°C (-4 to +122°F)	-40 to +70°C (-40 to +158°F)
<b>Relative Humidity</b>	0 to 95% (noncondensing)	0 to 95% (non condensing)
<b>Vibration</b>	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz	5.0 m/s <sup>2</sup> (0.5 g) from 5 to 200 Hz
<b>Contamination</b>	Class G1 (Mild) as defined in ISA Standard S71.04	Class G1 (Mild) as defined in ISA Standard S71.04

## 7-Port Time Strobe Extender (Optional) Physical Specifications

Mounting	Free Standing, 19-inch rack, or wall mount
Masst — Approximate	2.7 kg (6 lb)
Dimensions - Nominal	<ul style="list-style-type: none"> <li>• Height: 44 mm (1.75 in) or 1U</li> <li>• Width: 425 mm (16.8 in)</li> <li>• Depth: 190 mm (7.5 in)</li> </ul>
Indicator	Power OK (green), Power Unavailability (red), TS Pulse Tx (yellow), Link (yellow)
Cable	<ul style="list-style-type: none"> <li>• Length: <ul style="list-style-type: none"> <li>◦ Multi-Mode Fiber Optic Cable: Up to 2 km (10 to 6562 ft)</li> <li>◦ Single-Mode Fiber Optic Cable: Up to 10 km (6.2 mi)</li> </ul> </li> <li>• Connectors: Fiber Optic Input/Output Connectors - ST Bayonet Type</li> </ul>
Part Numbers	<ul style="list-style-type: none"> <li>• MMF EXTENDER RH100AM</li> <li>• SMF EXTENDER RH100AN</li> </ul>

## Regulatory Compliance

Electromagnetic Compatibility (EMC)	European EMC Directive 2014/30/EU Meets: EN61326-1:2013 Class A Emissions and Industrial Immunity Levels
ROHS Compliance	Components of the Foxboro DCS system that carry part numbers beginning in "RH" are in conformity with the requirements RoHS Directive: 2011/65/EU.
Product Safety	<p>Time Strobe Converter, Time Strobe Modem, and Time Strobe Extender</p> <ul style="list-style-type: none"> <li>• North America: <ul style="list-style-type: none"> <li>◦ Underwriters Laboratories (UL) listed for U.S. and Canada for use in Ordinary Locations</li> </ul> </li> </ul> <p>Time Strobe Converter is additionally UL/UL-C listed as suitable for use in UL/UL-C listed Class I, Groups A-D; Division 2; temperature code T4 enclosure based systems when connected to specified Foxboro DCS processor modules as described in the <i>Standard and Compact 200 Series Subsystem User's Guide</i> (B0400FA).</p> <p>Communications circuits also meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA No.70) and Section 16 of the Canadian Electrical Code (CSA C22.1). Conditions for use are as specified in the <i>Standard and Compact 200 Series Subsystem User's Guide</i> (B0400FA).</p> <p>Time Strobe Converter, Time Strobe Modem, and Time Strobe Extender are compliant with the European Low Voltage Directive 2014/35/EU.</p> <p>Time Strobe Converter is additionally compliant with the Explosive Atmospheres (ATEX) Directive 2014/34/EU and are DEMKO certified as Ex nA IIC T4 for use in certified Zone 2 enclosure when connected to specified Foxboro DCS processor modules as described in the <i>Standard and Compact 200 Series Subsystem User's Guide</i> (B0400FA).</p>

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As standards, specifications, and design change from time to time,  
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