The FEI-Zyfer Family of Modular, GPS-Aided Time & Frequency Systems

Multiple Capabilities—Easily Configured

▶ **High Performance**

▶ **Flexible, Expandable, Upgradable**

▶ **Redundant & Reliable**

▶ **Hot-Swappable**

▶ **Easily Maintainable**

▶ **COTS for Military Applications**

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FEATURES

- **Accuracy**
  - **Time: <50ns Peak (UTC) <25ns RMS**
  - **Frequency: 1E-12**
- **GPS Receivers**
  - **Standard Civil C/A-Code (L1) Frequency**
  - **SAASM Military C/A-P(Y)-Codes (L1, L2)**
- **User interface**
  - **Standard RS-232**
  - **Keypad/display**
  - **Ethernet I/O (Telnet, SNMP)**
  - **Zyfer Monitor™ GUI**
- **Time Server**
  - **SNTP, NTP**
  - **PTPv2 IEEE 1588-2008**
- **Standard Outputs**
  - **1PPS**
  - **10MHz**
  - **13 output module slots for flexibility**
- **External sync input (for distribution systems)**

CommSync II Benefits
- **Compact design**
- **Redundant time and frequency sources**
- **Automatic switchover in the event of a failure**
- **Expandable with distribution shelves**
- **Increased reliability due to fewer system components**
- **Shorter MTTR due to "hot swappable" spare modules**
- **Lower field maintenance costs due to less system complexity**
- **Lower training costs due to single system**

Model 385 Fully-Redundant Modular Time and Frequency System

CommSync II® is a fully-redundant, modular time and frequency system, combining dual GPS receivers, oscillators, and up to 13 output option modules in a single 3U chassis. The heart of the CommSync II is the GTF (GPS Time and Frequency) Module. This GTF module is fully self-contained with a Quartz or Rubidium oscillator, and a commercial C/A or military SAASM GPS receiver (Rockwell-Collins MPE-S GB-GRAM or Trimble Force 22E MRU). For redundancy, two GTF modules, which are hot-swappable, can be installed in the front.

Utilized as a Primary Reference Source (PRS), the CommSync II provides either Standard Positioning Service (SPS) GPS (the Civil C/A signal) or the very latest in GPS military technology—SAASM Precision Positioning Service (PPS) GPS receivers (for approved users only). With GPS as the reference source, the CommSync II provides a frequency accuracy of 1E-12 and a time accuracy of <50ns Peak to UTC, for calibrated units.

The CommSync II is also designed to take external inputs to provide internal frequency synchronization to the accuracy of the external source.

There are two choices of disciplined oscillator selection. An ovenized Quartz Crystal oscillator (OCXO) or a Rubidium Atomic oscillator can be specified. The CommSync II can be populated with (13) option modules.

There are a wide variety of output option modules available: Low-Phase Noise sine wave, T1/E1, Time Code, and Network Time Protocol (NTP). The full line of common CommSync II and GSync option modules are shown in the option module listing on our website.

For Monitor and Control functions there is an RS-232 communication port on the front panel of the GTF module, as well as optional Ethernet rear plug-in modules providing Telnet, SNMP, Network Time Protocol (NTP), and PTPv2 IEEE 1588-2008.

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Output Specifications (GTF Front Panel)

After 24 hours of GPS locked operation, fixed antenna location, antenna delays entered.

Frequency Accuracy [a]

24 Hour average	Rubidium OSC	Quartz OSC
Locked to GPS	<1E-12	<1E-12
Holdover[a] – first 24 hours	<5E-11	<1E-10

Time Accuracy to UTC, for calibrated units[b]

	Rubidium OSC	Quartz OSC
Locked to GPS	<50ns Peak	<50ns Peak
Holdover[a] – first 24 hours	<3us	<7us

Short-Term Stability[c] typical

(Allan Deviation)	Rubidium OSC	Quartz OSC
1 sec	<3E-11	<1E-11
10 sec	<1E-11	<1E-11
100 sec	<3E-12	<1E-10

Phase Noise[c] typical

	Standard	Low Noise 5MHz
1 Hz	<–90 dBc/Hz	<–100 dBc/Hz
10 Hz	<–105 dBc/Hz	<–130 dBc/Hz
100 Hz	<–125 dBc/Hz	<–150 dBc/Hz
1 kHz	<–135 dBc/Hz	<–158 dBc/Hz

Input/Output (GTF Front Panel)

(1) 1PPS, 50 Ω, TTL level, SMA, External Sync input

(1) RS-232 I/O, DE-9 Connector

(1) 10MHz, 50 Ω, TTL level, SMA connector

(1) 1PPS, 50 Ω, TTL level, SMA connector

SAASM Option

(1) Key Load connector

(1) Hot Start connector

(1) Zeroize button

Power Options

• AC input (115/230 VAC) 100 to 240 VAC, 150 Watts max., 47-63 Hz

• DC input (24 VDC) 18-36 VDC, 150 Watts max.

• DC input (48 VDC) 36-76 VDC, 150 Watts max.

• DC input (12 VDC) 11.5 -18 VDC, 150 Watts max.

• DC input (28 VDC aircraft bus) 22-29 VDC, 150 Watts max.

GPS Receiver Options

Standard GPS Receiver - Civil C/A-Code

Type	8 to 12 channel, independent tracking
Frequency	1575.42 MHz (L1)
Code	C/A only
Acquisition Time[b]	Warm Start: <2 min.
	Cold Start: <20 min.

SAASM GPS Receiver[d] - Military P(Y)-Code

Type

MPE-S GB-GRAM: 12 channel, independent tracking

FORCE 22E MRU: 24 channel, independent tracking

Frequency 1575.42 MHz and 1227.60 MHz (L1 & L2)

Code C/A and P(Y)

Acquisition Time[b]

– Warm start: <2 min.

– Hot Start or Cold Start: Dependent on accuracy of initialization parameters from PLGR or DAGR handheld military GPS receivers, or other initialization devices

Key Load Interface: DS-102

Physical

Height	134 mm (5.25") (3U)
Width	448 mm (17.65")
	Mounts in 19" EIA rack
Depth	381 mm (15") incl. connectors
Weight	25lb. Max
Panel Color	Black Satin finish (Front Panel)

Environmental

Temperature

Operating	0°C to 50°C
Rate of Change	10°C/Hour
Storage	-40°C to +85°C

Relative Humidity 5% to 95%, non-condensing

Altitude

Operating	-60m to 4000m
Storage	-60m to 9000m

Notes:

(a) After 48 hours of continuous operation.

(b) 2σ (95.5% probability).

(c) Detailed specifications for various frequency output modules: see "Option Module User Manual".

(d) See back page for SAASM receiver restrictions

Specifications subject to change without notice.

Optional Accessories

• L1 Antenna Kit

• L1/L2 Antenna Kit

• Antenna Cables

• Antenna Inline Amplifier

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FEATURES

- **Accuracy**
  - **Time: <50ns Peak (UTC) <25ns RMS**
  - **Frequency: 1E-12**
- **GPS Receivers**
  - **Standard Civil C/A-Code (L1) Frequency**
  - **SAASM Military C/A-P(Y)-Codes (L1, L2)**
- **User interface**
  - **Standard RS-232**
  - **Keypad/display**
  - **Ethernet I/O (Telnet, SNMP)**
  - **Zyfer Monitor™ GUI**
- **Time Server**
  - **SNTP, NTP**
  - **PTPv2 IEEE 1588-2008**
- **Standard Outputs**
  - **1PPS**
  - **10MHz**
  - **8 output module slots for flexibility**
- **External sync input (for distribution systems)**

Model 407 Modular Time and Frequency System
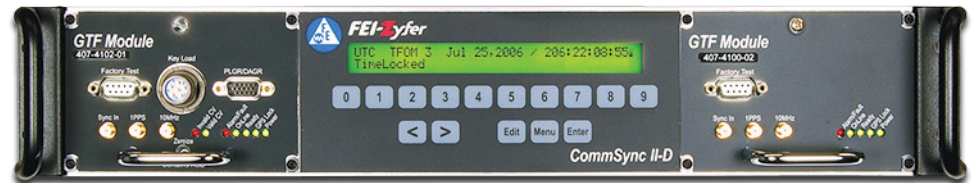
CommSync II®-D is a fully-redundant, modular time and frequency system, combining dual GPS receivers, oscillators, and up to 8 output option modules in a single 2U chassis. The heart of the CommSync II is the GTF (GPS Time and Frequency) Module. This GTF module is fully self-contained with a Quartz or Rubidium oscillator, and a commercial C/A or military SAASM GPS receiver (Rockwell-Collins MPE-S GB-GRAM or Trimble Force 22E MRU). For redundancy, two GTF modules, which are hot-swappable, can be installed in the front.

Utilized as a Primary Reference Source (PRS), the CommSync II-D provides either Standard Positioning Service (SPS) GPS (the Civil C/A signal) or the very latest in GPS military technology—SAASM Precision Positioning Service (PPS) GPS receivers (for approved users only). With GPS as the reference source, the CommSync II-D provides a frequency accuracy of 1E-12 and a time accuracy of <50ns Peak to UTC, for calibrated units.

The CommSync II-D is also designed to take external inputs to provide internal frequency synchronization to the accuracy of the external source.

There are two choices of disciplined oscillator selection. An ovenized Quartz Crystal oscillator (OCXO) or a Rubidium Atomic oscillator can be specified. The CommSync II-D can be populated with (8) option modules.

There are a wide variety of output option modules available: Low-Phase Noise sine wave, T1/E1, Time Code, and Network Time Protocol (NTP). The full line of common CommSync II and GSync option modules are shown in the option module listing on our web site.

For Monitor and Control functions there is an RS-232 communication port on the front panel of the GTF module, as well as optional Ethernet rear plug-in modules providing Telnet, SNMP, Network Time Protocol (NTP), and PTPv2 IEEE 1588-2008.

Output Specifications (GTF Front Panel)

After 24 hours of GPS locked operation, fixed antenna location, antenna delays entered.

Frequency Accuracy [a]

24 Hour average	Rubidium OSC	Quartz OSC
Locked to GPS	<1E-12	<1E-12
Holdover[a] – first 24 hours	<5E-11	<1E-10

Time Accuracy to UTC, for calibrated units[b]

	Rubidium OSC	Quartz OSC
Locked to GPS	<50ns Peak	<50ns Peak
Holdover[a] – first 24 hours	<3us	<7us

Short-Term Stability[c] typical

(Allan Deviation)	Rubidium OSC	Quartz OSC
1 sec	<3E-11	<1E-11
10 sec	<1E-11	<1E-11
100 sec	<3E-12	<1E-10

Phase Noise[c] typical

	Standard	Low Noise 5MHz
1 Hz	<–90 dBc/Hz	<–100 dBc/Hz
10 Hz	<–105 dBc/Hz	<–130 dBc/Hz
100 Hz	<–125 dBc/Hz	<–150 dBc/Hz
1 kHz	<–135 dBc/Hz	<–158 dBc/Hz

Input/Output (GTF Front Panel)

(1) 1PPS, 50 Ω, TTL level, SMA, External Sync input

(1) RS-232 I/O, DE-9 Connector

(1) 10MHz, 50 Ω, TTL level, SMA

(1) 1PPS, 50 Ω, TTL level, SMA

SAASM Option (front panel)

(1) Key Load connector

(1) Hot Start connector

(1) Zeroize button

Power Options

• AC input (115/230 VAC)	100-120 and 200-240 VAC, 130 Watts max., 47-63 Hz
• DC input (24 VDC)	18-36 VDC, 100 Watts max.
• DC input (48 VDC)	36-76 VDC, 100 Watts max.

GPS Receiver Options

Standard GPS Receiver - Civil C/A-Code

Type	8 to 12 channel, independent tracking
Frequency	1575.42 MHz (L1)
Code	C/A only
Acquisition Time[b]	Warm Start: <2 min. Cold Start: <20 min.

SAASM GPS Receiver[d] - Military P(Y)-Code

Type

MPE-S GB-GRAM:	12 channel, independent tracking
FORCE 22E MRU:	24 channel, independent tracking
Frequency	1575.42 MHz and 1227.60 MHz (L1 & L2)
Code	C/A and P(Y)

Acquisition Time[b]

– Warm start:	<2 min.
– Hot Start or Cold Start:	Dependent on accuracy of initialization parameters from PLGR or DAGR handheld military GPS receivers, or other initialization devices
Key Load Interface:	DS-102

Physical

Height	87 mm (3.50") (2U)
Width	438 mm (17.25") Mounts in 19" EIA rack
Depth	419 mm (16.5") includes connectors
Weight	27lb. Max
Panel Color	Black Satin finish (Front Panel)

Environmental

Temperature

Operating	0°C to 50°C
Rate of Change	10°C/Hour
Storage	-40°C to +85°C
Relative Humidity	5% to 95%, non-condensing

Altitude

Operating	-60m to 4000m
Storage	-60m to 9000m

Notes:

(a) After 48 hours of continuous operation.

(b) 2σ (95.5% probability).

(c) Detailed specifications for various frequency output modules: see "Option Module User Manual".

(d) See back page for SAASM receiver restrictions

Specifications subject to change without notice.

Optional Accessories

• L1 Antenna Kit

• L1/L2 Antenna Kit

• Antenna Cables

• Antenna Inline Amplifier

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FEATURES

- **Accuracy**
  - Time: <50ns Peak (UTC) <25ns RMS
  - Frequency: 1E-12
- **GPS Receivers**
  - Standard Civil C/A-Code (L1) Frequency
  - SAASM Military C/A-P(Y)-Codes (L1, L2)
- **User interface**
  - Standard RS-232
  - Keypad/display
  - Ethernet I/O (Telnet, SNMP)
  - Zyfer Monitor™ GUI
- **Time Server**
  - SNTP, NTP
  - PTPv2 IEEE 1588-2008
- **Standard Outputs**
  - 1PPS
  - 10MHz
  - 8 output module slots for flexibility
- **External sync input** (for distribution systems)

Model 402 Modular Time and Frequency System

The **GSync II**® is the 2U compact version of the popular and versatile GSync, and provides eight output module slots. The heart of the GSync II is the GTF (GPS Time and Frequency) module within the unit. It is self-contained with a Quartz or Rubidium oscillator, and a commercial C/A GPS receiver or a military SAASM GPS receiver (Rockwell-Collins MPE-S GB-GRAM or Trimble Force 22E MRU).

If a system needs a Primary Reference Source (PRS), the GSync II provides either Standard Positioning Service (SPS) GPS (the civil C/A signal) or the very latest in GPS military technology—SAASM Precision Positioning Service (PPS) GPS receivers (for approved users only). With GPS as the reference source, the GSync II provides a frequency accuracy of 1E-12 and a time accuracy to <50ns Peak to UTC, for calibrated units.

The GSync II is also designed to take external inputs to provide internal frequency synchronization to the accuracy of the external source.

There are two choices of disciplined oscillator selection. An Ovenized Quartz Crystal Oscillator (OCXO) or a Rubidium Atomic Oscillator can be specified. The GSync II can be populated with up to (8) option modules.

There are a wide variety of output option modules available: Low-Phase Noise sine wave, T1/E1, Time Codes, and Network Time Protocol (NTP). The full line of common GSync II and CommSync II option modules are shown in the option module listing on our web site.

For Monitor and Control functions there is an RS-232 communication port on the rear panel of the chassis and a standard Ethernet port providing Telnet, SNMP, and Network Time Protocol (NTP), as well as IEEE PTPv2 IEEE 1588-2008.
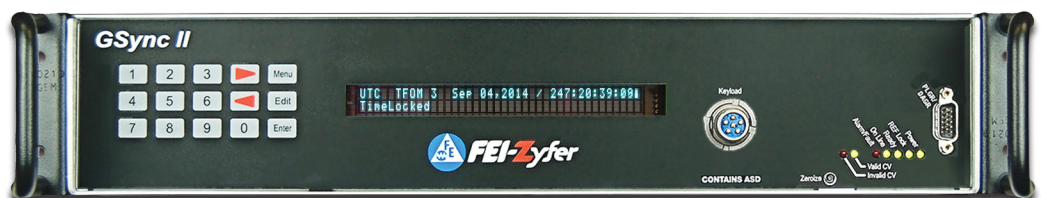
GSync II with SAASM configuration

Specifications

Output Specifications

After 24 hours of GPS locked operation, fixed antenna location, antenna delays entered.

Frequency Accuracy [a]

24 Hour average	Rubidium OSC	Quartz OSC
Locked to GPS	<1E-12	<1E-12
Holdover[a] – first 24 hours	<5E-11	<1E-10

Time Accuracy to UTC, for calibrated units[b]

	Rubidium OSC	Quartz OSC
Locked to GPS	<50ns Peak	<50ns Peak
Holdover[a] – first 24 hours	<3us	<7us

Short-Term Stability[c] typical

(Allan Deviation)	Rubidium OSC	Quartz OSC
1 sec	<3E-11	<1E-11
10 sec	<1E-11	<1E-11
100 sec	<3E-12	<1E-10

Phase Noise[c] typical

	Standard	Low Noise 5MHz
1 Hz	<–90 dBc/Hz	<–100 dBc/Hz
10 Hz	<–105 dBc/Hz	<–130 dBc/Hz
100 Hz	<–125 dBc/Hz	<–150 dBc/Hz
1 kHz	<–135 dBc/Hz	<–158 dBc/Hz

Input/Output (Rear Panel)

(1) 1PPS, 50 Ω, TTL level, BNC, External Sync input
(1) RS-232 I/O, DE-9 Connector
(1) GPS Antenna Connector, TNC
(1) 10MHz, 50 Ω, TTL level, BNC
(1) 1PPS, 50 Ω, TTL level, BNC
(1) RJ-45 10/100 Fast Ethernet

- TCP/IP, Ethernet 2.0/IEEE 802.3
- IPv4, IPv6
- Telnet RFC 854, SSHv1, SSHv2
- SNMPv1, SNMPv2c, SNMPv3
- SNTP, NTPv1, NTPv2, NTPv3, NTPv4
- PTPv2, IEEE 1588-2008
- Syslog support RFC 5424

SAASM Option (front panel)

(1) Key Load connector
(1) Hot Start connector
(1) Zeroize button

Power Options

- AC input (115/230 VAC) 100-120 and 200-240 VAC, 130 Watts max., 47-63 Hz
- DC input (24 VDC) 18-36 VDC, 100 Watts max.
- DC input (48 VDC) 36-76 VDC, 100 Watts max.
- DC input (12 VDC) 11.5 -18 VDC, 150 Watts max.

GPS Receiver Options

Standard GPS Receiver - Civil C/A-Code

Type	8 to 12 channel, independent tracking
Frequency	1575.42 MHz (L1)
Code	C/A only
Acquisition Time[b]	Warm Start: <2 min. Cold Start: <20 min.

SAASM GPS Receiver[d] - Military P(Y)-Code

Type
MPE-S GB-GRAM: 12 channel, independent tracking
FORCE 22E MRU: 24 channel, independent tracking
Frequency 1575.42 MHz and 1227.60 MHz (L1 & L2)
Code C/A and P(Y)
Acquisition Time[b]
 – Warm start: <2 min.
 – Hot Start or Cold Start: Dependent on accuracy of initialization parameters from PLGR or DAGR handheld military GPS receivers, or other initialization devices
Key Load Interface: DS-102

Physical

Height	87 mm (3.50") (2U)
Width	438 mm (17.25") Mounts in 19" EIA rack
Depth	381 mm (15") includes connectors
Weight	15lb. Max
Panel Color	Black Satin finish (Front Panel)

Environmental

Temperature
 Operating 0°C to 50°C
 Rate of Change 10°C/Hour
 Storage -40°C to +85°C
Relative Humidity 5% to 95%, non-condensing
Altitude
 Operating -60m to 4000m
 Storage -60m to 9000m

Notes:
(a) After 48 hours of continuous operation.
(b) 2σ (95.5% probability).
(c) Detailed specifications for various frequency output modules: see "Option Module User Manual".
(d) See back page for SAASM receiver restrictions

Specifications subject to change without notice.

Additional information on our website:
- GSync II User Manual
- Option Module User Manual
- A list of detailed specifications of more than 200 time and frequency plug-in modules and network I/O modules

Visit www.fei-zyfer.com

Optional Accessories
- L1 Antenna Kit
- L1/L2 Antenna Kit
- Antenna Cables
- Antenna Inline Amplifier

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FEATURES

- **Accuracy**
  - Time: <50ns Peak (UTC) <25ns RMS
  - Frequency: 1E-12
- **GPS Receivers**
  - Standard Civil C/A-Code (L1) Frequency
  - SAASM Military C/A-P(Y)-Codes (L1, L2)
- **User interface**
  - Standard RS-232
  - Keypad/display
  - Ethernet I/O (Telnet, SNMP)
  - Zyfer Monitor™ GUI
- **Time Server**
  - SNTP, NTP
  - PTPv2 IEEE 1588-2008
- **Standard Outputs**
  - 1PPS
  - 10MHz
  - 4 output module slots for flexibility
- **External sync input** (for distribution systems)

Model 391 Modular Time and Frequency System

GSync® is the 1U compact chassis version of the popular and versatile CommSync II. The heart of the GSync is the GTF (GPS Time and Frequency) module within the unit. It is self-contained with a Quartz or Rubidium oscillator, and a commercial C/A GPS receiver or a military SAASM GPS receiver (Rockwell-Collins MPE-S GB-GRAM or Trimble Force 22E MRU).
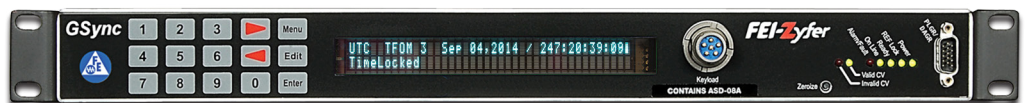
If a system needs a Primary Reference Source (PRS), the GSync provides either Standard Positioning Service (SPS) GPS (the civil C/A signal) or the very latest in GPS military technology—SAASM Precision Positioning Service (PPS) GPS receivers (for approved users only). With GPS as the reference source, the GSync provides a frequency accuracy of 1E-12 and a time accuracy of <50ns Peak to UTC, for calibrated units.

The GSync is also designed to take external inputs to provide internal frequency synchronization to the accuracy of the external source.

There are two choices of disciplined oscillator selection. Depending on holdover requirements, an Ovenized Quartz Crystal Oscillator (OCXO) or a Rubidium Atomic Oscillator can be specified. The GSync can be populated with up to (4) option modules.

There are a wide variety of output option modules available: Low-Phase Noise sine wave, T1/E1, Time Code, and Network Time Protocol (NTP). The full line of common GSync and CommSync II option modules are shown in the option module listing on our web site.

For Monitor and Control functions there is an RS-232 communication port on the rear panel of the chassis and a standard Ethernet port providing Telnet, SNMP, and Network Time Protocol (NTP), as well as PTPv2 IEEE 1588-2008.

GSync with SAASM configuration

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Output Specifications

After 24 hours of GPS locked operation, fixed antenna location, antenna delays entered.

Frequency Accuracy [a]

24 Hour average	Rubidium OSC	Quartz OSC
Locked to GPS	<1E-12	<1E-12
Holdover[a] – first 24 hours	<5E-11	<1E-10

Time Accuracy to UTC, for calibrated units[b]

	Rubidium OSC	Quartz OSC
Locked to GPS	<50ns Peak	<50ns Peak
Holdover[a] – first 24 hours	<3us	<7us

Short-Term Stability[c] typical

(Allan Deviation)	Rubidium OSC	Quartz OSC
1 sec	<3E-11	<1E-11
10 sec	<1E-11	<1E-11
100 sec	<3E-12	<1E-10

Phase Noise[c] typical

	Standard	Low Noise 5MHz
1 Hz	<–90 dBc/Hz	<–100 dBc/Hz
10 Hz	<–105 dBc/Hz	<–130 dBc/Hz
100 Hz	<–125 dBc/Hz	<–150 dBc/Hz
1 kHz	<–135 dBc/Hz	<–158 dBc/Hz

Input/Output (Rear Panel)

(1) 1PPS, 50 Ω, TTL level, BNC, External Sync input
(1) RS-232 I/O, DE-9 Connector
(1) GPS Antenna Connector, TNC
(1) 10MHz, 50 Ω, TTL level, BNC
(1) 1PPS, 50 Ω, TTL level, BNC
(1) RJ-45 Fast Ethernet

- TCP/IP, Ethernet 2.0/IEEE 802.3
- IPv4, IPv6
- Telnet RFC 854, SSHv1, SSHv2
- SNMPv1, SNMPv2c, SNMPv3
- SNTP, NTPv1, NTPv2, NTPv3, NTPv4
- PTPv2, IEEE 1588-2008
- Syslog support RFC 5424

SAASM Option (front panel)

(1) Key Load connector
(1) Hot Start connector
(1) Zeroize button

Power Options

- AC input (115/230 VAC) — 100-120 and 200-240 VAC, 100 Watts max., 47-63 Hz
- DC input (24 VDC) — 18-36 VDC, 100 Watts max.
- DC input (48 VDC) — 36-76 VDC, 100 Watts max.
- DC input (12 VDC) — 11.5-18 VDC, 150 Watts max.
- DC input (28 VDC aircraft bus) — 22-29 VDC, 150 Watts max.

GPS Receiver Options

Standard GPS Receiver - Civil C/A-Code

Type	8 to 12 channel, independent tracking
Frequency	1575.42 MHz (L1)
Code	C/A only
Acquisition Time[b]	Warm Start: <2 min.
	Cold Start: <20 min.

SAASM GPS Receiver[d] - Military P(Y)-Code

Type

MPE-S GB-GRAM:	12 channel, independent tracking
FORCE 22E MRU:	24 channel, independent tracking
Frequency	1575.42 MHz and 1227.60 MHz (L1 & L2)
Code	C/A and P(Y)

Acquisition Time[b]

– Warm start:	<2 min.
– Hot Start or Cold Start:	Dependent on accuracy of initialization parameters from PLGR or DAGR handheld military GPS receivers, or other initialization devices
Key Load Interface:	DS-102

Physical

Height	44 mm (1.75") (1U)
Width	448 mm (17.65")
	Mounts in 19" EIA rack
Depth	381 mm (15.0") includes connectors
Weight	10lb. Max
Panel Color	Black Satin finish (Front Panel)

Environmental

Temperature

Operating	0°C to 50°C
Rate of Change	10°C/Hour
Storage	-40°C to +85°C
Relative Humidity	5% to 95%, non-condensing

Altitude

Operating	-60m to 4000m
Storage	-60m to 9000m

Notes:

(a) After 48 hours of continuous operation.

(b) 2σ (95.5% probability).

(c) Detailed specifications for various frequency output modules: see "Option Module User Manual".

(d) See back page for SAASM receiver restrictions

Specifications subject to change without notice.

Additional information on our website:
- GSync User Manual
- Option Module User Manual
- A list of detailed specifications of more than 200 time and frequency plug-in modules and network I/O modules

Visit www.fei-zyfer.com

Optional Accessories
- L1 Antenna Kit
- L1/L2 Antenna Kit
- Antenna Cables
- Antenna Inline Amplifier

FEI-Zyfer

Design Concept

Customer requirements range from just one or two standard frequency (10 MHz) and/or time (1PPS) outputs to hundreds of outputs of various frequencies and time codes. Additional consideration must be given to:

- Redundancy
- Hot-swappable and hitless plug-in modules
- Phase coherent and/or aligned output signals
- Remotely upgradable software
- Remote monitoring and control
- Holdover performance in case of loss of GPS
- Various harsh environments

In response to such diverse demands, FEI-Zyfer integrated these design considerations and developed a family of 19" rack-mountable, modular products, 1U, 2U, and 3U high, to satisfy requests for:

- Redundant power supplies, both AC and DC
- Fully redundant GTF (GPS receiver with integrated OXCO or Rb oscillator)

- Expansion shelves/distribution systems locked to the master system/reference
- Ruggedization for transport or operation in harsh environments
- Fiber optic connectivity for antenna or master/slave for Tempest conditions

Applications include:

- Fully redundant Master Clock Systems for Satellite Ground Systems, Gateways, or Mobile SatCom Terminals
- Primary Reference Source for Telecom and Secure Communications and Data Networks
- Radar, C4ISR, and Air Traffic Control Systems
- Military Test Ranges and Calibration Laboratories, etc.

Most applications can be satisfied with a vast selection of hot-swappable Plug-In Modules, allowing easy and economical product configurations for GSync and CommSync II systems.

CommSync II Output Capability Diagram – Master/Slave Configuration
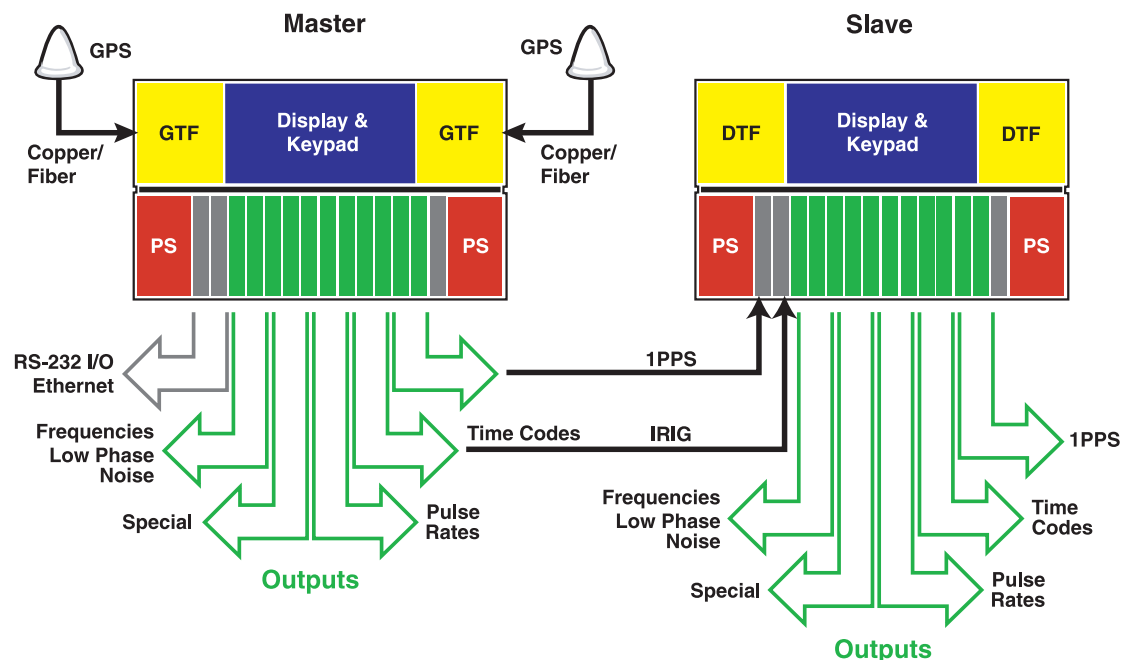
CommSync II rear panel showing vertical configuration and module locations

Power Input Module (must be in end slots)

I/O Modules (must be in these 2 slots) If no I/O Modules are used, the two slots are available for other time and frequency output modules.

Available Output Module slots

Wired GPS Antenna Panel (Not a Module)

Power Input Module (must be in end slots)

2U GSync II, rear panel Carries up to 8 modules horizontal

1U GSync, rear panel Carries up to 4 modules horizontal

CommSync II front view, showing GTF module locations

Sample Optional Plug-in Modules

Optional SAASM GTF Module

GPS Time & Frequency (GTF) Module

Ethernet Module

8 x BNC Low-Phase Noise Output Module

Time Code Output Module

Family of available Plug-In Modules:

- Power Supplies (DC and/or AC)
- Standard and Special Frequencies (1MHz to >100MHz)
- Time Codes (IRIG, HQ, PTTI) and Pulse Rates from 1PPS to 10M PPS
- Clock Rates (programmable) from 1PPS to 54M PPS
- E1/T1 for Telecom Synchronization at Stratum 1
- Standard GPS C/A and Military SAASM Receivers
- Product Management and Control via RS-232 and/or Ethernet I/O (Telnet, SNMP, NTP, PTPv2 IEEE 1588-2008) which facilitates easy maintenance and allows remote software upgrades

For special applications, FEI-Zyfer will ruggedize the product, perform ESS testing, calibrate to UTC or design new modules to meet customer's needs.

Additional information on our website:

- Product User Manuals
- **Option Module User Manual**
- **A list of detailed specifications of more than 200 time and frequency plug-in modules and network I/O modules**

Visit www.fei-zyfer.com

FEI-Zyfer

SAASM – Military GPS Receiver

The Chairman of the Joint Chiefs of Staff (CJCS) issued a mandate to begin SAASM GPS receiver deployment as of October 2002 and with full enforcement as of October 2006.

What is SAASM?

SAASM (Selective Availability Anti-Spoof Module) is the new generation military GPS receiver technology, providing a new security architecture and crypto key management infrastructure. Receiver hardware and software assets are protected by a tamper-resistant security module on the GPS receiver board. Crypto key security is protected by a new unclassified Black-Key infrastructure. Having unclassified hardware and key logistics greatly reduces the complexities of deploying military GPS.

What is Direct P(Y) acquisition?

The pre-SAASM GPS receiver technology requires the Civil C/A-Code signal to facilitate the acquisition of the crypto P(Y)-Code signal. In addition to a properly keyed receiver, the C/A signal provides the receiver with precision time and other parameters needed to acquire the P(Y) signal. The Hot Start acquisition functionality bypasses this need, able to come on-line in the absence of the Civil, in-the-clear C/A signal. This is a vital function of the SAASM receiver technology, because in today's tactical warfare scenarios, the C/A signal may not be available in the local area of conflict.

Why use GPS SAASM in time/frequency product applications?

Many existing communications and data networks used by the government and DoD receive precision time and frequency from GPS-C/A-aided synchronization products. GPS-C/A signals/receivers can be easily jammed or degraded, causing degradation or loss of synchronization and communications, unacceptable in vital applications. The use of GPS-SAASM receivers prevents such loss of synchronization.

Although GPS-SAASM receivers are "controlled items," they are not classified. Only U.S. Government and its NATO partners are authorized to use such military receivers.

7321 Lincoln Way
Garden Grove, CA 92841

Toll-free: 888-886-7465
Main: 714-933-4000
Fax: 714-933-4001

E-mail:
sales@fei-zyfer.com

www.fei-zyfer.com

CommSync II with SAASM configuration

Note: U.S. Government policy restricts the sale of Precise Positioning Service (PPS) equipment to those authorized by the U.S. Department of Defense. Non-U.S. authorized users must purchase PPS equipment through the Foreign Military Sales (FMS) process.

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