

# SecureSync®

## Option Module Cards



Add the features you need through options modules, up to 6 option modules per unit

### Option Module Cards

Add only the features you need by selecting SecureSync® option cards. Up to six cards can be accommodated per unit (SAASM units can accommodate up to four additional cards per unit). Order them as part of the original configuration, or add them to an installed unit to keep up the changing needs of your system. If you do not see a feature that you need, please contact us to discuss customizing a card.

### Option Card Feature Summary

Feature	Configuration (see specifications)
<b>1PPS</b>	1 input/output with 10 MHz input (TTL or RS-485)
	1 input/3 outputs (TTL coax or fiber)
	Quad outputs (TTL coax or fiber, 10V or RS-485)
<b>Alarm Relay</b>	3 NC/NO indicating unit status
<b>ASCII Time Code</b>	1 input/1 output (RS-232 or RS-485)
<b>Event Broadcast</b>	1 input (TTL)/broadcast (RS-232) pair
<b>Frequency</b>	1 KHz - 10 MHz input with 1PPS input/output (TTL or RS-485)
	3 outputs (1, 5, or 10 MHz)
<b>Gigabit Ethernet</b>	3x 10/100/1000 Base-T Ethernet Ports
<b>HaveQuick</b>	4 outputs (TTL or RS-485)
	1 input/3 outputs (TTL)
<b>IRIG</b>	1 input/2 outputs (coax or fiber)
	4 outputs (coax or fiber)
<b>Precision Time Protocol</b>	1x IEEE 1588 PTP v2 port (master or slave)
<b>Programmable TTL</b>	4 outputs
<b>STANAG</b>	Input module: 1x 1PPS, 1 ToD
	Output module: 1x 1PPS, 2 ToD, 1 frequency
<b>T1</b>	2 data rate outputs/1 frequency output (unbalance or balanced)
<b>E1</b>	2 data rate outputs/1 frequency output (unbalanced or balanced)
<b>Programmable Frequency</b>	4 outputs (RS-485, TTL, or sine wave)

### Specifications

#### 1PPS

The 1PPS option card is the ideal solution when 1PPS distribution is necessary. Option cards that provide four (4) 1PPS outputs are available with TTL, 10V, RS-485 (terminal block), and Fiber Optic signal types, facilitating a variety of requirements for pulse-per-second timing.

#### Specifications

	1PPS Input	1PPS Output
<b>Quantity</b>	1 (1204-28) 1 (1204-2A) 0 (1204-18) 0 (1204-19) 0 (1204-21) 0 (1204-2B)	3 (1204-28) 2 (1204-2A) 4 (1204-18) 4 (1204-19) 4 (1204-21) 4 (1204-2B)
<b>Signal Type and Connector</b>	TTL (BNC into 50 ohms) ST (Fiber Optic)	TTL or 10v (BNC into 50 ohms), or RS-485 (terminal block) ST (Fiber Optic)
<b>Fiber Optic Compatibility</b>	50/125 $\mu$ m, 62.5/125 $\mu$ m multi-mode cable	
<b>Fiber Operating Wavelength</b>	820/850 nm	
<b>Fiber Minimum Sensitivity</b>	-25 dBm @ 820 nm	—
<b>Fiber Optical Power</b>	—	-15 dBm average into 50/125 fiber
<b>Programmable Phase Shift</b>	—	$\pm 5$ ns to 500 ms with 5 ns resolution
<b>Programmable Pulse Width</b>	—	100 ns to 500 ms with 20 ns resolution
<b>Rise Time to 90% of Level</b>	—	<10 ns (1204-18) <30 ns (1204-19) <30 ns (1294-21)
<b>Absolute Phase Error</b>	—	$\pm 50$ ns (1 $\sigma$ )
<b>Maximum Number of Cards: 6</b>		

#### Ordering Information

1204-18: Quad 1PPS output module (TTL)  
1204-19: Quad 1PPS output module (10 V)  
1204-21: Quad 1PPS output module (RS-485 (terminal block))  
1204-2B: Quad 1PPS output module (Fiber Optic)  
1204-28: 1 in/3 out 1PPS module (TTL (BNC))  
1204-2A: 1 in/2 out 1PPS module (Fiber Optic)

## 1PPS/Freq Input and 1PPS Output

The 1PPS/Freq Input and 1PPS Output option card combines timing and frequency solutions on a single card. The option card includes one (1) 1 PPS input, one (1) 1 PPS output, and one (1) user selectable 1-10 MHz sine wave Frequency input capable of handling a wide range of applications.

### Specifications

	1PPS Input	Freq Input	1PPS Output
<b>Quantity</b>	1	1	1
<b>Signal Type and Connector</b>	TTL (BNC into 50 ohms) or RS-485 (terminal block)	1 KHz -10 MHz sine (1v p-p into 50 ohms, BNC) or RS-485 (terminal block)	TTL (BNC into 50 ohms) or RS-485 (terminal block)
<b>Input Signal Jitter</b>	< ±500 ns to achieve oscillator lock, < ±50 ns to achieve system performance		—
<b>Detected Level</b>	—	+13dBm to -6dBm	—
<b>Frequency Setting</b>	—	1 KHz - 10 MHz in 1 Hz steps	—
<b>Minimum Pulse Width Detected</b>	100 ns	—	—
<b>Programmable Phase Shift</b>	±5 ns to 500 ms with 5 ns resolution	—	±5 ns to 500 ms with 5 ns resolution
<b>Programmable Pulse Width</b>	—	—	100 ns to 500 ms with 20 ns resolution
<b>Rise Time to 90% of Level</b>	—	—	<10 ns
<b>Absolute Phase Error</b>	—	—	±50 ns (1σ)
<b>Maximum Number of Cards: 6</b>			

### Ordering Information

1204-01: 1PPS/freq input (TTL levels) module  
1204-03: 1PPS/freq input (RS-485 levels) module

## Alarm Contact Outputs

The Model 1204-0F Relay option module card provides three (3) configurable relay outputs for the SecureSync platform.

### Specifications

	Alarms
<b>Quantity</b>	3
<b>Signal Type and Connector</b>	NO/NC Relays (terminal block) Contacts Switch under max. load of 30VDC, 2A Contacts rated to switch 220VDC Breakdown voltage of 1000VDC between contacts Switch time 4 ms, max.
<b>Maximum Number of Cards: 1</b>	

### Ordering Information

1204-0F: Alarm module

## ASCII Time Code

The ASCII Time Code Module (RS-232) provides one RS-232 input interface and one RS-232 output interface for Asynchronous Serial signal including date and time information. The input and output Data Formats are selected among predefined formats.

### Specifications

	Input	Output
<b>Quantity</b>	1	1
<b>Signal Type and Connector</b>	RS-232 on DB-9 or RS-485 on terminal block	
<b>Formats<sup>1</sup></b>	ICD-GPS-153C: 5101 time transfer; NMEA: RMC, ZDA; Spectracom formats: 0, 1, 1S, 2 (IBM Sysplex), 3, 4, 7, 8, 9	ICD-GPS-153C: 253, 5040, 5101 (SINC-GARS); NMEA: GGA, RMC, ZDA; Spectracom formats: 0, 1, 1S, 2 (IBM Sysplex), 3, 4, 7, 8, 9; Broadcast formats
<b>Accuracy</b>	—	±100-1000 microsec (format dependent)
<b>Maximum Number of Cards: 6</b>		

<sup>1</sup>Contact factory for details.

### Ordering Information

1204-02: ASCII Time Code module (RS-232)  
1204-04: ASCII Time Code module (RS-485)

## Event Broadcast Output

The Event Broadcast Module (RS-232) provides a BNC connection for an Event Trigger Input and a RS-232 connector for an ASCII message output. When the defined signal edge is detected on the Event Input BNC Connector, an ASCII message is created containing the current time.

### Specifications

<b>Quantity</b>	1 event input/broadcast output pair
<b>Signal Type and Connector</b>	Event input: TTL (BNC) Broadcast output: RS-232 (DB9)
<b>Event Resolution</b>	5 ns
<b>Minimum Time Between Events</b>	20 ns
<b>Buffer Size</b>	512 entries
<b>Maximum Number of Cards: 6</b>	

### Ordering Information

1204-23: Event broadcast module

## Frequency Output (1, 5, 10 MHz)

The 1, 5, and 10 MHz SecureSync option cards provide three (3) sine wave BNC outputs. These outputs are phased-locked to the SecureSync's disciplined oscillator to supply highly precise waveforms with minimal distortion.

### Specifications

	Frequency Output
<b>Quantity</b>	3
<b>Signal Type and Connector</b>	+13 dBm (10 MHz) into 50 ohm, BNC +10 dBm (1 MHz & 5 MHz) into 50 ohm, BNC
<b>Spurious</b>	-70 dBc (10 MHz) -55 dBc (1 MHz & 5 MHz)
<b>Harmonics</b>	-40 dBc
<b>Maximum Number of Cards: 4 total (1 MHz, 5 MHz or 10 MHz)</b>	

### Ordering Information

1204-26: 1 MHz output module (3 outputs)  
1204-08: 5 MHz output module (3 outputs)  
1204-1C: 10 MHz output module (3 outputs)

### Gigabit Ethernet

This option module card adds three (3) 10/100/1000 Base-T network interfaces in addition to the standard 10/100 Base-T network interface.

#### Specifications

<b>Quantity</b>	3
<b>Signal Type and Connector</b>	RJ45
<b>Management</b>	Enabled or disabled (NTP server only)
<b>Maximum Number of Cards:</b> 1	

#### Ordering Information

1204-06: Gigabit Ethernet module (3 ports)

### HaveQuick

The HaveQuick input/output option cards provide several user-selectable formats, including STANAG 4246 HaveQuick I, STANAG 4246 HaveQuick II, STANAG 4372 HaveQuick IIA, STANAG 4430 Extended HaveQuick, and ICD-GPS-060A HaveQuick. HaveQuick option module cards are available with one (1) HaveQuick input and three (3) HaveQuick outputs or four HaveQuick (4) outputs.

#### Specifications

	Input	Output
<b>Quantity</b>	0 1 (1204-29)	4 3 (1204-29)
<b>Signal Type and Connector</b>	TTL (BNC)	TTL on BNC or RS-485 on terminal block
<b>Start of Signal</b>	—	<10 us after 1PPS output (1204-10) <10 us after 1PPS output (1204-1B)
<b>Programmable Phase Shift</b>	—	±5 ns to 500 ms with 5 ns resolution (1204-10) ±5 ns to 500 ms with 5 ns resolution (1204-1B)
<b>Time Code Format</b>	HQI, HQII, HQIIA, XHQ, ICD-GPS-060A HQ	
<b>Maximum Number of Cards:</b> 6		

#### Ordering Information

1204-10: HaveQuick output module (TTL)

1204-1B: HaveQuick output module (RS-485)

1204-29: 1 in/3 out HaveQuick module (TTL (BNC))

### Precision Time Protocol (PTP)

Both the 10/100 Mb and 1Gb Precision Time Protocol (PTP) option module cards support PTP Version 2, as specified in the IEEE 1588-2008 standard. PTP v2 is provided to the SecureSync in the 10/100 Mb card via one (1) PTP port (configurable as an input or output) and to the 1Gb card via BNC connector and SFP+ port. The 1 Gb card supports RF and fiber optic media.

#### Specifications for 10/100 Mb PTP Option Card

<b>Mode</b>	Ordinary clock, automatic slave or master selection, 1 step or 2 step operation
<b>Time Resolution</b>	±4ns packet time-stamping
<b>Accuracy</b>	30ns (3σ) master to slave via crossover cable
<b>Master Capacity</b>	Sync rate above 512 syncs/sec
<b>Network Addressing</b>	Multicast, unicast, hybrid modes
<b>Delay Mechanism</b>	End to end
<b>Connector</b>	10/100 Mb Ethernet, RJ45 (1 port per card)
<b>Maximum Number of Cards:</b> 6, allowing a boundary clock type configuration	

#### Ordering Information

1204-12: 10/100 Mb PTP module

#### Specifications for 1 Gb PTP Option Card

<b>Mode</b>	Ordinary clock, master mode, 1 step operation
<b>Time Resolution</b>	±4ns packet time-stamping
<b>Accuracy</b>	25ns (3σ) via crossover cable
<b>Master Capacity</b>	Sync rate: 128 syncs/sec (configurable) Up to 4,000 slaves at 128 requests/second
<b>Network Addressing</b>	Multicast, unicast, hybrid modes
<b>PTP Profile Support</b>	Default and telecom profiles
<b>Connectors</b>	BNC connector and SFP+ port
<b>Maximum Number of Cards:</b> 6	

#### Ordering Information

1204-32: 1Gb PTP module

### IRIG

The IRIG Input/Output modules provide the SecureSync with a variety of IRIG BNC input and output configurations. The IRIG input can be used as the system's primary synchronization reference or as an additional backup to other primary references such as GPS, Precision Time Protocol (PTP), and Network Time Protocol (NTP).

#### Specifications

	Input	Output
<b>Quantity</b>	1 (1204-05) 1 (1204-27) 0 (1204-15) 0 (1204-1E)	2 (1204-05) 2 (1204-27) 4 (1204-15) 4 (1204-1E)
<b>Signal Type and Connector</b>	Amplitude modulated (0 to 6 v peak-to-peak into 50 ohms) or DC level shift (unmodulated TTL into 50 ohms), user-selectable, BNC connectors. DC level shift ONLY with Fiber, ST connectors	
<b>Formats<sup>1</sup></b>	IRIG A, B, E, G, NASA 36, IEEE 1344/C37.118	
<b>Accuracy</b>	—	±20-200 microsec (format dependent)
<b>Fiber Optic Compatibility</b>	50/125 μm, 62.5/125 μm multi-mode cable	
<b>Fiber Operating Wavelength</b>	820/850 nm	
<b>Fiber Minimum Sensitivity</b>	-25 dBm @ 820 nm	—
<b>Fiber Optical Power</b>	—	-15 dBm average into 50/125 fiber
<b>AM Signal Level</b>	500mV to 10V p-p (modulated 2:1 to 6:1)	—
<b>DCLS Signal Level</b>	>10k ohms. TTL with DCLS IRIG IN connected to ground	—
<b>Maximum Number of Cards:</b> 6		

<sup>1</sup>Contact factory for details.

#### Ordering Information

1204-05: IRIG module, BNC (1 input, 2 outputs)

1204-27: IRIG module, Fiber Optic (1 input, 2 outputs)

1204-15: IRIG module, BNC (4 outputs)

1204-1E: IRIG module, Fiber Optic (4 outputs)

### Programmable TTL Output

The Programmable TTL Output option module card provides four (4) programmable square wave outputs for the SecureSync platform.

#### Specifications

	Output
<b>Quantity</b>	4
<b>Signal Type and Connector</b>	TTL (BNC into 50 ohms)
<b>Programmable Period</b>	100 ns to 1,000,000,000 ns in 5 ns steps 100 $\mu$ s to 60,000,000 $\mu$ s in 1 $\mu$ s steps
<b>Pulse Width Range</b>	20 ns - 900 ms in 20 ns steps
<b>Rise Time to 90% of Level</b>	< 40 ns
<b>Maximum Number of Cards: 6</b>	

#### Ordering Information

1204-17: Programmable TTL output module

### STANAG

The models 1204-1D and 1204-24 STANAG Input option modules provide two (2) configurable STANAG inputs and one (1) 1PPS input for the SecureSync platform.

#### Specifications

	1PPS	Time of Day	Frequency
<b>Quantity</b> (input module)	1	1	—
<b>Quantity</b> (output module)	1	2	1 (non-isolated output module only)
<b>Electrical Format</b>	Configurable: TTL, 10V or RS-485		Sine Wave, 1 Vrms
<b>Time Code Format</b>	ToD configurable formats: HQI, HQII, HQIIA, XHQ, STM, ICD-GPS-060A HQ, BCD		
<b>Connector</b>	All signals available on single DB25 connector		
<b>Accuracy</b>	100 ns to valid reference		
<b>Offset Range</b>	-500 to +500 ms in 5 ns steps		
<b>Edge</b>	Rising or falling edge		

#### Ordering Information

1204-1D: STANAG input module

1204-11: STANAG output module

1204-24: STANAG isolated input module

1204-25: STANAG isolated output module

### T1/E1 Output

The T1 / E1 Output option card provides one (1) user selectable 1.544 MHz or 2.048 MHz frequency output and two (2) E1 or T1 data rate outputs. When installed with the optional Rubidium oscillator, the SecureSync system meets G.812 Type I. The unit is compliant to G.811 when installed with a Rubidium oscillator option and synchronized with GPS.

#### Specifications

	Frequency Output	Data Rate Output
<b>Frequency</b>	1.544 or 2.048 MHz	1.544 or 2.048 Mb/sec
<b>Quantity</b>	1	2
<b>Signal Type and Connector</b>	TTL (BNC into 50 ohms) Rs-485 (terminal block)	T1 or E1 into 75 ohms (BNC) Differential T1 into 100 ohms or differential E1 into 120 ohms (terminal block)
<b>Maximum Number of Cards: 6</b>		

#### Ordering Information

1204-09: T1-1.544 (75 ohm) or E1-2.048 (75 ohm) module

1204-0A: T1-1.544 (100 ohm) or E1-2.048 (120 ohm) module

### Programmable Frequency Output

The Programmable Frequency Output option module provides output square wave pulses or sine wave at pulse rates (frequencies for sine wave) from 8kPPS(Hz) to 16384 kPPS(Hz) in 1PPS(Hz) steps, with the output frequency locked to the SecureSync system disciplined oscillator. Output configuration is via web browser. This option card offers four (4) independently programmable frequency synthesizers that provide pulse rates (frequencies for sine wave) from 8kPPS(Hz) to 16384 kPPS(Hz) in 1PPS(Hz) steps.

Outputs are available in 3 different formats, RS485 square wave on a pluggable terminal block, or TTL Square wave on BNC, or Sine Wave on BNC. This option module can be used for a variety of requirements for programmable frequency outputs. The RS-485 model of the programmable frequency output option card can be operated as an N.8 frequency synthesizer if frequencies are restricted to be from 8 kPPS to 8192 kPPS in 8 kPPS steps.

#### Specifications

	RS-485 Output	TTL Output	Sine Wave Output
Quantity	4, independently programmable		
Signal Type and Connector	RS-485 (terminal block)	TTL (BNC into 50 ohms)	+13dBm (BNC into 50 ohms)
Output Pulse (frequency) Rates	8kPPS to 16384 kPPS in 1PPS steps		8 kHz to 16384 kHz in 1 Hz steps
Accuracy	Function of input sync source (GPS, IRIG, 1PPS, etc.)		
Wave Form	Square Wave	Square Wave	Sine Wave
Synchronization	Output Frequency locked to SecureSync disciplined 10 MHz		
Jitter Cycle to Cycle	<10 nsec.	<10 nsec.	—
Phase Noise	—	—	-120 dBc/Hz @ 1khz offset -130 dBc/Hz @ 10khz offset -140 dBc/Hz @ 100khz offset
Harmonics	—	—	<30 dBc
Spurious	—	—	<60 dBc
Maximum Number of Cards: 6			

#### Ordering Information

1204-13: Programmable Frequency Output Module (Sine Wave)

1204-2F: Programmable Frequency Output Module (TTL)

1204-30: Programmable Frequency Output Module (RS-485)

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Specifications subject to change or improvement without notice.

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