SECURESYNC®

Timing Interface Option Cards

SecureSync is a great solution for time distribution in multiple industries and applications thanks to its modularity.

Indeed, each industry has its own standards, which require specific interfaces to ensure interoperability between time servers and synchronized devices.

In addition, both legacy and recent systems co-exist in infrastructures, which trigger different needs for synchronization interfaces.

Legacy devices require point-to-point modulated signals, like 1 pps, 10 MHz, IRIG, etc... Recent devices now often require network-based timing distribution, leveraging Ethernet networks, and using timing protocols like NTP, PTP or White Rabbit.

SecureSync solves this interoperability challenge thanks to its modularity, with up to six option cards slots are available. Through these option cards, different types of timing inputs and outputs can be added, allowing to meet precisely each application requirements in terms of number and type of interfaces.

SecureSync Option cards can be ordered as part of initial configuration (add option cards to the selected base unit) and as a later expansion for fielded units (as long as there are available slots in the unit). Option Cards can be installed by customers on the field.

Should not you find the appropriate option card, within our portfolio of more than 50 option cards, please contact us to discuss customizing or designing a new option card.

Number of Option Card slots available for each base unit :

Base Unit	Number of OC slots
SecureSync 2402-xyz	2
SecureSync 2406-xyz	6

In addition, Option Cards can be ordered and shipped in two ways:

- Integrated within a SecureSync base unit. It shall be ordered along with a SecureSync base unit. The Part Number format to be used in this case is : 1204-XX
- Shipped as a standalone spare part or field upgrade. The Part Number format to be used in this case (which includes back panel and bracket) is : 1204-XX-SA

Note : for any M-Code capable SecureSync 2400 configuration, please contact Safran Federal Systems

Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.

SecureSync Add the features you need through options modules, up to 6 option modules per unit and 2 Hot Swap power supplies slots.

Option Cards Overview

Network timing		Legacy timing and alarm	
Key Feature	Configuration (see Specifications)	Key Feature	Configuration (see Specifications)
1 GbE, NTP	2 ports SFP	1PPS	1 input/output with 10 MHz input (TTL or RS-485)
	4 ports SFP		1 input/3 outputs (TTL coax or fiber)
1 GbE, PTP high throughput master	1 port, SFP, master only ; up to 4000 slaves @ 128 req/s ; 1 pps out		Quad outputs (TTL coax or fiber, 10 V or RS-485)
1 GbE, NTP, PTP & White Rabbit	4 ports, SFP ; NTP Server ; PTP & WR Master & Slave ; 1 pps I/O	Frequency	1 kHz to 10 MHz input with 1PPS input/output (TTL or RS-485)
10 GbE, NTP, PTP & White Rabbit	4 ports, SFP+ ; NTP server ; PTP & WR Master & Slave ; 1 pps I/O		3 outputs (1, 5, or 10 MHz)
		Square Wave TTL	4 outputs
		Programmable Frequency	4 outputs (RS-485, TTL, or sine wave)
		ASCII Time Code	1 input/1 output (RS-232 or RS-485)
		IRIG	1 input/2 outputs (coax or fiber)
			4 outputs (coax or fiber)
		HAVE QUICK	4 outputs (TTL or RS-485)
			1 input/3 outputs (TTL)
		STANAG	Input module: 1x 1PPS, 2 ToD
			Output module: 1x 1PPS, 2 ToD, 1 frequency
		T1	2 data rate outputs/1 frequency output (unbalance or balanced)
			4 data rate outputs (unbalance or balanced)
		E1	2 data rate outputs/1 frequency output (unbalanced or balanced)
			4 data rate outputs (unbalance or balanced)
		Event Broadcast	1 input (TTL)/broadcast (RS-232) pair
		Alarm Relay	3 NC/NO indicating unit status

Network Timing Option Cards Specifications

1 and 10 GbE Ethernet – PTP and WR network timing (WROX)

This option module adds 4 ports, 1 GbE (1204-58) or 10 GbE (1204-59), supporting NTP, PTP and White Rabbit high accuracy time transfer protocol, as master or slave. Refer to dedicated WROX datasheet.

Specifications

	1204-58	1204-59
Port Number and type	4 ports SFP, 1 GbE	4 ports SFP+, 10 GbE
Protocols & roles	PTP : IEEE1588v2, IEEE1588v2.1 - Master, Slave NTP : NTPv3, v4, NTS - Server White Rabbit - Master, Slave, BC	
Profiles (PTP)	Default, Enterprise, Power, 802.1as, Telecom, High Accuracy	
Adressing	Multicast, Unicast, Hybrid	
Delay mechanism	E2E, P2P	
Transport protocol	L2, L3	
Synchronous ethernet	Meets key sections of ITU-T G.8261, G.8262 and G.8264	
NTP	NTP v2, v3 and v4 Supports HW timestamping	
Secured NTP	NTS	
Extended Throughput Capacity PTP (optional)		500 kreq/s, per port (5000 clients @ 128 req/s) - Enterprise profile, (hybrid mode)
Extended Throughput Capacity NTP (optional)	Available in later release	
Maximum number of cards : 2 (two slots-high, installed in slots 3&4, and 5&6) Required configuration : 2406-xxx base unit		
Features in blue available in upcoming releases		

Ordering Information

1204-58 : SecureSync Quad 1 Gigabit Ethernet Option Card
1204-59 : SecureSync Quad 10 Gigabit Ethernet Option Card

High throughput Gigabit Ethernet PTP

This option module adds 1 port, 1 GbE (1204-32) PTP Master with high throughput.

Specifications

Feature	Specification
Port number & type	1 port, SFP, 100 Mb/s or 1 Gb/s ; 1 pps output (BNC)
Protocol	PTP IEEE1588 v2
Profiles	Default, Enterprise
Clock role & capacity	Master only, supports up to 4000 slaves @ 128 req/s
Addressing	Multicast, Unicast, Hybrid
Delay mechanism, steps	E2E or P2P ;1 or 2 steps
Transport protocol	L2 or L3
Synchronous Ethernet	Yes, with ESMC (Fiber SFP only)
Maximum number of cards: 6	

Ordering Information

1204-32 : SecureSync 1 GbE PTP Master Option Card

Gigabit Ethernet NTP

Specifications

Feature	Specification
Port number & type	2 or 4 ports, SFP, 100 Mb/s or 1 Gb/s
Protocol	NTP
Clock role	Server only, peering
Security	Symmetric key, access restrictions
Maximum number of cards : 2	

Ordering Information

1204-49 : SecureSync Dual Gigabit Ethernet Option Card
1204-4A : SecureSync Quad Gigabit Ethernet Option Card

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, 10 V, RS-485 (terminal block), and Fiber Optic signal types, facilitating a variety of requirements for

Specifications

	1PPS Input	1PPS Output
Quantity	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)
Signal Type and Connector	TTL (BNC into 50 ohms) ST (Fiber Optic)	TTL or 10v (BNC into 50 ohms), or RS-485 (terminal block) ST (Fiber Optic)
Fiber Optic Compatibility	50/125 µm, 62.5/125 µm multi-mode cable	
Fiber Operating Wavelength	820/850 nm	
Fiber Minimum Sensitivity	–25 dBm @ 820 nm	—
Fiber Optical Power	—	–15 dBm average into 50/125 fiber
Programmable Phase Shift	—	±5 ns to 500 ms with 5 ns resolution
Programmable Pulse Width	—	20 ns to 900 ms with 20 ns resolution
Rise Time to 90% of Level	—	<10 ns (1204-18) <30 ns (1204-19) <30 ns (1294-21)
Absolute Phase Error	—	±50 ns (1σ)
Maximum Number of Cards: 6		

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) 1PPS input, one (1) 1PPS output, and one (1) user selectable 1 to 10 MHz sine wave Frequency input capable of handling a wide range of applications.

Specifications

	1PPS Input	Freq Input	1PPS Output
Quantity	1	1	1
Signal Type and Connector	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)
Input Signal Jitter	< ±500 ns to achieve oscillator lock, < ±50 ns to achieve system performance		—
Detected Level	—	+13 dBm to –6 dBm	—
Frequency Setting	—	1 kHz to 10 MHz in 1 Hz steps	—
Minimum Pulse Width Detected	100 ns	—	—
Programmable Phase Shift	±5 ns to 500 ms with 5 ns resolution	—	±5 ns to 500 ms with 5 ns resolution
Programmable Pulse Width	—	—	20 ns to 900 ms with 20 ns resolution
Rise Time to 90% of Level	—	—	<10 ns
Absolute Phase Error	—	—	±50 ns (1σ)
Maximum Number of Cards: 6			

Ordering Information

1204-01: 1PPS/freq input (TTL levels) module
1204-03: 1PPS/freq input (RS-485 levels) 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
Quantity	3
Signal Type and Connector	+13 dBm (10 MHz) into 50 ohm, BNC +10 dBm (1MHz & 5MHz) into 50 ohm, BNC
Spurious	–70 dBc (10 MHz) –55 dBc (1MHz & 5MHz)
Harmonics	–40 dBc
Maximum Number of Cards: 4 total (1 MHz, 5 MHz or 10 MHz)	

Ordering Information

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

Square Wave (TTL) Output

The Square Wave TTL Output option module card provides four (4) programmable outputs for the SecureSync platform.

Specifications

	Output
Quantity	4, independently programmable
Signal Type and Connector	TTL (BNC into 50 ohms)
Programmable Period	100 ns to 1,000,000,000 ns in 5 ns steps 100 µs to 60,000,000 µs in 1 µs steps
Pulse Width Range	20 ns to 900 ms in 20 ns steps
Rise Time to 90% of Level	< 40 ns
Maximum Number of Cards: 2	

Ordering Information

1204-17: Square Wave (TTL) output module

Programmable Frequency Output

The Programmable Frequency Output option module provides four (4) independently programmable frequency synthesizers that provide square wave pulses or sine wave frequencies from 1PPS (Hz) to 25 MPPS (MHz) in 0.1PPS (Hz) steps, with the output frequency locked to the SecureSync system disciplined oscillator. Outputs are available in three different formats: RS485 square wave on a pluggable terminal block, 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 RS485 model of the programmable frequency output option card can be operated as an N.8 frequency synthesizer. Each output can be phase offset between 0-360 degrees in 0.1 degree 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)	+13 dBm (BNC into 50 ohms)
Output Pulse (frequency) Rates	1PPS to 25 MPPS in 0.1PPS steps		1 Hz to 25 MHz in 0.1Hz 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 ns	<10 ns	—
Phase Noise	—	—	–120 dBc/Hz @ 1 kHz offset –130 dBc/Hz @ 10 kHz offset –140 dBc/Hz @ 100 kHz 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)

IRIG

The IRIG Input/Output modules provide the SecureSync with a variety of IRIG 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
Quantity	1 (1204-05) 1 (1204-27) 0 (1204-15) 0 (1204-1E) 0 (1204-22)	2 (1204-05) 2 (1204-27) 4 (1204-15) 4 (1204-1E) 4 (1204-22)
Signal Type and Connector	Amplitude modulated or DC level shift (unmodulated TTL into 50 ohms), user-selectable, BNC connectors. DC level shift ONLY with Fiber on ST connectors and RS-485 on terminal block	
Formats[1]	IRIG A, B, E, G, NASA 36, IEEE 1344/C37.118	
Accuracy	—	Amplitude modulated <0.2 to 1.5 µs (format dependent), DC level shift <30 ns
Fiber Optic Compatibility	50/125 µm, 62.5/125 µm multi-mode cable	
Fiber Operating Wavelength	820/850 nm	
Fiber Minimum Sensitivity	–25 dBm @ 820 nm	—
Fiber Optical Power	—	–15 dBm average into 50/125 fiber
AM Signal Level	500 mV to 10 Vp-p (modulated 2:1 to 6:1) >10k ohms impedance	500 mV to 6 (±1) Vp-p into 50 ohms
DCLS Signal Level	>10k ohms. TTL with DCLS IRIG IN connected to ground	TTL
Maximum Number of Cards: 6		

[1]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)
1204-22: IRIG module, RS-485 (4 outputs)

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
Quantity	1	1
Signal Type and Connector	RS-232 on DB-9 or RS-485 on terminal block	
Formats[1]	NMEA: RMC, ZDA; Orolia formats: 0, 1, 1S, 2 (IBM Sysplex), 3, 4, 7, 8, 9	ICD-GPS-153C: 253, 5040, 5101 (SINCGARS); NMEA: GGA, RMC, ZDA; Orolia formats: 0, 1, 1S, 2 (IBM Sysplex), 3, 4, 7, 8, 9; Broadcast formats
Accuracy	—	±100 to 1000 microsec (format dependent)
Maximum Number of Cards: 6		

[1]Contact factory for details.

Ordering Information

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

HAVE QUICK

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

Specifications

	Input	Output
Quantity	0 1 (1204-29)	4 3 (1204-29)
Signal Type and Connector	TTL (BNC)	TTL on BNC or RS-485 on terminal block
Start of Signal	—	<10 µs after 1 PPS output (1204-10) <10 µs after 1 PPS output (1204-1B)
Programmable Phase Shift	—	±20 ns to 500 ms with 20 ns resolution (1204-10) ±5 ns to 500 ms with 5 ns resolution (1204-1B)
Time Code Format	HQI, HQII, HQIIA, XHQ, ICD-GPS-060A HQ	
Maximum Number of Cards: 6		

Ordering Information

1204-10: HAVE QUICK output module (TTL)
1204-1B: HAVE QUICK output module (RS-485)
1204-29: 1 in/3 out HAVE QUICK module (TTL (BNC))

STANAG

These cards are compliant to several STANAG specifications for time and frequency typically required for reliable operation and security of radio networks. Version support STANAG as a reference or as an output. Galvanic isolation is supported on specific versions.

Specifications

	1PPS	Time of Day	Frequency
Quantity (input module)	1	2	—
Quantity (output module)	1	2	1 (non-isolated output module only)
Electrical Format	Configurable: TTL,10 V or RS-485		Sine Wave, 1 Vrms
Time Code Format	ToD configurable formats: HQI, HQII, HQIIA, XHQ, STM, ICD-GPS-060A HQ and BCD		
Connector	All signals available on single DB25 connector		
Accuracy	100 ns to valid reference		
Offset Range	–500 to +500 ms in 5 ns steps		
Edge	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 cards provide user selectable E1 or T1 data rate outputs and an optional 1.544 MHz or 2.048 MHz frequency output. 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
Frequency	1.544 or 2.048 MHz	1.544 or 2.048 Mb/sec
Quantity	1 (1204-09, 1204-0A) 0 (1204-4C, 1204-53)	2 (1204-09, 1204-0A) 4 (1204-4C, 1204-53)
Signal Type and Connector	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)
Maximum Number of Cards: 6		

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
1204-53: Quad T1 (75 ohm) or E1 (75 ohm) module
1204-4C: Quad T1 (100 ohm) or E1 (120 ohm) module

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

Quantity	1 event input/broadcast output pair
Signal Type and Connector	Event input: TTL (BNC) Broadcast output: RS-232 (DB9)
Event Resolution	5 ns
Minimum Time Between Events	20 ns
Buffer Size	512 entries
Maximum Number of Cards: 2	

Ordering Information

1204-23: Event broadcast module

Alarm Contact Outputs

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

Specifications

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

Ordering Information

1204-0F: Alarm module

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