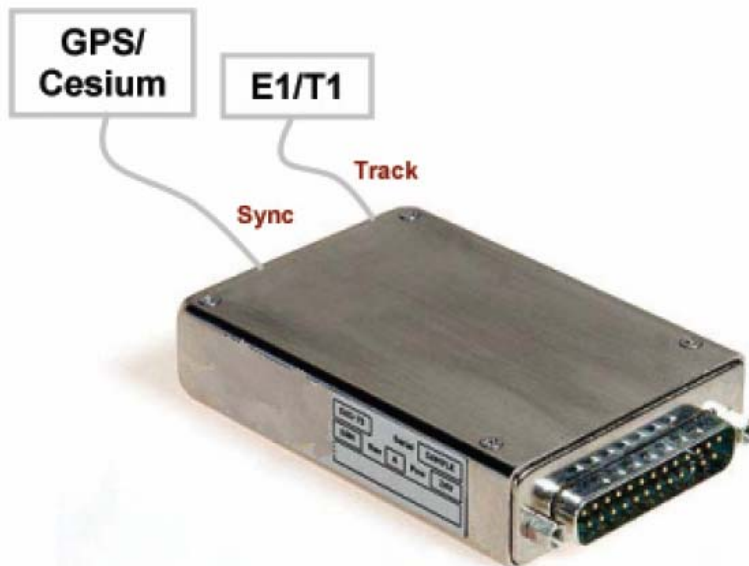


ANDHRA ELECTRONICS LIMITED

Low-Cost GPS/E1/T1/Cesium-Synchronized Crystal Clock (SXO-75)

Patented SXO-75 SynClock+®



APPLICATIONS

Telecom | Navigation | Broadcast | Defense | Instrument

Plot Nos.34 & 35, Industrial Development Area, KAKINADA - 533 005, INDIA.
Phone: 91-884-2342203 / 2341850 / 2379407 ♣ Fax: 91-884-2341145 / 2341698
E-mail: info@andhraelec.com ♣ www.andhraelec.com



ISO 9001:2000



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KEY FEATURES

Smart SXO-75 SynClock+®:

- Single power supply voltage : 10 to 25V
- Very small volume : 5.5 in³
- Frequency offset over temp. range : $\leq \pm 5E-10$
- Industry's first SmarTiming+® technology
 - REF locking resolution : 1ns
 - REF disciplining/filtering/controlling : Auto adaptive^(a)
 - Smart loop time constant : 100-10'000s
 - E1/T1 jitter & wander : ITU-T G.823/824
 - REF locking mode (user settable) : Sync^(b) or Track^(c)
 - REF types (PRS^(d)/Stratum 1 source) : GPS, Cesium, E1/T1, LORAN-C, Maser
 - OUT frequency accuracy/stability
 - PRS^(d)/Stratum 1 locked : 1E-12, typical
 - Holdover (no PRS^(d)) : <1E-10/24hr
 - OUT time accuracy/stability
 - GPS locked : <50ns
 - Holdover (no GPS) : <7µs/8 hr or <10µs/24 hr
 - Standards compliance:
 - PRS^(d) locked/unlocked : ANSI T1.101, Stratum 1/2/TNC/3E, GR-1244
ITU-T G.811/G.812, PRC, Type I/II/III/V
CDMA IS-95, UMTS 3GPPS 25.104
- Low warm-up current : <0.8A/24V heater current
- Ultra low aging : <1E-11/day
- Ultra low phase noise output : 10MHz -115dBc @ 10 Hz
- Synthesized output : 1-30 MHz
- RS232 standard interface : Control & monitoring commands, 9600 b/s

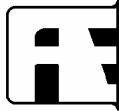
Notes

- (a) Request our **SmarTiming+® Technology White Paper** to compare performance at SynClock@spectratime.com
- (b) REF/OUT phase alignment
- (c) REF/OUT frequency alignment
- (d) PRS: Stratum 1 Primary Reference Source such as GPS, Cesium, E1/T1, LORAN-C, Maser

REVISION TRACKING LIST

Software Revision :			Hardware Revision :
Date	Version	Comment	
2005-04-28	2.09	SXO Software. For new controller.	2005-01-13 (C)





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SPECIFICATIONS

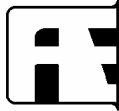
ELECTRICAL

Spec	Smart SXO-75 SynClock+®	
Type	Standard	Options
RFOUT Frequency		10 MHz
Synthesizer Output Frequency	Not applicable	2.048 MHz, 1.544 MHz, etc RFOUT not available (ordering code: 2.048M or 1.544M) RFOUT available** (ordering code: 10M/2.048M or 1.544 M) ** degraded spurious & sub-harmonics levels
Frequency Change Operating temperature range (Thermal chamber with air flow)		$\leq +5E-10$ -5°C to +60°C
Aging (After 3 months of continuous operation)		< 1E-10 /day (typical: 4 E-11/day)
Short Term Stability 1 to 100 s		< 2E-11
Phase Noise (dBc/Hz) (RFOUT 10 MHz)	1 Hz 10 Hz 100 Hz 1k Hz 10K Hz	10 MHz -90 -120 -135 -145 -150
Frequency Retrace Off/On (In stable temperature, gravity, pressure & magnetic field conditions)		< 1E-8 24 hr / 1 hr
Warm-up Time @ +25°C Frequency stability		15 min < 5E-8
Analog Frequency Adjustment [An external voltage (0-5 VDC) can be applied to pin 6 (FA). The cursor pin of a 10 kΩ variable resistor placed between pin 7 and GND can provide this voltage. If not used, pin 6 must be floating]		> 4E-7 (±2E-7)
Digital Frequency Adjustment (Through RS-232 commands)		> 4E-7 (±2E-7)
RFOUT Levels Output Spurious $f_0 \pm 100\text{kHz}$ Sub-harmonics		Sine wave 0.5 VRms ($\pm 10\%$ / 50Ω) < -80dBc ** < -60dBc ** ** Not applicable when both RFOUT & synthesizer outputs are available
Synthesizer Option Output level Frequency range Spurious Frequency resolution	Not applicable	For optional frequency only Square wave CMOS 5V 1 to 30 MHz (factory setting) -80dBc 1 KHz
Supply Voltage (DC)		10 to 25 V
Input Power Warm up @+25°C - 5°C +25°C +65°C		Typical < 12 W @ 12 V & < 16 W @ 24 V < 8 W < 6 W < 3 W
Communication Interface Protocol speed Compatible with		RS-232 commands for control & monitoring (see commands below) Timing and locking control functions VMGA messages 9600, n, 8, 1 SRO model

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SMARTIMING+® DISCIPLINING & FILTERING

Spec	Smart SXO-75 SynClock+®		
PPSREF Level Reference types Disciplining & filtering Disciplining mode Architecture Model	CMOS 0-5V or 0-3.3V rising edge GPS, E1, T1, Cesium, LORAN-C, Maser, etc Auto-adaptive through SmartTiming+® technology (request white paper) Sync (phase alignment) or Track (frequency alignment) See Principles of Operation below		
GPS Receiver Comm. Interface GPS control & monitoring T-RAIM Position hold	Multi-vendor GPS support Pins 12 & 16 Serial Interface (see pin-out info below) Continuous monitoring for optimum timing, if supported by GPS User settable for optimum timing, if supported by GPS		
PPSOUT Output Level Current	CMOS 0-5V ± 20 mA sink/source		
PPSOUT Pulse Width (PW) Duty cycle	User settable 0 to 1s in 50 ns/step		
PPSOUT to PPSREF Sync Error Conditions (Sync mode)	< 50 ns No PPSRef noise, ± 1°C temp fluctuations		
PPSOUT to PPSREF (DE) Programmable delay (Track mode)	0 to 1s 50 ns / step		
PPSOUT Holdover Time Stability Temperature window (After learning phase > 10 τ)	< 10μs / 24 hr Within ±2°C	< 7μs / 8 hr Within 40°C	< 4μs / 6 hr Within 20°C
Smart Loop Time Constant Phase/Frequency User settable	Auto-adaptive 100 to 10'000 sec Sync/Trak mode RS-232 command interface		

ENVIRONMENTAL

Spec	Smart SXO-75 SynClock+®		
Magnetic Field Sensitivity	< 2 · 10 ⁻¹⁰ / Gauss in worst axis		
Storage Temperature	- 55°C to + 85°C		
Humidity	GR-CORE-63, Section 5.1.2		
Operating Vibration	GR-CORE-63, Section 5.4.2 Random and Sinusoidal MIL-PRF-28800F, Class 3, 4		
Shock	Survival: 40g / 11ms		
G-Tip-Over Test	< 5E-10 / g in worst axis		

PHYSICAL

Spec	Smart SXO-75 SynClock+®		
Size (L x W x H)	3.25" x 2.25" x 0.75" (82.55 x 57.15 x 19.05 mm)		
Weight	200 g (7.1 oz)		
Mounting & Mechanical Layout	See drawings below		
Connector Compatible with	Male D-sub 25 pins (see drawing below) SRO model		

MODEL ORDERING INSTRUCTIONS

SXO-75 / XX / XX / 10M

↓ ↓ ↓ ↓
Type Option(s) Frequency (standard)

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