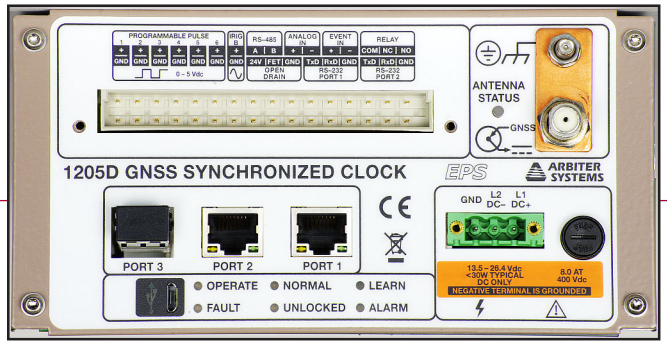
Model 1205D
GNSS Synchronized Clock



featuring

EPS

Enhanced Performance and Security

The Arbiter Systems®, Inc. Model 1205D GNSS Synchronized Clock is a multi-satellite system (GPS/GLONASS/Galileo/BeiDou) timing source for precision timing applications. Arbiter's next-generation substation clock provides enhanced performance and security (EPS) along with the wide range of functions you have come to expect from the leader in timing for the power industry. EPS benefits include multi-system timing sources, standard holdover oscillator, multiple levels of security, secure communications, and anti-spoofing technology.

The Model 1205 is available in three versions: the Model 1205B, the Model 1205C and the Model 1205D. The Model 1205B has eight status LEDs, an LCD status back-lit display, and a keyboard. The Model 1205C adds a large (20 mm or 0.8 in) LED time display. The Model 1205D is a DIN rail version with the status LEDs but without the front panel LCD display. All versions have 72 receiver channels, capable of tracking GNSS satellite systems simultaneously, providing optimum performance. Real time continuous estimation of actual holdover errors, oscillator trajectory prediction and high reliability architecture provide exceptional accuracy and stability allowing the Model 1205B/C/D (100 ns worst-case accuracy) to meet the requirements of a broad range of applications from relay synchronization to phasor timing. This accuracy applies to the PTP network timing, the high drive programmable pulse (including IRIG-B) outputs and optional outputs (Models 1205B/C only). The standard holdover oscillator maintains accuracy of 1 ms/24 hours when not tracking satellites. In addition to enhanced performance, Arbiter Systems' new EPS technology includes GNSS anti-spoofing and secure password-protected and encrypted configuration interface providing robust, reliable synchronization to help comply with latest NERC-CIP requirements.

The Model 1205D timing signals are available via the three Ethernet ports and from the thirty-two pin terminal block. The three 10/100 Ethernet ports (copper standard, fiber optional) provide status, configuration as well as network timing supporting the NTP, SNTP, PTP (Power Profile supported), SNMP, ICMP, TCP, SSH, SSL, HTTP, HTTPS and DHCP protocols. The thirty-two pin terminal block provides access to the Model 1205B/C standard inputs, outputs and legacy communication ports. Two inputs, an event timer and a frequency monitor, are included along with six Programmable Pulse outputs, a modulated IRIG-B output, a FET output, relay contacts, two RS-232 ports and a RS-422/485 port (transmit only). The event timer, 100 ns resolution, accepts an external 5 V CMOS/TTL signal while the frequency monitor accepts a single phase AC voltage input (50/60 Hz, 300 Vac). The Programmable Pulse high drive outputs (5 Vdc, 125 mA) are user configurable to unmodulated IRIG-B (UTC, Local, C37.118.1) or pulse output (one pulse a second to one pulse a day). The modulated IRIG-B outputs a 4 Vpp (20 ohms source impedance) signal and supports C37.118.1. An SPDT (form C) fail-safe relay is also included and is configurable to Out-of-Lock, Fault, Alarm, Stabilized, or Programmable Pulse. Three legacy serial communications ports (two RS-232 ports and a RS-422/485 port (transmit only) are included for monitoring and status information.

The Model 1205D standard power power options include an 85 Vac to 264 Vac/100 Vdc to 350 Vdc , 22 Vdc to 67 Vdc supplies with secure terminal strip inlets and surge-withstand capability or a direct 13.5 Vdc to 26.4 Vdc supply with secure terminal strip inlet. The surge-withstand network is designed to meet ANSI/IEEE C37.90-1 and IEC 61000-4 specifications. Also included is a built-in lightning arrestor and rear panel ground plate to protect against secondary lightning strikes and other antenna coupled surges.

Model 1205D Specifications

Timing and Receiver Characteristics

Timing Accuracy

Specifications apply at the 1 PPS/IRIG-B/PP/PTP outputs when receiving one satellite in position hold mode, as of date of publication.

UTC/USNO	± 100 ns peak
typical	± 40 ns peak

Holdover Oscillator

Standard	OCXO, 1 ms/24 h
Patents	High-Reliability Holdover Method and Topologies: No. US 9,326,926 & US 9,979,406 B2

Position Accuracy

2 meters, rms

Satellite Tracking

Seventy-two (72) channel receiver: L1 GPS C/A, L1 GLONASS CT, Galileo, BeiDou.

Acquisition

55 seconds typical, cold start

25 seconds, typical, warm start

3 seconds, typical, hot start

I/O Configuration

Connectors

One 32 pin pluggable terminal strip connector:

Programmable Pulse (six outputs)
IRIG-B modulated
MOSFET
Analog Input
Event Input
Relay Contacts
RS-232 (2 ports)
RS-485 (transmit only)

I/O Configuration (continued)

Programmable Pulse

Six programmable pulse outputs, high-drive 5 Vdc (125 mA at > 4 V). Available signals:

- IRIG-B unmodulated (UTC/Local, C37.118.1 On/Off)
- Every 1 to 60,000 seconds, starts top of the second
- Hourly at a specified offset
- Daily at a specified time of day
- One shot at a specified time of year
- DCF-77

Pulse polarity and pulse duration are programmable, duration from 0.01 to 600 seconds, except in one-shot mode, where the output is Low prior to the specified time and High thereafter. IRIG-B settings independent from main IRIG-B signal.

IRIG-B Modulated

One IRIG-B modulated output, 4 Vpp, 20 ohms source impedance. Configurable to Local or UTC time with C37.118.1 on or off, settings independent from Programmable Pulse IRIG-B output.

MOSFET

300 volt, 1 watt power dissipation open-drain FET driver with 24 Vdc output.

Analog Input

One single phase AC line voltage (50/60 Hz, 300 Vac) input provides accurate measurements of system frequency, frequency error and time deviation.

Event Input

One event timer channel with 100 ns resolution is standard. This function may be driven by the start bit of a received character on the serial port, or an external 5 V CMOS/TTL signal.

Relay

Form C (SPDT) fail-safe, 8 A at 250 Vac; configurable to Out-of-Lock, Fault, Alarm, Stabilized, or Programmable Pulse

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Model 1205D Specifications

Interface

Front Panel

Status LEDs	Normal (green) Learn (orange) Unlocked (red) Alarm (red) Operate (green) Fault (red)
USB	Micro-USB

System

Network	3 Ethernet ports; 10/100 BT (standard) or Fiber (optional)
Protocols	NTP, SNTP, PTP (Power Profile) SNMP, ICMP, TCP, SSH, SCP, SSL HTTP, HTTPS, DHCP
Setup	Web based configuration
Serial	2 RS-232 ports (TXD, RXD, GND) 1 RS-422/485 (TXD+, TXD-) 1200 to 230400 baud; 7 or 8 data bits; 1 or 2 stop bits; even/odd/no parity Has Interrogate (RS-232 only) and six Broadcast modes: standard ASCII (IRIG-J), Vorne large-display, status/alarm, extended ASCII, event data, ASCII with time-quality and user configurable serial time code

Power Requirements

Accommodates one power supply, choices include an universal supply or a low dc supply, both with surge withstand capability.

Universal

Voltage	100 Vac to 264 Vac, 47 to 440 Hz, 20 VA max. or 100 Vdc to 350 Vdc, 30 W maximum
Inlet	Secure Pluggable Terminal Strip

Low DC

Voltage	22 to 67 Vdc, 30 W maximum
Inlet	Secure Pluggable Terminal Strip

Direct Input

Voltage	13.5 Vdc to 26.4 Vdc, 30 W maximum
Inlet	Secure Pluggable Terminal Strip

General

Physical

Size	172 mm x 225 mm x 90 mm (6.75 in x 8.75 in x 3.55 in)
Weight	2 kg (4.5 lbs), net 5.5 kg (12 lbs), shipping
Ground Block	Antenna protective ground Copper, with M5 (10-32) stud and nut Internal lightning surge suppressor (GDT)
Antenna	3/4" NPT (1 in - 14 marine) thread Cable Connection: F-type Temperature: - 55 °C to + 65 °C Size: 80 mm dia. x 84 mm (3.2 in x 3.3 in) Weight: 170 grams (6.0 oz)
Antenna Cable	RG-6 type, 15 m (50 ft) provided Weight: 0.69 kg (1.52 lbs) per 15 m

Environmental

Temperature	Operating: - 40 °C to + 65 °C Nonoperating: - 40 °C to + 75 °C
Humidity	Noncondensing
EMC	Conducted emissions: power supply complies with FCC 20780, Class A and VDE 0871/6.78 Class A Surge withstand capability (SWC), power inlet: designed to meet ANSI/IEEE C37.90-1 and IEC 61000-4

Model 1205D Specifications

Options

A power supply, holdover oscillator, network connections, and output connector must be specified.

Description	Order No.
Power Supply	
Terminal Power Strip, Surge Withstand, 100 Vac to 264 Vac, 100 to 350 Vdc	A01
Terminal Power Strip, Surge Withstand, 22 Vdc to 67 Vdc	A02
Terminal Power Strip, Surge Withstand, 13.5 Vdc to 26.4 Vdc	A03
Holdover Oscillator	
Holdover OCXO 1 ms/day	C01
Network Connections	
3 - 10/100 BT	D01
2 - 10/100 BT, 1 Multimode Fiber	D02
1 - 10/100 BT, 2 - Multimode Fiber	D03
3 - Multimode Fiber	D04
32-Pin Output Connector	
None	H00
Screw Terminations	H01
Crimp Terminations	H02

Accessories

Description	Order No.
Included	
GNSS Antenna, pipe mountable	AS0099200
15 m (50 ft) RG-6 Antenna Cable[1]	CA0021315
Rack Mounts	AS0094800
Quick Setup Guide	PD0054500
Available	
Operation Manual	AS0109700
Antenna Mounting Kit	AS0044600
15 m (50 ft) RG-6 Antenna Cable[1]	CA0021315
30 m (100 ft) RG-6 Antenna Cable[1]	CA0021330
45 m (150 ft) RG-6 Antenna Cable[1]	CA0021345
60 m (200 ft) RG-6 Antenna Cable[1]	CA0021360
75 m (250 ft) RG-6 Antenna Cable[1]	CA0021375
21 dB In-Line Preamplifier for cable lengths greater than 75 m	AS0044700
Antenna Surge Protector	AS0094500
Antenna Grounding Block Kit	AS0048900
BNC (Male) Breakout to 100 mm Wires	AP0003400
BNC (Female) Breakout to 100 mm Wires	AP0008900

[1] RoHS compliant

Order Guide

Model	Power Supply A	Power Supply B	Holdover Oscillator	Network Configuration	Option Slot A	Option Slot B	Option Slot C	Output Connector
1205D	A03*	B00*	C01*	D01 D02 D03 D04	E00*	F00*	G00*	H00 H01* H02

x00 Indicates option not installed.
* Indicates default selection.

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