ARBITER SYSTEMS

Specifications subject to change.

Model 1201B/C
GNSS Synchronized Clock

featuring

EPS

Enhanced Performance and Security

The Arbiter Systems®, Inc. Model 1201B/C GNSS Synchronized Clock is a multi-satellite system (GPS/GLONASS/Galileo*/BeiDou*) timing source for precision applications. Arbiter's next-generation substation clock provides enhanced performance and security (EPS) while supporting the standard outputs and popular options of our existing clocks. EPS benefits include multi-system timing sources, standard holdover oscillator, multiple levels of security, secure communications, and anti-spoofing technology. The Model 1201B/C is compatible with Arbiter's earlier clock models, supporting the same legacy options and outputs, while enabling the transition to a more secure device.

The Model 1201 is available in two models, the Model 1201B and the Model 1201C. The Model 1201B has eight status LEDs, an LCD setup/status back-lit display, and a keyboard. The Model 1201C adds a large (20 mm or 0.8 in) LED time display. Both versions have 32 receiver channels, capable of tracking GNSS satellites simultaneously, providing optimum performance. The Model 1201B/C has 100 ns worst-case accuracy to meet the requirements of a broad range of applications from relay synchronization to phasor timing. The standard holdover oscillator maintains accuracy of 1 ms/day when not tracking satellites. In addition to enhanced performance, Arbiter Systems' new EPS technology provides six levels of user security selectable from Level 0 security (none) to Level 5 security (front panel display, keyboard, and legacy serial commands disabled). Spoofing concerns are a thing of the past with patent pending anti-spoofing algorithms, multi-system satellite tracking, and holdover oscillators that limit the time error to the holdover oscillator specification. If spoofing is suspected/detected, the user is alerted by the ALARM indicator.

Three pluggable terminal strip outputs (jumper configurable) provide IRIG-B unmodulated, 1 PPS, Programmable Pulse or Event Input. A modulated IRIG-B output is also available on the center pluggable terminal strip output. These outputs are configurable to provide 5 V CMOS bus drivers (± 75 mA drive capability) or 1 watt power dissipation open-drain FET (excludes IRIG-B modulated) or 4 Vpp, 20 ohms source impedance (IRIG-B modulated only) drivers. An 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 at one of the terminal strip connectors, jumper-selectable. The Model 1201B/C comes standard with two DB-9 communication ports. One also provides an RS-422/485 transmit only driver and a programmable pulse output.

An SPDT (form C) fail-safe relay is also included and is configurable to Out-of-Lock, Fault, Alarm, Stabilized, or Programmable Pulse. The Model 1201B/C accepts one or two power supplies in a redundant configuration. Standard power options include an 85 Vac to 264 Vac/100 Vdc to 350 Vdc or 22 Vdc to 67 Vdc supplies with secure terminal strip inlets and surge-withstand capability. The surge-withstand network is designed to meet ANSI/IEEE C37.90-1 and IEC 61000-4 specifications. Legacy options available include Four Additional Configurable Outputs; High Drive IRIG-B Outputs; Power System Time, Frequency, and Phase Monitor; NTP/PTP Server; Four BNC Output Connectors (parallels main outputs).

*When satellites become operational.

Model 1201B/C Specifications

Receiver Characteristics

Timing Accuracy

Specifications apply at the 1 PPS/IRIG-B/PP outputs when receiving four or more satellites, as of date of publication.

UTC/USNO ± 100 ns peak

Holdover Oscillator

Standard OCXO, 1 ms/day

Position Accuracy

2 meters, rms

Satellite Tracking

Thirty-two (32) channel receiver: L1 GPS/SBAS C/A, L1 GLONASS CT, (when operational): Galileo, BeiDou.

Acquisition

55 seconds, typical, cold start

25 seconds, typical, warm start

3 seconds, typical, hot start

I/O Configuration

Connectors

Three pluggable terminal strip connectors:

Port 1: IRIG-B unmodulated, 1 PPS, Programmable Pulse or Event Input; jumper-selectable

Port 2: IRIG-B modulated, 1 PPS, IRIG-B unmodulated, Programmable Pulse or Event Input; jumper-selectable

Port 3: IRIG-B unmodulated, 1 PPS, Programmable Pulse or Event Input; jumper-selectable

Jumper-selectable outputs are 5 V CMOS bus drivers with 10 ohms source impedance and ±75 mA drive capability or 4 Vpp, 20 ohms source impedance (IRIG-B modulated only) or 1 watt power dissipation open-drain FET drivers

I/O Configuration (Continued)

IRIG-B

One IRIG-B channel that controls both the unmodulated and modulated outputs. Configurable to Local or UTC time with C37.118.1 on or off, settings independent from Programmable Pulse IRIG-B output.

Programmable Pulse

One programmable pulse output (by a jumper connection) that may be output on a terminal strip connector and the AUX OUT pin on either COM port.

Six modes:

- 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
- Slow Code (UTC/LCL)

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.

Relay

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

Event

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 at one of the terminal strip connectors (jumper-selectable).

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Model 1201B/C Specifications

Interface

Operator

Display	2 x 20 character supertwist LCD White LED backlight 20 mm (0.8 in) LED; 6 digits (Model 1201C)
Functions	Time and date Antenna status and position Timing status System status
Status LEDs	Normal (green) Learn (orange) Unlocked (red) Alarm (red) Operate (green) Power A (green) Power B (green) Fault (red)
Keypad	8 keys; select display functions or setup menus
Setup	COM 1 (RS-232 port 1) COM 2 (RS-232 port 2) Local time offset Out-of-Lock Time Relay Configuration Backlight Control Event/Deviation Programmable Pulse System Delays IRIG Time Data Option Configuration

System

RS-232	1200 baud to 230400 baud; 7 or 8 data bits; 1 or 2 stop bits; even/odd/no parity
	2 Male 9-pin D-subminiature
	Has Interrogate (normal) 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
COM1	RS-232 (TXD, RXD, AUX IN, AUX OUT) RS-422/485 (TXD+, TXD-, AUX OUT)
COM2	RS-232 (TXD, RXD, AUX OUT)

Power Requirements

Accommodates any combination of the two available power supplies in a single or redundant configuration. Choices include an universal supply or a low dc supply, both with surge withstand capability.

Universal

Voltage	85 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 Vdc to 67 Vdc, 30 W maximum
Inlet	Secure Pluggable Terminal Strip

General

Physical

Size	425 mm x 280 mm x 44 mm (16.75 in x 11 in x 1.75 in) 19 in, 1 Rack Unit; 280 mm deep FMS. Rack mounts and feet for tabletop included 635 mm x 381 mm x 229 mm (25 in x 15 in x 9 in), shipping
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 in NPT (1 in - 14 marine) thread Cable Connection: F-type Temperature: - 55 °C to + 65 °C Size: 80 mm dia. x 84 mm (3.15 in x 3.31 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 1201B/C Specifications

Options

One option can be selected from each of the categories listed below; except Power Supply which accommodates two. A power supply and holdover oscillator must be specified.

Description	Order No.
Power Supply	
Terminal Power Strip, Surge Withstand, 85 Vac to 264 Vac, 100 Vdc to 350 Vdc	A01/B01
Terminal Power Strip, Surge Withstand, 22 Vdc to 67 Vdc	A02/B02
Holdover Oscillator	
Holdover OCXO 1 ms/day	C01
Main Board I/O	
Single Configurable Fiber-Optic Output	D01
Auxiliary I/O	
Four Configurable Outputs	E01
Four Configurable Fiber-Optic Outputs	E02
Eight-Channel High-Drive IRIG-B Output	E03
Power System Time, Frequency and Phase Monitor	E04
Four Additional Outputs with Dry Contact and +25/50 Vdc	E05
NTP/PTP Server Copper/Copper	E06
NTP/PTP Server Copper/Fiber	E07
NTP/PTP Server Fiber/Fiber	E08
Four BNC Output Connectors (Parallel to Pluggable Terminal Strip)	E09

Accessories

Description	Order No.
Included	
GNSS Antenna, pipe mountable	AS0099200
Quick Setup Guide	PD0015900
15 m (50 ft) RG-6 Antenna Cable	CA0021315
Rack Mount Kit	AS0094800
Available	
Operation Manual	AS0096700
Antenna Mounting Kit	AS0044600
15 m (50 ft) RG-6 Antenna Cable	CA0021315
30 m (100 ft) RG-6 Antenna Cable	CA0021330
45 m (150 ft) RG-6 Antenna Cable	CA0021345
60 m (200 ft) RG-6 Antenna Cable	CA0021360
75 m (250 ft) RG-6 Antenna Cable	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
BNC (Female) Breakout to Screw Terminal	AP0014900
BNC (Male) Breakout to Screw Terminal	AP0015000
RG-6 Stripping Tool	TF0013200
RG-6 Type F Compression Tool	TF0024000
RG-6 Type F Comp. Connector	CN0050700
300 m (1000 ft) Roll RG-11 Cable	WC0004900
RG-11 Type F Stripping Tool	TF0013300
RG-11 Type F Crimp Tool	TF0006000
RG-11 Type F Crimp-on Connector	CN0027800

Order Guide

Model	Power Supply A	Power Supply B	Holdover Oscillator	Main Board I/O	Auxiliary I/O
1201B	A01	B00*	C01	D00*	E00*
1201C	A02	B01		D01	E01
		B02			E02
					E03
					E04
					E05
					E06
					E07
					E08
					E09

*Indicates option not installed.

Example:

1201B-A01-B00-C01-D00-E06

Model 1201B with LCD display
Power Supply A: 85 to 264 Vac/ 100 to 350 Vdc
Power Supply B: Not installed
Holdover Oscillator: 1 ms/day
Main Board I/O: Not installed
Auxiliary I/O: NTP/PTP Server with RJ-45 Ethernet connectors

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