The Arbiter Systems®, Inc. Model 1201B/C 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) 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 1201B/C 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 72 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 granted 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).
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
  ± 40 ns typical

Holdover Oscillator
Standard OCXO, 1 ms/24 h

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
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.
Seven 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)
- 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.

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).
### 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 eight Broadcast modes: standard ASCII (IRIG-J), Vorne large-display, status/alarm, extended ASCII, event data, ASCII with time-quality, ASCII with time-quality + year, 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: 100 Vac to 240 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: 438 mm x 280 mm x 44 mm  
  (17.25 in x 11 in x 1.75 in)  
  19 in, 1 Rack Unit; 280 mm deep FMS.  
  Rack mounts 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  
  (20 kA Gas Discharge Tube (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 (3.2in 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 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Supply</strong></td>
<td></td>
</tr>
<tr>
<td>Terminal Power Strip, Surge Withstand, 100 Vac to 264 Vac, 100 Vdc to 350 Vdc</td>
<td>A01/B01</td>
</tr>
<tr>
<td>Terminal Power Strip, Surge Withstand, 22 Vdc to 67 Vdc</td>
<td>A02/B02</td>
</tr>
<tr>
<td><strong>Holdover Oscillator</strong></td>
<td></td>
</tr>
<tr>
<td>Holdover OCXO 1 ms/24 h</td>
<td>C01</td>
</tr>
<tr>
<td><strong>Main Board I/O</strong></td>
<td></td>
</tr>
<tr>
<td>Single Configurable Fiber-Optic Output</td>
<td>D01</td>
</tr>
<tr>
<td><strong>Auxiliary I/O</strong></td>
<td></td>
</tr>
<tr>
<td>Four Configurable Outputs</td>
<td>E01</td>
</tr>
<tr>
<td>Four Configurable Fiber-Optic Outputs</td>
<td>E02</td>
</tr>
<tr>
<td>Eight-Channel High-Drive IRIG-B Output</td>
<td>E03</td>
</tr>
<tr>
<td>Power System Time, Frequency and Phase Monitor</td>
<td>E04</td>
</tr>
<tr>
<td>Four Additional Outputs with Dry Contact and +25/50 Vdc</td>
<td>E05</td>
</tr>
<tr>
<td>NTP/PTP Server Copper/Copper</td>
<td>E06</td>
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<tr>
<td>NTP/PTP Server Copper/Fiber</td>
<td>E07</td>
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<tr>
<td>NTP/PTP Server Fiber/Fiber</td>
<td>E08</td>
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<tr>
<td>Four BNC Output Connectors (Parallel to Pluggable Terminal Strip)</td>
<td>E09</td>
</tr>
</tbody>
</table>

## Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Included</strong></td>
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<tr>
<td>GNSS Antenna, pipe mountable</td>
<td>AS0099200</td>
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<tr>
<td>Quick Setup Guide</td>
<td>PD0051900</td>
</tr>
<tr>
<td>15 m (50 ft) RG-6 Antenna Cable¹</td>
<td>CA0021315</td>
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<tr>
<td>Rack Mount Kit</td>
<td>AS0094800</td>
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<tr>
<td><strong>Available</strong></td>
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<tr>
<td>Operation Manual</td>
<td>AS0096700</td>
</tr>
<tr>
<td>Antenna Mounting Kit</td>
<td>AS0044600</td>
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<tr>
<td>15 m (50 ft) RG-6 Antenna Cable¹</td>
<td>CA0021315</td>
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<tr>
<td>30 m (100 ft) RG-6 Antenna Cable¹</td>
<td>CA0021330</td>
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<tr>
<td>45 m (150 ft) RG-6 Antenna Cable¹</td>
<td>CA0021345</td>
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<tr>
<td>60 m (200 ft) RG-6 Antenna Cable¹</td>
<td>CA0021360</td>
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<tr>
<td>75 m (250 ft) RG-6 Antenna Cable¹</td>
<td>CA0021375</td>
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<tr>
<td>21 dB In-Line Preamplifier for cable lengths greater than 100 m</td>
<td>AS0044700</td>
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<tr>
<td>Antenna Surge Protector</td>
<td>AS0094500</td>
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<tr>
<td>Antenna Grounding Block Kit</td>
<td>AS0048900</td>
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<tr>
<td>BNC (Male) Breakout to 100 mm Wires</td>
<td>AP0003400</td>
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<tr>
<td>BNC (Female) Breakout to 100 mm Wires</td>
<td>AP0008900</td>
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<tr>
<td>BNC (Female) Breakout to Screw Terminal</td>
<td>AP0014900</td>
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<tr>
<td>BNC (Male) Breakout to Screw Terminal</td>
<td>AP0015000</td>
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¹ RoHS compliant

## Order Guide

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Supply A</th>
<th>Power Supply B</th>
<th>Holdover Oscillator</th>
<th>Main Board I/O</th>
<th>Auxiliary I/O</th>
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<tbody>
<tr>
<td>1201B</td>
<td>A01</td>
<td>B00*</td>
<td>C01</td>
<td>D00*</td>
<td>E00*</td>
</tr>
<tr>
<td>1201C</td>
<td>A02</td>
<td>B01/B02</td>
<td></td>
<td>D00*</td>
<td>E00*</td>
</tr>
</tbody>
</table>

*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