The Arbiter Systems®, Inc. Model 1202B/C GNSS Synchronized Clock is a multi-satellite system (GPS/GLONASS/Galileo/BeiDou) timing source for precision applications. Arbiter Systems' 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 user security, secure communications, and anti-spoofing technology. The Model 1202B/C is compatible with Arbiter Systems' earlier clock models, supporting the same legacy options and outputs, while enabling the transition to a more secure device.

The Model 1202 is available in two versions. The Model 1202B has eight status LEDs, an LCD setup/status back-lit display, and a keyboard. The Model 1202C adds a large (20 mm or 0.8 in) LED time display. Both versions have 72 receiver channels, capable of tracking all visible GNSS satellites simultaneously, providing optimum performance. The Model 1202B/C has 100 ns worst-case accuracy to meet the requirements of a broad range of applications from relay synchronization to synchrophasor timing. The standard holdover oscillator maintains 1 ms/24 h accuracy 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.

Six BNC outputs (3 programmable high-drive and 3 jumper configurable) provide IRIG-B unmodulated, 1 PPS, and Programmable Pulse, Modulated IRIG-B outputs along with an Event Input. The three high drive outputs are independently set to any of the programmable pulse modes and provide ±125 mA of drive current. The three configurable outputs are selectable for 5 V CMOS bus drivers (±75 mA drive capability); 4 Vpp, 20 ohms source impedance (IRIG-B modulated only) drivers; or an event timer channel with 100 ns resolution. The event function may be driven by the start bit of a received character on the serial port or an external 5 V CMOS/TTL signal on one of the BNC connectors. The Model 1202B/C comes standard with one DB-9 communication port and the option to add a second port. An RS-422/485 transmit only driver is standard on the main communication port.

Two SPDT (form C) fail-safe relays are also included and are configurable to Out-of-Lock, Fault, Alarm, Stabilized, or Programmable Pulse. The Model 1202B/C accepts one or two power supplies in a redundant configuration. Standard power options include a universal 100 Vac to 240 Vac/100 Vdc to 350 Vdc or 24 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. Available options include Four Additional Configurable Outputs; High Drive IRIG-B Outputs; Power System Time, Frequency, and Phase Monitor; NTP/PTP Server.
## Model 1202B/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/24 h

**Position Accuracy**
- 2 meters, rms

**Satellite Tracking**
- Seventy-two (72) channel receiver: L1 GPS C/A, L1 GLONASS CT, Galileo E1-B/C, BeiDou B1.

**Acquisition**
- 55 seconds, typical, cold start
- 25 seconds, typical, warm start
- 3 seconds, typical, hot start

### I/O Configuration (Continued)

#### Programmable Pulse

Four programmable pulse outputs (one jumper configurable to ports 1-3 and 1 each for ports 4-6).

- **Modes:**
  - IRIG-B unmodulated (UTC/Local, C37.118.1 On/Off)
  - IRIG-B manchester (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
  - 1 KHz
  - 100 Hz

- 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.

#### Connectors

Six BNC connectors:
- **Port 1:** IRIG-B unmodulated, 1 PPS, Programmable Pulse or IRIG-B modulated; jumper-selectable
- **Port 2:** IRIG-B unmodulated, 1 PPS, Programmable Pulse, IRIG-B Modified Manchester or IRIG-B modulated; jumper-selectable
- **Port 3:** IRIG-B unmodulated, 1 PPS, Programmable Pulse or Event Input; jumper-selectable
- **Port 4:** High-drive Programmable Pulse
- **Port 5:** High-drive Programmable Pulse
- **Port 6:** High-drive Programmable Pulse

- 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). High-drive outputs are 5 V FET drivers with ±125 mA drive capability.
# Model 1202B/C Specifications

## Interface

| Operator | Display | 2 x 20 character supertwist LCD  
|          |        | White LED backlight  
|          |        | 20 mm (0.8 in) LED; 6 digits  
|          |        | (Model 1202C)  
| 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)  
|       | 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  
|       | Includes the following broadcast modes: Interrogate (default), standard ASCII (IRIG-J), Vorne large-display, status/alarm, extended ASCII, event data, ASCII with time-quality, ASCII with year and user configurable serial time code

## 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**: 24 Vdc to 48 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)  
- **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
- **Type**: 3/4 in NPT (1 in - 14 marine) thread  
- **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
- **Type**: 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 1202B/C Specifications

### Options

One option can be selected from each of the categories listed below; except Power Supply which accommodates two. One 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 240 Vac, 100 Vdc to 350 Vdc</td>
<td>A01/B01</td>
</tr>
<tr>
<td>Terminal Power Strip, Surge Withstand, 24 Vdc to 48 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>Slot A</strong></td>
<td></td>
</tr>
<tr>
<td>Second RS-232 Port</td>
<td>E01</td>
</tr>
<tr>
<td>Frequency and Time Monitor</td>
<td>E02</td>
</tr>
<tr>
<td>Programmable Pulse/IRIG-B Over RS-485</td>
<td>E03</td>
</tr>
<tr>
<td><strong>Slot B</strong></td>
<td></td>
</tr>
<tr>
<td>Four Configurable Outputs</td>
<td>F01</td>
</tr>
<tr>
<td>Four Configurable Fiber-Optic Outputs</td>
<td>F02</td>
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<tr>
<td>Eight-Channel High-Drive IRIG-B Output</td>
<td>F03</td>
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<tr>
<td>Power System Time, Frequency and Phase Monitor</td>
<td>F04</td>
</tr>
<tr>
<td>Four Additional Outputs with Dry Contact and +25/50 Vdc</td>
<td>F05</td>
</tr>
<tr>
<td>NTP/PTP Server Copper/Copper</td>
<td>F06</td>
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<tr>
<td>NTP/PTP Server Copper/Fiber</td>
<td>F07</td>
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<tr>
<td>NTP/PTP Server Fiber/Fiber</td>
<td>F08</td>
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</table>

### Accessories

<table>
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<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>
</tr>
<tr>
<td>Quick Setup Guide</td>
<td>PD0055700</td>
</tr>
<tr>
<td>15 m (50 ft) RG-6 Antenna Cable</td>
<td>CA0021315</td>
</tr>
<tr>
<td>Rack Mount Kit</td>
<td>AS0094800</td>
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<tr>
<td><strong>Available</strong></td>
<td></td>
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<tr>
<td>Operation Manual</td>
<td>AS0107900</td>
</tr>
<tr>
<td>Antenna Mounting Kit</td>
<td>AS0044600</td>
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<tr>
<td>15 m (50 ft) RG-6 Antenna Cable</td>
<td>CA0021315</td>
</tr>
<tr>
<td>30 m (100 ft) RG-6 Antenna Cable</td>
<td>CA0021330</td>
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<tr>
<td>45 m (150 ft) RG-6 Antenna Cable</td>
<td>CA0021345</td>
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<tr>
<td>60 m (200 ft) RG-6 Antenna Cable</td>
<td>CA0021360</td>
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<tr>
<td>75 m (250 ft) RG-6 Antenna Cable</td>
<td>CA0021375</td>
</tr>
<tr>
<td>21 dB In-Line Antenna Preamplifier</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>
</tr>
<tr>
<td>BNC (Female) Breakout to 100 mm Wires</td>
<td>AP0008900</td>
</tr>
<tr>
<td>BNC (Male) Breakout to Screw Terminal</td>
<td>AP0014900</td>
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<tr>
<td>BNC (Female) Breakout to Screw Terminal</td>
<td>AP0015000</td>
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</tbody>
</table>

### 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>Option Slot A</th>
<th>Option Slot B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1202B</td>
<td>A01</td>
<td>B00*</td>
<td>C01</td>
<td>D00*</td>
<td>E00*</td>
<td>F00*</td>
</tr>
<tr>
<td>1202C</td>
<td>A02</td>
<td>B01 B02</td>
<td></td>
<td>D01</td>
<td>E01 E02 E03</td>
<td>F01 F02 F03</td>
</tr>
</tbody>
</table>

*Indicates option not installed.

**Example:**

1202B-A01-B00-C01-D00-E01-F01

Model 1202B with LCD display
- Power Supply A: 100 to 240 Vac
- /100 to 350 Vdc
- Power Supply B: Not installed
- Holdover Oscillator: 1 ms/day
- Main Board I/O: Not installed
- Slot A: Second RS-232 Port
- Slot B: Four Configurable Outputs