Model 1200B
GNSS Synchronized Clock

The Arbiter Systems®, Inc. Model 1200B GNSS Synchronized Clock is a multi-satellite system (GPS/GLONASS/Galileo/BeiDou) timing source for precision timing applications. Designed with the advanced features of our 12xx line of clocks to give optimum performance without a holdover oscillator at an economical price. The Model 1200B is compatible with Arbiter’s earlier clock models, supporting the standard options and outputs, while enabling the transition to a modern design.

The Model 1200B has eight status LEDs, an LCD setup/status back-lit display, and a keyboard. The Model 1200B comes standard with 72 receiver channels, capable of tracking GNSS satellites simultaneously, providing optimum performance. The Model 1200B has 100 ns worst-case accuracy to meet the requirements of a broad range of applications from relay synchronization to synchrophasor timing. In addition to enhanced performance, Arbiter Systems’ new security feature 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).

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 1200B comes standard with two DB-9 serial 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 1200B accepts one or two power supplies in a redundant configuration. Standard power options include an 100 Vac to 240 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. Available options 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 1200B 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

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

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 are independent from main IRIG-B signal.

Relay
Form C (SPDT) fail-safe, 8 A at 250 Vac (5 A at 30 Vdc); 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).
### Interface

**Operator**
- **Display**: 2 x 20 character supertwist LCD
  - White LED backlight
- **Functions**: Time and date, Antenna status and position, Timing status, System status
- **Status LEDs**:
  - Normal (green)
  - Survey (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

- **Universal**
  - **Voltage**: 100 Vac to 240 Vac, 47-440 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)
- **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 +70 °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 1200B Specifications

## Options

One option can be selected from each of the categories listed below; except Power Supply which accommodates two. A power supply 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, 22 Vdc to 67 Vdc</td>
<td>A02/B02</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>
</tr>
<tr>
<td>NTP/PTP Server Copper/Fiber</td>
<td>E07</td>
</tr>
<tr>
<td>NTP/PTP Server Fiber/Fiber</td>
<td>E08</td>
</tr>
<tr>
<td>Four BNC Output Connectors (Parallel to Pluggable Terminal Strip)</td>
<td>E09</td>
</tr>
</tbody>
</table>

## Accessories

**Included**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbiter Universal GNSS Antenna</td>
<td>AS0099200</td>
</tr>
<tr>
<td>Quick Setup Guide</td>
<td>PD0057100</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>
</tr>
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</table>

**Available**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
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<tbody>
<tr>
<td>Operation Manual</td>
<td>AS0110500</td>
</tr>
<tr>
<td>Antenna Mounting Kit</td>
<td>AS0044600</td>
</tr>
<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>
</tr>
<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 Preamp for cable lengths greater than 100 m</td>
<td>AS0044700</td>
</tr>
<tr>
<td>GNSS Antenna Surge Arrester</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>
</tr>
<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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</table>

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>
</tr>
</thead>
<tbody>
<tr>
<td>1200B</td>
<td>A01</td>
<td>B00*</td>
<td>C00*</td>
<td>D00*</td>
<td>E00*</td>
</tr>
<tr>
<td></td>
<td>A02</td>
<td>B01</td>
<td></td>
<td>D01</td>
<td>E01</td>
</tr>
</tbody>
</table>

*Indicates option not installed.

**Example:**

1200B-A01-B00-C00-D00-E05

Model 1200B with LCD display

- Power Supply A: 100 to 240 Vac/100 to 350 Vdc
- Power Supply B: Not installed
- Holdover Oscillator: Not installed
- Main Board I/O: Not installed
- Auxiliary I/O: NTP/PTP Server with RJ-45 Ethernet connectors