The Arbiter Systems®, Inc. Model 1206B/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) 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 1206 is available in two versions: the Model 1206B and the Model 1206C. The Model 1206B has eight status LEDs, an LCD status back-lit display, and a keyboard. The Model 1206C adds a large (20 mm or 0.8 in) LED time display. Both 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 1206B/C (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. The rubidium holdover oscillator maintains accuracy of 1 µs/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 1206B/C timing signals are available via the three Ethernet ports, the thirty-two pin terminal block and from the available option slots. 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 1206B/C standard inputs, outputs and serial 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. Optional outputs include frequency, (5, 10, 1.544, and 2.048 MHz), configurable fiber optic, configurable 24 V, additional programmable pulse, and additional modulated IRIG-B outputs.

The Model 1206B/C accepts one or two power supplies in a redundant configuration and redundant GNSS inputs. 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. Also included is a built-in lightning arrester and rear panel ground plate to protect against secondary lightning strikes and other antenna coupled surges.
Model 1206B/C 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

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

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

Interface

Front Panel
Display 2 x 20 character supertwist LCD
  White LED backlight
  20 mm (0.8 in) LED; 6 digits (Model 1206C)

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
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
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) Programmable Pulse

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

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 264 Vac, 47 to 440 Hz, 20 VA max.
or 100 Vdc to 350 Vdc, 75 W maximum
Inlet Secure Pluggable Terminal Strip

Low DC
Voltage 22 to 67 Vdc, 75 W maximum
Inlet Secure Pluggable Terminal Strip

General

Physical
Size 438 mm x 350 mm x 66 mm
(17.25 in x 13.75 in x 2.6 in)
19 in, 1.5 Rack Unit; 350 mm deep FMS.
Rack mounts included
Weight 3.5 kg (7.8 lbs), net
6.8 kg (15 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: - 20 °C to + 40 °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 1206B/C Specifications

### Options

Up to 2 Power Supply options and 3 Auxiliary I/O options can be accommodated. A power supply must be specified.

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td></td>
</tr>
<tr>
<td>Terminal Power Strip, Surge Withstand, 100 Vac to 264 Vac, 100 to 350 Vdc</td>
<td>A01/B01</td>
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<tr>
<td>Terminal Power Strip, Surge Withstand, 22 to 67 Vdc</td>
<td>A02/B02</td>
</tr>
<tr>
<td>Holdover Oscillator</td>
<td>C01</td>
</tr>
<tr>
<td>Rubidium, 1 µs/24 h</td>
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</tbody>
</table>

### Network Connectors

| 3 - 10/100BT | D01 |
| 2 - 10/100BT, 1 - Multimode Fiber | D02 |
| 1 - 10/100BT, 2 - Multimode Fiber | D03 |
| 3 - Multimode Fiber | D04 |

### Auxiliary I/O

| Programmable Pulse Outputs, 50 Ohm | E01/F01/G01 |
| Programmable Pulse Outputs, 75 Ohm | E02/F02/G02 |
| 1.544/2.048 MHz, 50 Ohm, DC Coupled | E03/F03/G03 |
| 1.544/2.048 MHz, 75 Ohm, DC Coupled | E04/F04/G04 |
| 1.544/2.048 MHz, 50 Ohm, AC Coupled | E05/F05/G05 |
| 1.544/2.048 MHz, 75 Ohm, AC Coupled | E06/F06/G06 |
| Modulated IRIG-B Outputs | E07/F07/G07 |
| Programmable Pulse Fiber-Optic Outputs | E08/F08/G08 |
| Programmable Pulse 24V Outputs | E09/F09/G09 |
| Dual Relays | E10/F10/G10 |
| System PPS Output, 50 Ohm | E11/F11/G11 |
| System PPS Output, 75 Ohm | E12/F12/G12 |
| Redundant GNSS receiver | E13 |
| Frequency, 50 Ohm DC Coupled | E14/F14/G14 |
| Frequency, 75 Ohm DC Coupled | E15/F15/G15 |
| Frequency, 50 Ohm AC Coupled | E16/F16/G16 |
| Frequency, 75 Ohm AC Coupled | E17/F17/G17 |
| 1 MHz Sine Wave Outputs | E18/F18/G18 |
| 5 MHz Sine Wave Outputs | E19/F19/G19 |
| 10 MHz Sine Wave Outputs | E20/F20/G20 |

### Accessories

<table>
<thead>
<tr>
<th>Included</th>
<th>Order No.</th>
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<tbody>
<tr>
<td>GNSS Antenna, pipe mountable</td>
<td>AS0099200</td>
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<tr>
<td>15 m (50 ft) RG-6 Antenna Cable</td>
<td>CA0021315</td>
</tr>
<tr>
<td>Rack Mounts</td>
<td>AS0094800</td>
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<tr>
<td>Quick Setup Guide</td>
<td>PD0053000</td>
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<table>
<thead>
<tr>
<th>Available</th>
<th>Order No.</th>
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<tbody>
<tr>
<td>Operation Manual</td>
<td>AS0100300</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>
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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 Preamplifier for cable lengths greater than 100 m</td>
<td>AS0044700</td>
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<tr>
<td>GNNS 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>
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### Order Guide

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Model 1206B-A01-B00-C01-D01-E12-F01-G00-H01
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1 RoHS compliant