

Model 1084A/B/C GPS Satellite-Controlled Clock



The Arbiter Systems[®], Inc. Model 1084A/B/C GPS Satellite-Controlled Clock provides the most-needed GPS system clock features in an economical package. Three versions allow you to match your requirements. The Model 1084A has four LEDs to monitor operating status. The Model 1084B adds an LCD setup/status display and keyboard. The Model 1084C adds a large (20 mm or 0.8 in.) LED time display.

In all versions, one BNC output provides modulated IRIG-B while another BNC output is jumper configurable for IRIG-B unmodulated or Programmable Pulse. Both outputs have substantial drive capability and can easily drive multiple loads wired in parallel. A third output is jumper configurable for either one pulse-per-second, IRIG-B unmodulated, or IRIG-B modified Manchester (IEEE Standard 1344 high-precision time code). This third output may also be wired (by a simple modification) to any of the other digital signals generated inside the Model 1084A/B/C. These signals include rates of 1 PPH, 1 PPM, 10 PPS, 100 PPS, 1 kPPS, 10 kPPS, 100 kPPS, 1 MPPS, 5 MPPS, and 10 MPPS; IRIG-E, H, and D; Programmable Pulse, or Locked to satellite. Programmable Pulse generates an output pulse every 1 to 60000 seconds, daily at a specified time, or at a

specified time of year; pulse duration is 0.01 to 600 seconds. An optional fiber-optic output generates 1 PPS or IRIG-B in either unmodulated or modified Manchester format. Also, an event timer input measures time of occurrence of an applied pulse to 100 ns resolution. Up to 500 events may be stored.

The Model 1084A/B/C includes two Form C (SPDT) fail-safe relays, compatible with 129 Vdc digital fault recorder inputs. The first provides a LOCKED indication, and the second can be selected to the FAULT, 1 PPH, or Programmable Pulse functions.

Twelve receiver channels are standard for best performance, especially in difficult locations. The internal backup oscillator is a digitally-compensated crystal oscillator (DCXO) accurate to 1×10^{-7} over temperature.

Power options include 85 to 264 Vac/110 to 275 Vdc with an IEC-320 detachable cordset, 110 to 275 Vdc terminal strip inlet with surge withstand, or 10 to 60 Vdc terminal strip inlet with surge withstand. The terminal-strip versions have a surge-withstand network designed to meet ANSI/IEEE C37.90-1 and IEC801-4 specifications. All power configurations may be retrofitted in the field.

Model 1084A/B/C Specifications

Receiver Characteristics

Timing Accuracy

Specifications apply at the 1 PPS output, in the presence of Selective Availability (SA), as of date of publication.

UTC/USNO ± 100 ns rms, 1 PPS output
Typical < 40 ns rms, in Position-Hold Mode

Internal Oscillator

Standard DCXO, 1×10^{-7} , unlocked
Allan variance (locked and in Position-Hold Mode)
1 second 5×10^{-10} (2×10^{-10} , typical)
1 day 5×10^{-13}

Synchronization

CMOS output signals are synchronized to the 1 PPS output, ± 50 ns maximum.

IRIG-B modulated, ± 1 μ s maximum

The leading edge of the start bit of a received RS-232 data message may be selected to trigger the Event A input, providing synchronization with 100 ns resolution.

Position Accuracy

25 meters, SA off

100 meters, SA on

Altitude, 140 meters, SA on

All specifications rms, 95% confidence, with Position-Hold Mode off and receiving at least four satellites

Satellite Tracking

Twelve (12) channel, GPS-L1, C/A code (1575.42 MHz). Receiver simultaneously tracks up to twelve satellites. Results from all tracked satellites are averaged in Position-Hold Mode or, with Position-Hold Mode off, using least-squares estimation.

Acquisition

2 minutes typical

25 minutes, 90% confidence, cold start

66 seconds, 90% confidence, with almanac less than 1 month old

30 seconds, 90% confidence, with ephemeris less than 4 hours old

The GPS Data Backup Battery is included in all Model 1084s. This feature improves acquisition time by supplying constant power to the real-time clock and RAM in the GPS receiver module.

I/O Configuration



Optional equipment may be shown

Connectors

Three standard; one IRIG-B modulated connector and two user-configurable connectors:

1. IRIG-B modulated, bus driver, 4 Vpp, 20 ohms source impedance, drives a 50-ohm load at 3 Vpp
2. IRIG-B unmodulated or Programmable Pulse; jumper-selectable
3. 1 PPS, IRIG-B unmodulated or IRIG-B modified Manchester; jumper-selectable

Jumper-selectable outputs are 5 V CMOS bus drivers with 10 ohms source impedance and ± 75 mA drive capability.

Relay Contacts

Two (2) sets, Form C (SPDT) fail-safe, 0.3 A at 130 Vdc; one is Locked function; the second one is jumper-selectable and may be Fault, 1 PPH, or Programmable Pulse

Programmable Pulse Output

Four modes:

- Every 1 to 60,000 seconds, starts top of the minute
- Hourly at a specified offset
- Daily at a specified time of day
- One shot at a specified time of year

Pulse duration is programmable from 0.01 to 600 seconds, except in one-shot mode, where the output is Low prior to the specified time and High thereafter.

Event A Input

One input is available as an alternate function, with a simple hardware modification to the 1 PPS configurable output. The input may be configured to accept an external 1 PPS signal and measure the deviation from 1 PPS/GPS with 100 ns resolution. Each input may also be configured to record up to 500 sequential events with 100 ns resolution, provided that the events are separated by 11 ms. Event data is stored in battery-backed RAM.

Model 1084A/B/C Specifications

| Interface | | Power Requirements | |
|-----------------|---|----------------------|---|
| Operator | | Standard | |
| Display | 2 x 20 character supertwist LCD (Models 1084B/C only) 20 mm (0.8 in.) LED; 9 digits (Model 1084C only) | Voltage | 85 to 264 Vac, 47 to 440 Hz, 20 VA max. or 110 to 275 Vdc, 15 W maximum |
| Functions | Time: UTC or local Position: latitude, longitude, altitude Receiver and clock status 1 PPS (input) deviation Event time | Inlet | IEC-320 with fuse and mating cordset. Specify cordset P01-P10 (See page 35) |
| Status LEDs | Operate (green) On Line (green) Unlocked (red) Fault (red) | General | |
| Keyboard Setup | Eight keys (Models 1084B/C only) Local time offset Output code select: Local/UTC Recorder output A Daylight Saving Time: On/Off/Automatic Backlight control: On/Off/Automatic Event input: Event/1 PPS Programmable Pulse setup Antenna delay Clock offset Out-of-Lock time: 1 to 99 minute(s), Off, or Zero Delay Auto-Survey: On/Off, Survey duration Position Hold: On/Off, Position Auto/Manual Option Configuration and Setup Serial port: RS-232 | Physical | |
| System | | Size | 1 RU rack mount or tabletop; 260 mm deep FMS. Rack mounts included |
| RS-232 | 1200 to 19,200 baud; 7 or 8 data bits; 1 or 2 stop bits; even/odd/no parity Broadcast modes include ASCII, Extended ASCII, ASCII with Time Quality, and Vorne (output once every second), Status (output on change of Status) and Event (output on an Event) Male 9-pin D-sub; Second port available (order number 1084opt19) | Weight | 2 kg (4.5 lbs), net 8 kg (17 lbs), shipping |
| RS-422/485 | Transmit only | Antenna | 0.75 in. pipe (1 in. - 14 marine) thread Cable Connection: F-type Size: 77.5 dia. x 66.2 mm (3.05 x 2.61 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: 0° to +50° C (-20° to +70° C typical) Nonoperating: -40° to +75° C |
| | | Humidity | Noncondensing |
| | | EMC | Radiated susceptibility: passes walkie-talkie test 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 801-4 |

Model 1084A/B/C Options

Options

Except as noted otherwise, only one I/O Option may be installed. The available options are listed below and described in the Options and Accessories section, on page 32.

I/O

| <u>Description</u> | <u>Order No.</u> |
|---|------------------------|
| Four Additional Configurable Outputs | 1084opt03 |
| Parallel BCD Output 1 ms Resolution | 1084opt06 |
| BCD Output with Second RS-232 Port | 1084opt17 |
| Second RS-232 Port | 1084opt19 ¹ |
| Fiber-Optic Output, Type ST 820 nm | 1084opt20 ² |
| Four Configurable Fiber-Optic Outputs | 1084opt20A |
| COMTRADE Sample Rate Generator | 1084opt23 |
| 8-Channel High-Drive IRIG-B Output | 1084opt27 |
| Power System Time, Frequency and Phase Monitor | 1084opt28 |
| Four Additional Outputs with Dry Contact and +25/50 Vdc | 1084opt29 |
| Internal Network Time Protocol (NTP) Server | 1084opt32 |

Power (select only one)

| <u>Description</u> | <u>Order No.</u> |
|---|------------------|
| IEC-320 Power Inlet, 85 to 264 Vac, 110 to 275 Vdc | 1084opt07 |
| Terminal Power Strip, Surge Withstand 10 to 60 Vdc | 1084opt08 |
| Terminal Power Strip, Surge Withstand 110 to 275 Vdc, 85 to 264 Vac | 1084opt10 |

General

| <u>Description</u> | <u>Order No.</u> |
|--------------------|--------------------------|
| LCD Backlight | 1084Bopt01 1084Copt01 |
| On/Off Switch | 1084Aopt04 1084Bopt04 |
| Rack Slide Kit | 1084opt26 |
| CD Mark/Label | 1084opt99 |

Accessories

Included

| <u>Description</u> | <u>Order No.</u> |
|---------------------------------|------------------|
| GPS Antenna, pipe mountable | AS0076200 |
| 15 m (50 ft) RG-6 Antenna Cable | CA0021315 |
| Rack Mount Kit | AS0028200 |
| Operation Manual | AS0031000 |
| Power Cord (see page 35) | P01-P10 |

Available

| <u>Description</u> | <u>Order No.</u> |
|--|------------------------|
| 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 |
| GPS Antenna Mounting Bracket | AS0044600 |
| 21 dB In-Line Preamplicifier | AS0044700 ³ |
| GPS Surge Protector Kit | AS0049000 |
| Antenna Grounding Block Kit | AS0048900 |
| 300 m (1000 ft) Roll RG-11 Cable | WC0004900 |
| RG-6 Crimp Tool | TF0006400 |
| RG-11 Crimp Tool + 25 F-type Connectors | AS0044800 |
| High Interference GPS Antenna and Mounting Adapter Kit | AS0062000 |

¹ May be combined only with other I/O options that do not include an additional RS-232 Port

² May be combined with other I/O options

³ Used for cable length greater than 75 m (250 ft)