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 µs 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

Operator

Display	2 x 20 character supertwist LCD (Models 1084B/C only) 20 mm (0.8 in.) LED; 9 digits (Model 1084C only)
Functions	Time: UTC or local Position: latitude, longitude, altitude Receiver and clock status 1 PPS (input) deviation Event time
Status LEDs	Operate (green) On Line (green) Unlocked (red) Fault (red)
Keyboard	Eight keys (Models 1084B/C only)
Setup	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

System

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)
RS-422/485	Transmit only

Power Requirements

Standard

Voltage	85 to 264 Vac, 47 to 440 Hz, 20 VA max. or 110 to 275 Vdc, 15 W maximum
Inlet	IEC-320 with fuse and mating cordset. Specify cordset P01-P10 (See page 35)

General

Physical

Size	1 RU rack mount or tabletop; 260 mm deep FMS. Rack mounts included 508 x 381 x 203 mm (20 x 15 x 8 in.), shipping
Weight	2 kg (4.5 lbs), net 5.5 kg (12 lbs), shipping
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

Certifications and Approvals

CE mark/label and certificate

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

Description	Order No.
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)

Description	Order No.
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

Description	Order No.
LCD Backlight	1084Bopt01 1084Copt01
On/Off Switch	1084Aopt04 1084Bopt04

Accessories

Included

Description	Order No.
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

Description	Order No.
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 Preamplifier	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
Rack Slide Kit	AS0033100

[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)