

Model 1088B GPS Satellite-Controlled Clock



The Arbiter Systems[®], Inc. Model 1088B GPS Satellite-Controlled Clock provides unprecedented flexibility, performance, and value for worldwide timing applications. Combining GPS accuracy and ease of use with exceptionally-flexible interface features and options in a space-saving package, the Model 1088B offers unparalleled value in GPS-synchronized clocks.

Flexibility

Offering standard operation from worldwide AC power sources, plus 110-275 volt DC sources (also standard), the Model 1088B integrates into most environments with no options required. Optional power configurations include terminal strip power inlet (1088\07), surge-withstand capability (1088\15), and 10-85 Vdc operation (1088\08).

Standard user-configurable I/O provides over 260,000 possible setups, with 22 different available signals, in the standard unit alone. With the addition of the available options, trillions of combinations are possible!

The available options add a wide variety of capabilities to the Model 1088B. Additional outputs are available in a variety of formats, including fiber optic. High-performance internal oscillators are available, with or without backup batteries.

With option 16, the Model 1088B is a Power System Phase/Frequency/Time Monitor with state-of-the-art accuracy. The COMTRADE Sample Rate Generator option (1088\23) adds GPS synchronized sample rate outputs in accordance with IEEE C37.1-1991.

Performance

The Model 1088B offers full specified GPS timing accuracy of 50 ns rms from UTC/USNO. Typical performance is less than 40 ns rms. The Model 1088B provides this performance 24 hours a day, anywhere in the world.

Value

The Model 1088B Satellite-Controlled Clock was designed from the beginning to offer the greatest possible flexibility and value for a wide range of applications. See what we mean – compare the Model 1088B for yourself. Unmatched flexibility, performance, and value – put the Model 1088B to work in your system today!

Related Products

If your application does not require the outstanding flexibility and configurability of the Model 1088A/B, consider Models 1084A/B/C, 1092A/B/C and 1093A/B/C. All offer many of the most-needed features of the Model 1088B, plus several new features, and offer significant cost savings.

If you need a portable GPS clock, consider the Model 1088BP Portable GPS Satellite-Controlled Clock. A rugged transit case encloses a Model 1088B clock with an internal battery, for all of the performance and features of the Model 1088B in a portable package.

For applications which require even more resistance to loss of synchronization, Arbiter Systems offers redundant configurations. Each configuration consists of two clocks with clock-to-clock communications and an interconnect arbiter.

Model 1088B Specifications

Receiver Characteristics

Timing Accuracy

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

UTC/USNO ± 50 ns rms, when receiving 4 or more satellites in position-hold mode

UTC/USNO ± 100 ns rms, receiving a single satellite in position-hold mode

UTC/USNO ± 200 ns rms, when receiving 4 or more satellites and position-hold mode off

Synchronization

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

IRIG-B modulated, $\pm 1 \mu$ 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

8 channel, C/A code (1575.42 MHz). Receiver simultaneously tracks up to eight satellites. Results from all tracked satellites are averaged in position-hold mode or, with position hold 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 and GPS battery backup (1088\02)

30 seconds, 90% confidence, with ephemeris less than 4 hours old and GPS backup battery (1088\02)

I/O Configuration

Connectors

Four, BNC, user-configurable. Each connector may be configured as a specific input function or to any one of 22 output functions listed below, by means of internal push-on jumpers. Each output connector is independently buffered. Configuration may be changed easily in the field. Refer to the options section if more outputs are needed.

Analog outputs are op-amp (LF353) followers with 560-ohm protective resistors.

CMOS outputs are buffer type (74HC126) with 47 ohm source resistors.

Input Functions

Channel A Event/1PPS input, 5V TTL/CMOS

Channel B Event/1PPS input, 5V TTL/CMOS

Freq Reference 5V TTL/CMOS or AC-coupled;
100 kHz, 1, 5, or 10 MHz

Output Functions

Analog IRIG-B, 1 kHz modulated, 10 Vp-p
1PPS deviation; ± 5 V at 10 μ s/V

5V CMOS IRIG-B, E, D, or H, level-shift
(unmodulated)
1PPS, 1PPM, 1PPH
1, 10, 50, 60, or 100 PPS
1, 10, or 100 kPPS
1, 5, or 10 MPPS
Locked
Programmable Pulse
IRIG-B Modified Manchester (IEEE
Standard 1344)

Event A/B Inputs

Two inputs are available, each having a 100 ns timing resolution. Each input may be configured to accept an external 1PPS signal, and measure the deviation from 1PPS/GPS or to record up to 300 sequential events (separated by 11 ms) with 100 ns resolution. Event data is logged in battery-backed RAM and may be read or cleared from the front panel or RS-232 interface.

Model 1088B Specifications

I/O Configuration (Cont.)

Programmable Pulse Output

Four modes: repetitive pulse, every 1-60,000 seconds, starting at the top of the minute; every 1-1000 minutes, starting at the top of the hour; daily at a specified time of day; or one-shot at a specified time of year. Pulse duration programmable from 0.01 - 600 seconds, except in one-shot mode, where the output is Low prior to the specified time and High thereafter.

Interface

Operator

Display	2 x 20 character supertwist LCD
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) Battery Charge (green) Battery in Use (green) Battery Low (red)
Keyboard	Eight keys
Setup	Local time offset Output code select: Local/UTC Daylight Saving Time: on/off/automatic Backlight control: on/off/automatic Event input: event/1 PPS, for each input A and B Programmable Pulse setup Antenna delay Clock offset Out of lock time: 1-99 min., Off, or Zero Delay Auto-Survey: On/Off, Survey duration Position Hold: On/Off, Position auto/manual Option Configuration and Setup Recorder output A/B Frequency Reference: standard (internal) or external

Interface (Cont.)

System

RS-232	300-19,200 baud; 7/8 data bits; 1/2 stop bits; even/odd/no parity Has Interrogate (normal) and six Broadcast modes: standard ASCII (IRIG-J), Vorne large-display, status/ alarm, extended ASCII, event data, and ASCII with time-quality Male 9-pin D-sub ; 2nd port available (order # 1088\17A)
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Power Requirements

Standard

Voltage	85-264Vac, 47-440Hz, 20 VA max. or 110-275 Vdc, 15 W max.
Inlet	IEC-320 with fuse and mating cordset. Specify option P1 - P10.

General

Physical

Size	1RU rack mount or tabletop; 260mm deep FMS. Rack mounts included
Weight	2 kg (4.5 lbs.), net 8 kg (17 lbs.), shipping
Antenna	External, 3/4" pipe thread mounting size: 77.3 dia. x 74.6 mm (3.04"x2.94")
Antenna Cable	RG-6 type, 15m (50 ft.) provided weight: 0.69 kg (1.52 lbs.) per 15 m

Environmental

Temperature	Operating: 0° to +50° C (-20° to +70 C° typ.) Non-Operating: -40° to +75° C
Humidity	Non-condensing
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 1088B Options

Options

There are two internal option slots in the Model 1088B and options fit into two categories: those which require internal option slot space, and those which do not. Options without designation may be ordered in any combination except for where noted otherwise; however, only one option may occupy each of Option Slots A and B. Available options are listed below and described in the Options and Accessories section, on page 53.

I/O

Description	Order No.
Four Additional Configurable Outputs	1088\03 ¹
Parallel BCD Output 1ms Resolution	1088\04 ²
Four Additional Outputs and Clock Backup Battery	1088\11 ⁴
Power System Phase, Frequency and Time Monitor	1088\16x ¹
BCD with Second RS-232 Port	1088\17 ²
Second RS-232	1088\17A ²
Self-Monitor IRIG-B Distribution System and Second RS-232 Port	1088\18 ²
Out-of-Lock Relay 1 Form C (SPDT)	1088\19 ²
Four Configurable Fiber-Optic Outputs	1088\20A ³
COMTRADE Sample Rate Generator	1088\23 ³
Extended BCD Output (for Power System Monitor)	1088\24 ²
BCD, Sinewave Outputs, OCXO, Backup Battery, Self Monitor and Redundant Control	1088\25 ⁴
8-Channel High-Drive IRIG-B Output	1088\27 ²

Power (select only one)

Description	Order No.
Terminal Power Strip	1088\07
10-85 Vdc with Terminal Power Strip	1088\08
Clock Battery Backup	1088\10 ⁵
Surge Withstand & Terminal Strip 125/250 Vdc	1088\15x

Available cordset plug style and specifications are described in the *Options/Accessories* section, page 55.

¹ Uses Option Slot A.

² Uses Option Slot B.

³ Uses either Option Slot A or B.

Options (Cont.)

Oscillator and Timing

Description	Order No.
Oven Controlled Crystal Oscillator	1088\12 ¹
OCXO and 4 Additional Configurable Outputs	1088\12A ¹
OCXO, Battery Backup, and 4 Additional Outputs	1088\13 ⁴
High-Performance OCXO, Battery Backup, and Four Additional Outputs	1088\14x ⁴

General

Description	Order No.
LCD Backlight	1088\01
GPS Data Backup Battery	1088\02
Rack Slide Kit	1088\26

Accessories

Included

Description	Order No.
GPS Antenna, pipe mount	AP0004800
15m (50 ft.) Antenna Cable	CA0021315
Rack Mount Kit	AS0028200
Operation Manual	AS0029900
Power Cord	P01-P10

Available

Description	Order No.
30m (100 ft) RG-6 Antenna Cable	CA0021330
45m (150 ft) RG-6 Antenna Cable	CA0021345
60m (200 ft) RG-6 Antenna Cable	CA0021360
75m (250 ft) RG-6 Antenna Cable	CA0021375
GPS Antenna Mounting Kit	AS0044600
21 dB In-Line Preamplifier ⁶	AS0044700
GPS Surge Protector Kit	AS0049000
Grounding Block Kit	AS0048900
1000 ft. Roll RG-11 Cable	WC0004900
RG-6 Crimp Tool	TF0006400
RG-11 Crimp Tool + 25 Connectors	AS0044800

⁴ Uses both Option Slot A and B.

⁵ Can be combined with other Power Options.

⁶ Used for cable length greater than 75m (250 ft.).