

## Model 1093A/B/C GPS Satellite-Controlled Clock



The Arbiter Systems<sup>®</sup>, Inc. Model 1093A/B/C GPS Satellite-Controlled Clock is a GPS timing source for applications not requiring the ultimate 100 ns accuracy of our higher-performance models. The Model 1093A/B/C has 500 ns worst-case accuracy to meet the requirements of a broad range of applications. The Model 1093A has two LEDs to monitor operating status. The Model 1093B adds an LCD setup/status display and a keyboard. The Model 1093C also includes a large (20 mm or 0.8 in.) LED time display. In all versions, twelve receiver channels provide optimum performance.

Two pluggable terminal strip outputs provide unmodulated IRIG-B and 1 PPS. A modulated IRIG-B output (1093opt92) is available on a third pluggable terminal strip output. These outputs have substantial drive capability to easily drive multiple loads in parallel. These outputs are configurable to provide other output signals or an event-capture input.

The GPS Data Backup Battery is now included in the Model 1093A/B/C. This feature improves acquisition time to as little as 15 seconds after a brief power loss by supplying constant power to the real-time clock and RAM in the GPS receiver module.

Other available options include Four Additional

Configurable Outputs (1093opt03); High Drive IRIG-B Outputs (1093opt27); Power System Time, Frequency, and Phase Monitor (1093opt28); one Form C (SPDT) fail-safe, LOCKED relay (1093opt93) that is compatible with 129 Vdc digital fault recorder inputs; plus many more.

An event-capture input is standard, and may be wired to one of the output connectors or used for synchronizing data collection on an external computer via the serial port. This input has 1  $\mu$ s resolution. A programmable-pulse output may be used to generate an output pulse at the IRIG-B unmodulated or the 1 PPS outputs in addition to the AUX OUT on the RS-232 Port.

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

Also available, the Model 1092A/B/C GPS Satellite-Controlled Clock provides the same performance and functionality as the Model 1093A/B/C, but has a small, tabletop chassis and an external (wall-mount) power supply.

## Model 1093A/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  $\pm 500$  ns peak;  $< \pm 100$  ns typical (SA off)

#### Position Accuracy

10 meters, rms, 90% confidence

#### Satellite Tracking

Twelve (12) channel, 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

150 seconds typical, cold start

15 minutes, 90% confidence, cold start

40 seconds, typical, with almanac  $< 1$  month old

15 seconds, typical, with ephemeris  $< 4$  hours old

The GPS Data Backup Battery is included in the Model 1093A/B/C. This feature improves acquisition time by supplying constant power to the real-time clock and RAM in the GPS receiver module.

#### Connectors

Two standard; one IRIG-B Unmodulated and one 1 PPS; bus driver, 5 V CMOS; 10 ohms source impedance;  $\pm 75$  mA drive capability; pluggable terminal strip. 400 V, 220 mA, 1 watt power dissipation open-drain FET drivers can also be fitted; contact factory

### I/O Configuration



*Optional equipment may be shown*

#### Event A Input

One event timer channel with 1  $\mu$ s resolution is standard. This function may be driven by the start bit of a received character on the serial port, or (by internal connection) an external 5 V CMOS/TTL signal at one of the terminal strip connectors.

#### Programmable Pulse Output

One programmable output pulse (by a jumper connection) that may be output on a terminal strip connector or the AUX OUT pin on either RS-232 Port.

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.

#### I/O Options

IRIG-B Modulated (1093opt92): bus driver, 4 Vpp, 20 ohms source impedance; drives a 50-ohm load at 3 Vpp; pluggable terminal strip

Second RS-232 Port (1093opt19): In normal mode, provides all the same capabilities as the standard RS-232C serial port except there is *no* AUX IN line. AUX OUT provides programmable pulse function at RS-232 levels.

Relay contacts (1093opt93): 1 set, Form C (SPDT) fail-safe, 0.3 A at 130 Vdc; Locked function.

## Model 1093A/B/C Specifications

### Interface

#### Operator

Display	Status LEDs (Models 1093A/B/C) 2 x 20 character supertwist LCD (Models 1093B/C) 14 mm (0.56 in.) LED; 9 digits (Model 1093C)
Functions	UTC or local Time Position: latitude, longitude, altitude Receiver and clock status 1 PPS (input) deviation Event time
Status LEDs	Operate (green) Unlocked (red)
Keypad	8 keys; select display functions or setup menus (1093B/C)
Setup	Local time offset Output code select: Local/UTC Daylight Saving Time (Set Summer Time): Off/On/Auto USA/Auto EUR/Auto CUS Backlight control: On/Off/Auto Event input: Event/1 PPS Programmable Pulse setup Antenna delay 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 19200 baud; 7 or 8 data bits; 1 or 2 stop bits; even/odd/no parity Male 9-pin D-subminiature (TXD, RXD, AUX IN, AUX OUT) 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 AUX OUT can provide programmable pulse function at RS-232 levels RS-422/485 driver also available; contact factory Second RS-232 port available (1093opt19)
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### Power Requirements

#### Standard

Voltage	85 to 264 Vac, 47 to 440 Hz, 20 VA max. or 110 to 350 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 1093A/B/C Specifications

### Options

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

<u>Option Description</u>	<u>Order No.</u>
<b>I/O Options</b>	
Four Additional Configurable Outputs	1093opt03 <sup>1</sup>
Second RS-232 Port	1093opt19 <sup>3</sup>
Four Configurable Fiber-Optic Outputs	1093opt20A
Eight-Channel High-Drive IRIG-B Output	1093opt27 <sup>1</sup>
Power System Time, Frequency and Phase Monitor	1093opt28
Four Additional Outputs with Dry Contact and +25/50 Vdc	1093opt29
Internal Network Time Protocol (NTP) Server	1093opt32
Dual Port Internal Network Time Protocol (NTP) Server	1093opt33
IRIG-B Modulated Output	1093opt92 <sup>3</sup>
Out-of-Lock Relay	1093opt93 <sup>3</sup>
RS-422/485 Driver	1093opt94 <sup>3</sup>
Four BNC Output Connectors (Parallel to Pluggable Terminal Strip)	1093opt95 <sup>3</sup>
1 PPS Output Reconfigured to Programmable Pulse	1093opt96 <sup>3</sup>
IRIG-B Output Reconfigured to Programmable Pulse	1093opt97 <sup>3</sup>
1 PPS Output Reconfigured to Event Input	1093opt98 <sup>3</sup>
<b>Power Options (select only one)</b>	
IEC-320 Power Inlet, 85 to 264 Vac, 110 to 370 Vdc	1093opt07
Terminal Power Strip, Surge Withstand, 10 to 60 Vdc	1093opt08
Terminal Power Strip, Surge Withstand, 85 to 250 Vac, 110 to 350 Vdc	1093opt10
<b>General Options</b>	
LCD Backlight	1093Bopt01 1093Copt01
On/Off Switch	1093Aopt04 1093Bopt04

### 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	AS0035400
Power Cord (see page 35)	P01-P10

#### Available

<u>Description</u>	<u>Order No.</u>
GPS Antenna Mounting Kit	AS0044600
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
21 dB In-Line Preamp	AS0044700 <sup>2</sup>
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

<sup>1</sup> Modulated outputs also require Option 92

<sup>2</sup> Used for cable length greater than 75 m (250 ft)

<sup>3</sup> May be combined with other I/O options