

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



The Arbiter Systems®, Inc. Model 1093B/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 1093B/C has 500 ns worst-case accuracy to meet the requirements of a broad range of applications. The Model 1093B has two LEDs to monitor operating status and 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 1093B/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.

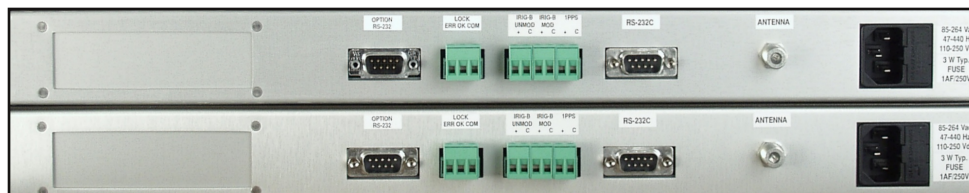
Other available options include Four Additional Configurable Outputs (1093opt03); High Drive IRIG-B Outputs (1093opt27); Power System Time, Frequency, and Phase Monitor (1093opt28); one Form C (SPDT) fail-safe, LOCKED relay (1093opt93) that is compatible with 129 Vdc digital fault recorder inputs; plus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

Power options include 85 Vac to 264 Vac or 110 Vdc to 370 Vdc with an IEC-320 detachable cordset, 85 Vac to 250 Vac or 110 Vdc to 350 Vdc terminal strip inlet with surge withstand, or 10 Vdc 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.

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

## Model 1093B/C Specifications



*Optional equipment may be shown*

### 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 1093B/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

#### 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 s to 60,000 s, 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 seconds 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 1093B/C Specifications

### Interface

#### Operator

Display	Status LEDs (Models 1093B/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
Setup	Local time offset Output code select: Local/UTC Daylight Saving Time: Off/On/Auto Backlight control: On/Off/Auto Event input: Event/1 PPS Programmable Pulse Antenna delay Out-of-Lock time: 1 min. to 99 minutes, Off, or Zero Delay Auto-Survey: On/Off, Survey duration Position Hold: On/Off, Position Auto/ Manual Option Configuration Serial port: RS-232

#### System

RS-232	1200 baud 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 (Option 07)

Voltage	85 Vac to 264 Vac, 47 Hz to 440 Hz, 20 VA max. or 110 Vdc to 370 Vdc, 15 W max.
Inlet	IEC-320 with fuse and mating cordset. Specify cordset P01 - P10

### General

#### Physical

Size	1 RU rack mount or tabletop; 260 mm deep FMS. Rack mounts included. 635 mm x 381 mm x 229 mm (25 in x 15 in x 9 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 80 mm hex (across flats) x 84 mm (3.2 in dia. x 3.3 in) 170 g (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 °C to + 50 °C (- 20 °C to + 70 °C typical) Nonoperating: - 40 °C 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 1093B/C Specifications

### Options

Except as noted otherwise, only one I/O Option may be installed.

<u>Option Description</u>	<u>Order No.</u>
<b>I/O Options</b>	
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
Network Time Protocol (NTP) / Precision Time Protocol (PTP) Server	1093opt34
Four Configurable Outputs	1093opt36 <sup>1</sup>
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
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>

### Power Options (select only one)

IEC-320 Power Inlet, 85 Vac to 264 Vac, 110 Vdc to 370 Vdc	1093opt07
Terminal Power Strip, Surge Withstand, 10 Vdc to 60 Vdc	1093opt08
Terminal Power Strip, Surge Withstand, 85 Vac to 250 Vac, 110 Vdc to 350 Vdc	1093opt10

### General Options

LCD Backlight	1093Bopt01 1093Copt01
On/Off Switch	1093Bopt04

### Accessories

#### Included

<u>Description</u>	<u>Order No.</u>
GPS Antenna, pipe mountable	AS0087800
15 m (50 ft) RG-6 Antenna Cable	CA0021315
19 in Rack Mount Kit	AS0028200
Quick Setup Guide	PD0057200
Power Cord (with Option 07)	P09

#### Available

<u>Description</u>	<u>Order No.</u>
Power Cord	P01-P10
Operation Manual	AS0035400
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 Preamplifier	AS0044700 <sup>2</sup>
Antenna Grounding Block Kit	AS0048900
GPS Surge Protector	AS0094500
GPS Antenna Cable Splitter	AP0013400
BNC (Male) Breakout to 100 mm Wires	AP0003400
BNC (Female) Breakout to 100 mm Wires	AP0008900
BNC (Female) Breakout to Screw Terminal	AP0014900
BNC (Male) Breakout to Screw Terminal	AP0015000
300 m (1000 ft) Roll RG-6 Cable	WC0005000
RG-6 Stripping Tool	TF0013200
RG-6 Type F Crimp Tool	TF0006400
RG-6 Type F Male Crimp-on Connector	CN0027700
300 m (1000 ft) Roll RG-11 Cable	WC0004900
RG-11 Stripping Tool	TF0013300
RG-11 Type F Crimp Tool	TF0006000
RG-11 Type F Male Crimp-on Connector	CN0027800
19 in Rack Slide Kit	AS0033100
24 in Rack Mount Kit	AS0056600

<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

## Model 1093B/C Specifications

### Cordset and Plug Styles

The following are the available IEC-320 mating cordset plug style and specifications:

<u>No.</u>	<u>Country</u>	<u>Specification</u>	<u>Rating</u>
P01	Continental Europe	CEE 7/7	220V
P02	Australia/NZ/PRC	AS 3112-1981	240V
P03	U.K.	BS 1363	240V
P04	Denmark	Afsnit 107-2-01	240V
P05	India	BS 546	220V
P06	Israel	SI 32	220V
P07	Italy	CEI 23-16/VII 1971	220V
P08	Switzerland	SEV 1011.1959	220V
P09	North America and ROC	NEMA 5-15P CSA C22.2 #42	120V
P10	Japan	JIS8303	120V