

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



The Arbiter Systems[®], 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 µs resolution. A programmablepulse 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.



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 ±500 ns peak; < ±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

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Connectors

Two standard; one IRIG-B Unmodulated and one 1 PPS; bus driver, 5 V CMOS; 10 ohms source impedance; ±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

| • | 0 | EN OF COM | 85200C | ANTONA CO | 85-564 Vic 12-443 RF 15-220 Vic 15-220 Vic 19-220 Vic 19-20 Vic 19 |
|---|---|-----------|---------|--------------|--|
| 0 | 0 | | 85-232 | ANTENNA | 65-264 Not 47-420 Ht 3 W 75p- 1465 St 147 (2017) |
| | | | R5-222C | ANTERNA | 85-294 NHC 47-440 HC 100-250 NHC 100-250 N |

Optional equipment may be shown

Event A Input

One event timer channel with 1 μ 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.



Operator Display Status LEDs (Models 1093A/B/C) 2 x 20 character supertwist LCD (Models 1093B/C)

Interface

| | (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 | 1200 to 10200 baud: 7 or 8 data bite: |
| NO-202 | 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)

Power Requirements Standard Voltage 85 to 264 Vac, 47 to 440 Hz, 20 VA max. or 110 to 350 Vdc, 15 W maximum IEC-320 with fuse and mating Inlet cordset. Specify cordset P01-P10 General Physical Size 1 RU rack mount or tabletop; 260 mm deep FMS. Rack mounts included. 508 x 381x 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



Options

| Except as noted otherwise, only one I/O be installed. | Option may |
|---|--------------------------|
| Option Description | Order No. |
| I/O Options | |
| Four Additional Configurable Outputs | 1093opt031 |
| Second RS-232 Port | 1093opt193 |
| Four Configurable Fiber-Optic Outputs | 1093opt20A |
| Eight-Channel High-Drive IRIG-B Output | 1093opt271 |
| 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 |
| IRIG-B Modulated Output | 1093opt923 |
| Out-of-Lock Relay | 1093opt93 ³ |
| RS-422/485 Driver | 1093opt943 |
| Four BNC Output Connectors (Parallel to Pluggable Terminal Strip) | 1093opt95 |
| 1 PPS Output Reconfigured to Programmable Pulse | 1093opt963 |
| IRIG-B Output Reconfigured to Programmable Pulse | 1093opt973 |
| Event Input | 1093opt983 |
| Power Options (select only one) | |
| 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 |
| General Options | |
| LCD Backlight | 1093Bopt01 1093Copt01 |
| On/Off Switch | 1093Aopt04 1093Bopt04 |

Accessories

| Included | |
|---------------------------------------|------------------------|
| Description | Order No. |
| GPS Antenna, pipe mountable | AS0087800 |
| 15 m (50 ft) RG-6 Antenna Cable | CA0021315 |
| 19 in. Rack Mount Kit | AS0028200 |
| Operation Manual | AS0035400 |
| Power Cord | P09 |
| Available | |
| Description | <u>Order No.</u> |
| Power Cord | P01-P10 |
| 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 ² |
| 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 |
| 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 |

¹ Modulated outputs also require Option 92

² Used for cable length greater than 75 m (250 ft)

³ May be combined with other I/O options



Cordset and Plug Styles

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

| Option | | | Voltage |
|--------|--------------------|----------------------|---------|
| No. | <u>Country</u> | Specification | Rating |
| P01 | Continental Europe | CEE 7/7 | 220V |
| P02 | Australia/NZ/ | AS 3112- | |
| | PRC | 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 | NEMA 5-15P | |
| | and ROC | CSA C22.2 #42 | 120V |
| P10 | Japan | JIS8303 | 120V |