Model 1094B
GPS Substation Clock

Specifications subject to change without notice

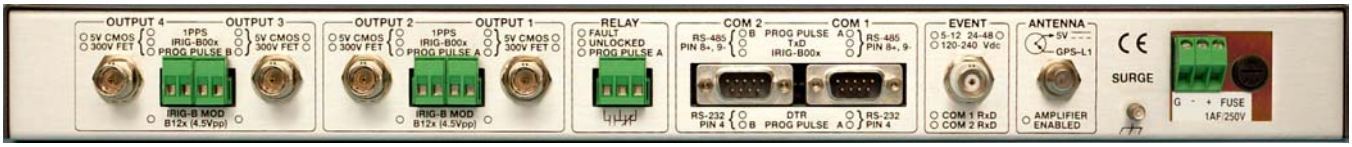
The Arbiter Systems®, Inc. Model 1094B GPS Substation Clock is a GPS timing source for substations which includes as standard the most common configuration options found in our other models. The Model 1094B with 400 ns (typical < 100 ns) worst-case accuracy meets the most demanding substation requirements, including synchrophasors. The Model 1094B has 4 LEDs to monitor operating status, a 2 x 20 character LCD setup/status display and a keyboard. The Model 1094B also comes equipped with a front panel screwdriver-slot power switch and white LED backlight.

The four outputs, with both BNC and 5 mm pluggable terminal strip connectors connected in parallel, are configurable to high-drive 5 Vdc (250 mA at > 4 V); IRIG-B12x modulated; or 300 volt open drain MOSFET signals. The high-drive 5 Vdc signal and the MOSFET outputs are selectable to: IRIG-B00x level-shift, 1 PPS, or programmable pulse A or B functions. All of the outputs have substantial drive capability to easily drive multiple loads in parallel.

Standard features include a GPS Data Backup Battery, one Form C fail-safe relay and Event Capture capability. The GPS Data Backup Battery maintains the real-time clock, almanac and ephemeris data in the 12-channel GPS receiver to speed acquisition. Satellites are acquired in as little as 15 seconds after a brief power loss. One Form C (SPDT) fail-safe, relay is jumper selectable to Fault, Unlocked or Programmable Pulse functions and is compatible with 129 Vdc digital fault recorder inputs. The Event Capture records events triggered from the dedicated, optically isolated rear panel input or from either serial port receive line with 100 ns resolution.

Power options include 85 to 264 Vac/110 to 275 Vdc, with either IEC-320 detachable line cord set 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.

Model 1094B Specifications



Receiver Characteristics

Timing Accuracy

Specifications apply at the 1 PPS output, with US Department of Defense Selective Availability (SA) as of date of publication.

UTC/USNO ±400 ns peak; < ±100 ns typical (SA off)

Position Accuracy

10 meters, rms, 90% confidence

Satellite Tracking

12 channel, C/A code (1575.42 MHz). Receiver simultaneously tracks up to twelve satellites.

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

I/O Configuration

Outputs

Four, each with BNC and 5 mm pluggable terminal strip in parallel. Jumper selectable to high-drive 5 Vdc (250 mA at > 4 V) selectable to: IRIG-B00x level-shift, 1 PPS, or Programmable Pulse A or B; IRIG-B12x modulated; or 300 volt MOSFET output. The MOSFET output is selectable to the same functions as the high drive 5 Vdc output. The MOSFET output is not electrically isolated from instrument common.

Event Input

One opto-isolated event capture input with 100 ns resolution, BNC connector jumper-configurable to 5 to 12, 24 to 48 and 120 to 240 Vdc nominal input. Event input is also jumper-configurable to COM 1 and COM 2 RXD line.

Programmable Pulse Output

Two programmable pulse outputs, PPA and PPB. PPA is available (by a jumper connection) on outputs 1, 2 and COM 1 pin 4 (RS-232) and pins 8 & 9 (RS-485). PPB is available (by a jumper connection) on outputs 3, 4 and COM 2 pin 4 (RS-232) and pins 8 & 9 (RS-485).

Six 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
- 1 to 1000 PPS squarewave (PPB only)
- Aux IRIG Mode (PPB only)

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.

Relay Contact

One, Form C (SPDT) fail-safe, 0.3 A at 130 Vdc; jumper selectable to Fault, Unlocked, or Programmable Pulse A (PPA) functions. Fail-safe means the relay indicates 'fault' or 'unlocked' condition with power off.

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Model 1094B Specifications

Interface

Operator

Display	2 x 20 character supertwist LCD White LED backlight
Functions	Time: UTC or local Position: latitude, longitude, elevation Clock status 1 PPS (input) deviation Event time
Status LEDs	Operate (green) Stabilized (green) Unlocked (red) Fault (red)
Keyboard	Eight keys
Setup	Local time offset IRIG Setup: Local/UTC/1344 Daylight Saving Time: On/Off/Auto Backlight control: On/Off/Auto Event input: Event/1 PPS deviation Programmable Pulse setup Antenna Cable delay Out-of-lock time: 1 to 99 minute(s), Off, or Zero Delay Auto-Survey 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 Male 9-pin D-subminiature (TXD, RXD, AUX IN, AUX OUT) 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)
RS-422/485	Transmit only, to drive multiple devices

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

General

Physical

Size	1 RU rack mount or tabletop; 260 mm deep FMS. Rack mounts included.
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 +85° 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 1094B Specifications

Options

The available power options are listed below and are described in the Options and Accessories section, see our Product Catalog.

Option Description	Order No.
Power Options (select only one)	
IEC-320 Power Inlet, 85 to 264 Vac, 110 to 275 Vdc	1094opt07
10 to 60 Vdc Terminal Power Strip, Surge Withstand	1094opt08
110 to 275 Vdc Terminal Power Strip, Surge Withstand	1094opt10

Accessories

Included

Description	Order No.
GPS Antenna, pipe mountable	AS0076200
15 m (50 ft) Antenna Cable	CA0021315
Rack Mount Kit	AS0028200
Operation Manual	AS0083400
Power Cord	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 Kit	AS0044600
21 dB In-Line Preamplifier[1]	AS0044700
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] For use with cable lengths greater than 75 m (250 ft)

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