

## Model 1094B GPS Substation Clock



*Specifications subject to change without notice*

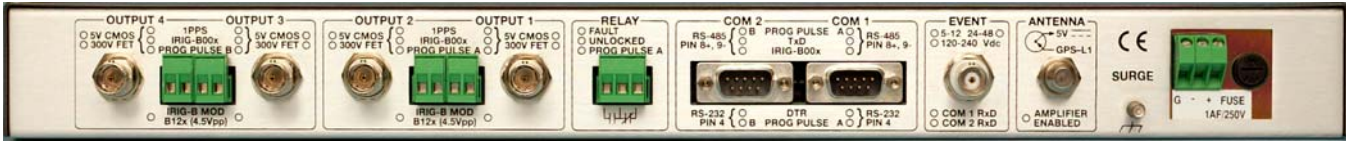
The Arbiter Systems®, Inc. Model 1094B GPS Substation Clock is a GPS timing source for substations which includes as standard the most common configuration options found in our other models. The Model 1094B with 250 ns (typical < 100 ns) worst-case accuracy meets the most demanding substation requirements, 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, two serial communication ports 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. Two RS-232 and RS-422/485 (transmit only) ports are available via two 9-pin D-subminiature connectors. 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  $\pm 250$  ns peak;  $< \pm 100$  ns typical (SA off)

#### Position Accuracy

10 meters, rms, 90% confidence

#### Satellite Tracking

Twelve (12) channel, GPS-L1, 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.

## Model 1094B Specifications

### Interface

#### Operator

|             |  |
|-------------|--|
| Display     | 2 x 20 character supertwist LCD<br>White LED backlight   |
| Functions   | Time: UTC or local<br>Position: latitude, longitude, elevation<br>Clock status<br>1 PPS (input) deviation<br>Event time  |
| Status LEDs | Operate (green)<br>Stabilized (green)<br>Unlocked (red)<br>Fault (red)   |
| Keyboard    | Eight keys   |
| Setup       | Local time offset<br>IRIG Setup: Local/UTC/1344<br>Daylight Saving Time:<br>On/Off/Auto<br>Backlight control: On/Off/Auto<br>Event input: Event/1 PPS deviation<br>Programmable Pulse setup<br>Antenna Cable delay<br>Out-of-lock time: 1 to 99 minute(s),<br>Off, or Zero Delay<br>Auto-Survey<br>Serial port: RS-232 |

#### System

|            |   |
|------------|---|
| RS-232     | 1200 to 38,400 baud; 7 or 8 data bits;<br>1 or 2 stop bits; even/odd/no parity<br>2 Male 9-pin D-sub, Com 1 and Com 2<br>(TXD, RXD, AUX IN, AUX OUT)<br>Broadcast modes include ASCII,<br>Extended ASCII, ASCII with Time<br>Quality, and Vorne (output once<br>every second), Status (output on<br>change of Status) and Event (output<br>on an Event) |
| RS-422/485 | Transmit only, to drive multiple<br>devices. Two outputs. Uses extra pins<br>on Com 1 and Com 2.  |

### Power Requirements

#### Standard

|         |  |
|---------|--|
| Voltage | 85 to 264 Vac, 47 to 440 Hz, 20 VA max.<br>or 110 to 350 Vdc, 15 W maximum |
| Inlet   | IEC-320 with fuse and mating<br>cordset. Specify cordset P01-P10           |

### General

#### Physical

|               |   |
|---------------|---|
| Size          | 1 RU rack mount or tabletop; 260 mm<br>deep FMS. Rack mounts included.  |
| Weight        | 2 kg (4.5 lbs), net<br>5.5 kg (12 lbs), shipping  |
| Antenna       | 0.75 in. pipe (1 in. - 14 marine) thread<br>Cable Connection: F-type<br>Size: 77.5 dia. x 66.2 mm (3.05 x 2.61 in.)<br>Weight: 170 grams (6.0 oz) |
| Antenna Cable | RG-6 type, 15 m (50 ft) provided<br>Weight: 0.69 kg (1.52 lbs) per 15 m   |

#### Environmental

|             |   |
|-------------|---|
| Temperature | Operating: 0° to +50° C<br>(-20° to +70° C typical)<br>Nonoperating: -40° to +85° C   |
| Humidity    | Noncondensing   |
| EMC         | Radiated susceptibility: passes<br>walkie-talkie test<br>Conducted emissions: power supply<br>complies with FCC 20780, Class A<br>and VDE 0871/6.78 Class A<br>Surge withstand capability (SWC),<br>power inlet: designed to meet<br>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.

| <u>Option Description</u>   | <u>Order No.</u> |
|---|------------------|
| <b>Power Options (select only one)</b>                                  |                  |
| IEC-320 Power Inlet,<br>85 to 264 Vac, 110 to 350 Vdc                   | 1094opt07        |
| Terminal Power Strip, Surge Withstand,<br>10 to 60 Vdc                  | 1094opt08        |
| Terminal Power Strip, Surge Withstand,<br>85 to 264 Vac, 110 to 350 Vdc | 1094opt10        |

### Accessories

#### Included

| <u>Description</u>          | <u>Order No.</u> |
|-----------------------------|------------------|
| GPS Antenna, pipe mountable | AS0087800        |
| 15 m (50 ft) Antenna Cable  | CA0021315        |
| Rack Mount Kit              | AS0028200        |
| Operation Manual            | AS0083400        |
| Power Cord                  | P01-P10          |

#### Available

| <u>Description</u>  | <u>Order No.</u> |
|---|------------------|
| 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 Preamp <sup>1</sup>                         | 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<br>and Mounting Adapter Kit | AS0062000        |
| Rack Slide Kit  | AS0033100        |

<sup>1</sup> For use with cable lengths greater than 75 m (250 ft)