

Timing and Frequency Products Options and Accessories

The following are descriptions of the options and accessories available for the Arbiter Systems®, Inc. line of Timing and Frequency products. The available options and accessories are divided into functional groups for convenience. The functional groups are as follows:

- I/O
- Power
- General
- Oscillators
- Antenna System Accessories

Special options or requirements can be accommodated; contact the factory for details and pricing. See the Option Selection Guide on page 32 or individual data sheets for ordering information. When an option number is known, place the model number and 'opt' before the option number to obtain the order number, e.g. 1088opt03.

I/O

Four Additional Configurable Outputs

Adds four more individually-buffered BNC outputs, jumper-selectable to any signal available on the clock Main Board. These connectors have no input function. *Available on the Models 1084, 1088, and 1093.*

Power System Time, Frequency & Phase Monitor

Accepts either a 60 Hz or 50 Hz, 30 to 300 Vrms signal, and measures the instantaneous phase and frequency of the fundamental component. Measurement results may be displayed or output via RS-232. More information is provided in a separate listing. *Available on the Models 1084, 1088, and 1093.*

Parallel BCD Output, 1 ms Resolution

Provides a 50-pin ribbon connector with 42 data lines representing BCD time from day of year through milliseconds. Also provides 1 ms and 1 second output sync (strobe) pulses. Outputs are 5 V CMOS buffer outputs (74HC541 or equivalent type). Two configurable outputs, individually-buffered and selectable, are included and may be routed to two of the extra pins on the connector. This option may also be used to output up to 48 lines of parallel digital data for special configurations; contact factory. *Available on the Models 1084 and 1088.*

I/O (Continued)

BCD Output with Second RS-232 Port

Adds an RS-232 channel to the 'Parallel BCD Output'. The RS-232 data signals are connected to pins on the 50-pin ribbon connector. *Available on the Models 1084 and 1088.*

Second RS-232 Port

Adds a second RS-232 channel with a 9-pin male D-subminiature connector. Only transmit, receive and ground are connected on this port unless stated otherwise in the data sheet. *Available on the Models 1084, 1088, 1092 and 1093.*

Out-of-Lock Relay 1 Form C SPDT

Adds a relay (Form C) and 3-pole terminal strip on the rear panel. This relay is energized when the clock is locked to the GPS system. The relay is in the Alarm state when not locked to GPS or power is off. Contact rating is 130 Vrms/dc at 0.3 A. *Available on the Models 1088, 1092, and 1093.*

COMTRADE Sample Rate Generator

Provides a GPS-synchronized sampling signal at rates of 200 PPS to 192,000 PPS, as defined in IEEE Standard C37.111-1991. Provides signals in normal and complemented polarity. This option has four configurable BNC outputs which (if not used for sampling signals) may be configured as described under 'Four Additional Configurable Outputs'. *Available on the Models 1084 and 1088.*

Internal Network Time Protocol (NTP) / Precision Time Protocol (PTP) Server

Provides a GPS-synchronized time synchronization using Network Time Protocol (NTP) and Precision Time Protocol (PTP) over two Ethernet interfaces (10/100Base-T or Fiber). NTP supports versions 1, 2, 3, and 4 while optionally supporting authentication via DES and MD5 cryptographic checksums as defined in RFCs 5905. Typical accuracy for NTP is one millisecond on a LAN to a few tens of milliseconds on a WAN. Accuracy varies depending upon network traffic. PTP supports the IEEE 1588-2008 protocol and functions as a grandmaster clock. Typical accuracy using software is better than 100 microseconds and using hardware assist is better than one microsecond. *Available on the Models 1084, 1088 and 1093.*

Options and Accessories

I/O (Continued)

Self-Monitor, IRIG-B Distribution System & Redundant Control/Second RS-232 Port

Provides a separate IRIG-B distribution bus with self-monitoring capabilities. Designed primarily for power substations or wherever unattended operation with timecode distribution in the presence of high noise levels is needed. In addition, a redundant timing system may be built using the Redundant Clock Control/Second RS-232 Interface. More information is provided in a separate listing. *Available on the Model 1088.*

8-Channel High-Drive IRIG-B Output

Adds eight independent, buffered outputs, each capable of driving multiple loads. Outputs are short-circuit and surge protected as well as individually configurable for either modulated or unmodulated IRIG-B signals. Output connector is a 16-position pluggable 5 mm (Phoenix-type) terminal strip. Signal levels for each output channel are (modulated) 4.5 Vpp with 20 ohm source impedance; will drive a 50 ohm load at 3 Vpp minimum; and (unmodulated) +5 V open-circuit; +4 V minimum at 250 mA load current; will drive 25 Schweitzer SEL-3xx (in parallel) or 50 SEL-2xx (in series/parallel) relays per channel at 10 mA per relay. This option requires the desired output signal to be available in the clock in which it is installed. *Available on the Models 1084, 1088, and 1093.*

IRIG-B Modulated Output

Adds a Modulated Inter-Range Instrumentation Group Format B (IRIG-B) distribution bus providing a low impedance, fault-protected output (4 Vpp, 20 ohm source impedance). *Available on the Models 1092 and 1093.*

Four Additional Outputs with Dry Contact and +25/50 Vdc

Adds four standard, 5 V CMOS outputs and two Aromat AQV210E solid-state relays. A +25 or +50 Vdc supply is on-board and may be switched by the solid state relay outputs. *Available on the Models 1084, 1088 and 1093.*

Additional Sine Wave Output

Adds an additional 1 MHz, 5 MHz or 10 MHz sine wave output with a BNC connector, up to a maximum of 8 total outputs. *Available on the Model 1083B.*

I/O (Continued)

Fiber-Optic Output, Type ST 820 nm

Provides a selectable fiber-optic output with Type ST connector and 820 nm transmitter compatible with multimode fiber. Optical power output is -15 dBm minimum (-12 dBm typical) into 62.5/125 μ m fiber. The transmitter is also usable with 50/125 μ m, 100/140 μ m, and 200 μ m PCS fiber. Jumper selectable for 1 PPS, IRIG-B unmodulated or IRIG-B modified Manchester signals. Transmitter bandwidth is compatible with all available logic signals. The optical signal is ON whenever the selected logic signal is HIGH. The signal may be converted back to electrical format using the Model 10881A Fiber-Optic to Logic converter, available separately. *Available on the Model 1084.*

Four Configurable Fiber-Optic Outputs

Provides four, individually-selectable fiber-optic outputs with Type ST connectors and 820 nm transmitters compatible with multimode fiber (typically 62.5/125 μ m). These outputs are jumper-configurable to each of the digital (CMOS) signals listed under 'Output Functions' for the applicable clock. Analog (IRIG-B modulated and \pm 5 V recorder) signals are not available.

Provides an optical power output of -15 dBm minimum, -12 dBm typical, into 62.5/125 μ m fiber. Using this 62.5/125 μ m fiber and the Model 10881A Fiber-Optic to Logic Adapter, the optical power budget is 8.0 dB minimum, 15.0 dB typical. This power capacity allows fiber link lengths of 2.3 km (7500 ft) worst-case, 5 km (3 miles) typical, with fiber having attenuation of 3.5 dB/km maximum, 2.8 dB/km typical. The optical signal is ON whenever the selected logic signal is HIGH. Transmitter bandwidth is compatible with all available logic signals; the Model 10881A Fiber-Optic to Logic Adapter is compatible with all available logic signals up to 5 Mpps. See Application Note 101 for information about timing distribution systems. *Available on the Models 1084, 1088, and 1093.*

Frequency / Time Interval Measurement

Adds the capability to measure frequency and time intervals via one 50 ohm or hi-impedance input. Measurements include Allan variance for 1 MHz, 5 MHz, and 10 MHz inputs and deviation for 1 pulse-per-second (1 PPS), 1 MHz, 5 MHz, and 10 MHz inputs. *Available on the Model 1083B.*

Options and Accessories

Power

Terminal Power Strip

This option replaces the standard IEC-320 power inlet with a three-pole barrier strip connector and separate fuse holder. This option is intended for dc applications which require screw-type connections. *Available on the Model 1088.*

Surge Withstand and Terminal Strip

Adds an input network consisting of metal-oxide varistors and a low-pass filter, designed to meet the requirements of specifications such as IEEE/ANSI C37.90-1 and IEC 801.4, which require the clock to withstand short-duration impulses of several kV at the power inlet. Specified for operation from 110 to 170 Vdc (1088opt15A) or 110 to 300 Vdc (1088opt15B), and includes a 3-terminal barrier strip power inlet. Operation from nominal 100 and 120 Vac lines is possible (up to 240 Vac), but leakage currents exceed some international safety specifications. *Available on the Model 1088.*

IEC-320 Power Inlet, 85 to 264 Vac, 110 to 370 Vdc

Provides an ac/dc power module which includes an IEC-320 type inlet and mating cordset. Input voltages are: 85 to 264 Vac, 47 to 440 Hz or 110 to 370 Vdc, 3 VA typical. Various plug styles are available as Options P01 through P10, see 'Cordset and Plug Styles' below. *Available on the Models 1083, 1084, 1088, and 1093.*

Cordset and Plug Styles

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

Option No.	Country	Specification	Voltage Rating
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

For wall mount transformers, append a 'W' to the Option number (e.g. P01W). Call factory for availability.

Power (Continued)

10 to 60 Vdc Power With Terminal Power Strip

Replaces the standard power supply with one accepting 10 to 60 Vdc. Replaces standard IEC-320 inlet with a dc terminal barrier strip. Operates from common low-voltage battery systems, including 12, 24, and 48 Vdc. *Available on the Model 1088.*

10 to 60 Vdc Power With Terminal Power Strip and Surge Withstand

Replaces the standard power supply with one accepting 10 to 60 Vdc, 3 VA typical. Replaces standard IEC-320 inlet with a 3-pole terminal strip. Provides input surge protection (SWC) for compliance with ANSI C37.90-1 and IEC 801-4. Operates from common low-voltage battery systems, including 12, 24, and 48 Vdc. *Available on the Models 1084, and 1093.*

110 to 350 Vdc Terminal Power Strip, Surge Withstand

Replaces the standard IEC-320 inlet with a 3-pole terminal strip and provides input surge protection for compliance with ANSI C37.90-1 and IEC 801-4. Input voltages are: 85 to 264 Vac, 47 to 440 Hz, or 110 to 350 Vdc, 3 VA typical. *Available on the Models 1084, and 1093.*

General

LCD Backlight

Operation is controlled from the keyboard, and may be continuous ON, OFF, or automatic: on for 30 seconds after any key is pressed. Backlight life - 2000 hours, continuous operation. *Available on the Models 1084B/C, 1088B, 1092B and 1093B/C.*

On/Off Switch

Provides for a front panel On/Off Line switch. *Available on the Models 1084A/B, and 1093A/B.*

Rack Slide Kit

Rack slides and custom mounts for a standard 19 in. EIA relay rack. Includes thumbscrews to lock unit in place. Rack slides are detachable; unit may be removed from the rack without special tools. *Available on the Models 1083, 1084, 1088, and 1093.*

Options and Accessories

Oscillators

Oven-Controlled Crystal Oscillator & 4 Additional Outputs

Adds a medium-performance ovenized backup oscillator (OCXO) and four additional jumper-configurable outputs. Maintains frequency within 1×10^{-7} , maximum, for a maximum drift rate of 8.6 ms/day. Typically maintains frequency within 1×10^{-8} and time within 500 microseconds for a period of 24 hours in a constant environment. *Available on the Model 1088.*

Antenna System Accessories

For use with all GPS Instruments

High Interference GPS Antenna and Mounting Adapter Kit

Designed for locations where other RF or microwave signals interfere with the tracking of satellites when using the standard antenna. The kit includes a mounting adapter that converts the marine thread of the antenna to a setscrew design, a short cable that converts the TNC connector of the antenna to a male F-type connector, and a barrel connector to convert the male F-type connector to a female F-type connector.

GPS Surge Protector Kit

Designed for GPS Protection against lightning and other surges. Multistage circuitry with a heavy-duty gas discharge tube, toroidal inductor, MOV, and capacitors provides less than 1 nanosecond response time and power handling capacity of 20,000 amps (8/20 μ s). Passes dc power to the antenna and preamplifier. Connections are two female F-type connectors. Includes two mating connectors for RG-6; crimp tool is available separately. Operating temperature is -40° to $+120^{\circ}$ C.

Antenna System Accessories (Continued)

Grounding Block Kit

F-type bulkhead feedthrough mounted in an extruded aluminum bracket with grounding screw. Includes two mating connectors for RG-6; crimp tool is available separately.

Antenna Mounting Kit

Mounts antenna to a mast or flat surface and allows for multiple angles (0 to 90° in 18° increments). Includes PVC nipple and pipe strap for 25 to 50 mm (1 to 2 in.) diameter masts. The user may provide screws for surface mounting or a strap for other mast sizes. All hardware is stainless steel.

21 dB In-Line Preamplifier

The In-Line Preamplifier provides 21 dB of gain, doubling the usable cable length. The preamp is self-contained, weatherproof, and has two female F-type connectors for placement between cables. Operating temperature range is -40° to $+85^{\circ}$ C.

RG-6 Type Antenna Cables

Low loss RG-6 type coaxial cable, with 21 dB of loss per 75 m. Lengths from 15 m (50 ft) through 75 m (250 ft) are available in 15 m (50 ft) increments. Cable runs greater than 75 m (250 ft) also require the 21 dB In-Line Preamplifier, above. Includes F-81 "barrel" adapter.

300 m (1000 ft) Roll of RG-11 Type Antenna Cable

For single cable runs up to 120 m (400 ft). Cable runs greater than 120 m up to 240 m also require the 21 dB In-Line Preamplifier. An RG-11 crimp tool/connector kit, available separately, terminates this cable in the desired length.