Tekron
Time Code Generator
TCG 02-E

A GPS clock with dual power supplies

The TCG 02-E is a highly accurate full featured GPS clock for use in electricity Distribution/Transmission and Generation protection and control systems. The TCG 02-E, like all Tekron clocks, also supports IEC 61850.

TEKRON
www.tekroninternational.com

About Tekron

Tekron International is a leading developer of exceedingly accurate GPS clocks and time synchronization solutions for use in industrial applications.

Tekron GPS clocks are simple to install and use and are extremely rugged, attributes that are a prerequisite in the often extreme environments in which the clocks are installed.

Tekron GPS clocks have been installed in thousands of power stations & substations across the globe, where they prove invaluable in assisting power companies to operate efficiently, minimizing downtime and increasing the accuracy of control decisions.

With a Tekron GPS clock you can be confident that you can set it up and walk away.

Features

Remote Configuration

Isolated singular or dual power supplies

High drive power outputs

Low noise characteristics due to balanced pair distribution

UTC and LST with user defined DST options

Master/ Slave function

Second power supply option

9 outputs

Configuration Security

Supports

DC IRIG-B or Modified Manchester: TTL, RS232, RS422/ RS485, HV MOSFET

AM IRIG-B (Modulated)

Serial Strings

User defined pulses

DCF77

NTP/ SNTP (IEC 61850)

PTP (IEEE 1588 v2)

Event Recording

> TEKRON | TCG 02-E Datasheet

Physical

19" rack mount 1U high

(W) 430 mm x (D) 270 mm x (H) 45 mm, 2.0 Kg

IP40 (Ingress Protection rating)

Front panel display

The TCG 02-E has a 2 line x 16 character FSTN LCD display and two LEDs indicating multiple statuses, including:

- GPS Sync Status
- IRIG-B and PTP Sync Status
- Antenna cable fault
- Satellite acquisition mode

GPS receiver

L1, C/ A code, 14 Channel Parallel-tracking receiver

Frequency:	1575.42 MHz
Pulse accuracy:	15 ns
Sensitivity:	
Acquisition	-160 dBm
Tracking	-155 dBm
Acquisition:	
Hot Start	<18 s
Warm Start	<45 s
Cold Start	<50 s

Antenna

Physical

Conical shaped polycarbonate durable shell which minimizes snow and dust buildup.

Dimensions:	98 mm tall 90 mm diameter
Weight:	200 g

Specifications

Bandwidth:	1575.42 ± 1.023 MHz
Attenuation:	60 dB (typical) at 1575.42 ± 50 MHz
Gain:	38 dB 5 +/- 0.5 V (27 mA max)
Operating temperature:	-40 to 85° C

Antenna Cable

Low loss, high shielding antenna cable

Inputs & Outputs

2 x independently programmable outputs, either:

- TTL 0 - 5 V, 150 mA (BNC or 2-pin)
- RS422 +/- 5 V, 50 loads (2-pin)
- HV switch MOSFET 300 V 1 A (2-pin)
- Fiber TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST connectors)

Timing accuracy: <100 ns to UTC

Plus:

1 x RS232/ RS422 serial port, DCE wired (DB9)

RS232: Signals are +/- 9 V, 15 mA

RS422 +/- 5 V, 50 loads

Serial time messages can be configured to be output at 1200, 2400, 4800, 9600, 19200 and 38400 baud.

The signal output ON P4 Pin1 is the same as programmed on the programmable output on the expansion module.

Timing accuracy of RS232/ RS422 port:
Serial Message   <200 μs to UTC
Pulse/ or IRIG-B time code   <1.5 μs to UTC

Plus:

1 x AM IRIG-B, 8 Vpp, 120 ohm (BNC)
Timing accuracy: <2 μs to UTC

Plus:

2 x Power supply alarms (Form A contacts)
Input rating: 5 V, 7 mA (10 V, 20 mA also accepted)

Plus:

1 x IRIG-B input alarm (2 pin - Form A contact)
Contact rating: 200 V, 150 mA DC or 150 V, 100 mA AC

Plus:

1 x Sync relay (2 pin - Form A contact)
Contact rating: 200 V, 150 mA DC or 150 V, 100 mA AC

Plus:

1 x 100 Mbps Ethernet interface for configuration.

NTP/ SNTP and PTP time server function can be activated via purchase of a license key.

Options

Expansion Module 1

2 x isolated digital inputs which can be configured for synchronization to an external TTL DC IRIG-B source and/ or event recording: 0-5 V TTL/CMOS (BNC)

Plus:

1 x Programmable output, either:

- TTL 0 - 5 V, 75 mA (BNC)

    or

- Fiber Digital TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy: <100 ns to UTC

Plus:

4 x IRIG-B outputs, either:

- IRIG-B switchable between TTL 0 - 5 V, 25 mA and AM IRIG-B (BNC)

    or

- Fiber Digital IRIG-B TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy TTL/ Fiber   <100 ns to UTC

Timing accuracy AM IRIG-B: <2 μs to UTC

Expansion Module 2

1 x Network time server port - RJ45 connector

100 Mbps

Timing accuracy: <200 ns to UTC

This UTP network interface option allows the TCG 02-E to function as a Stratum 1 NTP/ SNTP Time Server.

Protocols Supported:

ARP, ICMP, TFTP, DHCP, SNMP, and BOOTP.

Plus:

2 x isolated digital inputs which can be configured for synchronization to an external TTL DC IRIG-B source and/ or event recording: 0-5 V TTL/CMOS (2 pin)

Plus:

1 x Programmable output, either:

- TTL 0 - 5 V, 75 mA (BNC)

    or

- Fiber Digital TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)
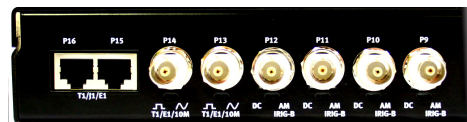
Timing accuracy: <100 ns to UTC

Plus:

4 x IRIG-B outputs, either:

- IRIG-B switchable between TTL 0 - 5 V, 25 mA and AM IRIG-B (BNC)

- Fiber Digital IRIG-B TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy TTL/ Fiber   <100 ns to UTC

Timing accuracy AM IRIG-B: <2 μs to UTC

Expansion Module 3

1 x Programmable output, either:

- TTL 0 - 5 V, 75 mA (BNC)

    or

- Fiber Digital TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy: <100 ns to UTC

Plus:

3 x IRIG-B outputs, either:

- IRIG-B switchable between TTL 0 - 5 V, 25 mA and AM IRIG-B (BNC)

- Fiber Digital IRIG-B TX (62.5/ 125 μm, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy TTL/ Fiber <100 ns to UTC

Timing accuracy AM IRIG-B: <2 μs to UTC

Plus:

2 x T1/E1/10M BNC outputs

- T1, E1 and 10M modes are software configurable

- Switchable between sine and square wave formats

Plus:

2 x T1/E1/J1 RJ48 outputs

- T1, E1 and J1 modes are software configurable

Network Time Server Port

1 x RJ45 UTP connector

100 Mbps

Timing accuracy: <200 ns to UTC

This UTP network interface option allows the TCG 02-E to function as a Stratum 1 NTP/ SNTP Time Server.

Protocols Supported:

ARP, ICMP, TFTP, DHCP, SNMP, and BOOTP.

IEEE 1588 v2 support

As per Network Time Server above plus:-

- PTP (IEEE1588) v2 operation

- GrandMaster (GPS) or ordinary clock functions -determined via BMC algorithm

- step tx, 1-step/ 2-step rx

- Layer 2 or Layer 3 mapping

- Peer to Peer and End to End delay support

- Multicast operation

Typical ordinary clock PPS accuracy (single sub-net) <250 ns

Lightning protection kit

Multi-strike weather proofed low throughput energy lightning arrestor kit.

Antenna Mounting Bracket

500 mm adjustable wall mount bracket.

Configuration software

Windows based configuration software is supplied on CD and is also available to be downloaded from the Tekron website. User adjustable options include:

Timing & Synchronization

Worldwide daylight savings and local time configuration using either rule based or fixed date methods.

Options that allow equipment checks prior to full installation and adjustable hold-over times to increase reliability in the case of poor GPS coverage.

Adjustments to compensate for installation parameters such as delay of GPS signal through antenna cable.

Programmable Outputs

IRIG-B (B00x / B22x) time code with selectable IEEE1344 and AFNOR S87-500 extensions

DCF77 time code

1000 Hz (500 µs) pulse

User defined pulse sequences:

- Repetition rates from 20 ms to 24 hours

- Offsets and durations from 10 ms to 24 hours

Serial Strings

- NMEA-0183 ZDA

- NMEA-0183 RMC

- IRIG J-17

- Tekron A - G (Seven protocols for plug and play compatibility with a wide range of equipment).

Electrical

The TCG 02-E comes standard with a single power supply. An additional power supply can be fitted for redundancy.

The orderable power supply ranges are:

- Low   12 - 36 V DC (2 pin)

- Medium 18 - 72 V DC (2 pin)

- High   80 - 300 V DC (2 pin)

- High   85 - 264 V AC (IEC320 Inlet)

Power Drain: 12 W max

Isolation

Outputs to base unit: 2.5 kV

Power supply to I/O: 3.5 kV

Environmental

Operating temperature: -10 to +65° C

Humidity: To 95% non-condensing

Request a quote

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Email: information@tekroninternational.com

Note: The quickest and most effective method to request a quote is through the online quote request form on the Tekron website

The specifications contained in this document are subject to change without notice.