COMPACT SUBSTATION CLOCK

TTM 01-E

The TTM 01-E is a reliable and accurate GPS clock with sub-microsecond timing that is used to synchronize Intelligent Electronic Devices (IEDs) in the power industry and other industries where precise and reliable timing is required.

As with all Tekron GPS clocks, the TTM 01-E has electrically isolated outputs, providing an extra layer of protection to all IEDs attached to it.

KEY FEATURES

- Independently isolated outputs
- Isolated power supply
- High power line drivers
- Low noise characteristics due to balanced pair distribution
- UTC and LST with user defined DST options
- Remote configuration
- Configuration Security

SUPPORTS

- DC IRIG-B (Un-modulated, DCLS)
- AM IRIG-B (Modulated)
- Serial Strings
- User defined pulses
- Modified Manchester
- NTP/ SNTP (IEC 61850)
- PTP (IEEE 1588 v2)
- DCF77

PHYSICAL

- UL94-V0 polycarbonate flame retardant DIN-rail mount case with IP40 (Ingress Protection rating).
- (W) 72 mm x (D) 60 mm x (H) 90 mm, 0.15 Kg
  Rising clamp terminals: Wire size (max): 1.5 mm Ø

LED INDICATORS

Two LEDs indicating multiple statuses:
- Sync Status
- Antenna/ cable fault
- Satellite acquisition mode

GPS RECEIVER

L1, C/ A code, 12 Channel Parallel-tracking receiver

Frequency:	1575.42 Mhz
Sensitivity:	
Acquisition	-146 dBm
Tracking	-160 dBm
Acquisition:	
Hot Start	<8 s
Warm Start	<35 s
Cold Start	<38 s

INPUTS AND OUTPUTS

Serial Version
1 x RJ45 UTP connector 100 Mbps
1 x Serial strings output
1 x Time code or pulse output
Electrical specification: +/- 9 V RS232 levels.
Timing accuracy:
Serial Message <1 bit time
Pulse/ or Time code ≤1.5 µs to UTC
1 x Sync indication output 200 V, 150 mA (Max)

TTL Version
1 x RJ45 UTP connector 100 Mbps
2 x TTL Outputs: Time codes or pulses
Electrical specification: TTL/CMOS compatible, 0-5 V 150 mA sink/source
Timing accuracy: ≤200 ns to UTC
1 x Sync indication output 200 V, 150 mA (Max)

AM IRIG-B Version
1 x RJ45 UTP connector 100 Mbps
1 x AM-IRIG_B12x
Electrical specification: 8 Vpk-pk, 120 ohms impedance
Timing accuracy: ≤2 us to UTC
1 x Sync indication output 200 V, 150 mA (Max)

INPUT AND OUTPUT OPTIONS

Network Time Server Port
Timing accuracy: <200 ns to UTC
This UTP network interface option allows TTM 01-E to function as a Stratum 1 NTP/ SNTP Time Server.
Protocols Supported: ARP, UDP, 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
- Profile selection: Default or Power
- 1-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 timing accuracy (single sub-net) <200 ns

ENVIRONMENTAL AND ELECTRICAL

Power supply:	
	L = 14-36 Vdc
	M = 20-75 Vdc
	H = 90-300 Vdc
Power Drain:	4 W max
Operating temperature:	-10 to +65°C
Humidity:	To 95% non-condensing
Isolation	
Power to Antenna:	1 kV
Power to I/O:	3.5 kV
Between TTL outputs	2.5 kV

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CONFIGURATION SOFTWARE

Windows based configuration software is available for download on the Tekron website.
Remote configuration over Ethernet includes the following user adjustable features:
- Multi-level access control
- Privacy & authentication methods equivalent to SNMP USM
- “Supervisor-mode” prevents non-approved changes.
- Test mode
- Commissioning tool

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 C37.118.1 and AFNOR S87-500 extensions
DCF77 time code 1 kHz square wave
User defined pulse sequences:
Repetition rates from 20 ms to 24 hours
Offsets and durations from 10 ms to 24 hours
Resolution is 10ms; timing accuracy is 100 ns

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).

OPTIONAL ACCESSORIES

Physical
- GNSS antenna
- Antenna cable
- Adjustable antenna mount
- Lightning protection kit

Refer to tekron.com for full techinical specifications.

ABOUT TEKRON

Tekron is a leading developer of accurate GPS/GLONASS clocks and time synchronisation solutions for use in industrial applications.

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

TEKRON
because timing is everything