

TTM 01-G

Compact Substation Clock

Key Features

- Supports GPS and GLONASS
- 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
- Fiber output option



As with all Tekron clocks, the TTM 01-G has electrically isolated outputs providing an extra layer of protection to all connected IEDs.





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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, 0.2 Kg
- Rising clamp terminals: Wire size (max): 1.5 mm Ø

LED Indicators

- Sync Status
- Antenna/cable fault
- Satellite acquisition mode

Environment 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:	1kV
Power to I/O:	3.5 kV
Between TTL	
outputs A+B:	2.5



Standard Outputs

TTL

1 x TTL programmable output, 2-pin, 0-5 V, 150 mA

Fiber

1 x Fiber programmable output, 62.5/ 125 $\mu m, \lambda$ 820 nm, compatible with multi-mode fiber

Additional Outputs

In addition to the standard output, one of the following output options are also available for the TTM 01-G $\,$

TTL

1 x TTL programmable output, 2-pin, 0-5 V, 150 mA Or AM IRIG-B 1 x AM IRIG-B output, 2-pin, 9 Vpp, 120 ohm Or Serial Strings 1 x RS232 level serial strings output

Alarm Output

Isolated contacts (AC Rated) capable of switching up to 300V at 100mA

Ethernet Output

- 1 x RJ45 10/100 Ethernet UTP connector
- Or 1 x ST multi-mode fiber Ethernet available

Protocols Supported:

ARP, UDP, ICMP, TFTP, DHCP, SNMP v1, v2c, v3

General

DHCP auto-configuration with fallback to ARP tested link-local address VLAN packet tagging

NTP*

Stratum-1 NTP & SNTP time server, Multicast & Broadcast server capability, Optional MD5 authentication Timing accuracy: <100 ns to UTC

SNMP

- v1, v2c & v3 support can be independently enabled
- Configurable v1, v2c community names & security groups
- Fully configurable via SNMP
- v3 User-based Security Module (USM) supports
 - USM authentication methods: MD5, SHA
 - USM privacy methods: DES, AES
 - USM MIB support

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*Some optional features may incur extra costs



GNSS Receiver

L1, C/ A code, 32 Channel Paralleltracking receiver

- Frequency:
- Constellation:

Acquisition:

- GLONASS
- Sensitivity:

0

-148 dBm

1598Mhz

GPS +

- Tracking:
- -160 dBm
- Antenna Supply: 5Vdc up to 100mA
- $\circ \quad \text{Antenna Impedance: 50 } \Omega$

Oscillator – TCXO

Holdover characteristics operating at 25 degrees C:

- TCXO 1PPS drifts 0.55 ms over a 24 hour period.
- Drift rate: 7 ppb per second

Optional Accessories

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

Refer to tekron.com for full technical 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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Ethernet Output Continued

Notifications

- SNMP trap generation v1, v2c & v3
- SNMPv3 traps can be authenticated & privatised via USM
- Syslog (RFC-3164 & 5424 varieties)

IEEE 1588 v2 (PTP) Support*

As per Ethernet Output section plus: -

- PTP (IEEE1588) v2 operation
- GrandMaster (GNSS) or ordinary clock functions
- Profile selection:
 - o Default
 - o C37.238 Power Profile (full support)
 - Telecom Profile (slave only)
- 1-step tx, 1-step/ 2-step rx
- Layer 2 or Layer 3 mapping
- Peer to Peer and End to End delay support
- Typical timing accuracy (single sub-net) <100 ns

Configuration Software

Windows based configuration software is available to be downloaded from 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

Daylight and local time configuration using either rule based or fixed date methods. Allows equipment checks prior to full installation and adjustable hold-over in case of poor GNSS coverage. Adjustments to compensate for installation parameters such as antenna cable delay.

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 (7 protocols for easy interoperability).