

TTM 01-G & PTP Translator Firmware Release Notes

Known Issue: For TCG -G series clocks running GNSS receiver firmware version d1.07 or d1.08 and configured to use GLONASS as the only constellation for synchronization, the time reported on the front panel, Configuration Tool and outputs will be ahead of UTC by 3 hours. Note that the pulse and frequency outputs are not affected by this anomaly. It is recommended that TCG products running these firmware versions are not configured with GLONASS as the only constellation. TCG products configured with "GPS + GLONASS" or "GPS" only are not affected by this issue.

Known Issue: When a GNSS reset is performed through the Configuration Tool, the timing outputs may jump by up to 1 second and this time jump may not be reflected by the accuracy indicators in the output signals. This is a temporary condition and the clock returns to normal operation once GNSS synchronization is re-gained.

VERSION 3.22r (February 2022)

This firmware requires Configuration Tool version 4.6.1.0 or later. This firmware is not compatible with older Configuration Tool versions.

- **Feature:** A stability validation window has been added for when the device is synchronizing to incoming sync sources. The device will usually take under one minute to synchronize to the source, then it will spend an additional 30 seconds at most validating that the sync source is stable before reporting that it is 'in sync'.
- **Improvement:** Adjusted the delay compensation for the additional HV MOSFET output option to improve accuracy.
- **Improvement:** The week number base date will now automatically be updated to the current date once per year to prevent rollover. This is only applicable to GNSS receivers with a firmware version of d1.05 or greater.
GPS uses its own date and time scale, which consists of a week counter and a counter for seconds within the week. The week counter is 10 bits due to hardware limitations of the GPS satellites. It can therefore only count from 0 to 1023, before going back to 0 (sometimes referred to as a "rollover"). The handling of the week number field value is based on a base date stored within the GNSS receiver module of the unit. Correct operation is expected for the 1024 weeks (19.6 years) following that date. This improvement automatically updates the base date to ensure that correct operation continues beyond 1024 weeks following the initial base date.
- **Bug Fix:** Fixed a bug where the G.8265.1 slave was requesting a durationField of 3600 seconds for all messages from the master, which was outside the allowable 60-1000 seconds range specified in the ITU recommendation. It now requests a durationField of 300 seconds.
- **Bug Fix:** Fixed a bug where the device was reporting a clock accuracy value better than the true time output accuracy while regaining synchronization after a previous loss of sync.
- **Bug Fix:** Fixed a bug in the additional RS232 output option where the end of text (ETX) character in String-G was missing.

- **Bug Fix:** Fixed a bug where the unit would report a 100 ns accuracy over PTP when first powered up, when the accuracy at first start up should be reported as >10s, as the clock has not tuned to any sync sources yet.
- **Bug Fix:** Fixed a bug that prevented login to the device via the configuration tool if connecting to the Ethernet port on the unit with VLAN tagging enabled, from an untagged network.
- **Bug Fix:** Fixed a bug where the clock would continue to report in sync with the same accuracy for 60 seconds while a GNSS receiver reset was being performed, despite the GNSS sync source being unavailable during the reset.
- **Bug Fix:** Fixed a bug that caused PTP ports that are configured to use the 61850-9-3 clock class rules to have an incorrect PTP clock class value while regaining synchronization.
- **Bug Fix:** Fixed a bug that could cause the clock to fail to synchronize correctly when switching its synchronization source from GNSS to a backup source such as PTP.
- **Bug Fix:** Fixed a bug that caused the SYNC LED to continue indicating that the unit is in the Tuning state after changing clock sources without an intervening loss of synchronization.

VERSION 3.21r7 (May 2018)

- **Bug Fix:** A bug that let leap second information to be accepted even if the UTC valid flag was not set when syncing to PTP, has been resolved in this firmware release.

VERSION 3.21r6 (March 2018)

- **Feature:** PTP C37.238-2017 and 61850-9-3 Power Utility profile has been added. ConfigTool v4.3.1.5 or later is required to select this Profile.



- **Improvement:** While configuring NTP multicast address, if the IPv4 address assigned for multicast is an invalid address, then the clock will use the broadcast MAC address. For valid IPv4 multicast addresses a valid multicast MAC will still be used.
- **Improvement:** Clocks getting their Sync from PTP will advertise Stratum-1. Previously they were advertised as Stratum-2
- **Improvement:** Added ability to lockout a user for a period following several unsuccessful login attempts. Both the number of unsuccessful attempts and the period of lockout can be configured.

System Policy

Login attempts before lockout: 1

Lockout Period: 60 Seconds

Minimum password length: 8

Password must contain n groups*: 3 of 4

Don't allow username in password: ☒

Two passwords: ☐

* of Upper Case, Lower Case, numeric & control

By default, this feature is disabled (Logging attempts before lockout set to 0) and this will be the case for clocks upgraded to this version.

To prevent the leaking of security information there is no notification to a user that the lockout is in place, and the standard login failed message will be displayed.

The lockout is based on the user account and operates regardless of the IP address that the attempt is made from or if the attempt is made via SNMP or the Config Tool. Similarly, a failed login via any method or from any address adds to the users failed login attempts count.

The lockout is per account and a lockout on one account does not prevent other accounts from logging in.

Subsequent incorrect login attempts during the lockout period will not increase that period. SNMPv3 traps authenticated with the credentials of a locked-out user will still be sent.

Config Tool 4.3.1.0 is required to access this feature.

- **Improvement:** Modified NTP broadcast and multicast periods to be expressed in raw seconds, rather than powers of two. This will allow a wider range of options than previously available but excludes rates of more than one message per second.

When upgrading the intervals will automatically be converted from the earlier format and any intervals of less than one second will be rounded up to one second.

ConfigTool 4.3.1.1 is required to select or view the full range of intervals.

Send broadcast every: Hours: 1, Minutes: 30, Seconds: 5, Off

Send multicast every: Hours: 1, Minutes: 2, Seconds: 30, Off

Figure 1 NTP Broadcast/Multicast Rate Selection in ConfigTool 4.3.1.1 and later.

Config Tools earlier than 4.3.1.1 offer a fixed set of options and will map the interval to one of these as follows:

| Old Value | New Value | Old Value | New Value |
|--------------------------|-----------|-------------|-----------|
| 1/8 th Second | 1 Second | 128 Seconds | 2 Minutes |
| 1/4 th Second | 1 Second | 256 Seconds | 5 Minutes |

| | | | | |
|------------|------------|--|---------------|------------|
| ½ Second | 1 Second | | 512 Seconds | 10 Minutes |
| 1 Second | 1 Second | | 1024 Seconds | 15 Minutes |
| 2 Seconds | 2 Seconds | | 2048 Seconds | 30 Minutes |
| 4 Seconds | 5 Seconds | | 4096 Seconds | 1 Hour |
| 8 Seconds | 10 Seconds | | 8192 Seconds | 2 Hours |
| 16 Seconds | 15 Seconds | | 16384 Seconds | 5 Hours |
| 32 Seconds | 30 Seconds | | 32768 Seconds | 10 Hours |
| 64 Seconds | 1 Minute | | | |

The NTP client request rate is not modified by this change.

There is a new MIB (201801250000Z) which includes the new objects

- tncNTPBroadcastInterval
 - tncNTPMulticastInterval
- **Bug Fix:** A bug in the PTP BMCA algorithm was discovered where the PTP Slave clock would go into an Uncalibrated State if the Best Master changed frequently in the network.
 - The Anti-Jamming feature was removed as it was found to be ineffective on some GNSS receiver models

VERSION 3.21r3 (November 2017)

- **Improvement:** Added a “maximum inaccuracy check” option, which allows a time inaccuracy threshold to be set, at which the clock will leave holdover and indicate out of sync. This option can be used instead of, or in addition to, the “holdover timeout” option, which causes the clock to indicate out of sync after a specified time in holdover.

The “maximum inaccuracy check” option is useful for ensuring that the clock does not exceed a specific accuracy level. The clock will automatically take into account factors such as the fitted frequency reference and time in sync to determine how long to remain in holdover.

If both “holdover timeout” and “maximum inaccuracy check” are enabled, the clock will leave holdover and indicate out of sync only when both the holdover time has expired, and the inaccuracy threshold has been crossed.

The screenshot shows a 'Sync' configuration window with the following settings:

- ☒ Enable holdover timeout
 - days: 0
 - hours: 0
 - minutes: 2
- ☒ Enable maximum inaccuracy check
 - 1 uS
- ☐ Never leave Sync (Test Mode)

VERSION 3.21r2 (October 2017)

- **Improvement:** Added support for new GNSS receiver hardware. TTM 01-G units from serial number 151000 onwards contain the updated GNSS receiver hardware, which will allow for the possibility of adding support for additional satellite constellations in future firmware revisions.
- **Feature:**

Added an advanced configuration option to use local time instead of UTC time for NTP timestamps. This is non-standard, but may be required in certain applications. This option applies to both server and client operation, and is set independently on each port. Tekron Configuration Tool 4.2.1.10 or later is required to enable this option.
- **Feature:**

Added an option to allow the unit to be reset to factory defaults in the event of a forgotten administrator password. Physical access to the unit is required to perform the reset procedure. Please refer to the Tekron website for the reset procedure. This option is disabled by default. Tekron Configuration Tool 4.2.1.0 or later is required to enable this option.

When this option is disabled, the unit must be returned to Tekron for reprogramming in the event of a forgotten administrator password.
- **New feature:**

Added support for ITU-T G.8275.1 PTP Telecom Profile. On TTM 01-G, both Telecom Grandmaster and Slave operation is supported. Tekron Configuration Tool 4.1.1.0 or later is required to configure PTP in this profile.
- **Improvement:**

PTP slave algorithm has been improved to be more resistant to noise and transients in the PTP time source, which could be caused by heavy or varying network traffic, or by network reconfiguration.
- **Improvement:**

Additional checks are now performed on incoming PTP messages when operating as a PTP slave, in order to improve resistance against possible PTP spoofing attempts.

VERSION 3.16r7 (18 October 2016)

- **Bug Fix:** The NTP time stamp consists of two fields, a 32 bit field for the number of seconds since 1 January 1900 and a 32 bit field for the sub-second fraction. From 23:00:00 UTC on December 31st 2016 (one hour before the leap second is applied) the sub-second fraction will be frozen at its maximum value (binary all 1's). However, the number of seconds field will continue to update and maintain correct time. This has the effect of decreasing the time stamp resolution from 16ns to 1s and means that the date and time will remain accurate down to 1 second accuracy only. At 23:59:00 UTC the sub-second fraction will return to normal operation and the leap second will be applied correctly.

VERSION 3.16r6 (16 March 2016)

- **Bug Fix:** When the GNSS satellite constellation is restricted to GLONASS only, and the unit has not been previously synchronised to GPS, the UTC time may be offset by the current leap second difference between GPS and UTC time. This fix detects and corrects the offset.

VERSION 3.16r5 (Not Released)

VERSION 3.16r4 (Not Released for TTM 01-G or PTP Translator)

VERSION 3.16r3 (2 November 2015)

- **Bug Fix:** Fixed a bug that could cause the Ethernet interface to fail to initialize when the Ethernet Link Settings are set to any option other than Auto. This bug could cause communication with the clock to be lost.

VERSION 3.16r2 (27 October 2015)

- **Improvement:** The precision reported by NTP when synchronized to GPS is now set at -23 (119 nanoseconds). Previously, NTP responses reported a precision of -34 (0.058 nanoseconds).
- **Bug Fix:** IRIG-B outputs are now correctly suppressed when the “Suppress outputs when out of sync” option is selected. Previously, when this option was selected, user defined pulse and DCF77 simulation outputs were correctly suppressed, but IRIG-B outputs were not.
- **Bug Fix:** The time quality and continuous time quality (CTQ) indicators included in the IRIG-B C37.118.1 extensions now indicate matching quality levels. Previously, these quality indicators indicated conflicting quality levels.
- **Bug Fix:** The daylight savings time change upcoming indicators are now suppressed when no daylight savings are observed. Previously, the clock could incorrectly output daylight savings change indicators when “Region observes daylight savings” is not selected.
- **Bug Fix:** The PTP foreign master timeout (announce receipt timeout) determines how often a slave clock must see announce messages in order to recognize a master as valid. The foreign master timeout is determined by the configured announce interval. A power cycle is no longer required before the foreign master timeout is updated from the configured announce interval.

VERSION 3.14 (4 August 2015)

- **Improvement:** Initialization and auto-negotiation timeout periods have been increased to improve interoperability with network infrastructure equipment.

VERSION 3.13 (25 June 2015)

- **New feature:** Added String-H option to serial string output (applicable to TTM 01-G and PTP Translator with RS232 extension). The format of String-H is as follows.

| | |
|--------------------|---|
| About | String-H |
| Timing | The string is transmitted once every second, with the leading edge of the "start" bit of the first character <STX> exactly on the second. |
| Definition | <STX>D:dd.mm.yy;T:w;U:hh.mm.ss;uvxy<ETX> |
| Placeholder | Content |
| D | ASCII "D" |
| dd.mm.yy | Current day, month and year |
| T | ASCII "T" |
| w | Day of Week (1 to 7, 1 = Monday) |
| U | ASCII "U" |
| hh.mm.ss | 24 hour format time |
| u | "#" if out of sync or <SPACE> if in sync |
| v | "*" if out of sync or <SPACE> if in sync |
| x | "U" if UTC, "S" if DST or <SPACE> if standard time |
| y | "!" if DST change pending, "A" if leap second pending or <SPACE> otherwise |

- **New feature:** The serial string output (applicable to TTM 01-G and PTP Translator with RS232 extension) can now be configured to provide a 9-bit serial output instead of the original 8-bit serial output. Configuration Tool 4.1.0.5 or later is required to select the new serial string options. The new configuration options are as follows.

| Configuration Option | No. Data Bits | Parity | No. Stop Bits |
|----------------------|---------------|--------|---------------|
| 8-O-1 (New) | 8 | Odd | 1 |
| 8-E-1 (New) | 8 | Even | 1 |
| 8-N-1 | 8 | None | 1 |
| 7-O-1 | 7 | Odd | 1 |
| 7-E-1 | 7 | Even | 1 |

- **Improvement:** When active, Test Mode will now override any other active time sources. This improves the ease of use of test mode, as it is no longer necessary to ensure that all other time sources are disabled.
- **Improvement:** The sync forced on "Test Mode" setting will now be automatically deactivated after 1 week. This setting should only be used for testing purposes and should not be left on. The timeout will ensure that it is deactivated if accidentally left on.

- **Improvement:** Increased rate of GPS leap second information requests. GPS leap second information requests are now made every 12.5 minutes following first almanac, and not 1 minute prior to, or in the 6 hours following an already scheduled leap second event.
- **Improvement:** Added the ability to select None as the delay calculation method for PTP. This allows a fixed delay to be used instead of a calculated delay.
- **Improvement:** During the leap second the sub second fraction of the NTP time stamp is now held at one count before the end of the second (for the entire second). Previously the sub-second fraction rolled to zero at the start of the leap second and counted up as per a normal second. Because most leap seconds are a repetition of the last second of the day, if the sub second fraction is not held at one count before the end of the second, timestamps taken during the leap second could appear to be earlier in time than stamps recorded during the previous second.

| Old Leap Second Behavior | New Leap Second Behavior |
|--------------------------|--------------------------|
| 23:59:58.00 | 23:59:58.00 |
| 23:59:58.25 | 23:59:58.25 |
| 23:59:58.50 | 23:59:58.50 |
| 23:59:58.75 | 23:59:58.75 |
| 23:59:59.00 | 23:59:59.00 |
| 23:59:59.25 | 23:59:59.25 |
| 23:59:59.50 | 23:59:59.50 |
| 23:59:59.75 | 23:59:59.75 |
| 23:59:59.00 | 23:59:59.99 |
| 23:59:59.25 | 23:59:59.99 |
| 23:59:59.50 | 23:59:59.99 |
| 23:59:59.75 | 23:59:59.99 |
| 00:00:00.00 | 00:00:00.00 |
| 00:00:00.25 | 00:00:00.25 |

- **Bug Fix:** SNMPv3 requests that fail authentication are now rejected when the maximum unauthenticated access is set to None. Previously, unauthenticated SNMPv3 'Get' requests succeeded when the maximum unauthenticated access was set to None, in which case they should have been rejected.

VERSION 3.12

- **Bug Fix:** Corrected time delimiter characters for serial string output String-C. The correct delimiter is the ':' character. Previously, the String-C output incorrectly used a space character as the time delimiter.

VERSION 3.11r2 (9 January 2015)

- **Improvement:** Minor improvement to configuration communication protocol for compatibility with latest version of the configuration tool.

VERSION 3.11r (1 October 2014)

- **Improvement:** Added name of new sync source to "Sync source changed" syslog message.
- **Bug Fix:** Fixed a bug that could cause recoverable failure of loader upgrades.
- **Bug Fix:** PTP Delay Asymmetry value is now stored to clock correctly. Previously, this value was incorrectly reversed when stored.

VERSION 3.10r (1 September 2014)

- **Improvement:** Increase range of the daylight savings change time to include 24:00.
- **Bug Fix:** IRIG-B extension fields are now set correctly. Previously, they were set using data from the following second.

VERSION 3.09r (18 July 2014)

- **Improvement:** Change default SNMP access to unauthenticated = none and authenticated = read-only. Reset SNMP access to defaults when leaving insecure mode.
- **Improvement:** Increase the time taken for the clock to fix its location from 10 minutes to 33.3 minutes. The clock will continue to improve its absolute accuracy to UTC during this period.
- **Improvement:** Lower holdover alarm when out of sync alarm is raised.
- **Improvement:** Add slave only PTP telecom profile.
- **Bug Fix:** IPv4 addresses with final octet > 233 were incorrectly rejected.
- **Bug Fix:** Reset pulse duration when switching from DCF77 to programmable pulses.
- **Bug Fix:** This bug caused occasional NTP multicast packets to be sent via broadcast.
- **Bug Fix:** Ensure TTL output invert state is recorded correctly.
- **Bug Fix:** Allow group creation in supervisor mode.
- **Bug Fix:** Allow Block VLAN 0 to be set (But only via a VLAN tagged Ethernet request).
- **Bug Fix:** Fixed bug that caused spurious flashing of the ALM LED on the PTP Translator.
- **Bug Fix:** Fiber output was incorrectly inverted.

- **Bug Fix:** Removed IRIG source priority setting, as the TTM 01-G and PTP Translator do not have any IRIG inputs.