TCG 01-G & TCG 02-G Ethernet 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 3.22r1 (August 2022)

- **Bug Fix:** Fixed a bug on the TCG 02-G M2 platform, introduced in version 2.30r, that could cause the TCG main board to appear to freeze for a few seconds after a configuration change is applied.
- **Bug Fix:** When a GNSS reset was performed via the Configuration Tool, the TCG would incorrectly continue to report that it is synchronized for up to 45 seconds before entering holdover. This bug has been fixed. The TCG will now correctly report the Holdover state shortly after the GNSS reset button is clicked.

VERSION 3.22r (February 2022)

Firmware version 3.22r or above requires Configuration Tool version 4.6.1.0 or later, and is not compatible with older Configuration Tool versions.

- **Improvement:** Changed the PTP boundary clock functionality so that boundary clock master ports will use their own true clock accuracy, and increment the stepsRemoved field, which will allow the BMCA to work as expected for a boundary clock. Previously, the unit would have boundary clock master ports act as Grandmaster and always use a clock class of 6, which could cause that port to be selected by the BMCA while not being the actual best master on the network.
- **Bug Fix:** Fixed a bug that prevented the user from configuring NTP or PTP through the secondary Ethernet port (ETH2).
- **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 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 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 an Ethernet port on the unit with VLAN tagging enabled, from an untagged network.
- **Bug Fix:** Fixed a bug where on rare occasions, the TCG main board configuration settings could be lost. The firmware now stores a backup copy of the main board configuration to prevent this.
- **Bug Fix:** For the TCG 02-G expansion module 2, the secondary Ethernet port (ETH2) would not show a group name change in the configuration tool until the configuration window was closed and reopened. Also, the group policy title did not receive the new name until the group was de-selected and re-selected.

VERSION 3.21r9 (February 2019)

- **Bug Fix:** In TCG 02-G clocks fitted with the OCXO or Rubidium oscillator option, the mask angle may unexpectedly change from the configured mask angle, to 60 degrees. The effect of the mask angle change is that it reduces the number of satellites that can be used in time and position calculations, causing loss of sync, and does not recover without external intervention. The issue arose because the internal time reference module was inadvertently reading messaging intended for another subsystem on the bus. One of the timestamp messages that should have been ignored, contained data in the same format as an instruction which configures the GNSS receiver to change the mask angle. The message handling has been changed so that the issue will no longer occur.

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. Configuration Tool 4.3.1.5 or later is required to select this Profile.
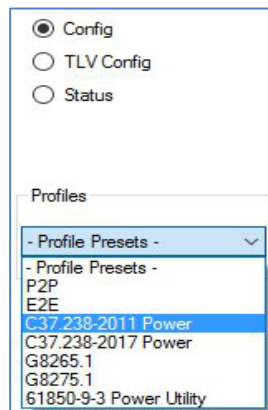
- **Improvement:** While configuring NTP multicast address, if the IPv4 address assigned for multicast is an invalid address, then the clock will use the broadcast MAC address. For valid IPv4 multicast addresses a valid multicast MAC will still be used.
- **Improvement**: Clocks getting their Sync from 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.

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.

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

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

because timing is everything

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

Old Value	New Value		Old Value	New Value
1/8th Second	1 Second		128 Seconds	2 Minutes
1/4th 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.
- **Change:** 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.

- **Improvement:**

  Added the ability to independently suppress individual outputs based on inaccuracy threshold or holdover timeout. When "holdover timeout expires" is selected, that particular output will stop providing a time signal when the clock is out of sync and the specified holdover time has expired.

  When "Inaccuracy threshold is exceeded" is selected, that particular output will stop providing a time signal when the clock is out of sync and the reported inaccuracy has exceeded the specified maximum inaccuracy. When "Never" is selected, that particular output will continue to provide a time signal even when the clock is out of sync.

  This applies to the following ports:
  - Configurable IRIG-B / Pulse output ports (P2, P3, P4 pin 1)
  - P4 serial string output port
  - P5 AM IRIG-B output port
  - P11 configurable IRIG-B / Pulse output port (TCG 02-G M2 expansion)
  - P9 configurable IRIG-B / Pulse output port (TCG 02-G M3 expansion)

- **Change:**
The persistent holdover availability option is now no longer optional, and is permanently enabled. This is required for correct operation of the clock with the added "maximum inaccuracy check" option.

VERSION 3.21r1 (October 2017)

- **Improvement:**
Added the ability to apply firmware upgrades to the GNSS receiver module of TCG 02-G clocks fitted with OCXO or Rubidium oscillators. This change allows for future field upgrades to be applied to the GNSS receiver module. Clocks not fitted with OCXO or Rubidium oscillators already have this capability.

VERSION 3.21r (May 2017)

- **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.

- **Improvement:**
The failure to obtain an IPv4 address via DHCP will result in the clock adopting an ARP tested Link-Local address (169.254.xxx.xxx). An IPv4 address fail alarm will now be displayed both in the Configuration Tool and on the LCD display. When this alarm occurs, the user may need to update their network adaptor settings to a Link-Local address to gain access to the clock. The alarm will persist until the IPv4 address settings are changed or the clock is connected to a DHCP enabled network.

The alarm appears in the Configuration Tool as "ipv4 address", and on the display as "IPe1", or "IPe2". "IPe1" and "IPe2" stand for "IP error, port ETH1" and "IP error, port ETH2" respectively. This alarm does not open any alarm relays, and does not send an SNMP notification.
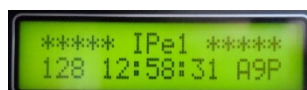
- **Bug Fix:**
  Fixed a bug that would cause the Fill Pattern transmitted to revert to None after about 1 second, when "All Zeros" fill pattern is selected for the P15 or P16 T1/E1 outputs on a TCG 02-G fitted with M3 (Telecom) expansion.

VERSION 3.20r (Not Released for TCG 01-G & TCG 02-G)

VERSION 3.19r (10 August 2016)
- **New feature:**
  Added support for ITU-T G.8275.1 PTP Telecom Profile. 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 3.18 (Not Released for TCG 01-G & TCG 02-G)

VERSION 3.17 (Not Released)

VERSION 3.16 (Not Released for TCG 01-G & TCG 02-G)

VERSION 3.15 (Not Released for TCG 01-G & TCG 02-G)

VERSION 3.14r5 (16 March 2016)
- **Bug Fix:**
  When the GNSS satellite constellation is restricted to GLONASS only, and it 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 3.14r4 (Limited Release)

VERSION 3.14r3 (Not Released for TCG 01-G & TCG 02-G)

VERSION 3.14r2 (Not Released for TCG 01-G & TCG 02-G)

VERSION 3.14r (29 July 2015)

- **Improvement:**
  Ethernet auto-negotiation timeout periods have been increased from a few milliseconds to 1 second to improve interoperability with some network infrastructure equipment.
- **Bug Fix:**
  Clock will now accept notification of an upcoming leap second from NTP or PTP when operating as an NTP client or PTP slave. This fault caused the leap second to happen late.

VERSION 3.13r2 (Limited Release)

- **Improvement:**
  Additional support added for OCXO and Rubidium oscillators (TCG 02-G only).

VERSION 3.13r (Limited Release)

- **Improvement:**
  Support added for clocks fitted with OCXO and Rubidium oscillators (TCG 02-G only).
- **Improvement:**
  Support added for longer holdover times, to allow for the increased stability of the OCXO and Rubidium oscillators to be fully utilized.
- **Improvement:**
  Ethernet module now follows the sync status of the host TCG. Previously, the Ethernet module determined the sync status of the clock by interpreting GPS data, which could result in the NTP, PTP and SNMP sync status and quality information differing from that of the other outputs.
- **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:**
  Increased rate of GPS leap second information requests. Previously, GPS leap second information requests would only be made 1 minute prior to, or 6 hours following an already scheduled leap second event. GPS leap second information requests are now made every 12.5 minutes following first almanac.
- **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:**
Added Mobile GPS mode, which allows for the GPS Clock to be installed on board a slow-moving vehicle or vessel. This mode is considered experimental.

- **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 leaps 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:**
The saved state of OCXO and Rubidium frequency references is no longer lost when the clock is restarted. This ensures correct behaviour of the clock during the application of a firmware upgrade.

- **Bug Fix:**
SNMPv3 requests that fail authentication are now rejected when the maximum unauthenticated access is set to None.

- **Bug Fix:**
When acting as a PTP telecom slave, the clock will now resend subscription requests immediately after selecting a PTP telecom master if the running rate is faster than the discovery rate.

VERSION 3.11r3 (Limited Release)

- **Improvement:**

Customer specific advanced configuration license added.

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:**
  Add the ability to configure ETH2 (when present) from ADMIN/ETH1 port.

- **Improvement:**
  Upgrade fault recovery improvements.

- **Improvement:**
  Add name of new sync source to "Sync source changed" syslog message.

- Improvement:
  Initial OCXO support.

- **Bug Fix:**
  Disable the test mode set time feature on ETH2 (when present). Test time is set by ADMIN/ETH1.

- **Bug Fix:**
  PTP Delay Asymmetry not stored to clock correctly.

- **Bug Fix:**
  Revert to factory settings not updating all settings.

VERSION 3.10r (1 September 2014)

- **Improvement:**
  Add slave only PTP telecom profile.

- **Improvement:**
  Add ability to suppress power alarms.

- **Improvement:**
  Remove GPS related functions and alarms when acting as a fiber slave**.**

- **Improvement:**
  Increase range of the daylight savings change time to include 24:00.

- **Improvement:**
  Allow Block VLAN 0 to be set (But only via USB or a VLAN tagged Ethernet request).

- **Bug Fix:**

IPv4 addresses with final octet > 233 were incorrectly rejected.

- **Bug Fix:**
  This bug caused occasional NTP multicast packets to be sent via broadcast.

- **Bug Fix:**
  Allow group creation in supervisor mode.

VERSION 3.08r (First release)