

## NTS 02-G & NTS 03-G+ Firmware Release Notes

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.

Sync

Outputs always report 'Good' Quality

Enable holdover timeout

days hours minutes

0 5 0

Enable maximum inaccuracy check

10 uS

Never leave Sync (Test Mode)

- **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:

- P3 configurable IRIG-B / Pulse output port
- P6, P7, P8, P9, P10, P11 configurable IRIG-B / Pulse output ports

IRIG-B / Pulse Output Port

User defined pulse  Inverted

Pulse Output

Every Pulses Hundredths

Second 1 Offset 00

Duration 01

Suppress Output When Holdover timeout expires

- **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 3.21r2 (October 2017)

- **Bug Fix:** Fixed a bug where the leap second pending and daylight saving pending bits in IRIG-B C37.118.1 outputs, and the leap indicator in NTP responses, were cleared one second late. This bug was introduced in version 3.21r.

## VERSION 3.21r1 (October 2017)

- **Improvement:** Added the ability to apply firmware upgrades to the GNSS receiver module of NTS 03-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.
- **Bug Fix:** Fixed a bug introduced in version 3.21r that prevented the “GPS Reset” command from having any effect on NTS 03-G+ units fitted with OCXO or Rubidium oscillators.

## VERSION 3.21r (May 2017)

- **Improvement:** The “Reset GPS” or “Reset GNSS” command sent from the Tekron Configuration Tool will now perform a factory reset of the clock’s integrated GNSS receiver. This will reset all configuration parameters stored in the memory of the GNSS receiver. Note that this does not change any configuration settings applied by the Tekron Configuration Tool. Previously, a “cold” reset of the GNSS receiver was performed, which did not clear all parameters.
- **Improvement:** The time quality reported by the SNTP client time source for the purpose of source selection is now limited to be no better than 1  $\mu$ s. This is to prevent the SNTP source from being selected when a high-quality GPS or PTP source is available.
- **Improvement:** The time quality comparison performed by the clock to select between multiple available time sources now uses “banding”. The time quality reported by each available source is rounded to the nearest 100ns “band”, before it is compared to other sources. This helps to prevent unnecessary frequent switching between two sources of similar quality.
- **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.



- **Change:** Updated the default new clock UTC-TAI offset to be 37 seconds as per the leap second added on January 1<sup>st</sup>, 2017.
- **Bug Fix:** During the recent (December 2016) leap second event, it was observed that the GNSS/GPS receiver module continued to report the previous UTC-TAI offset for many hours following the actual changeover. Prior to 3.21r, the firmware would ignore the UTC offset advice from the GNSS/GPS module for six and a quarter hours following the leap second event. This was found to be insufficient, and has been increased to 36 hours.
- **Bug Fix:** Fixed a bug that, if the ‘Suppressed when out of sync’ option is selected, caused the first pulse of the first IRIG-B frame to occur 2 milliseconds early when sync is achieved.
- **Bug Fix:** Fixed a bug introduced in version 3.18r that could, in rare conditions, cause an Ethernet port configured with a fixed IP address to unexpectedly revert to a link local (169.254.xxx.xxx) IP address.
- **Bug Fix:** Fixed a bug that could, in rare conditions, cause PTP timestamps to be miscalculated.
- **Bug Fix:** The “Block VLAN 0” advanced configuration option can now be set on non-admin ports with the Configuration Tool connected to the admin port. Previously, this configuration option was not accessible on non-admin ports while connected to the admin port.

## VERSION 3.20r2 (April 2017)

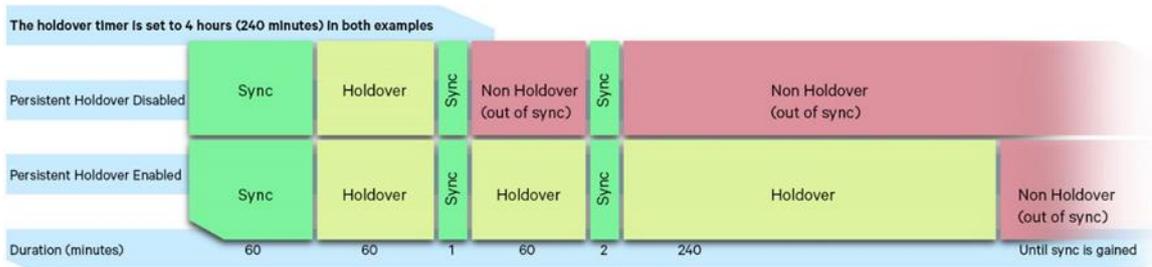
- **Change:** This firmware allows for the NTS 03-G+ to use either the NTS 03-G or NTS 03-G+ branding. This is a factory configurable option only.

## VERSION 3.20r1 (January 2017)

- **Feature:** Added support for enabling the persistent holdover availability option. Tekron Configuration Tool 4.2.1.10 or later is required to enable this option.

Normally, the clock can only enter holdover if it has been in sync for at least 5 minutes. If persistent holdover is enabled, and the clock has initially been in sync for at least 5 minutes, then the clock can still enter holdover if it experiences a sync switching condition. For example, sync is lost, regained for less than 5 minutes, then lost again. Such a condition may exist when GNSS jamming is present, or in the case of a poor antenna installation.

Please note, when entering holdover after a period of intermittent sync the holdover period timer is reset. This may cause the clock to enter into an extended holdover period, if the sync switching condition continues to be present. By disabling persistent holdover, you can ensure that the time in holdover is not extended by periods of intermittent sync lasting less than 5 minutes.



- **Bug Fix:** Fixed a bug that, in a rare event, could cause the clock to output a time exactly 2 seconds behind the correct time. This bug was most likely to affect NTS 03-G+ units fitted with the OCXO or Rubidium frequency reference option.
- **Bug Fix:** Fixed a bug that could cause the Configuration Tool to unexpectedly lose the connection to the clock when running on a PC that is singly attached to a PRP network (connected to only one of the two PRP redundant networks).

## VERSION 3.20r (November 2016)

- **Feature:** Added support for NTS 03-G+ 4 Port Plus IRIG-B Expansion. Tekron Configuration Tool 4.2.1.0 or later is required to configure the 4 Port Plus IRIG-B Expansion programmable outputs.
- **Feature:** Added support for NTS 03-G+ OCXO and Rubidium frequency reference options.
- **Feature:** Added support for Parallel Redundancy Protocol (PRP). Ports ETH3 and ETH4 (and ETH5 and ETH6 where fitted), can be linked to form a redundant pair. PRP support is available on all existing NTS 02-G and NTS 03-G hardware. Tekron Configuration Tool 4.2.1.0 or later and a PRP license are required to enable PRP support. Please contact Tekron to purchase a PRP license.
- **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.
- **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. 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. This option may be permanently disabled by Tekron on request. This factory reset is different from the factory reset that can be performed with the Configuration Tool, as that reset does not require physical access, but requires an administrator password.
- **Improvement:** Added ability to disable the holdover time setting, allowing the clock to remain in holdover indefinitely. This leaves it up to client devices to determine when they will stop synchronizing to the clock, based on the advertised quality in the time outputs.
- **Improvement:** Added a configurable option for suppression of output signals at startup, when the clock has not yet received a valid time.
- **Improvement:** Added a Fixed Manual delay mode to the available PTP delay mechanisms, in addition to the existing End-to-End and Peer-to-Peer options. Fixed Manual delay mode may be useful in some non PTP aware networks (networks which do not have switches with PTP support).
- **Improvement:** Added a PTP Forced Master option. When selected, this option ensures that the port will not operate as a PTP Slave.
- **Bug Fix:** Fixed a bug that could cause loss of communication to non-admin Ethernet ports after 25 days of operation. If this event occurs, non-admin Ethernet ports (ETH2 and above) will stop acting as an NTP or PTP master. Resetting the clock will restore normal operation.
- **Bug Fix:** Fixed a bug that could cause PTP Announce messages generated by the unit to occasionally contain incorrect information when the unit is itself synchronized to an external PTP grandmaster, that is, when the unit is operating as a PTP boundary clock.

### VERSION 3.18r6 (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.
- **Bug Fix:** Added the ability to automatically recover from an internal communication error. This rare event could cause non-admin Ethernet ports (ETH2 and above) to unexpectedly lose synchronization. Resetting the unit will return it to normal operation.

### VERSION 3.18r5 (Limited Release)

- **Feature:** Fiber Slave option introduced.

### VERSION 3.18r4 (March 2016)

- Initial Release