

## NTS 02-E & NTS 03-E Firmware Release Notes

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### VERSION 3.20r (November 2016)

- **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:** PTP delay asymmetry is now a configurable option. PTP cannot automatically measure and compensate for delay asymmetry, which means that the presence of delay asymmetry reduces the time accuracy of PTP. If the delay asymmetry is known, entering it manually will allow it to be compensated for, and improve time accuracy.
- **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 (Not Released)

#### VERSION 3.18r4 (Not Released for NTS E series)

#### VERSION 3.18r3 (Not Released for NTS)

#### VERSION 3.18r2 (February 2016)

- **Bug Fix:** Fixed a bug that could cause disruption to the communications between internal clock modules. This resulted in a number of symptoms including a mismatch between sync-status reported from different ports and an inability to save settings when connected to a non-admin Ethernet port. The bug was most likely to occur when a non-admin Ethernet port was acting as a PTP or NTP slave.

## VERSION 3.18r (December 2015)

- **Improvement:** The P3 output port on the NTS is now configurable. It can be configured to provide an IRIG-B signal, DCF77 simulation or a user-defined pulse. Configuration options can be found on the I/O tab of the Tekron Config Tool. Requires Config Tool 4.1.0.22 or later. Previously, the P3 output provided a non-configurable unmodulated IRIG-B signal with C37.118.1 extensions enabled. IRIG-B with C37.118.1 extensions is now the default configuration. This is to allow the IRIG-B output and input to be used out of the box for a redundant link between two NTS units.
- **Improvement:** When synchronized to an incoming IRIG-B signal, the NTS will now use the Continuous Time Quality (CTQ) field if it is present. The CTQ field was added to C37.118.1 2011 to give IRIG-B receivers more detailed information about the time accuracy of the source they are synchronized to, because the definition of the Time Quality field value “0” (Clock is locked to a UTC traceable source) is ambiguous. Previously, the NTS only used the Time Quality field.
- **Improvement:** Added a display page which will display the current firmware version and serial number on the front panel LCD when the front panel button is pressed during startup. Pressing the front panel button will cycle through available display pages.
- **Bug Fix:** The handling of request IDs by the SNMP agent has been modified to improve compatibility with some SNMP management engines.
- **Bug Fix:** SNMP v2c trap messages sent by the NTS now contain the correct variable binding for the system up time. Previously, trap messages contained an incorrect variable binding for system up time, which could cause compatibility issues with some SNMP management engines.
- **Bug Fix:** Fixed a bug which could cause an NTS fitted with a single power supply unit to incorrectly indicate power failure alarms.
- **Bug Fix:** IP addresses are now tested with ARP requests before being used. If using static IP addressing and the IP address is found to be in use, that port will revert to a link-local address (169.254.xxx.xxx).
- **Bug Fix:** The NTS will now send gratuitous ARP responses when the network interface starts. This is to provide compatibility with network routers that have very long or no ARP table timeouts.
- **Bug Fix:** The peer clock precision value reported in NTP responses is now correct when the NTS is not synchronized. Previously, the NTP peer clock precision value was not updated in the event of the NTS losing synchronization.
- **Bug Fix:** The IRIG-B output signal from the NTS now indicates correct values in the time quality and CTQ fields when the NTS is synchronized to an incoming IRIG-B signal. Previously, the IRIG-B output contained incorrect and conflicting values in the time quality and CTQ fields when synchronized to IRIG-B.

### VERSION 3.16 (Not released for NTS)

- **Improvement:** The peer clock precision reported in NTP responses when synchronized to GPS is now set at -23 (119 nanoseconds). Previously, NTP responses reported an incorrect precision of -34 (0.058 nanoseconds).
- **Bug Fix:** The IRIG-B output is now correctly suppressed when the “Suppress outputs when out of sync” option is selected. Previously, when this option was selected, the IRIG-B output was not suppressed.
- **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:** A power cycle is no longer required before the PTP foreign master timeout is updated. The foreign master timeout determines how often a slave clock must see announce messages in order to recognize a master as valid, and is determined by the configured announce interval. Previously, a change to the configured announce interval did not update the foreign master timeout until a power cycle occurred.

### VERSION 3.14 (Not released for NTS)

- **Improvement:** Initialization and auto-negotiation timeout periods have been increased to improve interoperability with network infrastructure equipment.
- **Improvement:** The default TAI -> UTC offset has been updated to the current value of 36.

### VERSION 3.13 (Not released for NTS)

- **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 setting will now be automatically deactivated after 1 week. This setting should only be used for testing purposes and should not be left on, and the timeout will ensure that it is deactivated if accidentally left on.
- **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
<b>23:59:59.75</b>	<b>23:59:59.75</b>
<b>23:59:59.00</b>	<b>23:59:59.99</b>
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

- **Improvement:** Added new display page which will display the current IP address on the front panel LCD. To change the front panel display, press the button on the front of the unit between the two LED's. Pressing the front panel button will cycle through available display pages. This feature can be used to check the IP address of the clock.



- **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.
- **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.
- **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.
- **Bug Fix:** Fixed a bug which could cause the USB interface to become unresponsive when the USB cable is disconnected and reconnected.

- **Bug Fix:** Fixed a bug where the USB interface could excessively consume system resources, reducing the ability of the clock to handle high network traffic.
- **Bug Fix:** Fixed a bug which could cause the NTS to erroneously reject an incoming IRIG-B signal.

#### VERSION 3.11 (Not released for NTS)

- **Improvement:** Added name of new sync source to "Sync source changed" syslog message.
- **Improvement:** Minor improvement to configuration communication protocol for compatibility with latest version of the configuration tool.
- **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.
- **Bug Fix:** Fixed a bug that could cause a factory reset to not reset all settings.

#### VERSION 3.10r

- **Improvement:** Increase the time taken for the clock to obtain GPS position hold from 10 minutes to 33.3 minutes. The clock is 'in sync' during this period but will continue to improve its absolute accuracy to UTC.
- **Improvement:** The holdover message shown on the LCD display and in the configuration tool now disappears when the holdover period expires (The clock announces a sync alarm when holdover expires).
- **Improvement:** Add slave only PTP telecom profile to NTS 03-E.
- **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:** Re-Work USB support to improve reliability.
- **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.
- **Bug Fix:** Security disabled mode not available on expansion ports (ETH2 – ETH6) in rare situations.
- **Bug Fix:** Ensure ports (ETH2 – ETH6) acquire an IPv4 address via DHCP (if available) at start-up.

## VERSION 3.08r & 3.09r (Not released for NTS)

### VERSION 3.07r

- **Improvement:** Tighter constraints on DHCP for improved security.
- **Improvement:** NTP broadcasts are no longer subnet directed. They use the global broadcast address 255.255.255.255.
- **Improvement:** SNMPv3 MIB support.
- **Bug Fix:** Some NTP requests sent without MD5 authentication when it was requested.
- **Bug Fix:** Fix bug in VLAN processing that caused tags to be omitted from replies to configuration protocol file requests (even if the requests were tagged).

## VERSION 3.06r (Not released for NTS)

### VERSION 3.05r (First release)