



**TG8000
Multiformat Test Signal Generator
Release Notes**

This document supports Firmware Version 3.2.

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Release notes

This document describes new features, improvements, and limitations of Firmware Version 3.2 for the TG8000 Multiformat Test Signal Generator.

New features

Option to require user approval for Locking Reference

In some cases, locking to a reference can cause a disruption or "shock" to the sync signals. To prevent this disruption, a new mode has been added whereby the system will wait for a user to allow the system to lock or re-lock to the reference. This mode is supported when locking to NTSC, PAL, Tri-level and CW signals.

To access this function, press the **MODULE** button as needed to get to the GPS7, then press the down arrow to reach the **REFERENCE** menu. Press **ENTER**, then press the down arrow multiple times to reach the **REFERENCE : GL LOCK ACTION MOD** menu. Use the left and right arrow to select either **Automatic** or **Wait for User Approval**. In **Automatic** mode, the system will lock as soon as the conditions allow. This is equivalent to the operation in previous versions of code. In the **Wait for User Approval** mode, the system will not lock until the user allows it. While waiting for the user to approve a lock, the **EXT** indicator on the front panel will be red, and the lock status readout will indicate - **Unlocked - Waiting for user approval**.

To approve the system to lock, press the **MODULE** button as need to get to the GPS7, then press the down arrow to reach the **REFERENCE** menu. Press **ENTER**, then press the down arrow multiple times to reach the **REFERENCE : GL MANUAL LOCK APP** menu. Follow the instructions, then press **ENTER** to approve the lock. The approval will be active for two seconds to allow the lock to occur. If the system is not able to lock, it will revert to waiting for the lock approval state.

The manual lock feature is supported by the GPS7. It is not supported by the AGL7.

CW Frame Reset select menu

When the reference mode is set to **CW**, the genlock timing will only affect one of the frames. Use this menu to select which frame rate will be adjusted by the genlock timing controls. Each output signal frame rate is related to one of the three internal frame rates as indicated in the menu selections:

- 2.997Hz : NTSC, 59.94, 23.98 Hz group
- 6.25Hz : PAL and 50Hz group
- 3.000Hz : 60 and 24 Hz group
- Keep GPS/PTP Timing

Keep GPS/PTP Timing allows for locking to GPS or PTP to set the time, then switching to CW lock with minimal shift. This operation is explained in the *Hybrid GPS/CW operation* section of these release notes.

To access this menu while referenced to CW, press the **MODULE** button as needed to get to the GPS7, then press the down arrow to reach the **REFERENCE** menu. Press **ENTER**, then press the down arrow multiple times to reach the **REFERENCE : FRAME MENU (CW)** menu. Use the left and right arrow to select the desired frame rate.

Hybrid GPS/CW operation

In some locations, the GPS may not be reliable. Other installations may have a large plant based on a rubidium standard and will want to maintain compatibility with that, but may want to add operations based on absolute time. Hybrid operation is a good mechanism for these applications, and a new CW frame menu allows this to work well.

This mode works by locking to GPS to get the correct time and leap second offsets, then switching to 10MHz CW lock to maintain a stable frequency and reject any interference on the GPS. Periodically, the system should be re-locked to the GPS to correct any drift in the system. Depending on the needs of the system, the interval between re-locking may be days or months.

To use this function, access the CW frame menu and set the CW frame to **Use GPS/PTP Timing**. The CW frame menu operation is explained in the *CW Frame Reset select menu* section of these release notes.

Set the reference to GPS and allow the system to lock. Connect the CW input and then switch to CW reference. There may be a small shift as this locks, so this should be done at a noncritical time. To re-lock to the GPS, change the reference back to that source. Depending on how long the system has been drifting, this will cause more of a disruption, so it should be done at a noncritical time.

The SPG8000A should be configured to power up in the GPS mode so that it recovers the time and phase correctly.

A second SPG8000A can be locked to the GPS, and outputs from the main and extra SPG can be compared in a monitor to help determine how much the system has drifted, and when it is a good time to re-lock to the GPS.

New HDR signals

Two new color bar type signals have been added to the SDI signal list. These are called BT2111-0 HLG Narrow and BT2111-0 PQ Narrow. These provide levels to test and design HDR systems and devices.

Other HDR signals may be available. Please contact Tektronix Customer Service for details.

Fixed firmware limitations

The following limitations are fixed in this firmware version:

Network Mask limitation	In previous versions, the Control and PTP ports had some limitations on the netmask values for addresses in the 192.168.x.x range. This version removes the special limits for netmasks when using those addresses.
BG7 HD sync artifacts	In previous versions, some HD tri-level sync signals occasionally had artifacts on the rising and falling edges. This has been fixed.
TG8000 responding to SNMP messages	Previously, the TG8000 would occasionally respond to SNMP messages, which could be problematic. The SNMP access has been disabled in the new release.

General limitations

This firmware release has general limitations, which are outlined below. Please check the Tektronix Web site (www.tek.com/software/downloads) for any firmware updates to the TG8000 generator.

TG setup software	In setting signal formats for the Black 2 and Black 3 outputs of the AGL7 Module, do not select Black 2 = HD sync (same as Black 3) and Black 3 = BB (same as Black 2) simultaneously, while Frame Reset 1 is set to 2.997 Hz. This operation makes Frame Reset 1 unstable. If this is the case, reset the system by recalling the Power On Default setting or a preset.
USB port	<ul style="list-style-type: none">■ When you mount a USB drive, the SDI output signal from an HDVG7 Module may briefly unlock. This problem only occurs on HDVG7 Modules with serial numbers B013412 or earlier, or HDVG7 Modules with a serial number that begins with the letter 'J'. The SDI outputs from DVG7, HD3G7, and SDI7 Modules are not affected by the mounting of a USB drive.■ The TG Setup application cannot be used for remote configuration while files are being restored from a USB drive. Wait until the restore operation is complete before opening the TG Setup application and connecting to the TG8000 generator.

Firmware upgrades

- When the TG8000 Firmware is upgraded (using a USB drive or a network connection), all files created or installed by the user are deleted. The deleted files include presets, signal files, frame picture files, logo files, sequence files, and for the SDI7 Module, can also include text and font files. The standard set of factory installed signal files, logo files, and SDI7 Module font files are restored when the firmware is upgraded.

To prevent the loss of your user created files, use the **Backup All User Data to USB** function from the **UTILITY** menu to save your user files before you upgrade the firmware. After the upgrade, use the **Restore All User Data From USB** function from the **UTILITY** menu to restore your user created files.

- If you have loaded the TG8000 memory with a large number of test signals or frame picture files, you may not be able to upgrade the instrument firmware because the memory is too full. If you receive a memory error while attempting to upgrade the firmware version, you need to delete some of the test signal or frame picture files and then perform the upgrade.

Network configuration using Manual mode

A network connectivity problem may occur when using Manual mode to configure the instrument IP address or subnet mask settings and the instrument is communicating across network boundaries. The problem does not occur when using DHCP mode to configure the network settings.

If your instrument is configured for Manual mode, use the following steps to work around this problem:

- Configure the instrument IP address or subnet mask settings using Manual mode.
- After configuring the IP address or subnet mask, perform one of the following:
 - Change the network gateway address to a valid value.
 - If the network gateway address is already correct, toggle the gateway address. For example, change the gateway address to some other (incorrect) address, apply the change, and then change the gateway address back to the correct value.

Resetting an output signal

A signal output interruption or synchronization shock may occur when the instrument rereads or resets signal data, such as format changing, preset recall, or signal-button assignment.

Changing output formats with open menus

Some front-panel menus and status displays are dependent on the frame rate of the currently selected output format. If you open a submenu and press the **FORMAT** button to change the frame rate, the submenu will not be refreshed until it is exited and reopened.

Assigning a signal and frame picture to a front-panel button

When you assign a downloaded signal to a front-panel button, do not assign different format signals to the same button.

Do not assign a signal set to a button that corresponds to the signal that is currently being output. Also, do not assign a signal set to a signal button while the message **No Signal Set Assigned** is displayed. If you reassign a signal set to the **OTHER** button, perform the reassignment while a signal that is assigned to a button other than the **OTHER** button is output.

Time of day changes for timecode outputs

When the time of day changes, such as when scheduled Daylight Savings adjustments are made or when the internal time is set from the front panel, there can be a delay before that change is reflected on timecode outputs.

This delay may be a small number of frames (fraction of a second) when all timecode output formats are based on the same clock rate (for example, NTSC black burst and 1080i 59.94 HD tri-level on black outputs in addition to 30 fps drop-frame on LTC outputs), or up to several seconds when timecode formats based on different clock rates are used (for example, 29.97 fps and 24 fps on different outputs).

Setting the genlock source on the AGL7 Module

If you change the frame reset period in the AGL7 Module after the genlock source is set to **CW**, the frame reset may not be selected properly. If this is the case, set the frame reset to **CW**.

Timing range of the AGL7 Module

The **TIMING** menu for the AGL7 Module will allow output timing adjustment beyond $\pm \frac{1}{2}$ frame of the current format.

Installing or upgrading an AGL7 Module

If you move an AGL7 Module from a TG700 mainframe to a TG8000 mainframe, or if you move an AGL7 Module from a TG8000 with Firmware Version 1.2 or below to a TG8000 with Firmware Version 1.3 or above, the FPGA of the AGL7 Module will be automatically updated when the instrument boots. This will also occur if you upgrade a TG8000 with an AGL7 Module installed, and if the Firmware Version in the TG8000 is 1.2 or below.



CAUTION. *To prevent an update failure of your AGL7 Module, do not remove or cycle power on the TG8000 while the instrument is rebooting after installing an AGL7 Module or after an upgrade from Firmware Version 1.2 or below. The FPGA update on the AGL7 Module takes about three minutes and there is no indication on the front panel that the AGL7 Module is being updated. If power is interrupted before the FPGA update is complete, the module will need to be returned to Tektronix for service.*

Daylight Savings Time (DST) scheduler system on the GPS7 Module

The DST scheduler system applies the DST offset even if the Time of Day (TOD) source is set to **VITC Input** or **LTC Input** and the SMPTE309 mode is set to **Ignore** or **Use as Input**. In these cases, the offset is applied whether or not a valid **VITC** or **LTC Input** signal is available. For proper DST scheduling, you need to ensure that the instrument has valid time information and manually enter the correct time of day if the system is not synchronized to an accurate time of day source.

When the TOD source is set to **GPS** signal and the GPS is not locked to the input signal, the DST scheduler system will apply the DST offset when the internal real-time clock (which is subject to slight drift) reaches the time scheduled for the DST offset to be applied or removed. Ensure that the GPS is locked and that the system time of day is correct before turning on the DST scheduler system.

The manual time of day setting is not automatically reapplied when the instrument power is cycled. If the instrument powers up in with the Time of Day source set to **Internal** mode, the time of day will be acquired from the internal real-time clock in the TG8000 generator. Check the system time of day and adjust as needed to ensure that it is correct before the next transition of the DST scheduler when the Time of Day source is set to **Internal** mode.

GPS Receiver versions on GPS7 Module

GPS receiver Version 3015 with Firmware Version 1.06. GPS receiver modules with Firmware Version 1.06 installed have a problem with the leap second information they receive from the satellite system. Occasionally, the receiver erroneously reports that the current number of applied leap seconds is 255 instead of the correct number (currently 18). This error causes a 3 minute 59 second offset in the system time of day, which will last until the correct report is received (usually in the next broadcast 12 minutes later). TG8000 Firmware Versions 2.1 and above contain a fix for this problem.

Receiver Version 3015 with SW 1.06 may occasionally see a smaller leap second change that lasts for 12.5 minutes. To prevent this from affecting the operation, configure the instrument to defer applying the leap second until a local time such as 1 or 2 AM. Ensure the local time is not the same as UTC midnight so the change is deferred at least an hour.

NOTE. *TG8000 Firmware Version 2.2 or above must be installed to view the GPS receiver firmware version.*

GPS receiver modules with Firmware Version 1.06 installed have a problem when they are configured to operate in the GPS & GLONASS dual constellation mode. It is recommended to configure the GPS receiver to operate in either the GPS or GLONASS single constellation mode.

GPS receiver Version 3015 with Firmware Version 1.08. GPS receiver modules with Firmware Version 1.08 installed corrected the issue with the occasional erroneous reporting of the currently applied leap second data. However, Firmware Version 1.08 introduced a new problem where the GPS receiver will prematurely apply pending leap second changes when the “pending leap second” flag in the GPS signal is asserted instead of waiting until the leap second is actually applied (June 30 or December 31).



CAUTION. *To prevent the premature application of a pending leap second, customers with GPS receiver Version 3015 which has Firmware Version 1.08 installed should contact your local Tektronix representative. An upgrade kit is available to replace this version of GPS receiver.*

GPS receiver Version 3015 with Firmware Version 1.09. GPS receiver modules with Firmware Version 1.09 installed corrected the issue with premature leap second changes. However, Firmware Version 1.09 had an issue with not automatically reacquiring the position after the instrument was moved to a new location. TG8000 Firmware Versions 2.2 and above contain a fix for this problem. It is strongly recommended that TG8000 Firmware Version 2.2 or above be installed on any instrument with GPS receiver Version 3015 with Firmware Version 1.09.

GPS receiver Version 3023. It is strongly recommended that instruments with GPS receiver Version 3023 have Firmware Version 2.5 or above installed. Previous TG8000 firmware versions have issues that will cause operational problems with the 3023 Version GPS receiver.

GPS receiver Version 3023 with Software Version 1.03. If receivers of this combination are inside of the footprint of the QZSS constellation, they may not maintain lock correctly. Instrument Software Versions 3.0.1 and later will update most instruments to 1.04 or later module code. Contact a local Tektronix representative to receive an upgrade kit if a system is not able to update to 1.04.

Embedded audio of the HDVG7 Module

- Embedded audio for 720 23.98p/24p formats are not supported for the HDVG7 Module, even though they can be selected in the menus.
- The first user data word in the audio control packet (containing the Audio Frame value) has incorrect parity when the frame count is 1, 2, or 4.

Y to GBR Convertor mode of the HDLG7 Module

If the output format is 2K and the Converter mode is set to Y to GBR, changing operating mode by selecting a test signal will cause an unexpected black and white signal to be generated. To correct the test signal, press the OTHER button until Normal is selected, and then press the test signal button.

25/29.97/30 Hz segmented frame format for the HDLG7 Module

The HDLG7 Module does not have format selections for 1080PsF at 25 Hz, 29.97 Hz, or 30 Hz. These formats are almost identical to 1080i (interlaced) formats at 50 Hz, 59.94 Hz, and 60 Hz respectively; these format settings can be used with progressive segmented signals. However, note that the SMPTE 352M payload identifier for the output signal will show an interlaced signal format, even when the HDLG7 Module is converting a single link progressive segmented input signal to dual link.

Converter mode of the HD3G7 Module

- Infrequently, the module will fail to up-convert the input HD-SDI signal. If no output is seen, the problem can be corrected by selecting a different test signal and then switching back to converter mode.
- The trigger output cannot generate a frame pulse or line pulse when the module is in converter mode.
- The moving picture and video component functions do not apply to up-converted output signals.
- When a Level B format is selected for the up-converted 3 Gb/s output signal, embedded audio from the input HD-SDI signal will be copied into both virtual links. Therefore, up to 32 channels of embedded audio can appear on the 3 Gb/s output.
- The HD3G7 Module does not reformat SMPTE 334 Caption Distribution Packets in converter mode. Therefore, when up-converting from 1080i 59.94 Hz to 1080p 59.94 Hz, for example, the output will contain CDP data in alternate frames, each with 40 bytes of caption data, instead of CDP data in every frame, each with 20 bytes of caption data.
- Up-conversion to a Level B fast progressive format may result in mis-ordered Caption Distribution Packets in the stream of output frames.

SDI Equalizer test signal of the HD3G7 and SDI7 Modules

Per SMPTE RP198 for HD-SDI, a polarity change word is used to ensure equal probabilities of the DC bias for the equalizer test pattern. However, some SDI formats still exhibit an unequal bias. Enabling a dynamic bit stream in the output signal, such as embedded audio or timecode data, will result in both DC levels appearing in the output signal.

Test signal files of the HD3G7 and SDI7 Modules

The HD3G7 and SDI7 Modules use file-based test signal definitions. If you modify a signal file from the factory version, unpredictable results may occur. To recover from this situation, reload the factory version of the signal file from the *TG8000 SW Library and Documentation DVD* that was supplied with the instrument.

SDI7 multi-language support

Languages that require combined glyphs in order to be represented may not be correctly rendered in the Text ID display on the SDI7 Module.

**Multiburst signal motion
on the SDI7 Module**

Do not set a Multiburst signal in motion on the SDI7 Module. Otherwise, a corrupted signal will be generated.

Timecode accuracy

The HDVG7 and HD3G7 Modules do not use the updated method for setting timecode. This means that when a GPS7 Module is installed, the timecode on the HDVG7 and HD3G7 Module outputs may not exactly match the outputs of the GPS7, BG7, and SDI7 Modules (if installed). It is possible that there could be a few frame difference between the outputs on these two modules and the others, especially in drop frame.

If a GPS7 Module is not installed, the BG7 and HDVG7 Modules will not support timecode and the HD3G7 and SDI7 Modules will only support program time.

NOTE. *PTP (Precision Time Protocol) uses the epoch established 1 January, 1970 00:00:00 GMT. To configure which epoch the GPS7 Module will use, use the Epoch Select submenu of the Time Setup menu to select between the 1958 and 1970 epochs.*
