Horita PTG

Portable SMPTE Time Code Generator
With 2-Line LCD Display

Operating Instructions
For Software Version V2.0

Doc. No. 073138-00 Rev. D

Table of Contents

1 GENERAL

This document provides instructions for operating the Horita PTG Portable Time Code Generator. Intended for portable use in the field, the Horita PTG is a low cost, palm-sized, battery operated miniature SMPTE/EBU longitudinal (or linear) time code (LTC) reader/generator. The PTG has a 2-line LCD display which shows time code and user bit values, as well as setup information.

When reading time code the PTG automatically determines and displays the frame rate of the incoming code. When generating time code, the PTG can be configured to automatically "jam sync" to an externally applied TC signal or to the serial data from a GPS receiver. The PTG can also be used in a manual "run/stop" mode of operation. LTC is generally referred to simply as time code, abbreviated TC.

1.1 FEATURES

- Reads and generates SMPTE time code at six frame rates of 23.976FPS, 24FPS, 25FPS, 29.97FPS DF (Drop Frame), 29.97FPS NDF (Non-Drop Frame) and 30FPS (FPS = frames-per-second).

- Provides selection of "LINE" or "MIC" output level when generating time code.

- Time code generator "auto jam" mode presets the generator to TC or to GPS serial data input values for time and date. Once jammed, generator operation continues and can be stopped only by powering the PTG off. This prevents accidentally stopping the generator via unintended actuation of the "run/stop" switch.

- The low "free run" drift rate of a maximum of one frame per hour over temperature provides close matching of PTG time with that of the jam source time throughout the day. Actual drift rate is much better than one frame per hour if the PTG is not subjected to large temperature changes, such as from being left in the sun or out in freezing conditions.

- GPS jam mode can auto select and operate from three different GPS NMEA message input formats.

- Frame rate of generator output does not have to match that of TC reader jam input (can "cross jam").

- Manual generator mode allows user to operate PTG manually using front panel "run/stop" switch.

- Time code reader mode displays time code, user bits, and frame rate values when reading time code, or GPS time and date values when reading GPS data.

- Auto power off after 15 minutes if not reading time code or GPS data when in reader or auto jam mode**.** User settable auto power off after 1-to-8 hours of generator operation when generating time code.

- Simple to use setup menus for time code, user bits, and system mode are easy to understand.

- All setup information is retained in non-volatile memory, even if battery removed.

- 2-line x 16 character LCD display shows time code, user bits, frame rate, setup information, low-battery condition, and provides for "contrast" adjustment.

- Includes an 18" RCA-to-RCA-cable for time code in and out, a BNC adapter to connect to LINE level BNC time code I/O's, and XLR and 1/8" mini phone male adapters for using with those type microphone inputs.

- Operates for over 24 hours from a single 9V alkaline battery.

2.0 CONNECTING THE PTG
2.1 Installing and Removing the Battery

NOTE:

Be sure to observe battery polarity. If the battery is installed with the polarity reversed, the PTG will not operate, but no damage will be done.

Slide open and remove the battery compartment cover to install a new 9Volt battery. Install the battery terminal-end first, pushing the battery against the battery clips and case until the battery snaps into the compartment. Install the cover.

To remove the battery, remove the cover and use a small screwdriver or other object to pry the battery out of the compartment, terminal-end first.

Alternatively, tap the PTG against a flat surface until the battery comes out. This can usually be done with a single, sharp rap.

2.2 Connecting Time Code IN

To read time code or to "jam" the PTG, connect an RCA cable from the time code output of your camcorder, VCR, or other device, to the PTG TC I/O SERIAL input. The PTG can work with time code input levels ranging from 0.5 volts P-P (peak-to-peak) to 10 volts P-P. If your system uses BNC or XLR connectors for the time code, you will have to use BNC-to-RCA or XLR-to-RCA adapters. Some common adapters are included with the PTG, but others are available from Horita or at most electronic supply stores, such as Radio Shack, should the need arise.

2.3 Connecting Video IN

The PTG accepts a video reference for the time code generator if it is desired to genlock the time code output to a video reference. When genlocked, the time code signal does not drift in time or phase relative to the video signal. Standard 1V P-P NTSC RS-170A composite video will lock up all varieties of 29.97 time code frame rates, while PAL 625/50 composite video will lock up 25FPS time code. 30FPS black and white RS170 composite video will lock up 30FPS time code. Connect the output from the video source to the VIDEO IN BNC on the PTG.

Note that the PTG does not terminate the video input and although the PTG will operate with an un-terminated video input, for most reliable operation the video reference should be terminated at the PTG if not terminated elsewhere. This can be done by using a either a "T" connector and 75 Ohm terminating resistor or an "inline" type 75 Ohm terminator at the PTG VIDEO IN input.

3 OPERATING THE PTG

3.1 Basic Operation

A single miniature toggle switch labeled ON (SET) - R/S (SEL) is used to operate the PTG. The PTG TC I/O SERIAL IN connector is used for both input and output of time code (I/O means Input/Output), as well as for input of RS232 serial data from a GPS receiver. The basics are that the PTG is powered on, time code or GPS data is applied to the TC I/O connector (if in reader or auto-jam mode), the PTG jams to the incoming time code, then the time code input is disconnected and the "TC I/O" output is connected to the time code input of the destination device.

3.2 Power ON/OFF

Momentary actuation of the toggle switch to the ON position powers up the PTG. To save battery life if accidentally left on, the PTG automatically powers off after about 15 minutes if no time code is applied or the generator is not started. When in the generator mode, the PTG can be set to automatically power off after operating for 1-to-8 hours. The PTG can also be manually turned off by selecting "OFF" in the Main Setup Menu as described in later paragraphs.

3.3 Liquid Crystal Display (LCD)

The liquid crystal display is organized as 2 lines of 16 characters each. When reading and generating time code, the first line displays the time code value and the second line displays the frame rate and the user bit values. When a GPS input is applied, the first line displays the GPS time value and the second line displays the GPS date value. When in "Setup" mode the LCD displays various setup selections and options.

LCD Display	Menu Text	Description
LINE – 1	**RDR XX:XX:XX:XX**	Reader mode, XX:XX:XX:XX = time code or GPS time
	GEN	Generator mode
LINE – 2	**24UB XX:XX:XX:XX**	Generator = 24FPS, XX:XX:XX:XX = user bit or GPS date
	25	Generator = 25FPS
	29	Generator = 29.97 FPS
	30	Generator = 29.97FPS or 30FPS NDF
	??	Reader FPS rate unknown

3.4 Modes of Operation

There are three basic modes of PTG operation, reader (RDR), generator (GEN), and setup. The actual PTG mode of operation is selected in the system setup menu described in later sections.

3.5 Reader Mode

In reader mode the PTG reads and displays incoming time code or GPS data.

3.5.1 Reading Time Code

When reading time code, the PTG reads at play speed in forward direction and the LED flashes at the frame rate. The time code value is displayed on line-1, the user bits are displayed on line-2. The frame rate of the time code input is also displayed on line-2. Either 24, 25, 29, or 30 is displayed for the frame rate. These numbers mean Frames-Per-Second (FPS). "24" is displayed when reading either 23.976FPS or 24FPS code. When reading standard SMPTE time code, "29" is displayed (meaning 29.97 FPS) if reading drop-frame code, "30" is displayed if reading either 29.97FPS or 30FPS non-drop frame code.
When reading time code, the LED flashes at the frame rate.

3.5.2 Reading GPS Data

The PTG can read and automatically select between three different standard NMEA GPS "sentences": $GPGGA, $GPRMC, and $GPZDA. The time information is UTC (Greenwich Mean Time), not local time. The "GGA" message does not have date information, RMC and ZDA do have the date. If you are jamming the PTG using a GPS input, make sure to setup your GPS receiver to output either ZDA or RMC data if you want the date in the user bits. If you can only get GGA data, then you can manually preset the user bits to the date and then set the jam mode to cause the PTG to jam using these "manual" user bits.

When reading GPS data, line-1 displays the GPS hours, minutes, and seconds time value as "HR:MN:SC:00", where HR is the hours, MN the minutes, SC the seconds. Since this is for time code, 00 is the frames value which is set to 00.

Line-2 displays the GPS date value as 00:YR:MO:DY. This Yr/Mo/Dy format for the date is an international format. If there is no date information in the GPS serial input, then line-2 is set to all zeros.

Usually the GPS data is input as bursts of data, once each second. When reading and displaying GPS data, the PTG LED flashes as GPS data is received, then stays steady on. This repeats once each second.

3.6 Generator Modes

There are two generator modes; manual "run/stop" (R/S) mode and "auto-jam" mode. In either mode a video reference may be applied to ensure frame accurate time code. In manual generator mode, the PTG generates time code according to the time code and user bit setup menu selections. These selections define the time code frame rate as well as any preset values for the time code or user bit fields.

3.6.1 Manual Mode

When in manual R/S mode, the time code generator is alternately started and stopped by alternately "clicking" the toggle switch to the R/S position.

3.6.2 Auto-Jam Mode

In auto-jam mode, the PTG jams, or presets, the time code generator to an externally applied time code or GPS signal. Once jammed, the PTG outputs time code according to the data input in the time code and user bit setup menus. Once the auto jam mode has been selected and the PTG has been jammed, the mode of operation cannot be changed until the PTG is powered off and then on again. Note that the frame rate can be changed after the PTG has jammed. The PTG always jams on frame 00 to maintain best accuracy.

If multiple PTGs are to be jammed to GPS time it's more accurate to first jam one of them to the GPS, then, after it starts generating time code, use its time code output as the jam source for the other PTGs. This way they will all be set to exactly the same time relative to each other. Otherwise, because the GPS time data is not always output at the same time relative to the start of each new GPS second, their times would not match as close if they were each individually jammed to the GPS data.

3.7 SETUP Mode

The SETUP mode allows the user to change operation of the PTG between reader and generator modes, change the generator frame rate, etc.

3.8 Main Setup Menu

The Main Setup Menu allows selection of various sub-menus in order to configure operation of the PTG according to meet a specific application or user preference. To enter the Main Setup Menu, hold the toggle switch in the ON position for approximately 2 seconds or until the Main Setup Menu is displayed along with a flashing black cursor on one of the selectable menu options.

After the Main Setup Menu is displayed, momentarily actuating the switch to the ON position moves the cursor to highlight a different menu selection. Actuation of the switch to the SEL position then selects the highlighted option. The following selections are available on the Main Setup Menu:

LCD Display	**Menu Text**
LINE-1	**OFF:N TC UB SYS**
LINE-2	**EXIT:N**

Menu Selection	**Description**
OFF	Powers the PTG OFF
TC	Enters the Time Code Setup Menu
UB	Enters the User Bits Setup Menu
SYS	Enters the System Setup Menu
Menu Selection	**Description**

Menu Selection	Description (cont.)
EXIT	Exits SETUP Mode, saves setup info and returns to the time code/user bit display

3.9 Time Code Setup Menu

The Time Code Setup Menu allows the user to preset the time code generator starting value (when in manual generator mode) and to select the frame rate of the time code generator output.

To enter the Time Code Setup Menu, select TC from the Main Menu. Momentary actuation of the toggle switch to the SET position moves the cursor from one time code field to the next; clicking the switch to the SEL position modifies the data in the currently highlighted field. After cycling through the time code fields, the FPS (frames per second) field is active. Clicking SEL cycles through the available frame rates of 23.976, 24, 25, 29 DF (drop frame), 29.97NDF (non-drop frame), and 30 NDF (non- drop frame) frames per second. The Time Code Setup Menu is described below:

LCD Display	Menu Text
LINE-1	**PRE=XX:XX:XX:XX**
LINE-2	**GEN FPS=XX**

Menu Selection		Description
PRE=XX:XX:XX:XX		Allows preset of time code values from 00:00:00:00 to 23:59:59:29
GEN FPS=XX		Allows selection of frame rate of time code output
	23.976	23.973 FPS
	24	24FPS
	25	25FPS
	29.97 DF	29.97FPS drop frame
	29.97NDF	29.976FPS non-drop frame
	30 NDF	30FPS non-drop frame

DF = Drop-Frame, NDF = Non Drop-Frame

To return to the main menu while in the FPS field, click the switch to the SET position.

3.10 User Bits Setup Menu

The User Bits Setup Menu allows the user to preset the user bits or select how the user bit data is handled in the different generator modes of operation. More specifically, this menu allows the user to define the user bits output when the generator is jammed.

To enter the User Bit Setup Menu, select UB in the Main Menu. The user may individually set each user bit to any number in the range of "00" to hexadecimal "FF". To preset the user bit data, click the switch to the SET position to highlight the desired field; click the switch to the SEL position to enter or modify data in the active field. If desired, an ID number in the range of "00" to hexidecimal "FF" can be assigned to user bits 8 and 7 to positively identify footage from multi- camera productions. The User Bits Setup Menu is described below:

LCD Display	Menu Text
LINE 1	**UB=XX:XX:XX:XX**
LINE 2	**ID=XX**

Menu Selection	Description
UB=XX:XX:XX:XX	Allows user to manually preset user bits = 00:00:00:00 to FF:FF:FF:FF
All 00	Sets all PTG user bits to "00"
ID + XX:XX:XX	Sets PTG user bits 8, 7 to ID, rest of user bits to preset value
RDR	Sets PTG user bits to same value as TC reader user bits
ID + RDR	Sets PTC user bits 8, 7 to ID, rest of user bits to TC reader value
ID=XX	Allows user to preset an ID number from 00 to FF (hex)

Click the switch to the SET position to exit the ID field and return to the main menu.

3.11 System Setup Menu

The System Setup Menu allows the user to configure the PTG's mode of operation. To enter the System Setup Menu, select SYS from the Main Menu. Actuating the switch to the SEL position cycles through the various operating modes and allows the user to set the generator automatic power off timer, adjust the contrast of the LCD, and select the output level. The System Setup Menu is described below:

LCD Display	**Menu Text**
LINE-1	**MODE:RDR**
LINE-2	**AUT OFF:N CONT:5**

Menu Selection	**Description**
MODE:	
RDR	Reads and displays incoming TC or GPS data
GEN AUTOJAM	**"**Jamsyncs" generator to incoming TC or GPS data, outputs TC and UB values according to the time code and user bits setup menus selections.
GEN MAN R/S	Manual Run/Stop mode. Uses the preset time code and user bit values. Actuation of switch to R/S alternately starts/ stops the time code generator.
AUT OFF:N	Automatic power off after 1-to-8 hours of generator operation. N=No, 1,2,3,4,5,6,7,8 = number of hours until generator automatic power off. This is to help conserve battery life.
	NOTE: T*he auto off timer is active only in the generator mode of PTG operation. It is turned off each time the PTG is powered off and needs to be reset each time the PTG is powered up if it is desired to be used. This is to prevent the PTG from unexpectedly powering off while actively being used because of a prior forgotten or unknown setting of the timer.*
CONT:5	Adjusts contrast of LCD – 0 to 9.
LEVEL OUT = LINE	Selects line level time code output of approximately 2.5V P-P, -2dBV.
LEVEL OUT = MIC	Selects microphone level time code output of approximately -35dBV. As compared to the output from a typical microphone, this MIC level is rather "hot". This is because it is output as an unbalanced signal in a relatively noisy environment. However, it is still well within the range of either automatic or manual microphone input level adjustment and therefore will not "swamp" microphone input circuits as an un-attenuated LINE level signal does.

Click the switch to the SET position to exit the contrast field and select the 2nd SYS setup menu, which is for selecting the MIC/LINE output level.

3.12 LED Operation

The red LED on the PTG indicates power on as well as the operational status of the PTG when reading or generating time code. This is summarized in the following table:

LED State	**Meaning**
OFF	Power off
Steady ON	Power on, not reading or generating time code
Rapid flashing	Reading time code if in reader mode, Generating time code if "running" in generator manual mode
Slow flashing	"stopped" while in manual generator mode
1PPS flash	1 pulse-per-second flash means generator "jammed" and running
Long 1PPS	1 PPS extra long flash occurs at the start of each minute
Double 1 PPS	Double 1PPS flash at each minute indicates also video genlock
Random flash	Indicates activity on TC/SERIAL input

+

3.13 Low Battery

When there are only a few hours of battery life remaining, line-2 of the LCD display alternates between displaying the message "BATT" and the FPS rate.

4 SERVICE AND TROUBLESHOOTING

4.1 Service

Do not attempt to disassemble your unit to service it. There are no user-serviceable parts inside. You can return your unit to HORITA for service or repair. Please contact HORITA first before returning your unit.

4.2 Troubleshooting

The following provides a list of the most common items to check if you are having trouble with your unit.

a. Check for a dead battery
b. Check all cables in signal paths for opens or shorts.
c. If using XLR-to-RCA adapters, apply the time code from the RCA connector to an audio monitor and listen for the "raspy" time code sound. If no time code is present, it may be necessary to disassemble the XLR adapter and switch the wiring between pins 2 and 3.

5 SPECIFICATIONS

Battery

9Volt, NEDA/ANSI 1604A

Switches and Indicators

POWER ON (SET) R/S (SEL)	Momentary ON-OFF-ON toggle switch
LED	Red, indicates power ON and flashes when reading or generating time code
LCD	Displays 2 lines of 16 characters each

Time Code

Format	SMPTE time code format running at frame rates of 23.976, 24, 25, 29.97DF, 29.97/30 NDF, or 30FPS
Input Level	0.5 to 10 volts p-p (-20dBV to +8dBu)
Impedance	10K Ohms (approx)
Output Level	LINE level - approximately 2.5 V P-P (-2dBV/0.22dBu) square wave MIC level - approximately -35dBV/-33dBu (50mV P-P) square wave, 10K load approximately -38dBV/-36dBu (35mV P-P) square wave, 1K load
Connector	RCA
Generator Drift	Not more than +/-1-frame per hour over temperature range

GPS

Input Level	RS-232
Format	NMEA $GPGGA, $GPRMC, or $GPZDA
Baud/bits	4800, 8 bits, no parity

Video

Input Level	RS170A composite NTSC video or equivalent 625/50 PAL video, 0.5 to 2 volts p-p NOTE: Not terminated by PTG

Environment

Operating	5-to-40 degrees C (41-to104 degrees F)
Storage	-10-to-60 degrees C (14-to-140 degrees F)

Dimensions

1” H, 2.4” W, 4.75” D

Weight

5 Oz, including battery.

Specifications subject to change without notice