

**LTC-GEN**  
**LINEAR TIME CODE GENERATOR**  
**(SMPT-E TIME CODE GENERATOR)**  
**| MANUAL |**

Version 1.00



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## 1. General description

The Marenius LTC-GEN is a linear time code generator encoding SMPTE time code into an audio signal. The device is able to read and jam to an external time code signal. The device is supporting cross-jamming between different frame rates.

An extremely wide viewing-angle and very clear OLED display is used for time code display, menus and information.

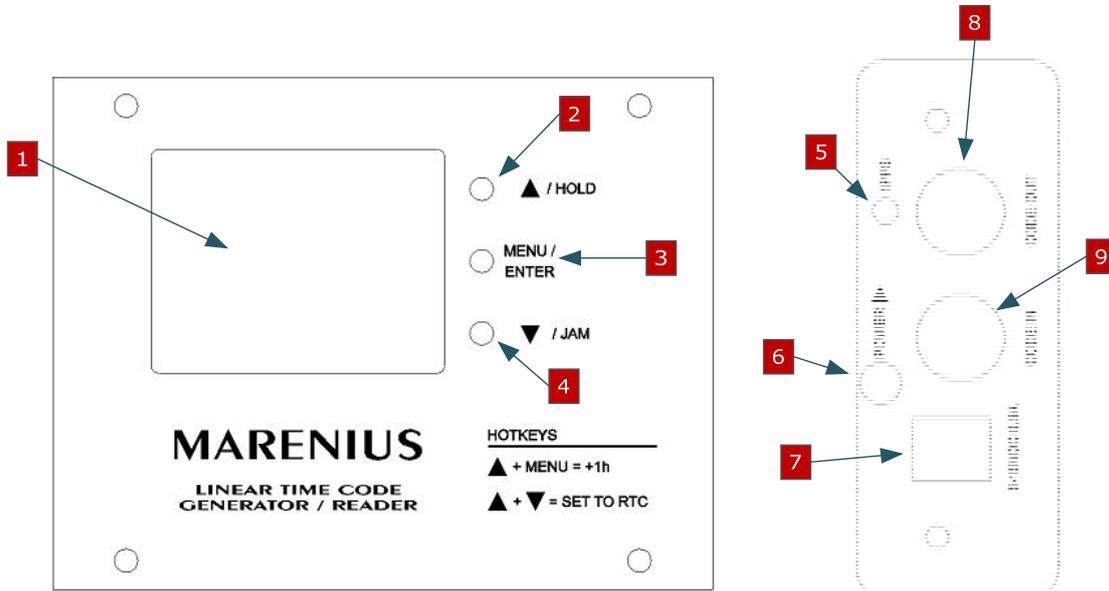
LTC-GEN can be powered from standard LR03 (AAA type) batteries and/or an external 5-15V power supply. A supercap is used instead of a traditional backup battery for real time clock and LTC, meaning no internal battery needs to be replaced. A LED is used to indicate operation when the OLED is turned off. A very accurate 0.5ppm crystal oscillator is used to ensure time code accuracy for at least 8 hours. The crystal is voltage tuned when the device is shipped from the factory.

The LTC-GEN is housed in a heavy duty aluminum cabinet.

### ***Package includes:***

- 1x LTC-Generator**
- 1x 9VDC adaptor**
- 1x BNC-BNC cable**
- 1x BNC-RCA adapter**
- 4x AAA batteries**

## 2. Front panel and connections



1. **OLED Display**  
Displays operation information, settings and menus.
2. **UP / HOLD button**  
When the device is in menu mode this button is UP button. When the device is in default mode the button will hold the time code both in the display and on the output, however the internal counter is still counting. When the button is released the time code will catch up to the internal counter.
3. **MENU / ENTER button**  
Pressing the MENU / ENTER button will enter the main menu. When the device is in menu mode the button is used to confirm a selection.
4. **DOWN / JAM button**  
When the device is in menu mode this button is DOWN button. When the device is in default mode the button will JAM the device to the external time code if a valid time code is presented. The button must be hold down until "JAM" is flashing on the display.
5. **1PPS LED**  
The LED will flash each second when the device is operating (exception: HOLD mode).

6. **Power switch**  
The switch is used to power on or off the device.
7. **Power input**  
The power input accepts 5V to 15V DC.  
*Note: voltage levels above 15V will damage the unit.*
8. **Code output**  
This is the main time code output. The output level is 2Vpp (unloaded).
8. **Code input**  
The connector is used to read an external time code from a third party device. The LTC-GEN is able to synchronize to the external time code independent of the frame rate.

### 3. Powering the LTC-GEN

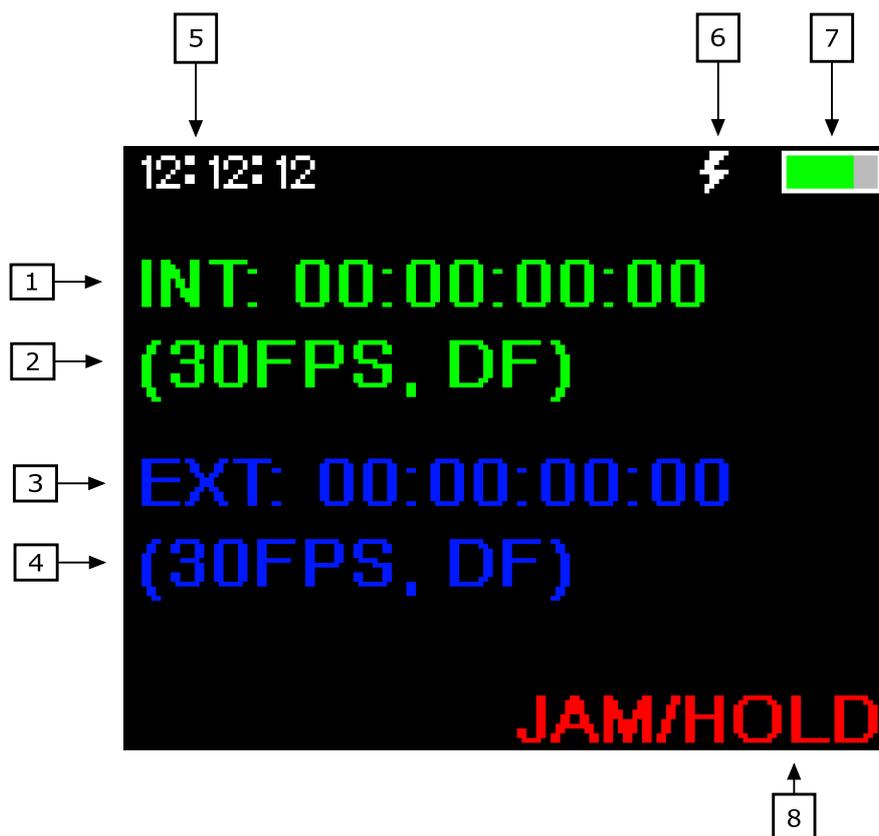
The LTC-GEN can be powered from an external power supply or four standard LR03 (AAA type) batteries. Both NiMH and alkaline batteries can be used. The batteries shall be placed in the battery holder as the label on the battery cover describes. The battery chemistry shall be set in the main menu to allow the unit to display the correct battery level.

The MM-4240 can be powered from an external power supply of **5V-15V**; the external power supply can be a mains adapter, batteries or any power supply that is able to deliver at least **0.5A** of current. Even if the LTC-GEN doesn't draw 0.5A the power supply must be able to handle load transients.

The internal batteries are disconnected from the unit when an external power supply is connected to the unit. Therefore it is *very important that the voltage level of the external power supply doesn't drop below 5V.*

### 4. Primary display mode

When the LTC-GEN is powered up the default display mode is entered. The unit displays internal time code, external time code, real time clock and power information. The image below shows the primary display mode.



1. **Internal time code**  
The line is displaying the internal time code, the time code displayed here is the time code generated at the output.
2. **Internal time code format**  
The format of the internal time code (24 FPS, 25FPS, 30FPS or 30FPS DF)
3. **External time code**  
The line is displaying the external time code, if no time code is presented on the input the device is showing --:--:--:--.
4. **External time code format**  
The format of the external time code (24 FPS, 25FPS, 30FPS or 30FPS DF). The device is using the drop frame bit to detect drop frame, if the third party generator isn't supporting drop frame bit the LTC-GEN isn't able to display this information.
5. **RTC**  
Real time clock. The clock can be set via the menu.
6. **External power**  
The power symbol is lit when an external power source is attached to the unit.
7. **Battery level**  
Displays current internal battery level. The symbol is filled with green or red depending on the current level. If the symbol is flashing, replace the batteries as soon as possible. The LTC-GEN will only run for about 15 minutes when the battery symbol is flashing.  
*Note: For a true display of the battery level, the battery chemistry must be set.*
8. **JAM/HOLD field**  
If the device is jamming or holding the time code this field is used otherwise the field is blank.

## 5. HOTKEYS

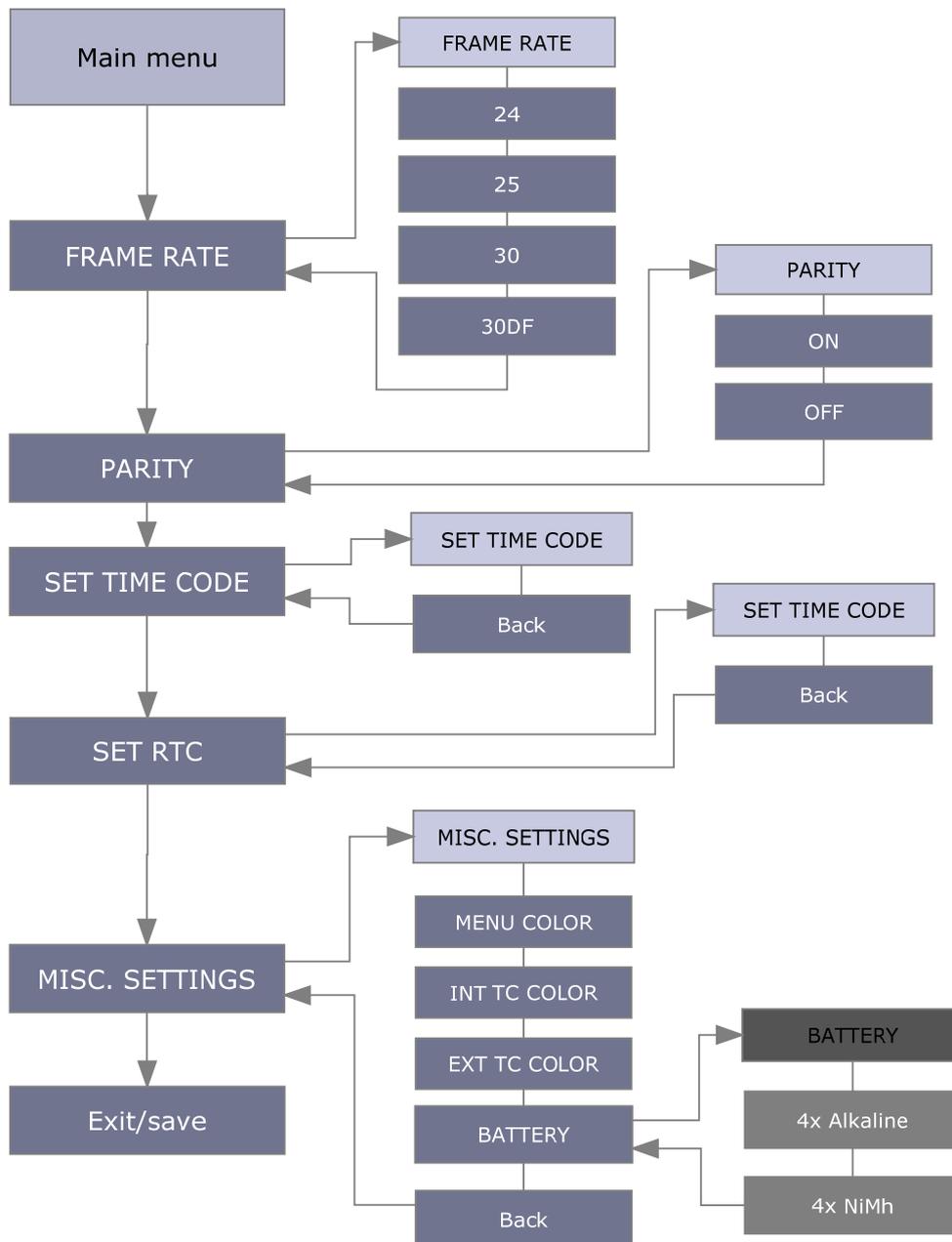
The LTC-GEN has two hotkey functions, "+1h" and "SET TO RTC". Holding down the UP button in default mode will enable the hotkey function. When holding down the UP button press either MENU button or DOWN button to increase one hour or synchronize the internal time code to the real time clock.

UP button + MENU button = Increase one hour.

UP button + DOWN button = Synchronize the internal time code to the real time clock.

## 6. Main menu

Secondary functions are accessible through the main menu. To enter the main menu press the MENU button. To navigate through the menu use the MENU UP, DOWN and CENTER buttons. The main menu structure is shown in the illustration below. The menu will automatically return one step every 15 second until the general screen has been reached.



### **6.1. Frame rate**

This frame rate option set the main frame rate of the time code generation. The available options are:

- 24 FPS
- 25 FPS
- 30 FPS
- 30 FPS with drop frame

### **6.2. Parity**

The user is able to turn on or off the parity bit defined in the SMPTE 12M specification. This may be useful if the device connected to the LTC-GEN doesn't support parity. If a third party connected device doesn't support parity the reader may flicker if the parity bit is enabled.

### **6.3. Set time code**

If the user want to change the outgoing time code this menu option is used. The ENTER button is used to step forward in the fields. The UP and DOWN button is used to change hours, minutes and seconds. The new time code is activated on the last ENTER button click (confirming seconds).

### **6.4. Set RTC (real time clock)**

The menu option is used to set the real time clock. See 5.3 Set time code, for procedure.

### **6.5. MISC. SETTINGS**

The general setup menu handles various settings of the LTC-GEN

#### **6.5.1 MENU COLOR**

The user is able to change the colors used in the menu and the colors used in the channel information rows. The available colors are:

- PURPLE
- RED
- GREEN
- BLUE
- DARK RED
- YELLOW
- PINK

#### **6.5.2 INT TC COLOR**

See 5.5.1 MENU COLOR.

#### **6.5.3 EXT TC COLOR**

See 5.5.1 MENU COLOR.

#### **6.5.4 BATTERY**

The battery chemistry must be set to the battery chemistry used for a correct battery level meter. The choices are

- Alkaline
- NiMH

Other batteries may be used as long as the voltage stays between 4V and 10V; however the battery level indicator will be incorrect.

## 7. Technical specifications

### Power supply

External supply voltage .....	5-15 VDC
Power consumption (Typ).....	0.2W
Internal battery voltage .....	4-10VDC

### Time code output

Output level.....	2Vpp (Unloaded)
Output impedance .....	470Ω
Crystal oscillator precision.....	0.5ppm

### Time code input

Minimum input level.....	0.5Vpp
Maximum input level.....	5Vpp
Input impedance .....	100kΩ

### Dimensions and weight

Size (H x W x D) .....	3.4 x 8.5 x 9.7 cm
Weight (without batteries).....	~350 grams