

# **HORITA RLT-50**

RS 422 to SMPTE Time Code Translator

## **USER MANUAL**

For Models RM-50/RLT, SR-50/RLT

Doc. 071050  
Rev. D  
Copyright (C) 2018

**HORITA®**

## **COPYRIGHT**

**(C) 2018 HORITA CO., INC.**

**All rights reserved**

No part of this document may be copied or reproduced in any form or by any means without prior written consent of HORITA CO., INC., P.O. Box 3993, Mission Viejo, CA 92690.

HORITA CO., INC. makes no warranties with respect to this documentation and disclaims any warranties of merchantability or fitness for a particular purpose.

HORITA, its logo, and RLT-50 are trademarks of HORITA CO., INC

# TABLE OF CONTENTS

---

<b>INTRODUCTION</b>	<b>CHAPTER 1</b>
1.1 Model Numbers	4
<b>GENERAL</b>	<b>CHAPTER 2</b>
	4
<b>FEATURES</b>	<b>CHAPTER 3</b>
	4
<b>CONNECTING</b>	<b>CHAPTER 4</b>
4.1 Connecting VIDEO IN and VIDEO OUT	5
4.2 Connecting TIME CODE OUT	5
4.3 Connecting for Stand Alone Operation	5
4.4 Connecting for Operation in an Editing System	5
<b>BASIC CHECKOUT</b>	<b>CHAPTER 5</b>
5.1 Local Mode	6
5.2 System Mode	6
5.3 Front Panel LED Indicator	6
<b>SPECIAL TIME CODE OUTPUT OPTIONS</b>	<b>CHAPTER 6</b>
6.1 "Direction of SMPTE Time code Output	6
6.2 Bi-Directional Forward/Reverse Time code	7
6.3 Forward Time code Only	7
6.4 Search Offset	7
6.5 Normal Switch Settings	7
<b>PRESETTING THE USER BITS</b>	<b>CHAPTER 7</b>
	7
<b>USING THE RLT-50 IN THE FIELD</b>	<b>CHAPTER 8</b>
8.1 Operating From Battery Power	8
<b>MAINTENANCE AND TROUBLESHOOTING</b>	<b>CHAPTER 9</b>
9.1 Cleaning	8
9.2 Service	8
9.3 Troubleshooting	8
9.4 General	8
<b>SPECIFICATIONS</b>	<b>CHAPTER 10</b>
	9

# 1 INTRODUCTION

---

This manual provides installation, operation, and troubleshooting instructions for all models of the HORITA RLT-50 Remote Longitudinal Translator.

## 1.1 Model Numbers

The RM-50/RLT is the basic model. The other model, SR-50/RLT, differs in packaging only, not in operation. Because of this, except where noted, they both are referred to as the RLT-50.

# 2 GENERAL

---

The RLT-50 outputs a standard SMPTE longitudinal time code (LTC) signal whose time value is obtained from and matches that present on the DB9 remote control connector of video recorders and other devices that use the Sony RS422 serial remote machine control protocol.

The SMPTE time code follows the drop/non-drop frame status of the RS422 time code and is genlocked to the video output from the video recorder or to any other analog composite video reference signal.

The SMPTE time code obtained from the remote connector can be used by other pieces of video and audio equipment needing standard SMPTE time code to operate.

A special feature of the RLT-50 is that it enables the "user bits" of the SMPTE time code to be individually preset as desired to add additional information such as production number, date, reel number, etc., when the time code is copied.

The RLT-50 has controls to permit selection of local and system modes of operation so that it can operate either stand alone or can connect to an edit controller and become part of an editing system. In addition, the RLT-50 has controls to select particular options in the format of the SMPTE time code so that it will be compatible with the widest variety of time code equipment.

# 3 FEATURES

---

- \* Dual DB-9 remote I/O connectors allow RLT-50 to operate stand alone or as part of editing system.
- \* Translates and outputs drop frame or non-drop frame TIME CODE according to format of time code recorded on RS422 VCR.
- \* Simple front panel switch control allows independent presetting of all user bits of the translated SMPTE TIME CODE.
- \* Front panel switch allows selection of time code output format such that it is either forward direction only, or is forward/reverse direction according to VCR tape motion. This insures compatibility with greatest number of TIME CODE readers, inserters, editing systems, synchronizers, etc.
- \* TIME CODE output is always play speed only, no matter how fast VCR is moving tape. It can be read frame-by-frame or at highest search speeds by inexpensive play speed readers and window inserters, such as the HORITA WG-50.
- \* Special selectable "-1-frame" search offset mode compensates for the +1-frame "on-time" updating done by many time code readers. This makes sure translated time code is frame accurate when operating at slow and still frame speeds.
- \* Front panel LED indicates power-on, normal translating, input video missing, and user bit preset modes.
- \* Operates from 9-to-13.5 volts DC. Can be used in the field.
- \* Provides multi frame rate operation capability of 23.976, 24, 25, and 29.97/30 FPS in DF (drop frame) and NDF (non-drop frame) formats.

Frame rate detection is accomplished by continuously measuring the vertical sync rate of the composite video reference input signal and then adjusting operation of the RLT-50 accordingly. The entire FPS detection and adjustment process follows FPS changes in the composite video signal and is automatic and transparent to the user.

## 4 CONNECTING

---

Figure-1 is a general diagram of how to connect the RLT-50 to a typical video deck with a DB9 remote connector, in this example a Sony EVO-9800 VCR, an edit controller such as an RM-450, and a HORITA WG-50 time code window dub inserter to display or make window dubs of the translated SMPTE time code. Note that the RLT-50 does not require use of an edit controller, as it can operate in local stand alone mode.

### 4.1 Connecting VIDEO IN and VIDEO OUT

The RLT-50 must have a video input from the EVO-9800 so that the SMPTE time code is locked to video and does not freerun. When locked to video there is one SMPTE time code number per video frame, timed such that the number does not "straddle" two video frames.

The RLT-50 VIDEO IN and VIDEO OUT connectors are looping type input/output video connections and do not terminate the video input. For proper operation make sure the video input/output to the RLT-50 is terminated at just one location at the standard 75-ohm value.

Connect a separate BNC type 75-ohm terminator at the VIDEO OUT of the RLT-50 when using a dedicated video output from the EVO-9800 to the RLT-50. If looping the video through the RLT-50, make sure one of the pieces of video equipment connected to the RLT-50 VIDEO OUT terminates the signal.

### 4.2 Connecting Time Code Out

The SMPTE time code output from the RLT-50 is single ended at a level of 2-volts peak-to-peak (approx 0dB). It is compatible with most all VCR audio channel or address track levels for recording time code.

The RLT-50 time code output can drive several loads if it's necessary to provide time code to more than one piece of equipment. The output can be split into two or more signals by using simple passive RCA "Y" type splitters or cables, rather than using a distribution amplifier.

### 4.3 Connecting for Stand Alone Operation

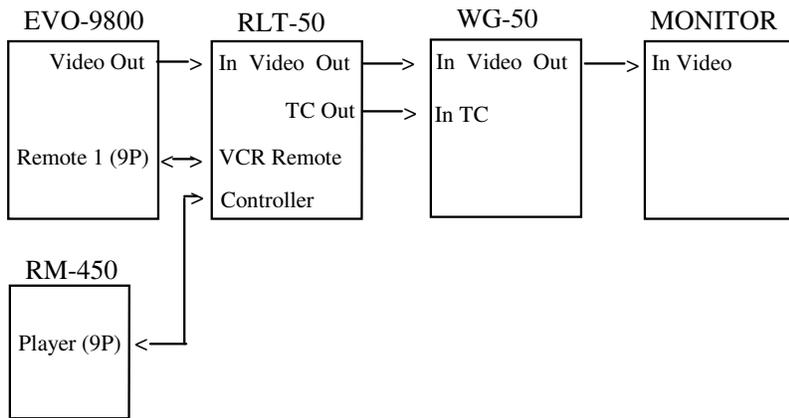
In the local stand alone mode of operation, the RLT-50 requests and translates the time code from the EVO-9800 once per video frame.

After connecting video and time code, connect the RLT-50 9-pin connector labeled VCR REMOTE to the EVO-9800 remote connector labeled REMOTE 1 (9P), using the 9-pin interconnect cable supplied with the RLT-50.

### 4.4 Connecting for Operation in an Editing System

In the system mode of operation the RLT-50 is passive and translates the time code requested by and sent to the edit controller. This request is usually at the rate of once-per-video-frame, so that the translated time code is always updated once each frame.

First connect the RLT-50 to the EVO-9800 as previously described for stand alone operation. Next connect the 9-Pin cable from your edit controller (or other controller) to the RLT-50 9-Pin connector labeled CONTROLLER.



Note: RM-450 edit controller is not required for operation of RLT-50.

Figure-1, Connecting the RLT-50 to EVO-9800/RM-450 system

## 5 BASIC CHECKOUT

### 5.1 Local Mode

After the RLT-50 is connected to your system, switch power ON and set the MODE switch to LOCAL. Place a previously recorded tape into the EVO-9800 and place into PLAY mode. The power on LED on the RLT-50 should be flashing rapidly and if viewing the translated SMPTE time code on a window inserter or a time code reader, the numbers should be counting up in step with the time code numbers on the EVO-9800 LED display.

### 5.2 System Mode

If connected inline with your editing system, switch the RLT-50 MODE to SYSTEM and verify that your edit controller still operates the EVO-9800 and that the translated SMPTE time code is still produced.

### 5.3 Front Panel LED Indicator

The front panel LED flashes to indicate POWER ON, as well as other information as follows:

LED Indication	RLT-50 Operation
Rapid flashing	Normal operation, video in ok, communicating with EVO-9800
Quick flash on	User-bit setup mode
1/2-sec flash	Video in ok, no EVO comm
1-sec flash	No video in, no EVO comm
Alternate rapid/flash	No video in, EVO comm ok slow

## 6 SPECIAL TIME CODE OUTPUT OPTIONS

The RLT-50 offers two special time code output options to insure compatibility with the greatest variety of SMPTE time code equipment that may use the RLT-50 time code output. These options are the "direction" of the translated time code, and incorporation of a one frame "search offset" of the time code number.

### 6.1 "Direction" of SMPTE Time code Output

The "direction" of the time code output from the RLT-50 can be set for either forward time code only, or forward/reverse time code. Direction in this context means the change in the sequence of information in the time code corresponding to tape motion in the forward or reverse direction.

For example, when normally reading SMPTE time code recorded on a standard VCR audio channel or time code track, the time information is received in the sequence of frames, seconds, minutes, and hours when the tape is

moving forward, and hours, minutes, seconds, and frames when tape motion is reverse.

## 6.2 Bi-Directional Forward/Reverse Time code

The direction information contained in the time code may be required by time code based audio synchronizers and edit controllers in order for them to operate properly.

If your downstream time code equipment reads and processes bi-directional SMPTE time code, the RLT-50 LTC OUTPUT switch should be set to FWD/REV.

In this position, the RLT-50 outputs "forward" direction play speed SMPTE time code when the EVO-9800 tape is moving forward, and "reverse" direction play speed time code when the tape is moving in reverse.

## 6.3 Forward Time code Only

If your SMPTE time code equipment only reads or processes play-speed "forward" direction time code, set the RLT-50 LTC OUTPUT switch to FWD.

In this position the RLT-50 always outputs time code as though it is coming off tape that is moving in the forward direction at play speed, even though the actual translated frame number count may be counting down in reverse.

## 6.4 Search Offset (-1 Frame)

When reading time code at play speed, it takes the time of the entire video frame to read the SMPTE time code number for that frame of video, and, as soon as the frame number is read, that frame of video is history.

Because of this, most (but not all) SMPTE time code equipment adds one frame count to the time code number read so that the number of the next frame of video will be known beforehand. This process is generally referred to as "on time" updating.

However, when the EVO-9800 is in search mode and is still-framed, adding an extra count to the translated time code number causes the frame number to be ahead by one frame, as compared to the number on the EVO-9800 LED display.

To compensate for this, the RLT-50 can be set to offset or subtract one frame count from the translated SMPTE time code when in search mode. Then, when one frame is later added by other equipment, the correct frame number is produced.

To enable the search offset, set the RLT-50 SEARCH OFFSET switch to ON.

### *Note:*

Although it depends on the characteristics of the other time code equipment you are using with the RLT-50, in general, it's safest to assume that one frame count will always be added and therefore the RLT-50 SEARCH OFFSET should normally be set to ON.

If you have a time code reader or other equipment that displays the time code from the RLT-50 and it is one frame behind, the SEARCH OFFSET should be set to OFF.

In general, search offset is important only if you are concerned with absolute frame accurate correspondence between the translated SMPTE time code and the time code number indicated on the EVO-9800 LED display.

## 6.5 Normal Switch Settings

For most applications of the RLT-50 time code output, the LTC OUT switch is set to FWD/REV and the SEARCH OFFSET set to ON.

# 7 PRESETTING THE USER BITS

---

The user bits of the translated SMPTE time code can be preset to add reel number, scene/take number, date, production number, or other information. This is especially useful when making a copy of the EVO-9800 material for editing on a different format system.

A SMPTE time code reader that can display the user bits, such as the HORITA WG-50 play speed reader/window inserter, is required to view the user bits when presetting them.

To preset the user bits first momentarily actuate the RLT-50 USER BITS switch to SEL (select), then release.

From then on this causes the RLT-50 to ignore the "zero" user bit information from the EVO-9800 and respond to preset information from the RLT-50 front panel USER BITS SET switch.

When the user bits preset mode is first entered, the left most user bit on the display "flashes" between 0 and 8 about once per second to indicate the selected user bit character. The front panel LED also flashes at the same rate.

Next, momentarily actuating USER BITS SET causes the selected user bit character to count up in hexadecimal fashion from 0-9, then A-F, then repeat. When the desired number is set, momentarily switch to SEL to select the next user bit digit. Repeat this process until all digits have been selected and no user bit characters are flashing.

## **8 USING THE RLT-50 IN THE FIELD**

---

### **8.1 Operating From Battery Power**

You can operate your RLT-50 from battery power in order to use it in the field.

The RLT-50 operates from 9 to 13.5 volts DC. In general it is recommended operating the RLT-50 from 12-volts DC, obtained either from a conventional 12-volt video camera battery, or from a battery pack consisting of eight 1.5 volt cells. Either Alkaline or rechargeable Nicad may be used.

You can make a 12-volt battery pack from an eight cell AA battery holder (or two four cell holders), a length of two-conductor wire, and a 3.5MM mini phone plug, all obtainable from local electronics supply stores such as Radio Shack. You can also use a single pack of six cells to provide 9-volts, or a single 9-volt battery, but the operating times will be considerably lower.

HORITA offers the BP-50 battery pack as an economical and convenient means of operating your RLT-50 from battery power. The BP-50 consists of eight rechargeable AA sized batteries, battery holder, power cable, heavy duty cloth case with nylon strap, and convenient wall-type overnight recharger with LED.

The BP-50 will typically operate the RLT-50 for 3-to-4 hours.

## **9 MAINTENANCE AND TROUBLESHOOTING**

---

### **9.1 Cleaning**

- a. Do not attempt to disassemble your RLT-50 to clean it.
- b. Clean your RLT-50 using only a damp cloth.
- c. NEVER use water or solvents such as alcohol, window cleaner, etc. to clean your RLT-50.

### **9.2 Service**

Do not attempt to disassemble your RLT-50 to service it. There are no user-serviceable parts or adjustments inside. You can return your RLT-50 to HORITA for service or repair. Please contact HORITA first before returning your unit.

### **9.3 Troubleshooting**

The following provides a list of the most common items to check if you are having trouble with your RLT-50.

### **9.4 General**

If you suspect your RLT-50 is not operating properly, check the following first:

- a. Make sure the video input to the RLT-50 is not "double terminated", that is, there are not two video terminations on the video input and/or output line from other recorders, monitors, etc.
- b. Check all coaxial cables in signal path for opens or shorts.
- c. Check for proper installation of the 9-Pin communications cable between RLT-50 and EVO-9800.
- d. If using an AC power adapter different from the one supplied with the RLT-50, make sure it supplies the RLT-50 with at least 9-volts (maximum of 12-volts) when the RLT-50 is switched on.
- e. Use the RLT-50 flashing LED indications to help determine presence of video, EVO-9800 communications, etc, as previously described.

# 10 SPECIFICATIONS

---

## Power

Operation 9-to-13.5 volts DC, 250 milliamperes Connector 3.5MM Mini phone jack  
AC Adapter 9-volt, 500 milliamperes

## Video

Standard NTSC 525 line, 60 field, RS-170A or PAL 625 line, 50field  
Input  
Level 1-Volt p-p Impedance 100K-Ohm  
Output Video loop-through  
Connectors BNC

## Time code

Format SMPTE 80-bit longitudinal  
Drop frame/non-drop frame

Output  
Level 1.5 volts p-p  
Impedance 1K Ohm  
Risetime 25 microseconds, +/-5uS  
Connectors RCA

## Preset

User bits Hexadecimal 0,1,2,3,4,5,6,7,8,9,A,  
B,C,D,E,F

## Switches And Controls

Power ON/OFF  
Mode LOCAL/SYSTEM  
LTC Output FWD-FWD/REV  
Search Offset ON/OFF  
User bits SEL/SET

## LED Indicator

Power ON - ok Continuous rapid flashing  
VCR Comm Alternate slow/rapid flashing  
User bit Set Quick flash  
Video 1/2-sec flash  
No Video 1-sec flash

## Environment

Operating 5°C to 40°C (41°F to 104°F)  
Storage -10°C to 60°C (14°F to 140°F)

## Dimensions

Rackmount 1-3/4" H, 19" W, 5-3/4" D  
Shortrack 1-3/4" H, 7" W, 5-3/4" D

## Weight

Rackmount 1-1/2 Lbs.  
Shortrack 1-3/8 Lbs.