HORITA   MTD-100

Time Code Time/Date Display

USER MANUAL

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1 GENERAL

The MTD-100 is a studio time/date display which reads SMPTE longitudinal time code (LTC) and provides either an hours, minutes, and seconds time readout, or a month, day, and year readout. The MTD-100 can optionally be equipped to read vertical interval time code (VITC).

A variety of user selectable time and date display formats are available, as is the ability to automatically switch between time and date displays. The MTD-100 can also be used as a 30- or 60-minute down counter.

If the incoming time code is for a different time zone, for example, Greenwich Time, a "local" time zone adjustment offsets the displayed time and date from the values supplied by the time code so that the MTD-100 displays the local time and date, accurately referenced to Greenwich Time.

The MTD-100 is an ideal display device for use with HORITA GPS/SMPTE time code products.

2 FEATURES

*   Time display format can be 12 hour AM/PM with four (10:15 P), or six (10:15:06 P) digits, or 24 hour military style with four (22:15) or six (22:15:06) digits.

*   Date display can be set to month/day/year (9-27-94), day/month/year (27-09-94), year/month/day (94-09-27), month/day (9-26), or year/month (94-09).

*   Display can be set to alternate between time and date every two seconds.

*   Zone switch permits changing the time zone to cause the MTD-100 to display the local time and date of other geographical areas anywhere on the globe.

*   Time and date formats in addition to the time zone value are retained in non-volatile memory.

*   Seven-segment LED display with 0.8" high red characters provide good visibility and legibility from across a room.

*   Brightness control permits adjusting display intensity for indoor use in a darkened room or outdoor use in bright light.

*   Reads play speed LTC (VITC reader option available).

*   Outputs 2V P-P reshaped SMPTE time code for passing on to other units.

*   Operates from +9V to +14V DC for portable use in the field. Includes a 9 Volt AC adapter.

*   Desktop sized MTD-100 measures 8.75"W x 1.5"H x 4.5"D.

3 CONNECTING THE MTD-100

3.1 Connecting Power

Included with your MTD-100 is an AC power adapter that provides a 9 volt, 500 milliamperes DC output. This adapter is equipped with a miniature phone plug with the "+" (positive) voltage output connected to the front tip of the plug.

Insert the power plug into the MTD-100 "+9V DC" connector and plug the adapter into 110-120 volt, 60-Hz AC power.

WARNING:

ELECTRICALLY OPERATED PRODUCT

As with all electrical products, precautions should be observed during handling and use to prevent electrical shock.

NOTE:

Make sure the plug is inserted all the way into the power connector or else damage to the power adapter may result. Do not use an adapter of more than 9 volts at 500 milliamperes or damage to the MTD-100 may result.

3.2 Connecting LTC In and Out

Figure 3-1 shows a basic hookup for the MTD-100.
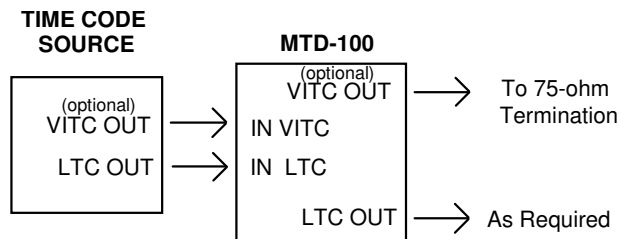
Figure 3-1, Basic MTD-100 Hookup

Connect SMPTE LTC from its source to the RCA connector labeled LTC IN. Reshaped, 2V P-P LTC is available at the RCA connector labeled LTC OUT.

3.3 Connecting VITC In and Out (Option)

Connect the video source supplying VITC to the BNC connector labeled VITC(VIDEO) IN. The VITC(VIDEO) IN signal is directly looped through to the BNC connector labeled VITC(VIDEO) OUT. To ensure correct VITC reader operation, this video loop through must be properly terminated at 75-ohms by using a BNC terminator, connecting the VITC(VIDEO) OUT to a terminating video monitor, VCR, etc.

4 OPERATING THE MTD-100

To operate the MTD-100, connect LTC in (and/or VIDEO in/out if the VITC reader option is installed), apply power, and set the POWER switch to ON.

The MTD-100 retrieves the most recently used display format and time zone value from its non-volatile memory.

Depending upon which display format is currently in use, the MTD-100 indicates the status of the incoming time code through the use of the colons and hyphens as follows:

*   If no valid time code is available, the colons (time) or hyphens (date) are off.
*   If valid time code is available but in not incrementing, then the colons (time) or hyphens (date) remain constantly on.
*   Incrementing seconds digits indicate valid, incrementing time code. However, if the time format does not include the seconds digits or if the date is displayed, then the colons (time) or hyphens (date) blink at a one-second on/off rate to indicate the presence of valid, incrementing time code.

4.1 Required User Bits Format

In order to correctly display date information and to adjust for time zone differences, the MTD-100 requires the following time code user bit format:

User Bit

Character	**Description of Use**
UB1	BCD units of day
UB2	BCD tens of day
UB3	BCD units of month
UB4	BCD tens of month
UB5	BCD units of year
UB6	BCD tens of year
UB7	BCD units of time zone
UB8	BCD tens of time zone

This user bit format matches that supplied by the HORITA GPS-MTG Master Time Code Generator. Other HORITA GPS-based time code products (GPS1, GPS2 and GPS3) vary in their use of user bit characters UB7 and UB8. An internal jumper allows the MTD-100 to be used with these products and is described in more detail in Chapter 5.

The values contained in the user bits time zone fields range from 00 to 23. Time zone 00 represents Greenwich, England. The time zone number increases as one moves west from time zone 00.

The following table provides the time zone values for various locations around the world:

Zone	Location
0	London (Greenwich)
1	Iceland
2	Azores
3	Rio de Janeiro
4	Buenos Aires (Eastern Daylight Time)
5	New York (Eastern Standard Time)
6	Chicago (Central Standard Time)
7	Denver (Mountain Standard Time)
8	Los Angeles (Pacific Standard Time)
9	Whitehorse, Yukon Territory
10	Anchorage, Alaska
11	Nome, Alaska
---	(International Date Line)
12	New Zealand
13	Kamchatka
14	Sydney
15	Tokyo
16	Manila
17	Djakarta
18	Igarka, Siberia
19	Omsk
20	Sverdlovsk
21	Baghdad
22	Moscow
23	Paris

4.2 Selecting the Time Display Format

When pressed to its TIME position, the rear panel TIME/DATE momentary switch causes the display to change to the current time display format, if the display had been in the date display mode.

If the TIME/DATE switch is held in the TIME position for more that one second, the current time format number is displayed as `"F:nn"` (where `"F"` indicates Format and `nn` is the time format number). It will blink on and off at a ¼-second rate to indicate that the time format setup mode is active.

Once in this setup mode, releasing the TIME/DATE switch causes the corresponding time format to be displayed, also blinking.

If the switch is then pressed to the TIME position while the display is blinking, the time format number will increment and be displayed and, when released, the associated time format displayed. In this manner, the user is able to step through the available time formats, displaying each number and format until the desired selection is found.

When the TIME/DATE switch has been released and has remained in its released position for more than two seconds, the chosen time format value is saved in the non-volatile memory, the display stops blinking, and the setup mode ends.

The available time formats are as follows:

Format Number	Time Display	
01	hh:mm:ss A/P	(12-hr)
02	hh:mm:ss	(24-hr)
03	hh:mm A/P	(12-hr)
04	hh:mm	(24-hr)
05	hh:mm:ss A/P	(12-hr, alt w/date)
06	hh:mm:ss	(24-hr, alt w/date)
07	hh:mm A/P	(12-hr, alt w/date)
08	hh:mm	(24-hr, alt w/date)
09	mm:ss	(30-minute counter)
10	mm:ss	(60-minute counter)

Time format numbers 05 through 08 select the time/date alternating display. The alternating display switches between the corresponding time format and the most recently selected date format once every two seconds.

Time formats 09 and 10 provide 30- and 60-minute down counters, respectively. The 30-minute down counter begins at 30:00 on each half hour, while the 60-minute version starts at 60:00 on the hour.

4.3 Selecting the Date Display Format

When pressed to its DATE position, the rear panel TIME/DATE momentary switch causes the display to change to the current date display format, if the display had been in the time display mode.

If the TIME/DATE switch is held in the DATE position for more than one second, the current date format number is displayed as: "F-nn" (where "F" indicates Format and nn is the date format number). It will blink on and off at a ¼-second rate to indicate that the date format setup mode is active.

Once in this setup mode, releasing the TIME/DATE switch causes the corresponding date format to be displayed, also blinking.

If the switch is then pressed to the DATE position while the display is blinking, the date format number will increment and be displayed and, when the switch is released, the associated date format displayed. In this manner, the user is able to step through the available date formats, displaying each number and format until the desired selection is found.

When the TIME/DATE switch has been released and has remained in its released position for more than two seconds, the chosen date format value is saved in the non-volatile memory, the date display stops blinking, and the date setup mode ends.

The available date formats are as follows:

Format Number	Date Display
01	mm-dd-yy
02	dd-mm-yy
03	yy-mm-dd

4.4 Time Zone Setup

In addition to containing time and date information, the incoming time code may also contain the time zone value from the generating time code source. The ability to set a local time zone value for the MTD-100, which may differ from that supplied by the incoming time code, allows for automatic adjustment of the displayed time and date values.

For example, the generating time code source might have a time zone number of 05 indicating U.S. east coast time, while the user may wish his MTD-100 to display the local time in Los Angeles. By setting the MTD-100 time zone number to 08 (U.S. west coast), the displayed time and date is automatically adjusted for the time difference between Los Angeles and the east coast.

Setting of the local time zone number is accomplished via the rear panel ZONE switch. This switch operates in much the same manner as does the TIME/DATE switch. When pressed to its momentary SET position, the MTD-100 displays its current local zone number as "L nn" (where "L" means Local zone and "nn" is the local zone number). If held in the SET position for more than one second, the zone number display begins to blink, indicating that the zone number setup mode is

now active. When released, the adjusted time is displayed. Subsequent toggles of this switch to its SET position increment the zone number and cause the time display to be adjusted accordingly. In this manner, the user can simply step through the zone numbers, checking the displayed time value until the correct zone number is found.

Once the ZONE switch has remained in its released MAN position for more than two seconds, the new local zone number is saved in the non-volatile memory and the zone setup mode ends. The display remains set to its latest time format, but stops blinking.

Placing the ZONE switch into its TC position forces the displayed time and date values to match those supplied by the incoming time code. No time zone adjustment is made.

4.5 Selecting LTC or VITC(option)

If the VITC option is installed in the MTD-100, an additional rear panel switch, SOURCE, allows selection between LTC and VITC.

4.6 Mounting Options

The standard MTD-100 is shipped as a desktop unit. Two other mounting options are available.

The HORITA S100EK Rackmount Ear Kit allows the MTD-100 to be installed in a standard 19" equipment rack. This kit includes a single rackmount ear and all necessary mounting hardware. All HORITA Series 100 display units are one rack unit high (approximately 1-½"). Two units can be mounted side-by-side by using two Rackmount Ear Kits. Series 100 units can also sit side-by-side in a rack "tray".

The HORITA S100SK Wallmount Swivel Bracket Kit allows the MTD-100 to be mounted on a wall or attached to a studio camera or other equipment for viewing by studio personnel. The bracket kit allows the unit to swivel to adjust the viewing angle up or down and to the left or right. Two bracket kits can be used to mount two units individually or can be used such that one mounts to the wall and the other holds the two units together. Each kit includes a bracket, knurled thumbscrews, and wall mounting hardware.

5. MAINTENANCE

5.1 Cleaning

      1. Do not attempt to disassemble your MTD-100 to clean it.

      2. Clean your MTD-100 using only a damp cloth.

      3. NEVER use water or solvents such as alcohol, window cleaner, etc., to clean your MTD-100.

5.2 Service and Troubleshooting

If you suspect your MTD-100 is not operating properly, check the following:

      1. Check all cables for opens or shorts.

      2. If using an AC power adapter different from the one supplied with the MTD-100, make sure it supplies the MTD-100 with at least 9 volts (maximum of 14 volts) when the MTD-100 is switched on.

You may return your MTD-100 to HORITA for service. Please contact HORITA first, either by phone or mail, before returning your unit.

5.3 Adjustments

Internal jumper selections are provided for regenerated LTC risetime and user bit time zone data.

To access these jumpers, remove the top cover from the MTD-100 by removing the four hex screws. The locations of these jumpers are shown in Figure 5-1.
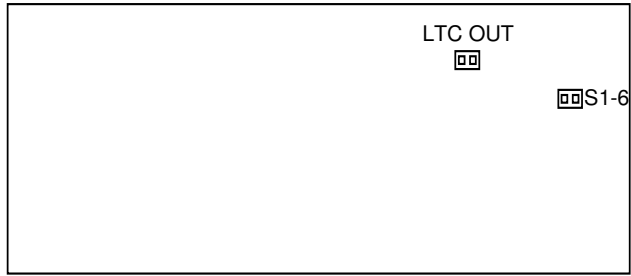
Figure 5-1, Jumper Locations

5.4 LTC Output Risetime Jumper

The LTC OUT jumper allows adjustment of the regenerated LTC output risetime waveform. With a shunt installed, the risetime of the regenerated LTC output is limited to 25uS, ±5uS. With no shunt installed, wide band LTC is regenerated. Factory setting is wide band.

5.5 Source Time Code Zone Selection

As mentioned in Chapter 4, some HORITA GPS time code generators do not supply a time zone value in user bit characters UB7 and UB8. Installing a shunt at jumper SW1-6 forces the MTD-100 to assume a time zone value of 00. With no shunt installed, the MTD-100 expects a valid time zone number in user bit nibbles UB7 and UB8. Factory setting is no shunt installed.

6 SPECIFICATIONS

Power
Operation	9-to-14V DC, 275 milliamperes
Connector	3.5 MM mini phone jack
AC Adapter	9 volt, 500 milliamperes

Connectors
VIDEO IN	
VIDEO OUT	BNC (VITC option only)
TC IN	
TC OUT	RCA
POWER	3.5MM Mini Phone

Switches And Controls
SOURCE	Toggle switch (VITC option only)
ZONE	Toggle switch (momentary in SET position)
TIME/DATE	Momentary toggle switch
POWER ON/OFF	Toggle switch
BRIGHT	Brightness adjustment

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

Dimensions
8.75"W x 1.5"H x 4.5"D

Weight
Approximately 13 Oz. (shipping weight approximately 29 Oz. including power adapter)

Specifications subject to change without notice