

TCD24 and TCD44

SMPTE - IRIG

TIME CODE DISPLAY



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See important *limited warranty* information at the end of this document.

TCD TIME CODE DISPLAY

Introduction

The TCDX4 is a series of versatile, multi-featured time code driven clock displays. These units decode and display industry standard SMPTE and IRIG-B linear (longitudinal) time code formats. The units may be placed on a desktop or shelf, or they may be wall mounted by using the included mounting bracket.

SMPTE decoding supports 30 fps (including drop-frame), 25 fps and 24 fps. IRIG-B decoding supports the 1kHz modulated format (B1) and the unmodulated format (B). Other features include:

- +12 to -11 hour time zone offsets
- Half hour offsets
- US/Canada daylight savings time adjustments
- Retains time during loss of power and/or time code
- Automatic level adjustment to incoming time code signals
- Automatic detection of time code type and date encoding availability
- RTC backup for time and date when time code not present

Operation

Connect a source of SMPTE or IRIG-B time code to the input connector. Connect the DC power jack. Then plug in the wall power supply into an appropriate AC source.

Operating Environment

The TCD series is not water or moisture proof. Treat it as you would any other delicate electronic device and do not expose it to water, excessive heat or physical abuse.

Configuration

Basic operation of the TCD series is configured via the **S1** switch bank accessible by removing the rear panel of the clock.

Caution: *To reduce the risk of damage to the TCDX4 unit and electrical shock from live low voltage DC circuitry, Always unplug and remove DC power from the unit before accessing the configuration switches, by disconnecting the DC power plug. Do not remove the rear panel or make configuration adjustments with the DC power connected.*

S1 switches 1-4 configure the time zone (hour) offset:

<u>Hour offset</u>	<u>S1-1</u>	<u>S1-2</u>	<u>S1-3</u>	<u>S1-4</u>
0 hour offset	OFF	OFF	OFF	OFF
1 hour offset	ON	OFF	OFF	OFF
2 hour offset	OFF	ON	OFF	OFF
3 hour offset	ON	ON	OFF	OFF
4 hour offset	OFF	OFF	ON	OFF
5 hour offset	ON	OFF	ON	OFF
6 hour offset	OFF	ON	ON	OFF
7 hour offset	ON	ON	ON	OFF
8 hour offset	OFF	OFF	OFF	ON
9 hour offset	ON	OFF	OFF	ON
10 hour offset	OFF	ON	OFF	ON
11 hour offset	ON	ON	OFF	ON
12 hour offset	OFF	OFF	ON	ON

S1 switch 5 configures positive/negative time zone (as set with S1 switch positions 1-4).

<u>Function</u>	<u>S1-5</u>
Time offset is positive	<i>OFF</i>
Time offset is negative	<i>ON</i>

S1 switch 6 ON- applies an additional +½ hour offset.

<u>Function</u>	<u>S1-6</u>
No ½ hour offset	<i>OFF</i>
Enable ½ hour offset	<i>ON</i>

S1 switch 7 configures daylight savings time adjustment option. (See *Daylight Savings Time*)

<u>Function</u>	<u>S2-7</u>
DST adjustment disabled	<i>OFF</i>
DST adjustment enabled	<i>ON</i>

S1 switch 8 configures time display format.

<u>Format</u>	<u>S1-8</u>
24-hour	<i>OFF</i>
12-hour	<i>ON</i>

S1 switches 9, 10 and 11 configure brightness intensity of the clock display.

<u>Level</u>	<u>S1-9</u>	<u>S1-10</u>	<u>S1-11</u>
Level 1 - Brightest	<i>OFF</i>	<i>OFF</i>	<i>OFF</i>
Level 2	<i>ON</i>	<i>OFF</i>	<i>OFF</i>
Level 3	<i>OFF</i>	<i>ON</i>	<i>OFF</i>
Level 4	<i>ON</i>	<i>ON</i>	<i>OFF</i>
Level 5	<i>OFF</i>	<i>OFF</i>	<i>ON</i>
Level 6	<i>ON</i>	<i>OFF</i>	<i>ON</i>
Level 7	<i>OFF</i>	<i>ON</i>	<i>ON</i>
Level 8 - Dimmest	<i>ON</i>	<i>ON</i>	<i>ON</i>

S1 switch 12 configures RTC backup.

<u>Format</u>	<u>S1-12</u>
RTC enable	<i>OFF</i>
RTC disable	<i>ON</i>

Default Configuration

A TCD ships from the factory with all S1 switches in the OFF position. This configuration results in the time displayed as: no time zone offset, no daylight saving time adjustment, and 24 hour display format.

Time Display Operation

After application of power the TCD will go through an internal checkout. Time from the real-time clock backup will then be displayed until a time code signal is acquired.

Connect a source of SMPTE or IRIG-B time code to the input connector. The time should appear on the display within 30 seconds of application of time code. If the time code signal is lost or disconnected the TCD will continue to display time based on its internal reference until the time code signal is returned. If the clock is unable to achieve a time code lock see the section entitled *Troubleshooting Tips*.

The colons of the clock display will flash when the time date displayed is not locked to time code. When time code is present and decoding properly the colons will remain steady-on. In some situations time code may be providing time but not date information. Under these circumstances the TCD will assume the year to be 2000. The date will be Jan 1st for SMPTE. And IRIG-B will be current day since IRIG has day of year by default.

If the TCD is configured with the RTC disabled, then the LED display will show dashes with blinking colons when time code is lost or invalid.

If the TCD is configured for a 12-hour time display mode an AM/PM indicator will appear in the bottom right corner of the display during the PM hours.

Daylight Saving Time

When Daylight Saving Time (DST) is enabled, the TCD will apply an extra hour of offset to the incoming time code during US/Canadian-defined daylight saving time. Daylight savings time in the US/Canada begins on the first Sunday of April at 2:00AM and ends on the last Sunday of October at 2:00AM. The TCD will process DST from Jan 1st 1992 to Dec 31st 2091.

IMPORTANT: The incoming time code must have a date encoded in a format recognized by the TCD-x4 for daylight savings time adjustments to be performed. *For best reliability Masterclock, Inc. recommends a time code source that encodes full date information, such as the Masterclock, Inc. GPS-200 master clock.*

For SMPTE time codes date must be encoded to the Leitch specification. IRIG-B date decoding is supported for the IEEE 1344 standard. The TCD will automatically detect a recognized date encoding format in time code. These specifications are also supported by Masterclock, Inc. master clock systems.

If your time code source is already making adjustments for daylight savings time do not enable this feature in the TCD.

Troubleshooting Tips

Problem: Clock is unable to “lock” to time code after 2 minutes.

Possible reasons/solutions:

1. Clock is not currently connected to time code source. Verify that all cables are properly connected.
2. There is a problem with the cabling between the clock and the time code source. Verify that all cables and connectors are working, in good condition, and that proper pinout connections have been observed.
3. There is a ground loop or other type of interference between the clock and the time code source. Verify that a common ground exists between the clock and the time code source. If the cabling distance between the time code source and clock is large you may want to consider inserting an audio distribution amplifier between the devices.
4. The signal level of the incoming time code is out of the range of the time code decoder’s circuitry. See the clock specification section for acceptable signal level ranges.
5. The signal level of the incoming time code is fluctuating. The signal level must be stable for the TCD to detect and decode the time code.
6. The time code being fed to the TCD is not a recognized format. Verify that your time code source is providing one of the time code formats that the TCD can decode.

Problem: Clock is not displaying date information.

Reason:

The TCDX4 series displays *time information only*.

Problem: Clock is not displaying the correct local time.

Possible reasons/solutions:

1. The time code source is not referenced to your local time zone. Possibly it is referenced to UTC (GMT) or other another time zone. Determine the time zone reference of your time code source then set the clock’s time zone offset accordingly to arrive at a correct displayed local time.
2. Your time code source is not providing the time/date that you expect. Contact the individual responsible for the time code source for more information.

Problem: Clock did not properly negotiate the daylight time to standard time (or vice-versa) transition.

Possible reasons/solutions:

1. Your time code source is not providing date information. Valid date information is required to provide the daylight savings time adjustment feature.
2. Your time code source provides the daylight savings time adjustment. If so, then the daylight savings time adjustment feature in the TCD should be disabled.

If these troubleshooting tips do not solve your problem please visit the support area of our website www.masterclock.com for additional information and Frequently Asked Questions, or contact technical support.

SPECIFICATIONS

Input

Format.....LTC: .SMPTE 24fps, 25fps or 30fps, IRIG-B and IRIG-B(1)
Level.....Approx.1.25 Vpp(0db/600Ω)
Level Range.....Nominal 1-16 Vpp
Impedance.....Approx. >10 K ohm
Connector.....BNC female

Power Requirements

DC Input Voltage.....9 – 28 VDC
DC Input Connector.....2.1 mm male panel mount jack, center pin/conductor positive (+)
Power Consumption.....Less than 10 Watts

Battery (real time clock chip).....3.3VDC, 12.5mm coin cell, (Panasonic BR1225 or equiv.)
Operational Life expectancy.....10 yr+

Physical

Chassis-TCD-24.....L-9.32"/20.72cm H - 3.00"/6.68cm D - 1.63"/3.62cm
Chassis-TCD-44.....L-16.63"/36.99cm H -5.31"/11.82cm D - 1.86"/4.17cm

LED Characters TCD-24.....4 digits @ 2.25 in/5.7cm
LED Characters TCD-44.....4 digits @ 4 in/8.9 cm

Weight TCD-24.....1.5lbs/0.68 kg
Weight TCD-44.....4lbs/1.82 kg

Power Supply Characteristics

Approvals - UL, CSA, IEC & VDE.

Operating/Storage Temperature & Humidity

Operating Temperature 0 to +40°C
Relative Humidity Up to 90% (non condensing @ 25°C)
Storage Temperature -40 to +70° C
Relative Humidity Up to 90% (non condensing @ 25°C)

OPTIONS – SPECIAL ORDER

Green or Amber LED's – special order

LIMITED WARRANTY

This Masterclock, Inc. (hereinafter MC) product warranty extends to the original purchaser.

MC warrants the TCD24 and TCD44 against defects in materials and workmanship for a period of one year from date of sale. If MC receives notice of such defects during the warranty period, MC will, at its option, either repair or replace products, which prove to be defective.

Should MC be unable to repair or replace the product within a reasonable amount of time, the customer's alternate remedy shall be a refund of the purchase price upon return of the product to MC. This warranty gives the customer specific legal rights. Other rights, which vary from state to state or province to province, may be available.

Exclusions

The above warranty shall not apply to defects resulting from improper or inadequate installation or maintenance by the customer, customer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product or improper site preparation and maintenance (if applicable).

Warranty Limitations

MC MAKES NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THIS PRODUCT. MC SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

In any state or province which does not allow the foregoing disclaimer, any implied warranty of merchantability or fitness for a particular purpose imposed by law in those states or provinces is limited to the one-year duration of the written warranty.

Exclusive Remedies

THE REMEDIES PROVIDED HEREIN ARE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MC BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

In any state or province which does not allow the foregoing exclusion or limitation of incidental or consequential damages, the customer may have other remedies.