CLKTCD Series Analog Clocks

User Manual

The **CLKTCD** series of Time Code Display analog clocks refers time from a Time Code source

Masterclock®

CE FC

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The CLKTCD series of analog clocks
are designed to display precise time referenced from a Time Code source, like SMPTE or IRIG-B.

The CLKTCD clock contains a stepper motor drive with an advanced microprocessor and electronics to rapidly and automatically synchronize the hands on the face of the clock.

Thank you for your purchase of a new TCD analog clock from Masterclock

Here you'll find instructions for unpacking and installing your clock, proper care and configuration.

We are here to help.

You can reach us using various contact methods (phone, email, etc.) found at our website: **www.masterclock.com**

Before calling, please attempt to find the answer to your situation in this user manual. You'll find it will handle virtually all of your questions.

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There are no user serviceable parts inside CLKTCD analog clocks. Please contact Masterclock, Inc. (back page) if you require servicing or repair.

Do not expose this clock to temperatures outside the range of 32˚ to 140°F (0˚ to 60˚C). Placing it in an environment that is too cold or humid may damage the unit. Do not place heavy objects on top of this clock or use excessive force on it. Never use benzene, paint thinners, detergent or other chemical products to clean the outside of this clock. Such products will disfigure and discolor the casing.
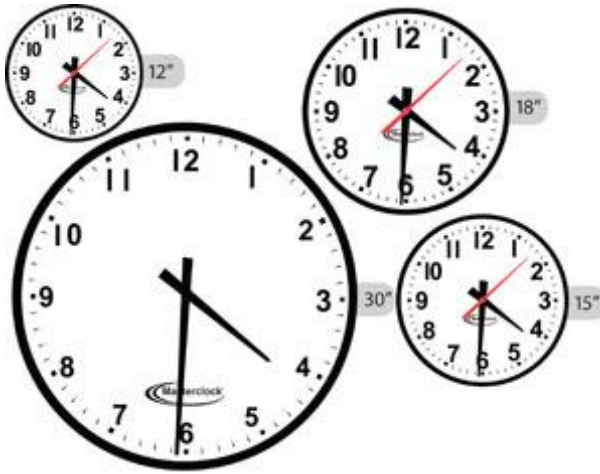
See radio frequency emissions precautions (page 10).

Only qualified persons are authorized to carry out maintenance on this device. Read this User's Manual carefully, and follow the correct procedure when setting up the device. Do not open your Masterclock product or attempt to disassemble or modify it.

Introduction

The CLKTCD series of Masterclock Time Code analog clocks take their signal from a Time Code servers, like SMPTE or IRIG-B. They are fully configurable using TCD-Set software (page 17).

They contain a stepper motor drive and advanced microprocessor controlled electronics to rapidly and automatically synchronize the hands to adjust for **Leap Second** and **Daylight Savings Time** in a maintenance-free, reliable and quiet operation.

Clock options include rim lighting for nighttime visibility and a variety of clock faces including 12- and 24-hour, plus tic marks (no numerals, page 4).

The second hand may be preset to "tick" or "sweep."

These clocks are designed for indoor use only.

Time Code

Please refer to the **"Specifications"** section of this document (page 23) for additional details on each clock model.

There are several forms of Time Code with EBU, IRIG-B and SMPTE the most commonly used in Masterclock devices.

IRIG-B

Defined by the Range Commanders Council, U.S. Army White Sands Missile Range. IRIG (Inter-range Instrumentation Group) is used by military, government, power industry and many other commercial and industrial applications. The CLKTCD decodes IRIG-B in both a 1 kHz modulated (IRIG-B1) and un-modulated/pulse width coded/DC level shifted (IRIG-B0) format. All formats of IRIG-B Time Code decoded by the CLKTCD use the time of year information BCD (Binary Coded Decimal). All formats of IRIG-B Time Code decoded by the CLKTCD also use the extended year/date and Time Zone information in the control functions as defined by the IEEE 1344 specification. SBS (Straight Binary Seconds) information is not decoded. Manchester format/encoding is not supported.

The CLKTCD can be configured for world-wide Time Zone offset and automatic DST (Daylight Saving Time) adjustment and allows for reliable, accurate and maintenance free operation. Use of the automatic DST feature requires that the clock be enabled to accept the Time Code date encoding, using the USB port and TCD-Set (Clock Time Code Display) USB Configuration Utility (i.e. Windows software application). The Time Code reference must provide date encoding in the control bits/fields to the Masterclock/Leitch date encoding standard for SMPTE or the IEEE-1344 year encoding for IRIG-B.

The CLKTCD does not support decoding of SMPTE drop-frame, reverse running, VITC, NTSC, color frame, blackburst or other video time code formats and synchronization options.

SMPTE

This Society of Motion Picture and Television Engineers format is available in frame rates of 24, 25, and 30 frames second. The CLKTCD Time Code clock supports all three formats. All formats of SMPTE Time Code decoded by the CLKTCD use the full date information in the user bits as defined by Leitch, Inc.

Features

Please refer to the **"Specifications"** section of this document (page 34) for additional details on each clock model.

- RTC (Real Time Clock) backup retains time during loss of power or reference

- Self-correcting hands once power and/or Time Code reference is re-established

- Time Zone offsets (to one second resolution) supports any biasing requirements

- DST configuration

- TCXO (Temperature Compensated Crystal

- Oscillator) for ± 1 minute per year accuracy without a reference signal (freewheeling)

- All configuration settings retained in non-volatile flash memory

- Second hand with sweep or step option

- Status LED (Light Emitting Diode) on clock face, located at the 6 o'clock position

Below:
CLKTCD12 – 12" (30cm) TCD clock
Powder coated steel case
12-hour faceplate.

CLKTCD15 – 15" (38cm) TCD clock
Stainless steel case
12-hour faceplate

CLKTCD18 – 18" (45cm) TCD clock
Stainless steel case
Tick mark faceplate (option)
Illumination (option)

Unpacking and Installation

YOUR CLKTCD CLOCK PACKAGE INCLUDES:

The list below is for illustration purposes.
Refer to your sales order for actual items shipped.

- CLKTCD analog clock

- Mounting bracket with retaining screw

- CD-ROM (TCD-Set, USB Configuration
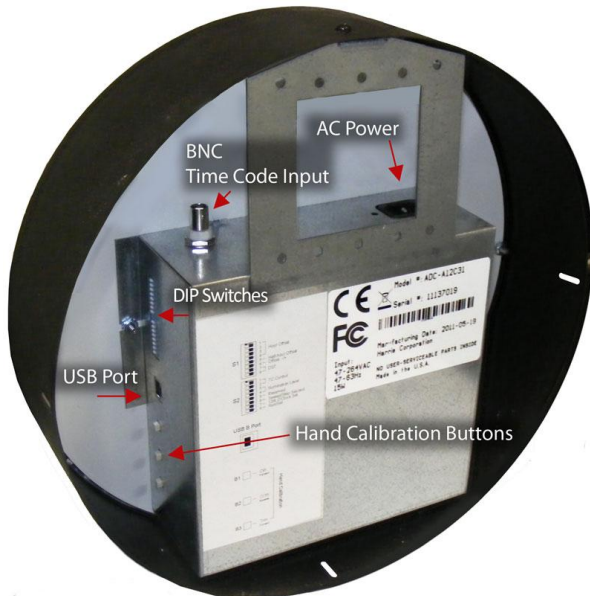 Utility and User Manual)

- Power cord

CD- ROM

IEC power cord
(select power option when ordering)

The Back of Your Clock

AC POWER

The AC models are supplied with an IEC power cord (above).

SIGNAL

Connect the 50 ohm (Ω) RG59 coaxial cable (not supplied) to the BNC connector, located on the back panel.

MOUNTING

The CLKTCD analog clock is designed for both wall and ceiling mount (model dependent). Power and low voltage signal wiring should be installed according to local electrical codes, so to access the back of the clock. See page 6.

DIP SWITCHES, USB PORT, CALIBRATION BUTTONS

For DIP switch information see page xx. For USB port information see page 12. For information on the hand calibration buttons, see page 15.
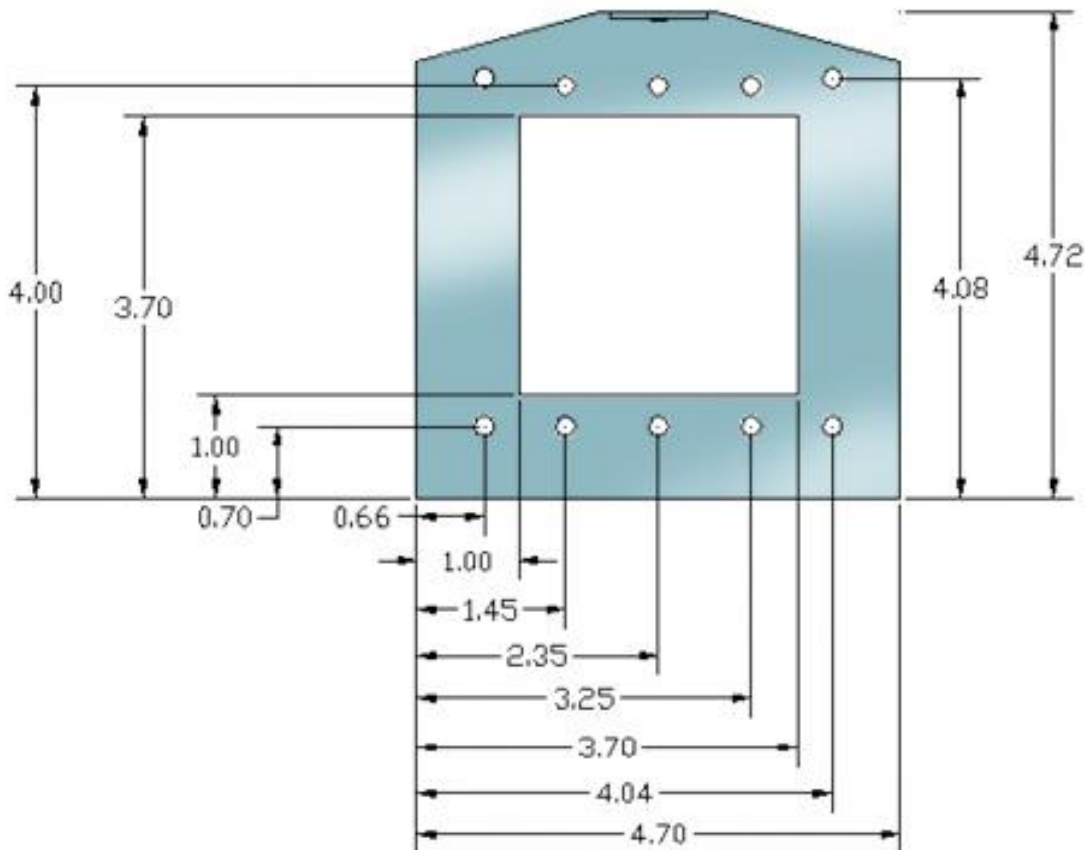
Mounting Bracket

The CLKTCD series of analog clocks is designed for both wall and ceiling mounts (model dependent). Power and low voltage signal wiring should be installed according to local electrical codes to access the back of the clock.

Do not route power or signal cables between the case and the wall (along the exterior of the wall)

12" AND 15" MODEL WALL MOUNT

On the 12" and 15" models a mounting bracket is supplied to fit on either a standard 2"x 4" or 4" x 4" conduit box.

1. Mount the bracket on the wall/conduit box.

2. Attach the RG59 coaxial cable and AC power cord

3. Secure the clock to the bracket using the supplied retaining screws.

12" DUAL FACE CEILING MOUNT

The dual face mounting bracket supplied, allows the 12" dual face clock to be mounted on the wall or from the ceiling, depending on the specific version.

1. Attach the Time Code cable and power.

2. Secure the clock to the bracket using the supplied screws.

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4 x ⌀0.266in [6.76mm]

2 X ⌀0.157in [3.99mm]

4.050in [102.87mm]

4.300in [109.22mm]

4.800in [121.92mm]

0.400in [10.17mm]

1.400in [35.56mm]

1.800in [45.73mm]

0.500in [12.70mm]

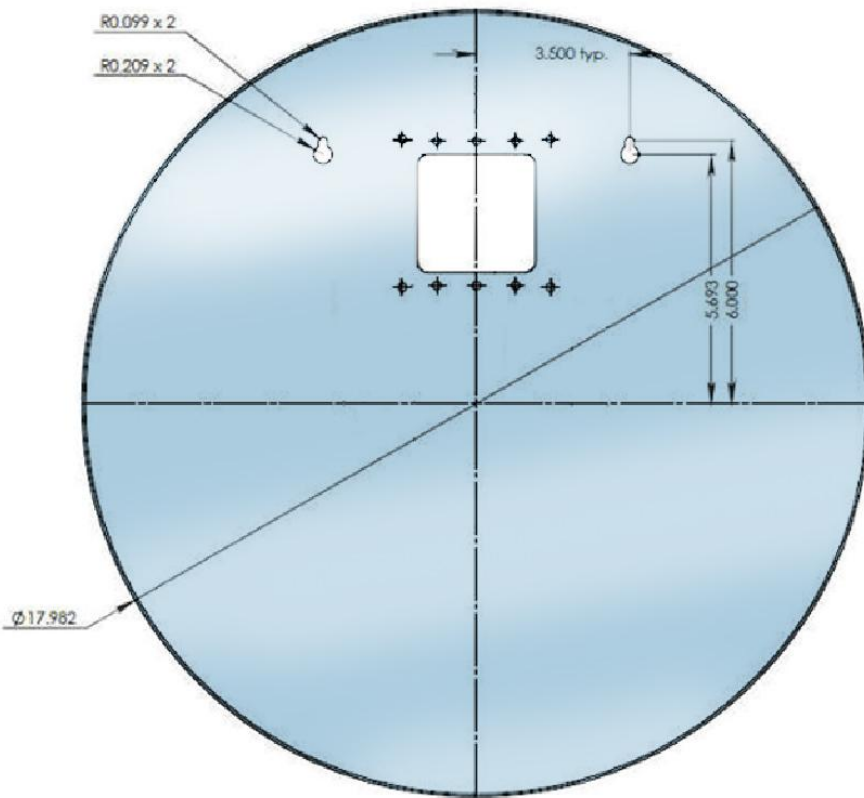0.750in [19.05mm]
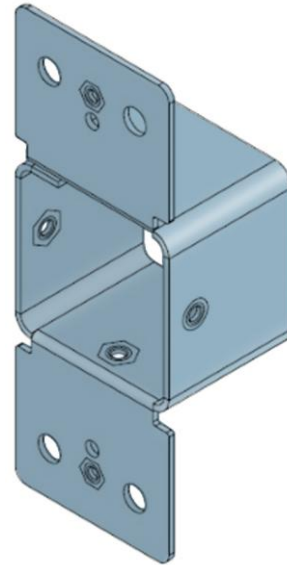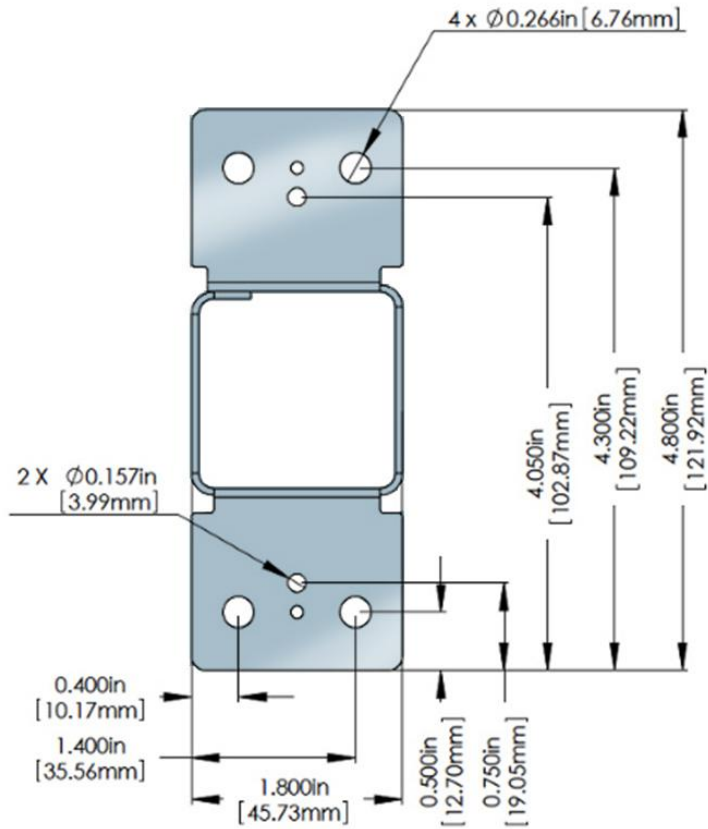
18" WALL MOUNT BRACKET

The 18" model has two (2) keyhole slots in the back panel that are placed 7" (17.78 cm) apart. Use an appropriate anchoring method to hang the clock on the wall.

Keyhole slot measurements

Diameter .209" (5.31 mm)

Keyhole to keyhole 7" (17.78 cm)

Clock center to keyhole 5.693" (14.46 cm)

Radio Frequency Emissions and Operating Environment

This CLKTCD analog clock has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Only qualified persons are authorized to carry out maintenance on this device. Read this User's Manual carefully, and follow the correct procedure when setting up the device. Do not open your Masterclock product or attempt to disassemble or modify it.

RADIO FREQUENCY EMISSIONS

The CLKTCD series of clocks generate, use and can radiate radio frequency energy. If not installed and used in accordance with the instructions, this RF energy may cause harmful interference to nearby radio communications. There is no guarantee that interference will not occur in a particular installation. If this clock does cause harmful interference to radio or television reception, which can be determined by removing power from the clock, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Connect the clock's AC power cord into an outlet on a different circuit than other devices.

2. Increase the physical distance between the clock and other devices.

3. Contact technical support.

Operation

After applying power, the CLKTCD will go through an internal checkout. UTC (Universal Coordinated Time) from the RTC (Real Time Clock) backup will then be displayed plus any Time Zone and/or DST offsets, until a Time Code signal is acquired. If Time Code is not "locked", the red status LED will be on solid until Time Code is acquired.

Never insert any metallic object into the clocks case, doing so increases the risk of electrical shock, short circuiting, fire or personal injury.

Never expose your clock to rain, or use it near water or in damp or wet conditions. Never place objects containing liquids on or near this clock, as they may spill into its openings increasing the risk of electrical shock, short circuiting, fire or personal injury

STATUS LED

The red LED on the CLKTCD clock face, located at the 6:00 indicates;

OFF
The clock acquired valid Time Code and has synchronized its internal RTC to the Time Code reference. The internal clock time is considered accurate. The clock hands may be adjusting/correcting rapidly either clockwise or counter-clockwise during a correction.

ON SOLID
The clock is not able to decode the Time Code reference or a reference is not present. Time displayed on the face of the clock is based upon internal and TCXO and should not be considered accurate.

CORRECTION BEHAVIOR

The correction cycle engages when there's a change to the internal RTC reference as compared to the Time Code reference.

1. While acquiring Time Code

   - Initial startup

   - After loss of power

   - After loss of Time Code

2. Changes to the clock's configuration

   - DIP switch settings

   - TCD-Set configuration utility

   - Reset device

HAND POSITION

Once configured and powered, the hands will automatically set adjust to the Time Code reference, plus any Time Zone and/or DST offsets.

If for any reason the clock hands become slightly out of alignment, a calibration setting function has been provided in **TCD-Set Configuration Utility** (page 17) or using the buttons located on the back.

The CLKTCD series can be configured using one of the following methods:

1. **DIP Switches and buttons**

   If the configuration software is used to configure the clock, the DIP switch settings will be ignored or over-ridden. In order to restore the configuration mode to the use of the DIP switches, the unit must be reset to the factory default mode.

2. **TCD-Set Configuration Utility** via the USB port.

TIME ZONE OFFSETS

All Time Code analog clocks maintain time as UTC.

A Time Zone offset or bias can be used to adjust the time for display purposes. A bias can be set as a positive (+) offset indicating that the unit leads the UTC time or negative (-) offset value indicating the unit lags behind UTC time. An offset with a resolution of one half hour (via DIP switches) or 1 second (via TCD-Set configuration utility) can be achieved.

If the Time Code input to the analog clock is not UTC, do not adjust the Time Zone and/or DST offset.

> The hands of the CLKTCD cannot be set manually. Do not attempt to open the clock to access the hands. This action will void your warranty. This device has no user serviceable parts inside.

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DAYLIGHT SAVINGS TIME

An automatic DST setting can be configured separately and in addition to a Time Zone offset.

For SMPTE Time Codes, date must be encoded to the Leitch specification. IRIG-B date decoding is supported for the IEEE 1344 standard.

The incoming Time Code must have the date encoded in a format recognized by the CLKTCD for DST adjustments to be performed. For best reliability Masterclock recommends a Time Code reference that encodes full date information, such as the Masterclock GPS200A Time Code generator.

DST now begins on the second Sunday of March at 2:00 AM (Local Time) and end the first Sunday of November at 2:00 AM (Local Time).

EU STANDARD – EUROPEAN UNION

In the European Union, daylight change times are defined relative to the UTC time of day instead of local time of day (like in the U.S.). For the European Union, Summertime Period begins at 1:00 AM UTC on the last Sunday of March and ends at 1:00 AM UTC on the last Sunday of October. European customers, please page 14 for details on setting Summertime Period.

To ensure proper hands-free year-around operation, DST adjustments must be configured using the daylight time option and not with the Time Zone offset option.

FREEWHEELING ACCURACY

The CLKTCD has built-in provisions to allow the clock to freewheel and maintain accuracy for extended periods in the absence of Time Code. These features also allow the unit to be set manually and operate without Time Code.

TCXO AND RTC CIRCUIT

The CLKTCD contains a precision TCXO and RTC circuit allowing the clock to maintain an accuracy of ±1 minute per year to the last known Time Code input (± 165 mS per day) when Time Code is not preset or cannot be decoded (i.e. freewheeling mode).

MAINTENANCE-FREE RECHARGEABLE BATTERY

The RTC and TCXO are maintained continuously from a rechargeable battery circuit during periods of power outage. Minimum holdover period is two weeks once the battery is charged. The battery will automatically charge when the unit is next powered and requires no maintenance.

NON-VOLATILE CONFIGURATION

The clock configurations are maintained in non-volatile memory allowing the current settings to be retained during power outages.

Configuration
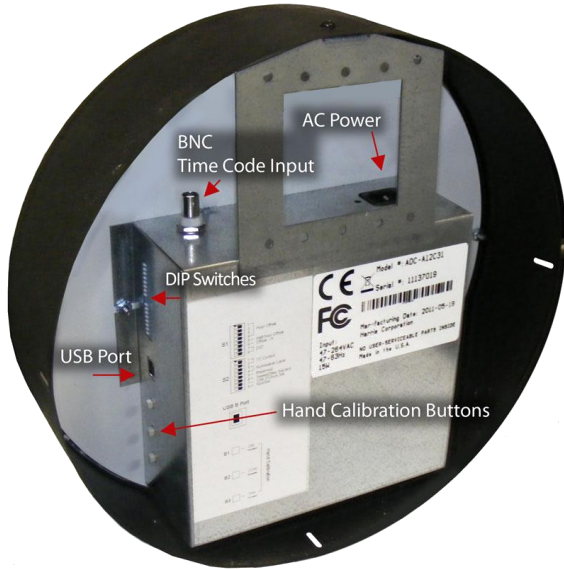
The CLKTCD may be configured using DIP switches or by the Windows software application **TCD-Set Configuration Utility** via the USB port.

Masterclock TCD analog clocks ship from the factory with all DIP switch and software configuration offset options set to [OFF] in order to display UTC time.

This is the factory default configuration is defined as:

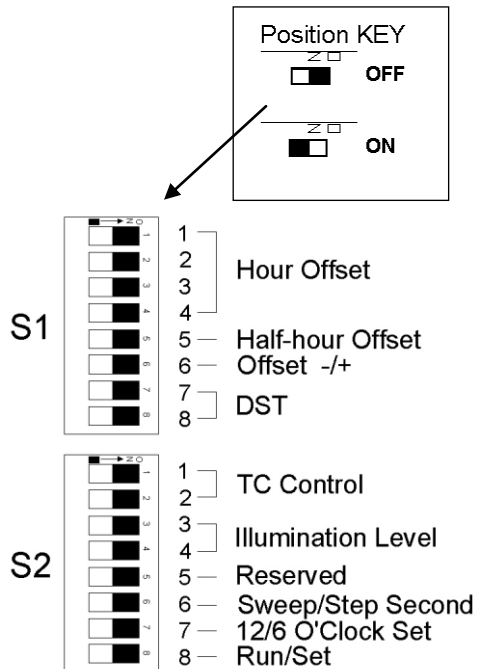| Setting	Configuration Selection
Disabled	Time Zone Offset
Disabled	Time Code Date/Year Encoding

DIP SWITCHES

Basic operation of the TCD analog clock is configured via the DIP switch banks accessible on the left hand side of the rear electronics cover.

The TCD analog clock will accept switch changes dynamically. It is not necessary to restart or cycle the power for the device to accept the new settings.

DIP switch bank 1 (S1) configures Time Zone Offset and Daylight Savings Time

S1.1, S1.2, S1.3, and S1.4 Time Zone hour offset:

Hour offset	S1.1	S1.2	S1.3	S1.4
0 hour (default)	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

S1.5

Additional ½ hour time offset
(as set by switch positions 1-4).

Function	S1.5
Time offset is negative (default)	OFF
Time offset is positive	ON

S1.6

Negative/Positive Time Zone offset
(as set by switch positions 1-5).

Function	S1.6
No ½ hour offset (default)	OFF
Enable ½ hour offset	ON

S1.7 and S1.8

Daylight Savings Time adjustment

Function	S1.7	S1.8
Disabled (default)	*OFF*	*OFF*
US/Canada DST enabled (*US standard up to Fall 2006*)	*ON*	*OFF*
US DST enabled (*US standard since Spring 2007*)	*OFF*	*ON*
EU DST enabled (*European Union*)	*ON*	*ON*

The incoming Time Code must have a date encoded in a format recognized by the TCD analog clock for daylight savings time adjustments to be performed. The Time Code date encoding Switches S2.1 and S2.2 must be set to enable the decoding of these control bits/fields.

DIP switch bank 2 (S2) configures how Time Code Control Bits/Fields are handled.

S2.1 and S2.2

Time Code Control Bits or Control Fields

Hour offset	S2.1	S2.2
No additional encoding (default)	*OFF*	*OFF*
IRIG 1344 & SMPTE Leitch	*ON*	*OFF*
Reserved for future use	*OFF*	*ON*
Reserved for future use	*ON*	*ON*

Quick Reference Guide
Time Zone & DST Switch Settings for US/Canada

Pacific UTC - 8 Mountain UTC - 7 Central UTC - 6 Eastern UTC - 5

S1

(Shown with US (Pre 2007) /Canada DST Enabled)

US/Canada Standard Pre 2007

Pacific UTC - 8 Mountain UTC - 7 Central UTC - 6 Eastern UTC - 5

S1

(Shown with US Post 2006 Policy DST Enabled)

US Standard Post 2006

S2.3 and S2.4

Controls the face plate illumination level,
if your clock has this option installed.

Illumination Level (Brightness)	S2.3	S2.4
0% (default)	OFF	OFF
35%	ON	OFF
70%	OFF	ON
100%	ON	ON

S2.5

Reserved for future use.

Function	S2.5
Reserved (default)	OFF
Reserved	ON

S2.6

Sets the second hand motion mode

Function	S2.6
Sweep or continuous (default)	OFF
Step (pulse)	ON

S2.7

Calibrate hands to position. Used in conjunction with S2.8
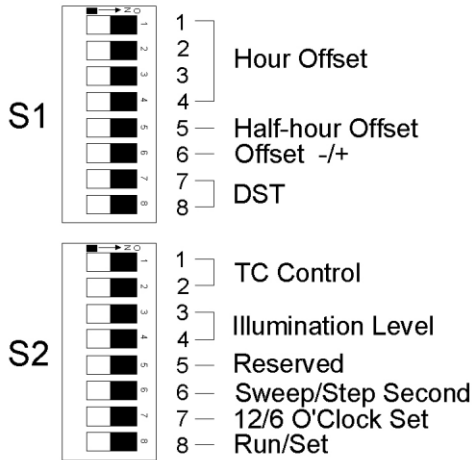"ON" to set the clock hands

Function `	S2.7
Set to 12:00:00 (default)	OFF
Set to 6:00:00	ON

S2.8

Used in conjunction with S2.7 to set the clock hands

Function	S2.8
Run (default)	OFF
Set	ON

Once the clock has been configured with the TCD-Set
app, the switch settings will be overridden and the unit
will ignore all settings until reset to factory default

B1 ☐ — CW
Forward

B2 ☐ — CCW
Reverse

B3 ☐ — Trim
Forward

Hand Calibration

S1
1 ⎤
2 ⎥ Hour Offset
3 ⎦
4
5 — Half-hour Offset
6 — Offset -/+
7 ⎤ DST
8 ⎦

S2
1 ⎤ TC Control
2 ⎦
3 ⎤ Illumination Level
4 ⎦
5 — Reserved
6 — Sweep/Step Second
7 — 12/6 O'Clock Set
8 — Run/Set
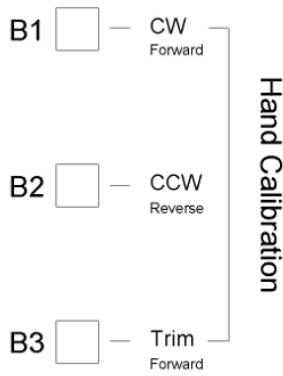
HAND CALIBRATION

The CLKTCD analog clock hands have been pre-set and aligned at the factory. This hand location and alignment information is retained in non-volatile flash.

The visual determination of the accuracy of the hand display should be done by comparing the clock hands only after the TCD analog clock indicates that it is synchronized to Time Code and then only to a digital display or other reference that has also been locked, preferably to the same Time Code reference . The reference display should be set adjacent to the TCD analog clock and eye movements should be minimized when doing comparisons.

To adjust the hands

1. Select "Set" using switch S2.8 [**ON**}.

2. Select either the 12:00:00 [**OFF**] or 6:00:00 [**ON**] position using switch S2.7.

3. Depress and release either button [**B1**] or [**B2**] to move the hands in the desired direction for either 12:00:00 o'clock or 6:00:00 o'clock. After releasing the button, the hands will rotate in the desired direction until any button is pressed. This feature allows for easier setting of the hands.

4. Depress and hold [**B1**] or [**B3**] down for 10 seconds to advance rapidly, then release.

5. The hands will rotate rapidly until any button is pressed.

6. Stop the hands a few seconds before the desired position.

7. Fine-tune the second hand position to the center of the 12-indicator mark by pressing [**B3**] to move the second hand in the forward direction incrementally.

8. Verify the final hand positions.

    All hands (hour, minute and second) point to center of 12 tic mark

    – or –

    Hour hand points to center of 6, minute and second point to center of 12 tic mark.

9. Change S2.8 to "Run" mode [**off**].

The new hand alignment settings are stored in non-volatile flash. The clock hands will adjust to the new settings and display the time after several moments.
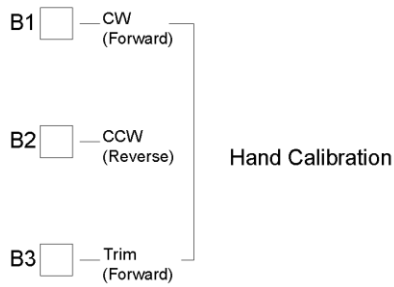
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DEFAULT CONFIGURATION

The TCD analog clock ships from the factory with all S1 DIP switches in the [**off**] position. This default configuration results in the time displayed as:

Time Zone Offset: **None**

Daylight Savings Time: **Disabled**

Time Code Date Encoding: **Disa**bled

B1 [ ] — CW (Forward)

B2 [ ] — CCW (Reverse)   Hand Calibration

B3 [ ] — Trim (Forward)

RESET FACTORY DEFAULT CONFIGURATION

In some situations (e.g. a lost password) it may be necessary to return the clock to its factory default configuration.

1. Remove AC power from the device.

2. Press and hold both [**B1**] and [**B3**] simultaneously.

3. After applying power, continue holding both buttons for 10 seconds and then release.

4. The Time Code clock configuration will now be reset and the unit will default to using the current DIP switch positions.

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TCD-Set Configuration

Masterclock TCDS clocks are configured on screen using the Windows software app, **TCD-Set Configuration Utility**. (See Installation details on page 17.)

The TCD analog clock ships from the factory with "Time Zone/Time Offset" options set to **OFF** in order to display UTC time. The TCDS interprets the incoming Time Code as UTC.

DEFAULT CONFIGURATION RESTORATION

The factory defaults may be restored by using the **TCD-Set** program, **Telnet,** or by using the **reset button** at the rear of each clock. On dual face clocks, the reset button is located on top.

SETTING	CONFIGURATION SELECTION
Disabled	Time Zone offset
Disabled	Daylight Savings Time
Enabled	Time Code client with DHCP
Enabled	24 Hour format

Your TCDS clock/device ships from the factory with the following configuration (at left). The firmware interprets the incoming time as UTC.

Masterclock TCDS clocks maintain their configuration data in non-volatile flash memory, even when the power is off.

DEVICE NAME/DHCP NAME REGISTRATION

As mentioned earlier, all network devices should be provided with a custom name (e.g. "reception-north-wall"). By default, device names are the product name abbreviation followed by the last octet of the device's MAC (Media Access Control) address (e.g. TCDS12-04:F7).

If a DHCP server is networked when the Time Code device is installed, the unit will be auto-registered with the DHCP server. The network system administrator can then view this DHCP name registration and the currently assigned IP address at the DHCP server.

DEFAULT PASSWORD

The factory-default password for the network device is: "**public**." Please use lower case.

RESET FACTORY DEFAULT CONFIGURATION

In some situations (such as a lost password) it may be necessary to return your device to its factory default configuration. A [**RESET**] button is located either on the clock's rear cover (on single-face clocks) or on top (on dual-face clocks).

TO RESET THE CONFIGURATION TO FACTORY DEFAULT:

Press and hold the reset button for 10 seconds (until dashes appear on the digits) and then release. The configuration will now be reset, including the password. The unit will need to be reconfigured to your custom settings.

TCD-Set Installation

To install the **TCD-Set** complete the following steps:

**Insert the CD** that shipped with your network device.

1. Run the "**RunShellExecute.exe**" application from the CD.
2. Approve all subsequent queries.
3. Your browser window opens to the Time Code Products webpage of **www.Masterclock.com**.
4. Click on a TCDS product to bring you to the products page.
5. Click [**Installer**].
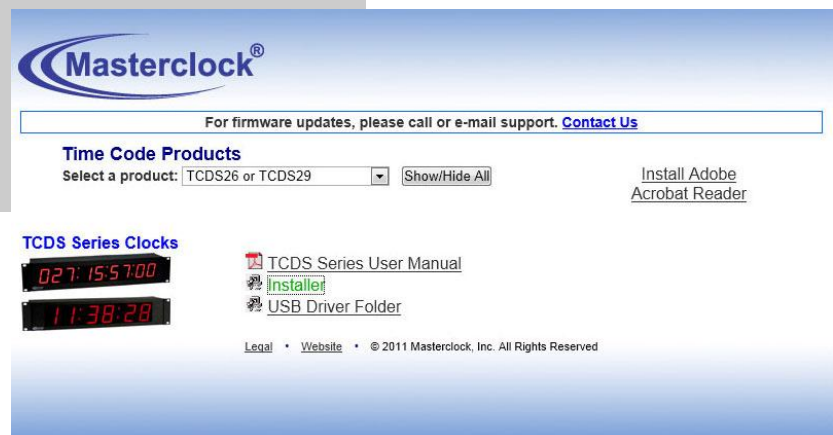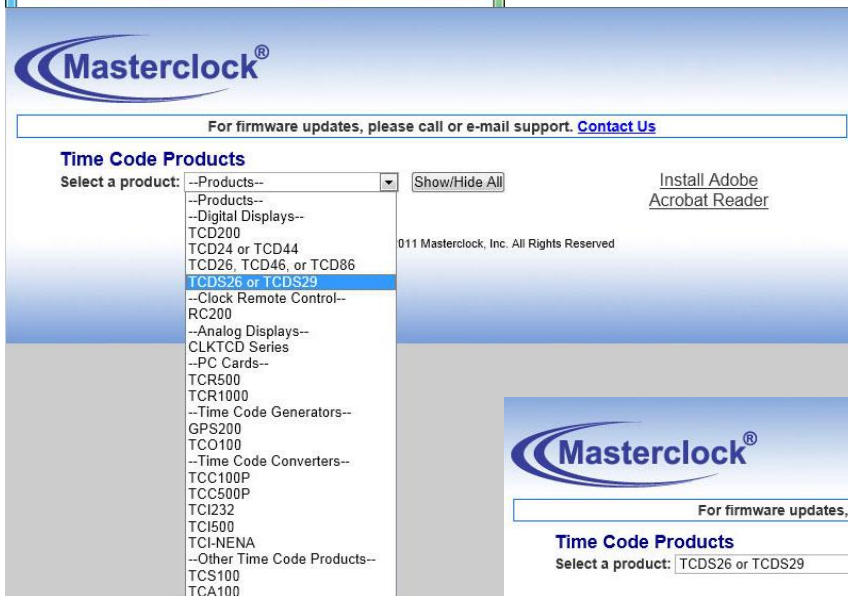
6. Click [**Next**] on the "**Install Wizard**."

7. Accept the "**Software License Agreement**" and click [**Next**].

8. Type in your user name and organization and click [**Next**].

9. When you are ready to install, click Install.

10. On the "**Custom Setup**" page, click [**Next**].
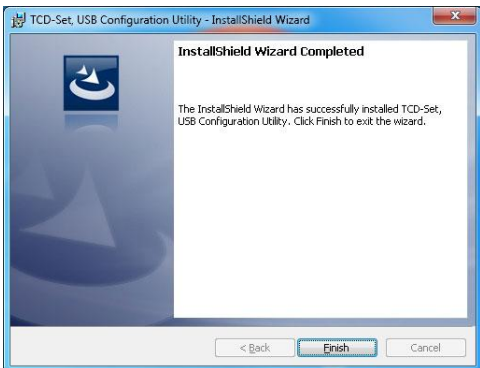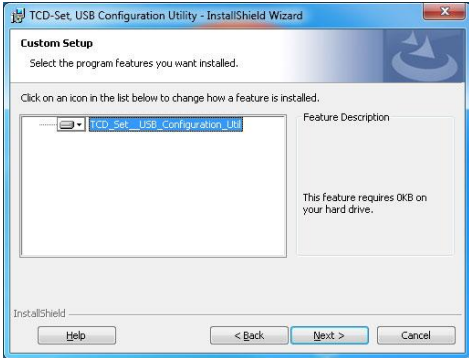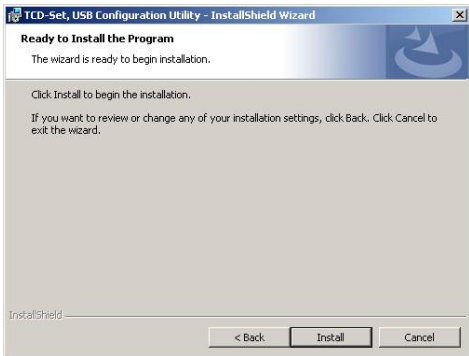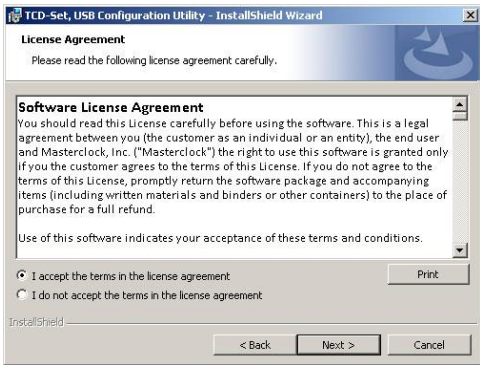
USB Device Driver

USB A cable
(to computer)

USB B cable
(to clock)

USB B port on clock
(back panel view)

A USB type B port has been included on the rear cover of the clock to configure the clock to allow for firmware upgrades, corrections and enhancements.

INSTALLING THE DEVICE DRIVER

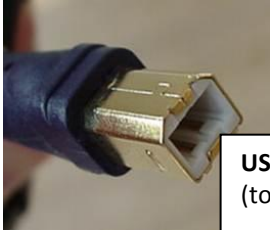First, power-on the clock. Next, use a USB cable (not supplied) and connect the clock to your PC. The Windows **Plug and Play** manager will detect a new USB device and request device drivers. If Windows is unable to install the USB device drivers, the system will send an alert.

Open **"Device Manager"** and locate [**Time Code Display**] listed under "**Other devices**." <u>Right click</u> the device and click on [**Update Driver Software**.] This will need to be performed for both USB device drivers (i.e. COM and BUS).

There are two locations for the USB Device Driver:

1. **C:\ Program Files\Masterclock\TCD-Set \Drivers**

2. CD labeled, "**Time Code Products**"
   X:\Products\TCDS\Drivers
   Note: "X" is the CD/DVD drive letter of your Windows PC.

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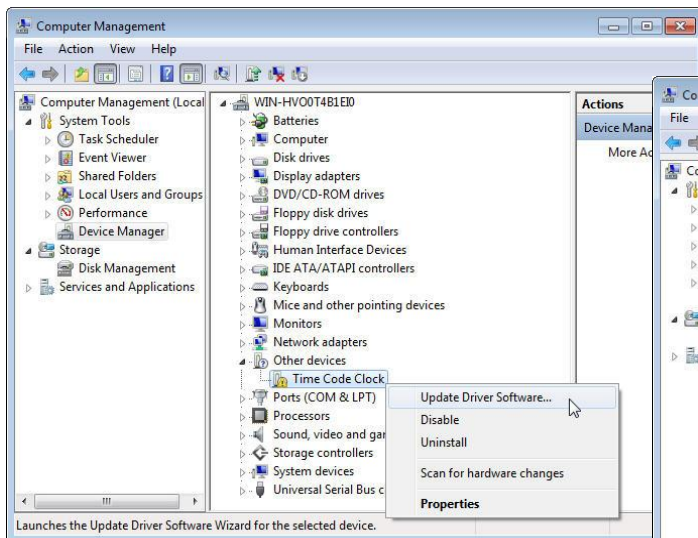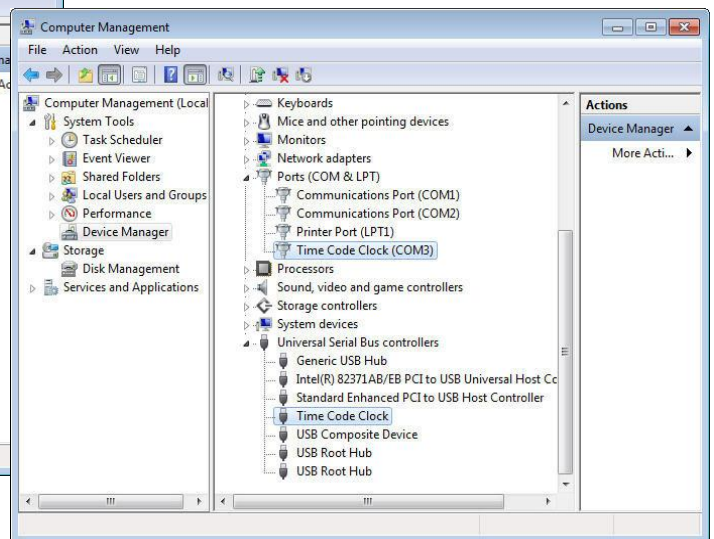
Device Manager

Device Manager with correct USB Device Driver

Using TCD-Set

HOW TO OPEN TCD-SET

Open the configuration app, **TCD-Set**, from the "**Start Menu**" (perhaps under the "**Masterclock**" category or by double-clicking the **shortcut icon** on the desktop). If you have your clock and Time Code device hooked up by USB cables to your computer, the Local Time showing up on your device and clock should also appear on your "**TCDS Digital Clock - Set**" window (at left).

On the left you'll see windows for the status of your current [**Local Time**], [**UTC Time**] and [**Time Code Status**.] This information is continually upda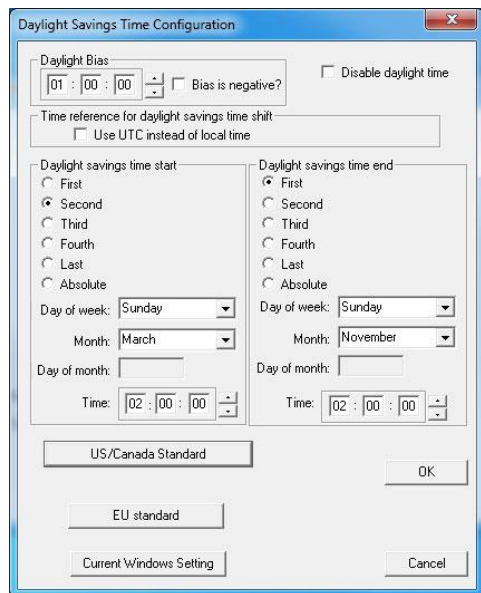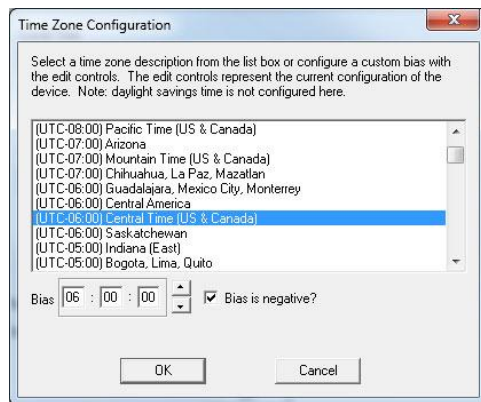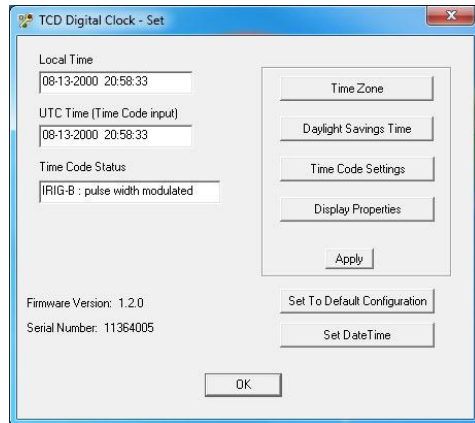ted. The [**Local Time**] field is displayed in the 24-hour format, even if the clock's display is set to the 12-hour format. This display update is not precise, but is meant to give you a view of the clock display time for basic troubleshooting and maintenance purposes. The TCDS can be configured to display local time using the [**Time Zone**] and [**Daylight Savings Time**] settings. These offset changes are made relative to UTC time. The clock always interprets the incoming Time Code as UTC.

On the right you'll see seven buttons:

1. [**Time Zone**]
2. [**Daylight Savings Time**]
3. [**Time Code Settings**]
4. [**Display Properties**]
5. [**Apply**]
6. [**Set To Default Configuration**]
7. [**Set Date Time**]

TIME ZONE

Modify the Time Zone offset by clicking the [**Time Zone**] button. This opens a new window that gives you a list of Time Zones, including descriptions to help with the selection. Select the desired Time Zone and click [**OK**] to close the window. Changes are applied as you click [**OK**].

DAYLIGHT SAVINGS TIME

Configure and/or enable the "**Daylight Savings Time**" function by clicking the [**Daylight Saving Time**] button. North American and European Union DST settings are entered by clicking the appropriate button: [**US Standard**] or [**EU Standard**]. Daylight Savings Time configurations will be applied when you click [**OK**]. Here (at left) the US/Canada standards have been selected.

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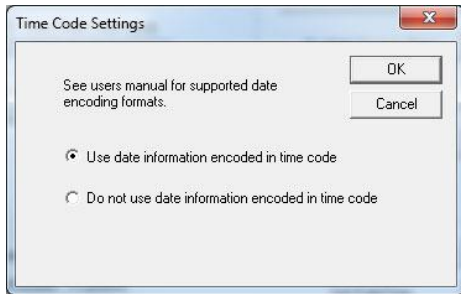
TIME CODE SETTINGS

This product contains an automatic detection and gain control circuit for the incoming SMPTE 30/25/24 fps longitudinal/linear Time Code or for IRIG-B(0) pulse width modulated or IRIG-B(1) amplitude modulated Time Code.

To support common SMPTE/IRIG-B standard Time Codes without date/year encoding to the aforementioned standards, an option to ignore the date information encoded in the Time Code is provided.
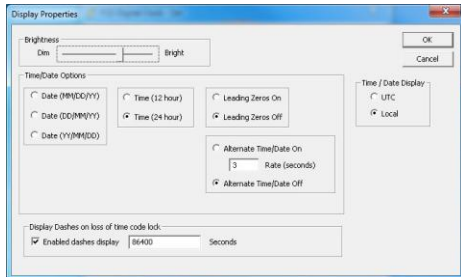
DISPLAY PROPERTIES

The settings on this window (at left) control how the clock displays time, date and level of display digit brightness.

Display Properties configurations will be applied after you click [**OK**] and then click [**Apply**] from the main window, "**TCD Digital Clock - Set**".
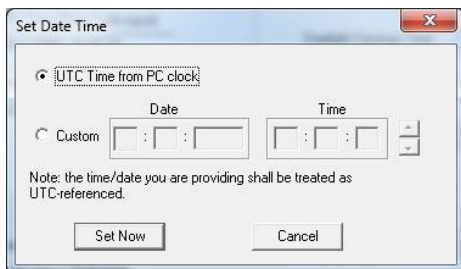
SET DATE TIME

The "**Set Date Time**" window lets you manually set the time and date for the clock. This may be most useful for lab situations. The clock keeps time via its internal precision oscillator and RTC when Time Code is not present. The time can be set either to the time of the Windows PC or a manual time and date can be entered.

Practical use of this feature requires the clock to be removed from any and every Time Code source. When the clock has access to a valid Time Code source, information obtained via Time Code will immediately overwrite any manually established time/date.
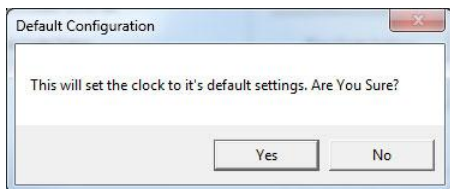
SET TO DEFAULT CONFIGURATION

The user may set the configuration to the factory default settings. The user will be prompted with the message window at left.

Specifications

Communications I/O

USB... B type connect
Format.. .v1.1

Time Code Formats

SMPTE 30 fps............. Masterclock/Leitch Date Encoding
SMPTE 25 fps (EBU)... Masterclock/Leitch Date Encoding
SMPTE 24 fps (FILM)   Masterclock/Leitch Date Encoding
IRIG-B pulse width modulated
                                IEEE – 1344 Year Encoding
IRIG-B(1) amplitude modulated
                                IEEE – 1344 Year Encoding

Time Code Type
   LTC (Longitudinal/Linear Time Code), forward running,
      automaticdetection and automatic gain adjustment

Time Code Formats (extended)
            SMPTE 24(Film), 25(EBU) or 30fps non-drop frame

            IRIG-B(1) 1kHz amplitude modulated 3:1 ratio

                    IRIG-B(0) DC offset/level shifted
      /un-modulated/pulsewidth modulated/TTL level

Nominal Level 1.Vpp (0dB/600dB)

Level Range............0.175-12 Vpp (-15dBV to 20dBV)

Impedance ....> 50 KΩ

Connector .... BNC female, Single Ended, unbalanced

Center pin .... Time Code In

Outer Conductor .... Time Code Return

POWER REQUIREMENTS

AC OPTION
AC input voltage ... 100-240 VAC ±10% (90-264VAC)
AC input frequency .... 47-63 Hz
AC input connector .... Universal IEC input
AC power consumption .... 10 W

SIZE AND WEIGHT

Physical Size	CLKTCD12	CLKTCD15	CLKTCD18	CLKTCD30 preliminary product
Diameter Depth Dual Face Depth	12.5" (31.8 cm) 4.25" (10.8 cm) 12.5" (31.8 cm)	14.9" (37.85 cm) 4.08" (10.35 cm) NA	18" (45.7 cm) 5" (12.7 cm) NA	30" (76.2 cm) 3.31" (8.4 cm) NA
Clock Face Diameter	6" (15.2 cm)	NA	NA	NA
Weight Round Stainless Dual Face	12" (30.5 cm) 7.6 lb (3.5 kg) 7.6 lb (3.5 kg)	14.9" (37.85 cm) 7.0 lb (3.18 kg) 7.0 lb (3.18 kg)	16" (40.6 cm) NA 11.4 lb (5.1 kg)	30" (76.2 cm) 31.28 lb (14.19 kg) 31.28 lb (14.19 kg)
Material Case Lens	11 lb (5 kg) Powder Coated Steel Polycarbonate	NA Powder Coated Steel Polycarbonate	NA Stainless Steel Polycarbonate	NA Stainless Steel Acrylic

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MAINTENANCE FREE RECHARGEABLE BATTERY

3V, 17 mAh, coin cell

Rechargeable manganese lithium

Panasonic ML1220/V1A

Rechargeable manganese lithium coin cell (Panasonic ML1220) and recharging circuit requires no maintenance and retains all configuration settings for two weeks (minimum holdover) without applied external power.

Clock hand alignment settings are maintained in non-volatile flash and are not affected by either loss of power or internal battery voltage.

OPERATING PARAMETERS

Operating Temperature	32˚ to 140°F (0˚ to 60˚C)
Relative Humidity	0 to 90%, non-condensing
Storage Temperature	-40° to 185°F (-40° to 85°C)

Troubleshooting

PROBLEM:

The time is incorrect.

Red status LED is always on.

Possible reasons/solutions:

The TCD analog clock is not currently connected to a valid Time Code reference.

There is a problem with the cabling between the TCD analog clock and the Time Code reference. Verify that all cables and connectors are in good condition.

There is a ground loop or other type of interference between the TCD analog clock and the Time Code reference. Verify that a common ground exists between the TCD analog clock and the Time Code reference. If the cabling distance between the Time Code reference and the TCD analog clock is large you might consider inserting an audio distribution amplifier or a Masterclock TCA100 Time Code amplifier in-line.

The signal level of the incoming Time Code is out of the range of the CLKTCD's Time Code decoder's circuitry. See the CLKTCD specification section for acceptable signal level ranges.

The Time Code reference, to the CLKTCD is not a recognized format. Verify that your Time Code reference is providing one of the Time Code formats that the CLKTCD can decode.

PROBLEM:

Not displaying the correct [local] time.

Possible reasons/solutions:

1. The unit is not receiving Time Code. Verify that the front LED status indicator is off.

2. The Time Code reference is referenced to UTC but your local Time Zone has not been configured.

3. Your DIP switch settings for DST may have been overridden by TCD-Set configuration utility.

4. You may be seeing the result of a double offset. Determine the Time Zone reference of your Time Code reference and then set the CLKTCD's Time Zone offset to arrive at a correct local time.

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- If the Time Code reference is already providing Time Code with local Time Zone and/or DST offsets, then set the Time Zone and/or DST offset of the clock to UTC.

- If the Time Code reference is providing UTC Time Code, then configure your clock to have a local Time Zone and/or DST offset.

5. Your Time Code reference is not providing the time/date that you expect. Contact the individual responsible for the Time Code reference for more information.

PROBLEM:

Displayed time [local] is off a small amount.

Possible reasons/solutions:

1. Perception/recognition response time. The average human ability to visually perceive and recognize time synchronization and/or instantaneous change between two visually separated systems is limited due to the movement of the eyes and the delayed response to process the data. To reduce this effect:

   - Place a digital display adjacent to the clock you are trying to verify the time on.

   - View the clocks from a position that will avoid eye movements.

   - Ensure that both clocks are locked to an accurate Time Code reference.

   - Ensure that both units have the same offset settings for Time Zone and/or DST.

2. TCD-Set configuration utility's screen display is a GUI (Graphical User Interface) that is not being run at the highest priority level for the system. There will likely be a delay in processing the data and updating the screen, therefore it should not be considered an accurate reference.

3. Ensure that you are not using Drop-Frame SMPTE Time Code. Drop-Frame Time Code is not supported. Accurate time cannot be guaranteed with drop-frame Time Code.

4. The clock hands have been incorrectly calibrated with either the calibration buttons or TCD-Set configuration utility. See the calibration procedure for details on how to recalibrate the hands.

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PROBLEM:

DST is not properly negotiated.

The date shown in the status window of TCD-Set configuration utility is always 01/01/2000.

Possible reasons/solutions:

1. Your Time Code reference is not providing date/year information. The DST adjustment will not work unless valid date information is provided. Verify that your Time Code reference has either date encoding to the Leitch standard for SMPTE Time Code or year/date encoding to the IEEE 1344 specification for IRIG-B/B1 Time Code.

2. The TC control DIP switches S2-1 and S2-2 have both been set to off and/or the Time Code date encoding has been disabled in the TCD-Set configuration utility.

3. Your Time Code reference already provides the DST adjustment. The DST adjustment in the CLKTCD should be disabled.

4. You have disabled the DST setting or the incorrect DST setting was enabled. The CLKTCD has DIP switches for enabling various modes of DST or disabling the DST option. In addition to the DIP switches, the TCD-Set configuration utility may be used to set the DST settings as well as all configuration settings of the clock. If the TCD-Set configuration utility is u~~sed, it w~~ill over-ride the DIP switch settings.

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Compliance Certification

CE Marking

Electromagnetic Compatibility
 89/336/EEC ; 92/31/EC ; 93/68/EEC ; 2004/108/EC

Tested and Conforms to the following EMC standards:

EN61000-6-1:2001 (EMC Immunity Generic Commercial)

EN61000-4-2:2000 (Electrostatic Discharge)

EN61000-4-3 (RF Immunity)

EN61000-4-4 (Fast Transient Common Mode)

EN61000-4-5 (Surge) EN61000-4-6
(RF Injection Common Mode)

EN61000-4-8: 1993 (Power Frequency Magnetic Field)

EN61000-4-11 (Voltage Dips)

EN61000-6-3:2001 (EMC Emissions Generic Commercial)

EN55022:1998+A1:2000 +A2:2003

CISPR22

EN61000-3-2:2000 (Harmonic Current Emission)

EN61000-3-3:1995 + A1:2001
(Voltage Fluctuations and Flicker)

Low voltage directive 2006/95/EC

Tested and Conforms to the following Safety standards

EN60950-1:2001 (Safety of Information Technology
Equipment) Certificated By CELAB®

 www.celab.com
UCN = 900547007279

FCC STATEMENT

This device complies with Part 15 of the FCC Rules and found to comply with the limits for a Class B digital device. These limits are designed to provide reasonable protection against harmful interference in a commercial/residential installation.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

WEEE

Waste Electrical and Electronic Equipment Directive (WEEE) 2002/95/EC

The CLKNTD models are considered WEEE Category 9 (Monitoring and Control Instruments Equipment) as defined by the WEEE Directive and therefore fall within the scope of the WEEE Directive.

For more information about Masterclock's WEEE compliance and recycle program, please visit: http://www.masterclock.com/rohs_compliance.php

Restriction of the Use of Certain Hazardous Substances Directive 2002/95/EC

The RoHS directive covers the same scope of electrical and electronic equipment that are under the WEEE directive, except that Category 8, Medical Devices, and Category 9, Monitoring and Control Instruments, which are under WEEE, are excluded from the RoHS directive.

Compliant by Exemption

The time display product CLKNTD fall under the category of Monitoring and Control Instruments Equipment (Category 9 as defined in Annex 1A of WEEE 2002/96/EC Directive) which is excluded from the RoHS directive 2002/95/EC (reference Article 2, paragraph 1) requirements.

These products are manufactured using lead in the soldering process as allowed for items excluded from the RoHS directive. These units are RoHS Compliant only in that they are excluded from the RoHS directive under Category 9, Monitoring and Control Instruments

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Care and Cleaning

Adherence to proper cleaning procedures is recommended to preserve the "like new" appearance of your CLKNTD analog clock. Scratched and damaged lenses caused by misuse, mishandling, improper storage, or improper cleaning are not covered under the limited warranty (page 47)

MINIMIZE HAIRLINE SCRATCHES

Always store the clock face-up in the protective plastic shipping bag until ready for installation and during transporting to the installation site. Do not place the clock face (lens surface) down on any surface as this may scratch or mar the lens.

Scratches and minor abrasions can be minimized by using a mild automobile polish. Three such products that tend to polish and fill scratches are Johnson Paste Wax, Novus Plastic Polish #1 and #2 (Novus, Inc., Minneapolis) and Mirror Glaze plastic polish (MG M10, Mirror Bright Polish Co., Pasadena). It is suggested that a test be made on a very small section of the polycarbonate lens with the product selected and that the polish manufacturer's instructions be followed.

"DON'T" - VERY IMPORTANT

- Don't store the clock without the protective plastic shipment bag.

- Don't store or place the clock face down on any surface, as this may scratch the lens.

- Don't use abrasive or highly alkaline cleaners.

- Don't use paper towels, paper products, rayon, or polyester cloths to clean or dry the lens.

- Don't scrape the lens with squeegees, razor blades or other sharp instruments.

- Don't ever use benzene, gasoline, acetone, methyl ethyl ketone (MEK), muriatic acid, or carbon tetrachloride on the lens.

- Don't clean lenses in hot sun or on very hot days.

CLEANING THE LENS

The following cleaning agents have been found to be compatible with the Polycarbonate and Acrylic lens. Manufacturer's instructions should be followed. Formula 409™ (Clorox Co.), Top Job™ (Proctor and Gamble), VM and P grade Naphtha Joy™ (Proctor and Gamble), Windex w/Ammonia D™, Drackett Products), Palmolive Liquid™ (Colgate Palmolive).

FOREIGN SUBSTANCE REMOVAL

- Use Butyl Cellosolve
  (For removal of paints, marking pens, lipstick, etc.)

- Use of adhesive tape or lint removal tools for lifting off old weathered paints.

- To remove labels, stickers, etc., the use of kerosene, naphtha, or petroleum spirits is generally effective. When the solvent will not penetrate sticker material, apply heat (hair dryer) to soften the adhesive and promote removal. Gasoline should never be used.

JOB SITE PRECAUTIONS

Remove the clock from the wall and stored face up in its protective shipment bag during painting and construction.

Contact with harsh solvents such as methyl ethyl ketone (MEK) or muriatic acid can result in surface degradation and possible crazing of the polycarbonate.

When the clock is first installed, glazing compound and masking tape adhesive can be easily removed from the lens by applying naphtha (VMandP) or kerosene with a soft cloth, followed immediately with a soap and water cleaning.

<div style="border:1px solid black; padding:10px;">

COMPATIBLE CLEANERS AND POLISH

Use these cleaning and polish agents. Manufacturer's instructions should be followed.

- Magic® Complete™ Stainless Steel Cleaner

- Polish Spray (Magic American Products.

</div>

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STAINLESS STEEL CASE

A cleaner and polish designed for use on stainless steel is recommended. Use a recommended product to maintain and protect the stainless steel finish while resisting water spots and fingerprints.

WASHING TO MINIMIZE SCRATCHING

Wash with a mild soap or detergent (such as 409™ (Clorox Co.) cleaner) and lukewarm water, using a clean sponge or a soft lint free cloth. DO NOT USE PAPER TOWELS OR PAPER PRODUCTS TO CLEAN OR DRY THE LENS. Rinse well with clean water. Dry thoroughly with a chamois or moist cellulose sponge to prevent water spots. Do not scrub or use brushes or abrasives on these products; the UV coating is not mar resistant. Also do not use butyl cellosolve in direct sunlight.

Fresh paint splashes, grease and smeared glazing compounds can be removed easily before drying by rubbing lightly with a good grade of naphtha or isopropyl alcohol. Follow the alcohol rub with a mild detergent wash with warm water and end with a thorough rinsing with clean water.

Limited Warranty

THIS MASTERCLOCK, INC. PRODUCT WARRANTY EXTENDS TO THE ORIGINAL PURCHASER

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

Should Masterclock 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 Masterclock. 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).

LIMITATIONS

Masterclock makes no other warranty, either expressed or implied, with respect to this product. Masterclock specifically disclaims the implied warranties of merchantability of 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 Masterclock 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 that does not allow the foregoing exclusion or limitation of incidental or consequential damages, the customer may have other remedies.

Service Information

We sincerely hope that you never experience a problem with any Masterclock product. If you do need service, contact Masterclock's Technical Support team. A trained specialist will help you to quickly determine the source of the problem. Many problems are easily resolved with a single phone call or email. If it is necessary to return a unit to us, an **RMA** (**Return Material Authorization**) number will be given to you.

Visit our website to download a current RMA request form.

http://www.masterclock.com/rma.php

Masterclock tracks the flow of returned material with our RMA system to ensure speedy service. You must include this RMA number on the outside of the box so that your return can be processed immediately.

RETURNED MERCHANDISE - RMA POLICY

Our RMA policy is straight forward and is based on several basic premises

- An item can be returned, subject to several basic requirements, under our 30-day Satisfaction Guarantee.

- If an item fails within the Warranty Period we will repair and return it freight prepaid.

- If an item is outside the warranty period and requires repair we will inspect, repair and return the item to you for a reasonable charge for the work and the cost for freight.

- If you think an item or system is not working properly we expect you to read the instruction manual, talk with our technical support department and make a reasonable effort to resolve the issue.

- If you return an item to us for repair and the item is found to work properly then we will charge you an "Analysis and Inspection" charge plus the return freight.

Please supply us with as many details about the problem as you can. The information you supply will be supplied to the repair department before your unit arrives. This helps us to provide you with the best service, in the fastest manner.

We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call. We appreciate your ideas and will respond to them.

Contact Us

Masterclock, Inc.
2484 West Clay Street
St. Charles, MO 63301 USA

website
www.masterclock.com

USA and Canada
1-800-940-2248
1-636-724-3666
1-636-724-3776 (fax)

International
1-636-724-3666
1-636-724-3776 (fax)

Sales
sales@masterclock.com

Technical Support
support@masterclock.com