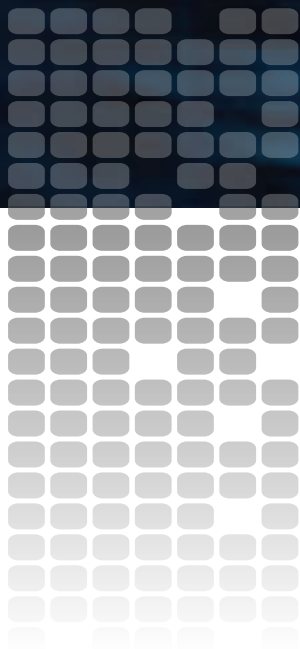**HARRIS**®

*assured*communications™

# Digital Time/Date Display Clocks

**DTD-5230, DTD-5231, and DTD-5233**

Installation and Operation Manual

# DTD-5230, DTD-5231, and DTD-5233

## Digital Time/Date Display Clocks

## Installation and Operation Manual

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# Warranty Information

The Limited Warranty Policy provides a complete description of your warranty coverage, limitations, and exclusions, as well as procedures for obtaining warranty service. To view the complete warranty, visit www.broadcast.harris.com/leitch.

# Contents

**Preface**

**Chapter 1: Introducing the DTD-523X Clock Series**

**Chapter 2: Installing the DTD-523x**

# Preface

## Manual Information

### Purpose

This manual details the features, installation, operation, maintenance, and specifications for DTD-5230, DTD-5231, and DTD-5233 Digital Time/Date Display Clocks.

### Audience

This manual is written for engineers, technicians, and operators responsible for installation, setup, maintenance, and/or operation of DTD-5230, DTD-5231, and DTD-5233 Digital Time/Date Display Clocks.

### Revision History

**Table P-1.** Revision History of Manual

| Edition | Date | Comments |
|---------|------|----------|
| A | March 2002 | Full release |
| B | October 2006 | Manual reformatted and updated |

# Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

**Table P-2.** Writing Conventions

| Term or Convention | Description |
|---|---|
| **Bold** | Indicates dialog boxes, property sheets, fields, buttons, check boxes, list boxes, combo boxes, menus, submenus, windows, lists, and selection names |
| *Italics* | Indicates E-mail addresses, the names of books or publications, and the first instances of new terms and specialized words that need emphasis |
| CAPS | Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, or DELETE |
| **Code** | Indicates variables or command-line entries, such as a DOS entry or something you type into a field |
| > | Indicates the direction of navigation through a hierarchy of menus and windows |
| hyperlink | Indicates a jump to another location within the electronic document or elsewhere |
| Internet address | Indicates a jump to a Web site or URL |
| Note | Indicates important information that helps to avoid and troubleshoot problems |

# Obtaining Documents

Product support documents can be viewed or downloaded from our Web site at www.broadcast.harris.com/leitch (go to **Support> Documentation**). Alternatively, contact your Customer Service representative to request a document.

# Unpacking/Shipping Information

## Unpacking a Product

This product was carefully inspected, tested, and calibrated before shipment to ensure years of stable and trouble-free service.

1. Check equipment for any visible damage that may have occurred during transit.

2. Confirm that you have received all items listed on the packing list.

3. Contact your dealer if any item on the packing list is missing.

4. Contact the carrier if any item is damaged.

5. Remove all packaging material from the product and its associated components before you install the unit.

Keep at least one set of original packaging, in the event that you need to return a product for servicing.

## Product Servicing

DTD-5230, DTD-5231, and DTD-5233 Digital Time/Date Display Clocks are not designed for field servicing. All upgrades, modifications, or repairs require you to return the product to the Customer Service center.

## Returning a Product

In the unlikely event that your product fails to operate properly, please contact Customer Service to obtain a Return Authorization (RA) number, then send the unit back for servicing.

Keep at least one set of original packaging in the event that a product needs to be returned for service. If the original package is not available, you can supply your own packaging as long as it meets the following criteria:

• The packaging must be able to withstand the product's weight.

• The product must be held rigid within the packaging.

• There must be at least 2 in. (5 cm) of space between the product and the container.

• The corners of the product must be protected.

Ship products back to us for servicing prepaid and, if possible, in the original packaging material. If the product is still within the warranty period, we will return the product prepaid after servicing.

# Restriction on Hazardous Substances (RoHS) Compliance

Directive 2002/95/EC—commonly known as the European Union (EU) Restriction on Hazardous Substances (RoHS)—sets limits on the use of certain substances found in electrical and electronic equipment. The intent of this legislation is to reduce the amount of hazardous chemicals that may leach out of landfill sites or otherwise contaminate the environment during end-of-life recycling. The Directive takes effect on July 1, 2006, and it refers to the following hazardous substances:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent Chromium (Cr-V1)
- Polybrominated Biphenyls (PBB)
- Polybrominated Diphenyl Ethers (PBDE)

According to this EU Directive, all products sold in the European Union will be fully RoHS-compliant and "lead-free." (See our Web site, www.broadcast.harris.com/leitch, for more information on dates and deadlines for compliance.) Spare parts supplied for the repair and upgrade of equipment sold before July 1, 2006 are exempt from the legislation. Equipment that complies with the EU directive will be marked with a RoHS-compliant emblem, as shown in Figure P-1.

RoHS
Compliant

**Figure P-1.** RoHS Compliance Emblem

# Waste from Electrical and Electronic Equipment (WEEE) Compliance

The European Union (EU) Directive 2002/96/EC on Waste from Electrical and Electronic Equipment (WEEE) deals with the collection, treatment, recovery, and recycling of electrical and electronic waste products. The objective of the WEEE Directive is to assign the responsibility for the disposal of associated hazardous waste to either the producers or users of these products. Effective August 13, 2005, producers or users will be required to recycle electrical and electronic equipment at end of its useful life, and may not dispose of the equipment in landfills or by using other unapproved methods. (Some EU member states may have different deadlines.)

In accordance with this EU Directive, companies selling electric or electronic devices in the EU will affix labels indicating that such products must be properly recycled. (See our Web site, www.broadcast.harris.com/leitch, for more information on dates and deadlines for compliance.) Contact your local sales representative for information on returning these products for recycling. Equipment that complies with the EU directive will be marked with a WEEE-compliant emblem, as shown in Figure P-2.
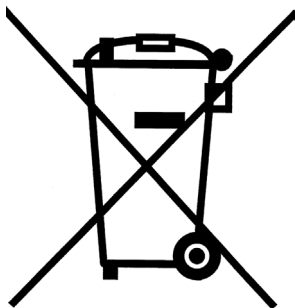
**Figure P-2.** WEEE Compliance Emblem

# Safety

Carefully review all safety precautions to avoid injury and prevent damage to this product or any products connected to it. If this product is rack-mountable, it should be mounted in an appropriate rack using the rack-mounting positions and rear support guides provided. It is recommended that each frame be connected to a separate electrical circuit for protection against circuit overloading. If this product relies on forced air cooling, it is recommended that all obstructions to the air flow be removed prior to mounting the frame in the rack.

If this product has a provision for external earth grounding, it is recommended that the frame be grounded to earth via the protective earth ground on the rear panel.

*IMPORTANT!* Only qualified personnel should perform service procedures.

## Safety Terms and Symbols in this Manual

### WARNING

Statements identifying conditions or practices that may result in personal injury or loss of life. High voltage is present.

### CAUTION

Statements identifying conditions or practices that can result in damage to the equipment or other property.

# Introducing the DTD-523X Clock Series

## Overview

The DTD-523x series of digital time/date display clocks (including the DTD-5230, DTD-5231, and DTD-5233) replaces the following clocks:

- DTD-5200
- DTD-5210
- DTD-5203

📝 **Note**

Except where noted, the term "DTD-523x" is used in this manual to refer to the DTD-5230, DTD-5231, and DTD-5233 digital time/date display clocks.

The DTD-523x series are digitally controlled, self-setting clocks. They operate in one of two modes: Stand-alone mode via power line frequency or internal crystal, or with an SMPTE or EBU serial timecode input as either a clock or a timecode reader.

When provided with an SMPTE or EBU timecode source, the DTD-523x series of clocks are instantly self-setting. In the event of a power failure, the DTD-523x clocks maintain the correct time internally via a battery-backed timekeeping memory. If power is restored without timecode, the clocks will self-set to the correct time as maintained by the battery backup, and then continue to operate on internal crystal or power-line time base.

DTD-523x clocks automatically decode either SMPTE or EBU timecode inputs. Additionally, these clocks function as timecode generators when operated from their internal crystals. Either SMPTE or EBU timecode can be generated and used to drive other clocks.

When driven from the MTG-3901 Master Time Generator or CSD-3901/3902 Clock System Driver, DTD-523x clocks are compatible with a user-defined auxiliary time offset and date. Some abilities are as follows:

- Local offset can also be programmed up to 23:59:59.
- Time display can be either **12-** or **24-hour** format, and can display HH:MM:SS or MM:SS.FF.
- Dates can be displayed as month:day:year (MM:DD:YY) or day:month:year (DD:MM:YY).

In the event of a timecode input failure, the colon LEDs flash at the rate of twice per second. DTD-523x clocks then automatically switch to the user-selected secondary time base, either power line frequency or internal crystal. (The power line frequency is automatically determined during power-up.)

If timecode operation is not required, DTD-523x clocks may be set to use the secondary time base permanently, and the colon LEDs will not flash.

If operated as a timecode reader display, DTD-523x clocks continually track the input code, and then stop when the input fails. The colon LEDs extinguish when timecode is absent in this mode.

The digital time/date display clocks are available in rack-mount (1 RU) or desktop versions.

## Available Models

The following digital time/date display clock models are available:

- **DTD-5230**    Digital Time Display (0.8 in./20.3 mm display)
- **DTD-5231**    Digital Time Display, desktop, time, or date
- **DTD-5233**    Digital Time Display with dual time or date

# Installing the DTD-523x

## Overview

This chapter exaplaind the installation process, including unpacking your equipment, ensuring a safe installation and operating environment, and connecting a DTD-523x clock.

### 📝 Note

Except where noted, the term "DTD-523x" is used in this manual to refer to the DTD-5230, DTD-5231, and DTD-5233 digital time/date display clocks.

The DTD-523x digital time/date display series of clocks are carefully inspected, tested, and calibrated before shipment to ensure years of stable and trouble-free service. Please check the equipment for any visible damage, which may have been caused during transit.

The following topics are found in this chapter:

# Installation Requirements

## Rack Mounting

The DTD-5230 and DTD-5233 require a standard 1RU rack space. Dimensions for these rack-mounted clocks are as follows:

| Front Panel | |
| --- | --- |
| Height | 1.75 in. (4.4 cm) |
| Width | 19 in. (48.3 cm) |
| Depth | 6 in. (15.2 cm) |
| **PCB Box** | |
| Height | 1.58 in. (4.01 cm) |
| Width | 8.14 in. (20.68 cm) |
| Depth | 6.5 in. (16.61 cm) |

### Note

The DTD-5231 is a desktop model and does not require rack.

## Cooling

The equipment is designed to operate in an ambient temperature range of 0° to +50° C. No special cooling arrangements are necessary, but care should be taken to prevent excessive ambient heat rise in closed, unventilated equipment racks.

# Rear Panel Installation

The rear panel has two connectors (see Figure 3-1 on page 3-8). Depending on the configuration, these connectors either accept or output serial timecode (SMPTE or EBU). All clocks are shipped configured for timecode input (slave) operation, unless otherwise specified when ordering. A label indicates whether the clock is in Master or Slave configuration.

A standard AC power connector and cord are included.

## Input Switch Functions

The DIP switch at the rear of the DTD-523x unit is used to configure many of the operational parameters of the unit. All switches enable their corresponding function when in the up position.

See "Setting the Control Mode" on page 8 for details on DIP switch operation.

# Power Supply

The power consumption of the DTD-523x is 6 W at nominally 100-120/200-240 VAC (0.25/0.15 A max.), 50/60 Hz. In order that the unit operates with maximum stability, it is recommended that the power be applied 24 hours a day.

# Operation

# Overview

This chapter explains how to operate the DTD-523x series of digital time/date display clocks.

The following topics are found in this chapter:

**Note**

Except where noted, the term "DTD-523x" is used in this manual to refer to the DTD-5230, DTD-5231, and DTD-5233 digital time/date display clocks.

# Setting the Control Mode

DTD-523x control modes are selected with rear panel DIP switches. These switches are described in the table below. Each mode is described in the pages that follow.

| Switch | | Closed Position (Up) | Opened Position (Down) |
|---|---|---|---|
| SW1-1 | Display format | 12-hour (HH:MM:SS) | 24-hour (HH:SS:FF) |
| SW1-2 | Normal and secondary reference | Normal | Run on secondary (Date if code present) |
| SW1-3 | Auxiliary offset | Normal | Use auxiliary offset (MTG-3901, CSD-3901/3902 required) |
| SW1-4 | Secondary reference | Internal—Secondary reference | Line |
| SW1-5 | Timecode output format | SMPTE—Output format | EBU |
| SW1-6 | Clock mode | Clock | Timecode |
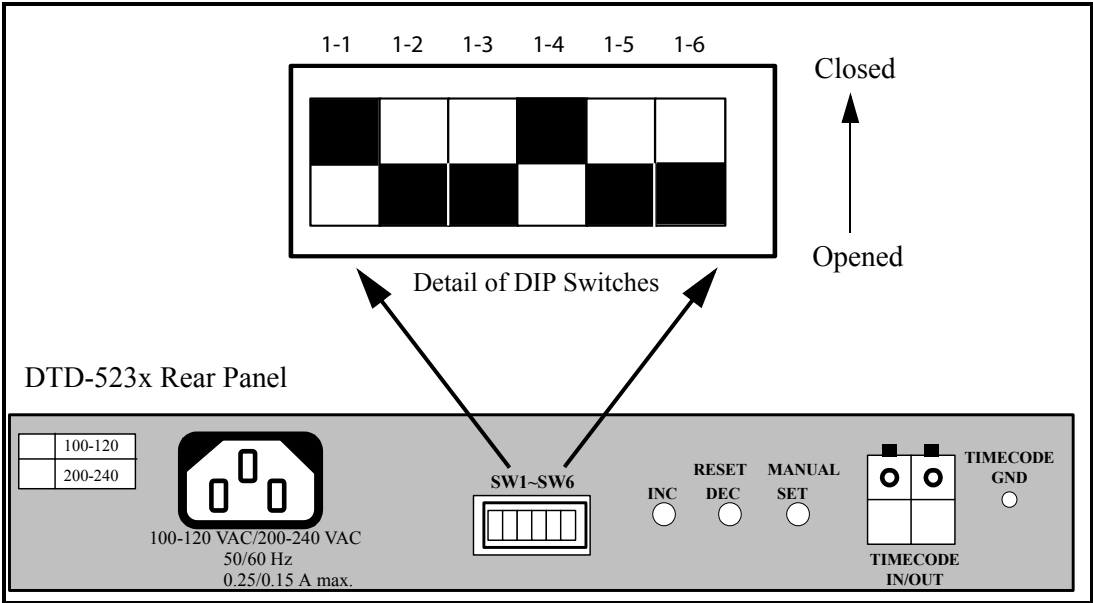


**Figure 3-1.** DTD-523x DIP Switches

# Clock Mode

To operate the DTD-523x as a timecode reading clock, the DIP switch **1-6** must be in the **Clock** (closed) position.

No time setting is required when input timecode is provided to the DTD-523x clock.

Once a valid SMPTE/EBU timecode is detected, the clock instantly self-sets.

### Timecode Failure

If there is a failure or an error with the input timecode, the DTD-523x switches to secondary reference as selected by DIP switch **1-4**. Either the clock's own internal crystal or the power line frequency can be selected as the secondary reference. Both provide the clock with a time base during the absence of input timecode.

> ✏️ **Note**
>
> Note that either a 50 Hz or 60 Hz power line frequency is suitable for the time base since the clock automatically selects the correct frequency available.

When signaling the failure of the input timecode, the colon LEDs on the clock face flash at a rate of twice per second.

When correct timecode is reestablished, the clock self-sets to the new time, and the colon LEDs stop flashing.

### Timecode Error

If there is an error in the input timecode, the clock automatically switches to the secondary reference, and the colon LEDs flash.

### Time Display Format

When used in **Clock Mode**, the DTD-523x displays time in either **12-** or **24-hour** format. DIP switch **1-1** selects the display format:

- **12-hour**: Closed position; uses the AM/PM LEDs
- **24-hour**: Opened position; no LEDs

# Timecode Reader Mode

To operate the DTD-523x strictly as a timecode display, DIP switch **1-6** must be in the **Timecode** (opened) position. When input SMPTE or EBU timecode is present, the DTD-523x follows it directly: up, down, or paused.

### Timecode Failure

If there is a failure of input timecode, the following occurs:

- Colon LEDs extinguish
- Last valid time remains displayed
- Input timecode does not switch to a secondary reference

### Time Display Format

When used in **Timecode Mode**, the DTD-523x always displays time in 24-hour format without AM and PM indications. Using DIP switch **1-1**, the digits are configured for HH:MM:SS display or MM:SS.FF display.

# Secondary Reference Mode

The DTD-523x runs as a standard clock when no input timecode is provided. To operate the clock in this mode, make these settings:

- Move the rear panel DIP switch **1-4** to select the time base: The **Internal** (closed) position selects the clock's internal crystal, while the **Line** (opened) position selects the power line frequency (50Hz or 60Hz).
- Move DIP switch 1-6 to the **Timecode** (closed) position.
- Move the rear panel DIP switch **1-2** to the **Run on Secondary** (opened) position.

### Note

The DTD-523x will still function without selecting **Run On Secondary**. However, the colon LEDs will flash at the rate of twice per second to indicate the absence of input timecode.

When in this position, the colon LEDs do NOT flash.

### Setting Time

When operating in **Secondary Reference Mode**, the time must be set manually using the rear panel set switches: **MANUAL SET**, **INC**, and **RESET DEC**. See "Manual Time Setting" on page 14.

### Power Failure

Once set, the correct time is maintained even in the event of a power failure. Upon the return of external power, the clock automatically self-sets to the correct time. The internal battery-backed timekeeping function maintains time for up to four years in the absence of external power.

# Auxiliary Offset

DIP switch 1-3 allows access to a user-programmed, auxiliary offset from the input timecode's user bits. The timecode source must have the ability to generate the correct information in the user bits. The MTG-3901 Master Time Generator and CSD-3901/3902 Clock System Driver are real-time, time-code source that can program such an offset into the timecode's user bits.

### Offset Programming

The offset is programmed in 30-minute intervals, up to 23 hours and 30 minutes, using 6 bits of the timecode's user bit space. The offset is encoded using timecode bits 36, 37, 38, 52, 53, and 54. Bit 36 is the least significant bit (LSB), while bit 54 is the most significant bit (MSB).

When DIP switch **1-3** on the DTD-523x is in the **Use Auxiliary Offset** (opened) position, the following occurs:

- The auxiliary offset found in the input timecode's user bits is added to the input timecode, and the DTD-523x displays the total.

- DIP switch **1-3** has no effect if no input timecode is available.

- The offset is disregarded if the user bits are incorrectly programmed.

- A programmed local offset is still in effect while using the auxiliary offset.

- The local offset is totally transparent to the input timecode's user bit offset.

**Loss of Timecode**

If input timecode is removed while **Use Auxiliary Offset** is selected, the clock retains the time with the offset added, not the original time.

# Date Display

The date can be displayed by DTD-523x clocks when they are used with an MTG-3901 Master Time Generator or CSD-3901/3902 Clock System Driver. DIP switch 1-1 is used to select the date display format: either a YY:MM:DD or a DD:MM:YY date format can be displayed.

# Timecode Generator Mode

The DTD-523x clocks can function as real-time, time-code generators, essentially operating as master clocks. Timecode output may be used to drive other clocks and timecode reading devices.

**Configuration**

To configure the DTD-523x clocks as timecode generators, an internal connector must be transposed. Connect pins 2 and 3 of jumpers **J4** and **J5**. See Figure 3-2.

When configured as a timecode generator, the rear panel connectors become timecode output terminals.
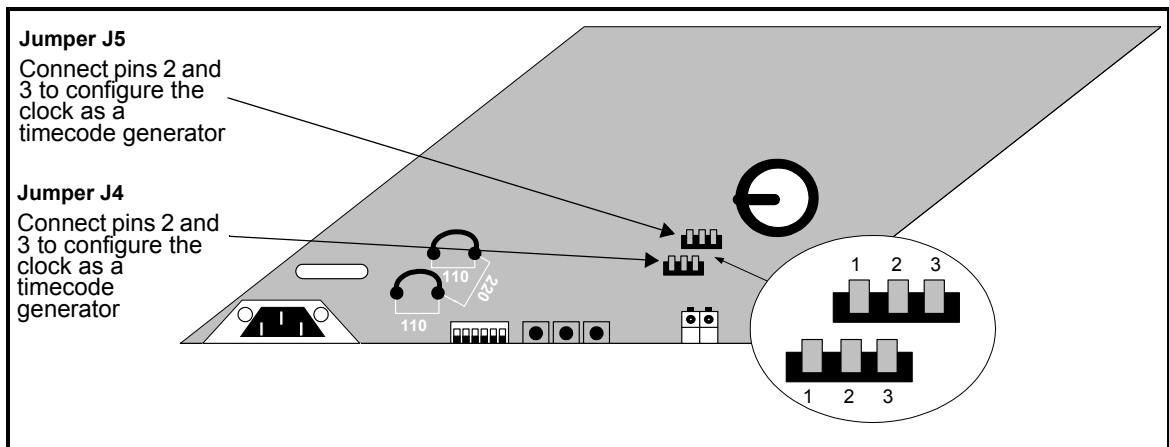


**Figure 3-2.** DTD-523x Jumpers

Once the DTD-523x are configured as timecode generators, the rear panel terminals will output real-time timecode when DIP switch **1-4** is set to the **Internal** (closed) position.

The DTD-523x makes use of an internal crystal for a time base when operated in **Internal Timecode Generator Mode**. Additionally, DIP switch **1-2** is set to the **Run on Secondary** (opened) position. This disables the flashing colon LEDs.

### Timecode Format

Select the output timecode format by moving DIP switch **1-5** to either the **SMPTE** (closed) position or **EBU** (opened) position.

# Brightness Adjustment

You can adjust the brightness of the LED display incrementally by simultaneously holding the **MANUAL SET** button and either the I**NC** or **RESET DEC** button on the rear panel.

1. Hold **MANUAL SET** and **INC** to increase the brightness one level per second.

2. Hold **MANUAL SET** and **RESET DEC** to decrease the brightness one level per second.

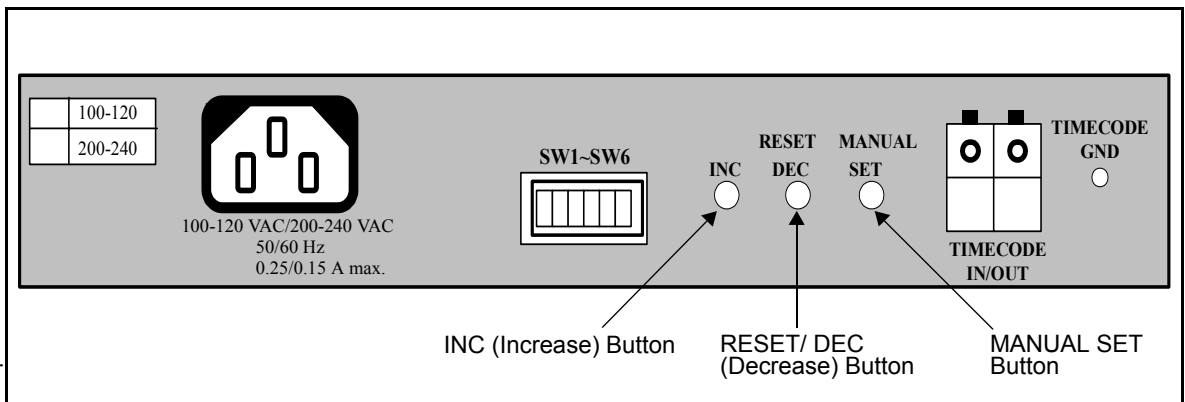There are 16 brightness levels to choose from.



**Figure 3-3.** DTD-523x Rear Panel

# Clock Setting

Set your DTD-523x clock with the three push-button switches located on the rear panel. To program a local time-zone offset or to manually set the time, use the following labelled push buttons:

- **MANUAL SET**
- **INC**
- **RESET DEC**

## 📝 Note

If this operation is attempted while input timecode is available, no time change will occur. The clock will automatically reset.

# Manual Time Setting

To set the time manually, follow this procedure:

1. Verify that DIP switch **1-2** is in the **Normal** (closed) position.

2. Enter **Manual Set Mode** by pressing and releasing the **MANUAL SET** button until the seconds digits flash.

3. Use the **INC** and **RESET DEC** buttons to set the time.

   The **INC** button increases the value in increments of one, while the **RESET DEC** button resets the value to zero.

4. Press and release the **MANUAL SET** button to move to the next pair of digits, from seconds to minutes and minutes to hours.

5. When programming is complete, press and release the **MANUAL SET** button to start the new time.

Manually setting the time in this fashion erases any previously programmed local offset. See .

### Time Zone Changes

To simplify clock setting for seasonal time zone changes, the following procedures provide one-hour time changes:

- To advance the time by one hour, press and hold the **INC** button for 10 seconds.

   The clock will automatically self-set to the new time.

- To set the time back by one hour, press and hold the **RESET DEC** button for 10 seconds.

  The clock will automatically self-set to the new time.

# Local Offset Programming

You can electronically program a local time offset to provide an offset from the input timecode. This is particularly useful for displaying multiple time zones from the same timecode source.

To program the local offset, follow this procedure:

1. Ensure DIP switch **1-3** is in the **Use Auxiliary Offset** (opened) position.

   This switch can be returned to its previous position after programming the offset.

## Note

The offset value programmed is always added to the current time. To achieve a -3 hour offset, program an offset value of 21 hours.

6. Enter **Manual Set Mode** by pressing and releasing the **MANUAL SET** button until the seconds digits flash.

1. Use the **INC** and **RESET DEC** buttons to set the offset time value.

   The **INC** button increases the value in increments of one, while the **RESET DEC** button resets the value to zero.

2. Press and release the **MANUAL SET** button to move to the next pair of digits, from seconds to minutes and minutes to hours.

3. When programming is complete, press and release the **MANUAL SET** button.

   The offset will become effective immediately.

The local offset may be used in addition to any auxiliary offset as programmed by an MTG-3901 Master Time Generator or CSD-3901/3902 Clock System Driver. All offsets are additive.

# Specifications

## Overview

The following tables list selected specifications for the DTD-523x:

# Input Specifications

| Item | Specification |
|---|---|
| Serial timecode | • SMPTE 12M-1999<br>• EBU |
| Impedance | Hi-Z, balanced |
| Level | 4 Vp-p, ±8 dB |

# Output Specifications

| Item | Specification |
|---|---|
| Serial timecode | • SMPTE 12M-1999 (non-drop frame)<br>• EBU |
| Impedance | Lo-Z, balanced |
| Level | 4 Vp-p with a resistive load of 1 k$\Omega$ |

# Electrical Specifications

| Item | Specification |
|---|---|
| 100-120/200-240 VAC ±10%, 0.25/0.15 A max. | Internally selectable |
| 50/60 Hz | Automatic selection |
| Power 12 VA | 6 W max power, 32 VA apparent power |

# Time Base Specifications

| Item | Specification |
|---|---|
| Timecode | Automatic selection:<br>• SMPTE 12M-1999<br>• EBU |
| Internal | Crystal, ±4 sec./month, 0° - 50°C |
| Power line | 50/60Hz, automatic selection |
| Battery backup | Crystal, ±10 sec./month, 0° - 50°C |

# Control Specifications

| Item | Specification |
|---|---|
| Output timecode format | SMPTE/EBU (non-drop frame) |
| Secondary reference | Internal or power line |
| Auxiliary offset | Requires MTG-3901 Master Time Generator, CSD-3901/3902 or CSD-5300 Clock System Driver |
| Date display | M/D/Y or Y/M/D<br>(MTG-3901 Master Time Generator, CSD-3901/3902 or CSD-5300 Clock System Driver) |
| Local offset | Any amount, user selectable |
| Display | 12- or 24-hour format,<br>HH:MM:SS or MM:SS:FF |

# Mechanical Specifications

**Rack Mount**

| Item | Specification |
|------|---------------|
| **Front Panel** | |
| Height | 1.75 in. (4.4 cm) |
| Width | 19 in. (48.3 cm) |
| Depth | 6 in. (15.2 cm) |
| **PCB Box** | |
| Height | 1.58 in. (4.01 cm) |
| Width | 8.14 in. (20.68 cm) |
| Depth | 6.5 in. (16.61 cm) |

**Desktop Model**

| Item | Specification |
|------|---------------|
| Height | 2.2 in. (4.8 cm) |
| Width | 8 in. (20.3 cm) |
| Depth | 7 in. (17.8 cm) |

Specifications and designs are subject to change without notice.

<div align="right">

Appendix A

# Servicing Instructions

</div>

## Overview

| ⚠ **Caution** | These servicing instructions are for use by qualified personnel only. Only qualified personnel should perform service procedures. Refer all servicing to qualified service personnel. |

Servicing is required when the apparatus has been damaged in any way. Examples of damage include: a power-supply cord or plug has been damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, or the apparatus has been dropped or does not operate normally.

To reduce the risk of electric shock do not perform any servicing, other than that contained in the servicing instructions, unless you are qualified to do so.

In the event of equipment failure, user-servicing is limited primarily to the replacement of the fuse and replacement of the battery. Instructions for these procedures follow.

### 📝 Note

Except where noted, the term "DTD-523x" is used in this manual to refer to the DTD-5230, DTD-5231, and DTD-5233 digital time/date display clocks.

# Fuse Replacement

The fuse-replacement procedure for the DTD-523x clocks is described below.

## Replacement Procedure



### Warning

To avoid the risk of fire, the fuse must always be replaced with the same type of fuse and specified rating. Failure to comply may result in equipment damage and/or personal injury.

There may be occasions when you must access the unit's fuse.

To access this fuse:

1. Remove AC power from the clock, and then remove the cover.

2. Locate the fuse.

3. Use a small flat-head screwdriver or similar device to carefully lift out the old fuse from its socket.

4. Replace the top panel and all screws.

5. Reapply AC power to the clock, and then confirm start up.

**Replaceable Fuse**

The following table lists the replaceable fuse for the DTD-523x clocks.

| Replaceable Fuse | Marking |
|---|---|
| F1 (primary circuit on TD 523X PCB) | T 250 mA L 250 V |

# Battery Replacement

Typically, the battery will last for more than four years of actual use; the battery is only in use when AC power is removed from the unit. Note that once battery failure has occurred, the clock will not self-set when AC power is restored.

## Battery Use Warnings

**CAUTION:**
Danger of explosion if battery is incorrectly placed. Replace only with the same or equivalent type recommended by the manufacturer (Panasonic CR2032). Discard used batteries according to the manufacturer's instructions.

**Finland**

**VAROITUS:** Paristo voi rajahtaa, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan valmistajan suosittelemaan tyyppun. Havita kaytetty paristo valmistajan ohjeiden mukaisesti.

**Sweden**

**VARNING:** Explosionsfara vid felaktigt batteribyte. Anvand samma batterityp eller en eller en ekvivalent typ som rekommenderas av tillverkaren. Kassera anvant batteri enligt fabrikantens instruktion.

**Denmark**

**Advarsel!** Lithiumbatteri. Eksplosionsfare ved fejlagtig handtering. Udskiftning ma kun ske med batteri af samme fabrikat oq type. Lever det brugte batteri tilbage till leverandoren.

**Korean**

경고
만약 틀린 전지로 교환했을 경우, 폭발 위험이 가능합니다.
똑같거나, 동등한 종류와 교체하는 것을 제조업자로서 권장합니다.
제조업자의 지시에 따라, 사용된 전지는 버려 주십시오.

# Replacement Procedure

The battery is a Panasonic CR2032. It should be replaced only with a battery of the same type and size. Before installation, verify that the new battery voltage is 3.0 V or greater.

To replace a battery in the DTD-5230 and DTD-5233, follow this procedure:

1. Remove AC power from the clock, and then remove the cover.
2. Lift the old battery from its socket, being careful not to damage other components.
3. Short U4 Pin 16 and U4 Pin 10 to ground.
4. Install the new battery in the holder, noting the proper polarity.
5. Short U4 Pin 10 to ground for a moment.
6. Replace the cover, and then reapply AC power to the clock to confirm start-up.
7. Remove AC power from the clock, and again remove the cover.
8. Confirm that U4 Pin 9 is exactly at ground.

   *Any* voltage greater than zero is not allowed (even a few tenths of a volt). If you observe a non-zero voltage, remove the AC power and battery, and then repeat this procedure from the beginning.
9. Confirm that the voltage of the new battery is still 3.0 V or greater.
10. Replace the cover, and then re-apply AC power to the clock.

    The LED remains on.
11. Immediately perform the Local Offset Programming procedure set out in "Local Offset Programming" on page 15.

# Voltage Selection

The transformer for the power supply is provided with a dual primary winding that enables the unit to operate at either 100-120 VAC or 200-240 VAC, depending on the jumper connection.

## Note

Voltage selection is normally done during the manufacturing process, based on indicated customer requirements.

To set the voltage, follow this procedure:

1. Remove AC power from the clock, and then remove the cover.
2. Locate the dual primary winding voltage selector.

   See Figure A-1.



**Winding Voltage Selector Settings**
Solder both voltage selectors horizontally on the board for 120 VAC (as shown). Remove and solder both voltage selectors vertically on the board for 240 VAC.
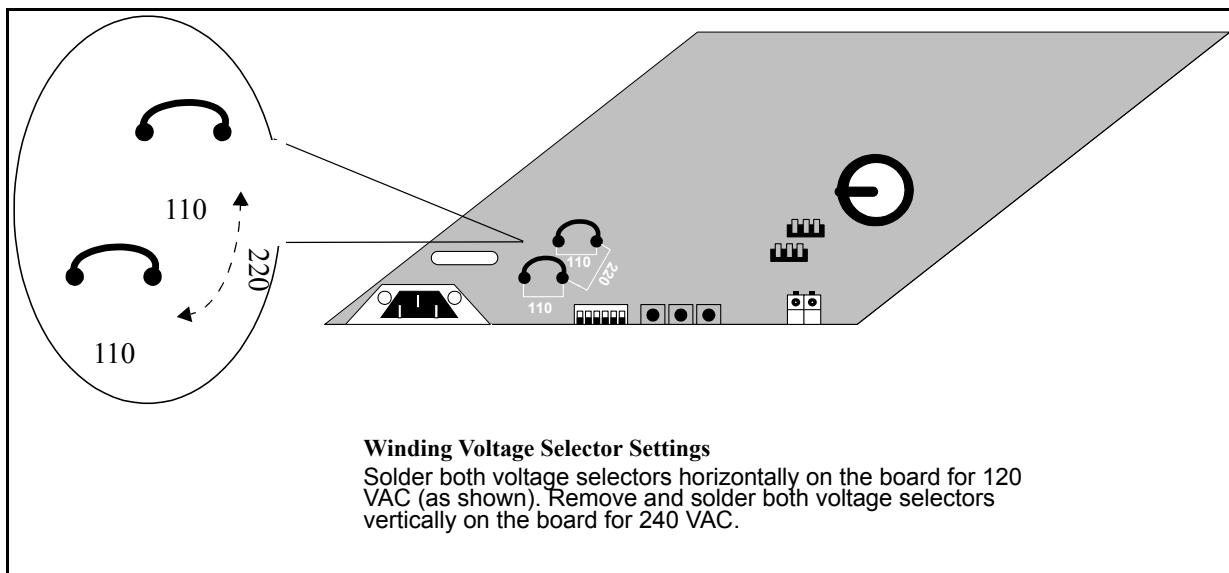
**Figure A-1.** Location of Dual Primary Winding

3. Solder both voltage selectors horizontally on the board for 120 VAC or vertically for 240 VAC. See exploded diagram in Figure A-1.
4. Replace the top panel and all screws.
5. Reapply AC power to the clock, and then confirm start-up.

# Index

## Symbols

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