

TCR1000 PC Card User Manual

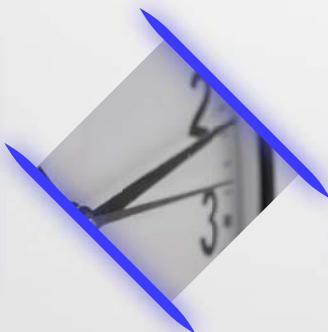


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Forward

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Trademarks

Trademarks mentioned in this manual are the property of their respective owners.

Icons Used In This Manual



Caution: This icon signifies a potential hazard, and gives tips on how to avoid them.



Important Information: This icon indicates to an important step that must be followed.



Technical Note: This icon describes technical terms and actions.



Helpful Hint: This icon suggests the general setup and practice.

Printing

While optimized for onscreen viewing, the pages of this manual are formatted for printing on 8 1/2" x 11" and A4 sized paper, giving you the option to print the entire manual or just a specific page or section.

Compliance

WEEE



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

The TCR1000 is 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

RoHS



Compliant
by
Exemption

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.

This device 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.

Introduction

The TCR1000 is a universal voltage time code reader plug-in style card for both 3.3V and 5V PCI busses on IBM-PC compatible computer systems. The card is designed to synchronize time in a PC or Server from a master time code reference. In addition, it can be used as a SMPTE or IRIG-B/B1 linear time code (LTC) reader under software control. The reader is compatible with 24/25/30 fps NDF (Non Drop Frame) SMPTE linear time code. The reader is also compatible with the IRIG-B pulse-width time code format and the IRIG-B(1) 1 kHz amplitude modulated time code format.

This instruction book covers installation and operation of the card using SMPTE and also IRIG-B and IRIG-B(1) time code formats. In some cases references are made to 24, 25 or 30 frames. It should be understood that the reference to 24, 25 or 30 NDF frames per second only applies to the SMPTE time code.

Features

- Device drivers for Windows XP (32 bit only), Windows 7, Server 2003 and Server 2008-SP1
- TCRSync-1000 – An advanced time synchronization software package providing time zone offset capabilities, automatic daylight savings time handling, unobtrusive background operation functionality, and many other features.
- Time Code Viewer – A time code display/diagnostic utility.
- SDK (software development kit – libs, source code and samples) for developers with documentation and example MSVC++ code.

Unpacking

Supplied (Ship Kit)

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

- TCR1000 PCI card
- PCI Bracket(s), half and full height brackets provided
- CD-ROM
 - Installer
 - Software Applications
 - Device Drivers
 - Windows Service
 - User Manual
 - Developer Resources
 - SDK
 - Sample Project



Not actual size

Installation

Hardware

PCI card

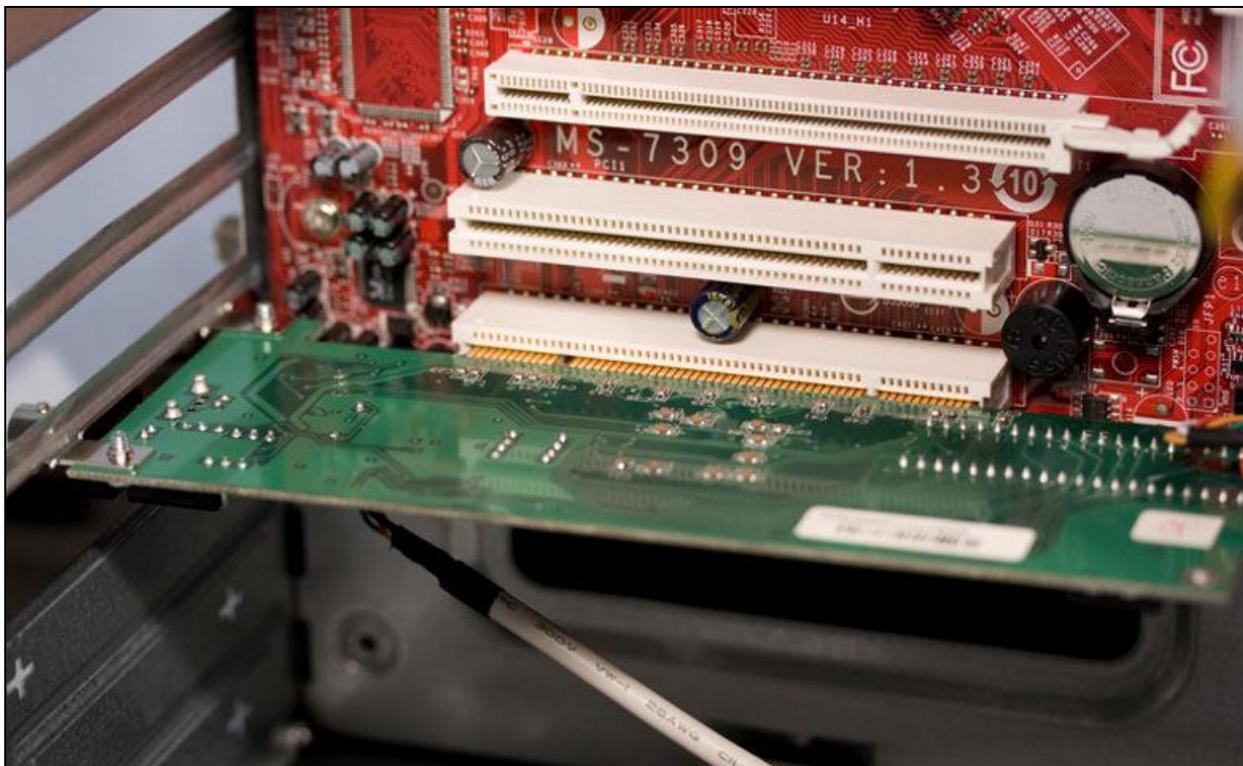
The TCR1000 card will need to be installed before installing the software device drivers.



The TCR1000 is a static sensitive device, which can be damaged by ESD. Observe the proper precautions for handling static sensitive devices. Damage sustained to the TCR1000 due to ESD or mishandling is not covered under warranty.

Follow the steps below to install the TCR1000 PCI card.

1. Shut down the computer and remove the power cord.
2. Remove the computer case and locate an available PCI slot.
3. Identify which type of PCI bracket the card requires.
 - a. If need, replace the bracket to the PCI card.
4. Insert the TCR1000 into the PCI bus slot and secure with retaining screw.
5. Install the computer case.
6. Plug in the power cord.
7. Power on the computer.



Software

The “Time Code Products” CD contains the TCR1000’s installer, device drivers, software application, user manual, SDK document and monitor sample project user manual and source code.

TCRSync Application and Services

A feature in Windows OS is the WIN32Time native computer-to-computer time synchronization mechanism. For TCRSync Monitor to operate properly W32Time must be configured in specific ways depending on the network environment.



The TCRSync Service is installed and started during the installation process.

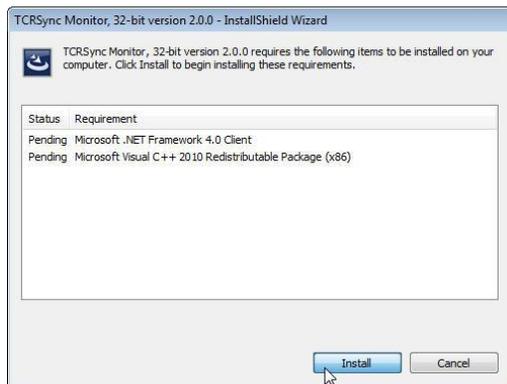
1. Insert the CD-ROM in to the drive.
2. If auto-run is enabled, a web browser window will open to the “Time Code Products” menu. You can also open the “index.htm” file located on the root of the CD-ROM.
3. From the drop-down menu, select TCR1000.
4. Click TCR Installer (32 or 64 bit).
5. You might be given the option to save the file or run from the CD-ROM. Click [Run] to run the installer from the CD-ROM.



6. Depending on Windows OS security settings, there could be a number of different pop-up “Warning” windows. Click [Run] to allow the installation to begin.



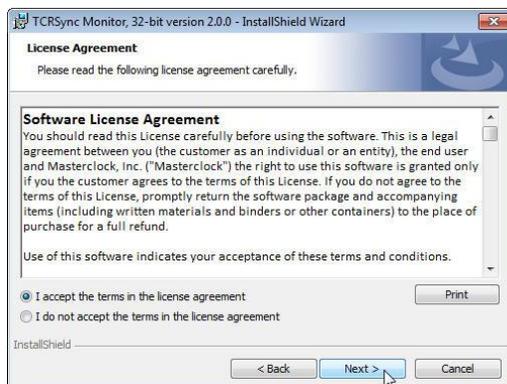
7. Follow the window prompts and input field data to install the TCR1000 files to the Windows OS.



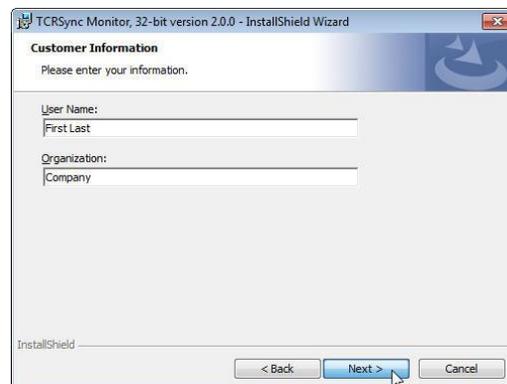
1. Required support files...



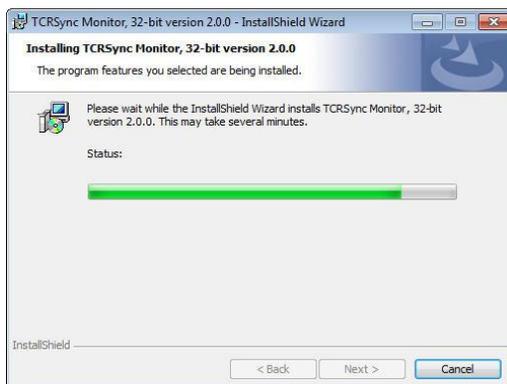
2. Welcome screen...



3. Accept the software license terms...



4. Enter company information



5. View the status bar...



6. Installation complete.

Device Driver

Follow the steps below to install the device drivers for the TCR1000 PCI card.

1. Navigate to “Device Manager” and locate:

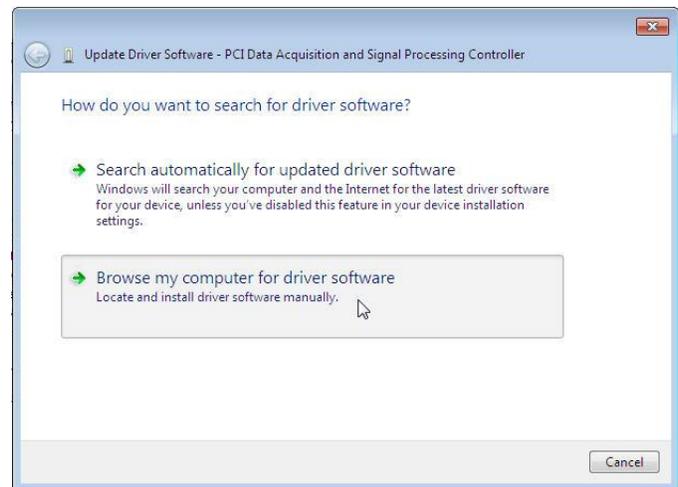
“PCI Data Acquisition and”.

2. Right-click the device and from the drop-down menu click:

“Update Driver Software...”.



3. Click “Browse my computer...”.



4. Click [Browse] and navigate to either the hard-drive or CD.

Hard-drive

C:\Program Files\ Masterclock\
TCRSync1000\xxbit\Drivers\

Or

CD

X:\Products\TCR1000\xxbit\Drivers\

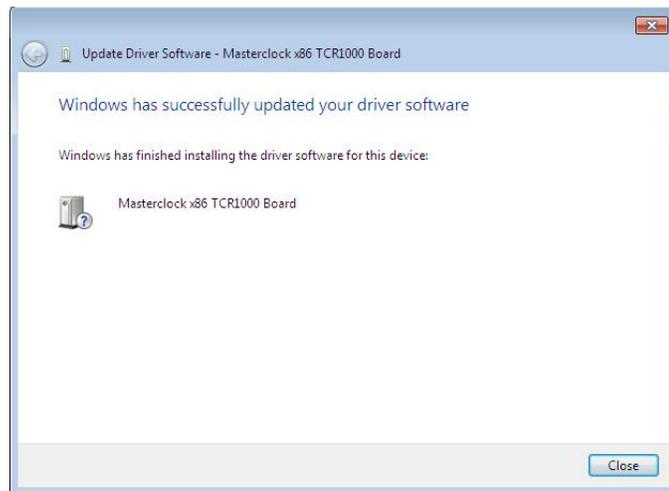
5. Verify the path and click, [Next].



6. Depending on Windows OS security settings, there could be a number of different pop-up “Warning” windows. Click, “Install this driver...” to allow the installation to begin.

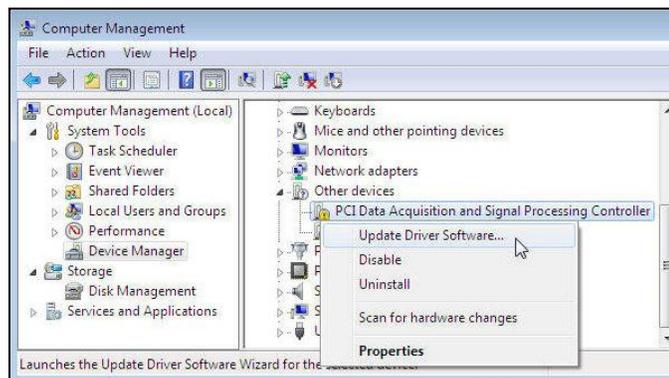


7. The next window shows a successful update of the Masterclock TCR1000 driver, click [Close].



8. In “Device Manager”, notice the entry, “Masterclock PCI card” with the “Masterclock TCR1000”.

9. The device driver is now installed. Now the “Computer Management” window can be closed.



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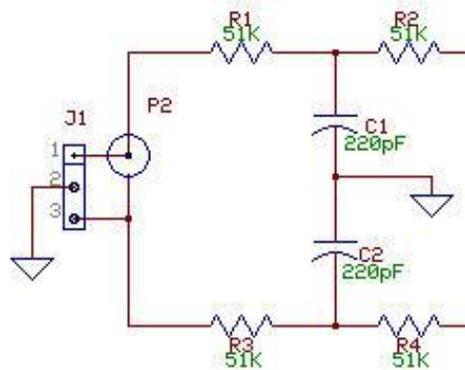
Configuration

Hardware

Input “Time Code” Connection

The Time Code input is balanced; as such the input polarity is not critical to operation of the TCR card. For systems distributing single ended or unbalanced time code signal to multiple devices, it is suggested that the signal distribution method be consistent.

An insulated BNC female connector is provided as a standard connector for 2-wire time code input. The TCR1000 card has a single BNC connector. Along with coaxial cable to distribute time codes reserve the center conductor of the BNC as the Time Code signal and the outer BNC conductor as the Time Code Reference/Signal GND.



Partial Masterclock's TCR1000 time code input circuit



An optional 3-pin locking header connector can be ordered at time of purchase instead of the BNC connector.

Input Impedance

The input impedance for the TCR1000 circuit is considered to be relatively high at approximately 100k Ω . This high input impedance allows for connecting multiple time code devices on the same signal path without loading and/or distorting the input time code signal.

Input Level

The TCR1000 firmware will automatically determine the appropriate gain control setting for your incoming time code dB level within range (not outside the range of -15 and +20dB).

The TCR1000 requires up to 30 seconds to complete automatic gain control when decoding SMPTE and (in the worst case) up to three minutes when decoding IRIG-B0/B1. When proper gain control has been achieved the incoming time code should be read and displayed on the screen without any hesitations or jumps, and the LED on the card will light steady-on.

Time Code Input Select

The TCR1000 card will automatically detect which format of time code is being provided to the card upon initial power up with a valid time code. No user hardware adjustments are necessary.

Software

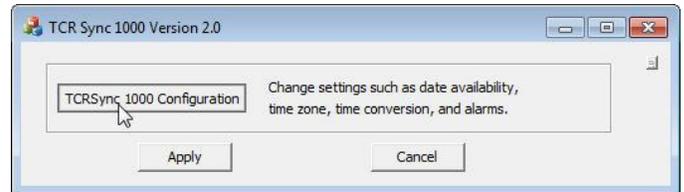
TCRSync Configuration Utility

The TCRSync Configuration Utility should be run to configure your TCR1000 card and software parameters for your source of time code input and your system setting. This configuration utility prompts you for information regarding your source of time code and various clock synchronization operating parameters.

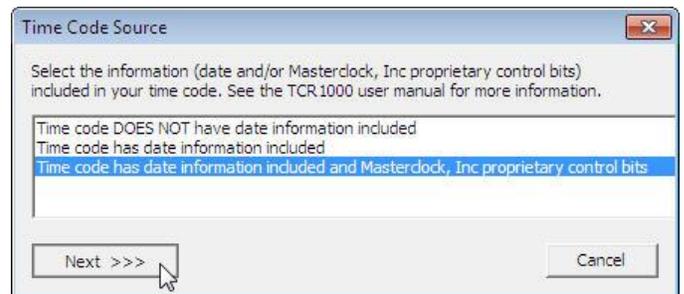
Follow the window prompts to select configuration settings for the TCR1000 card.

1. From the “Start Menu”, navigate to and click, “TCR1000 Configuration Utility”.

2. Click [TCRSync 1000 Configuration]



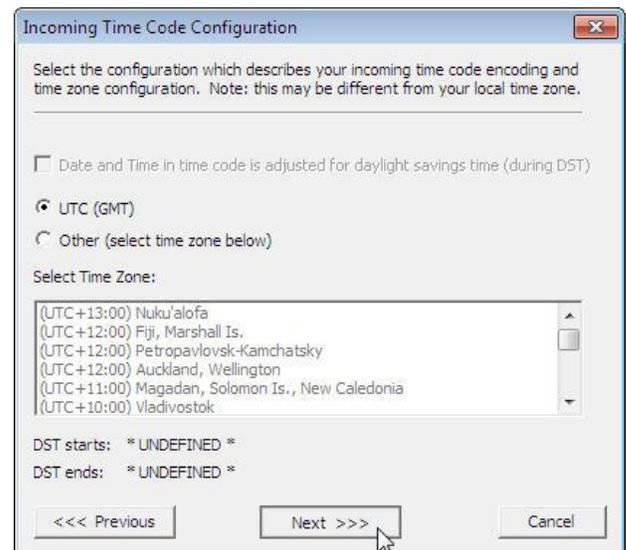
3. Select date and control bit information.



4. If selection for Masterclock, Inc. proprietary control bits was selected, you can choose alert options.



5. Select incoming time code information. See the next page for more information.



Date information encoded in time code

Check this option if the time code source encodes date information. For SMPTE-type time codes, the date must be encoded to the Leitch™ specification. For IRIG-B time code, the date must be encoded within the IEEE 1344 specification. *[Note: date support for IRIG-B under IEEE 1344 requires TCR500 time code reader firmware version 1.6 or later, or TCR500-PCI card. Consult TCR500 manual for information on determining firmware version.]*

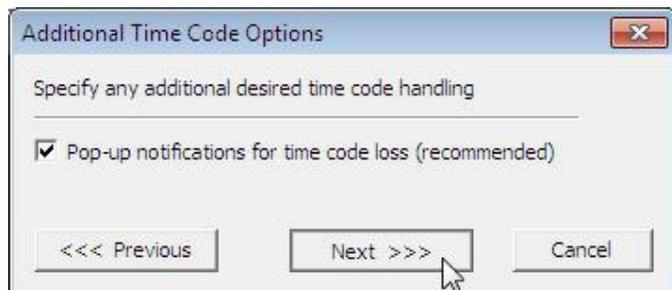
Time/Date in time code is adjusted for daylight savings time (during DST)

Check this option if your time code, time/date information is adjusted for daylight savings time (during DST) to some time zone standard. This option is available only if the selected time zone reference defines daylight savings time and the *Date information encoded in time code* option is checked.

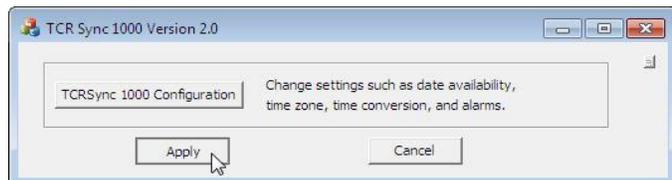
Select time zone

Check *UTC* if your incoming time code is referenced to UTC/GMT, select *Other* if it is not. If *Other* is selected a time zone must be chosen from the time zone list box. Select the time zone that matches the reference of your time code source. This is not necessarily your local time zone. If the selected time zone defines daylight savings time, the start and end of daylight savings time will be displayed below the time zone selection list box. You may select a time zone that defines daylight savings time even if your time code source does not adjust for daylight savings time.

6. Select an additional pop-up notification to indicated time code loss in excess of 3 minutes.



7. To save the configuration settings, click [Apply].



Windows OS does not have to restart in order for changes to take effect.

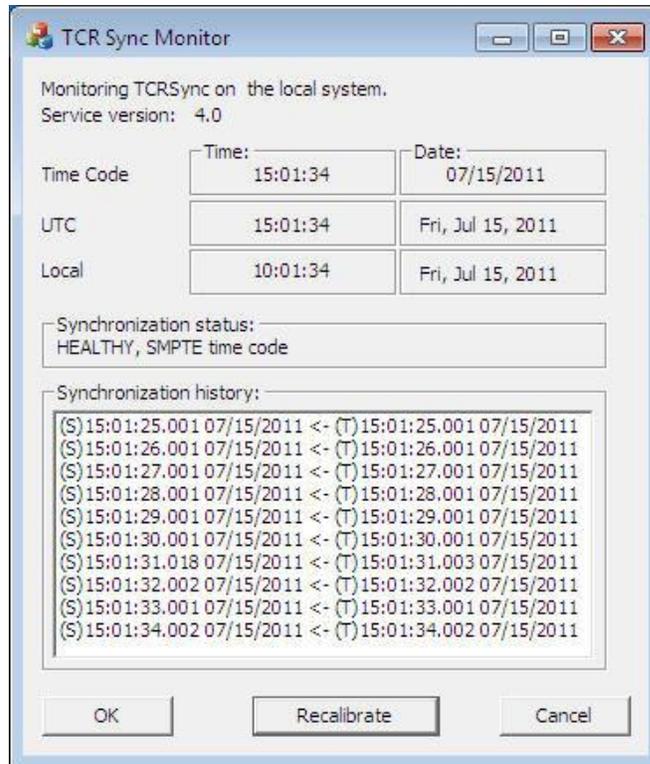
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Operation

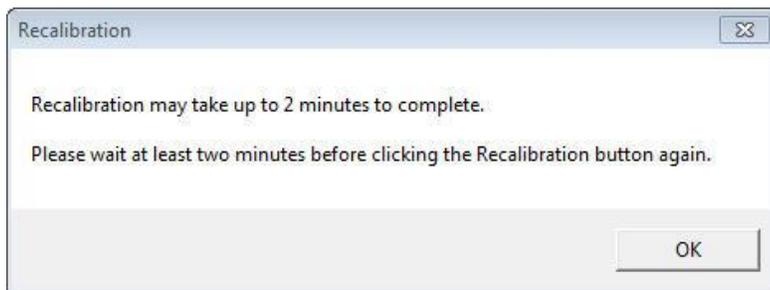
TCRSync Monitor

The TCRSync Monitor provides information about time code (when decoding is active) and troubleshoot any issues with the incoming time code reference.

The TCR1000 auto negotiates the time code format and it will be displayed from the TCR Sync Monitor.



Under normal operating conditions, the “Recalibrate” button is not used. If TCR Sync Monitor is not showing correct information, click [Recalibrate] to have the TCR1000 try and re-establish a time code reference.



If the LED light is on (solid), time code is present at the input.

Custom Programming

SDK

The TCR1000 SDK contains an API (Application Programming Interface) to the TCR1000 DLL (Dynamic Link Library). It runs on all Windows platforms. The API can be linked to and called from custom Windows applications to provide specialized handling of time code and for integration into OEM-level applications. The API includes programmer's documentation, libraries and sample applications for MS Visual C++.



Support for custom applications, OEM, and software development with the TCR1000 is not provided by Masterclock, Inc. Information, libraries, and sample code is provided as-is.

DLL

The TCR1000 DLL (Dynamic Link Library) is a library that is used by Windows programs to access the TCR1000 device driver.

Specifications

Connectors

Standard	BNC, isolated
Optional	3 Pin locking header (J1), RA, 0.1" spacing
Input Impedance	High, >100kΩ

PCI BUS (PCI V2.1 ,V2.2)

Voltage.....	Universal, 3.3 V & 5V
Speed	33 MHz (66MHz bus with reduced speed)
Width.....	32 bit, (also works with 64 bit bus)

Time Code

Input	Longitudinal/ LTC (Linear Time Code), forward running
SMPTE/EBU/Film	24 (film), 25(EBU) and 30fps, NDF (Non Drop Frame)
Date encoding (User Bits).....	Leitch/Masterclock Encoding

IRIG-B0 (unmodulated/pulse width modulated)

B000.....	BCD, CF to IEEE-1344 or zero filled, No SBS or zero filled
B001.....	BCD, CF to IEEE-1344, No SBS (zero filled)
B002.....	BCD, No CF (zero filled), No SBS (zero filled)
B003.....	BCD, No CF (zero filled), No SBS or zero filled.

IRIG-B1 (Amplitude Modulated, 1kHz)

B120.....	BCD, CF to IEEE-1344 or zero filled, No SBS or zero filled
B121.....	BCD, CF to IEEE-1344, No SBS (zero filled)
B122.....	BCD, No CF (zero filled), No SBS (zero filled)
B123.....	BCD, No CF (zero filled), No SBS or zero filled.

Physical

Height	2.5"/63.6mm
Length	6.6"/167.6mm

Operating/Storage Temperature & Humidity

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)
Relative Humidity	0 to 90%, non-condensing

Troubleshooting

Unable to lock to time code

Possible reasons/solutions:

1. TCR1000 is not currently connected to a valid time code reference.
2. Time Code reference is not a recognized format.
3. Verify that the cable and connector is in working condition.
4. Signal level of time code is not at acceptable levels.

Not displaying the correct local time.

Possible reasons/solutions:

1. The unit is not receiving time code.
2. The time code reference is referenced to UTC but your local time zone reference of your time reference and then set the time zone offset to arrive at a correct local time.
3. If the time code reference is already providing time with local time zone and/or DST offsets, then set the time zone and/or DST offset of the TCR1000 to UTC. If the time reference is providing UTC time, then configure your TCR1000 to have a local time zone and/or DST offset.
4. Your time code reference is not providing the time/date that you expect. Contact the individual responsible for the time reference for more information.

DST is not properly negotiated

Possible reasons/solutions:

1. Verify the DST is enabled on the TCR1000.
2. Verify that the correct format of DST is enabled (US/EU).

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 five years 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.

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.

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