

**TCR500 / TCR500-PCI**

**SMPTE - EBU & IRIG - B**

**TIME CODE READER**

**FOR PCs**



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## **INTRODUCTION**

The TCR500 series are time code reader plug-in cards for ISA and PCI bus, IBM-PC's and compatible computer systems. The card can be used to synchronize time in a PC or Server to a master time code. In addition, it can be used as a SMPTE or IRIG-B(1) linear time code reader, under software control. The reader is compatible with all formats of the SMPTE linear time code including drop frame. The reader is compatible with the IRIG-B(1) modulated time code format.

This instruction book covers installation and operation of the card using all versions of linear SMPTE and also IRIG-B TC. In some cases references are made to 24, 25 or 30 frames. It should be understood that the reference to 24, 25 or 30 frames per second only applies to the SMPTE TC.

Masterclock, Inc. provides the following on the diskette which ships with the TCR card:

- Card drivers for the following operating systems: Windows 95, 98, 98SE, Me (Millennium), NT 3.51/4.0, and 2000.
- WinSet - A simple time synchronization utility.
- Time Code Viewer – A time code display/diagnostic utility.
- An API (application programming interface) library with documentation and example code.

Available for separate purchase are:

- TCRSync-PRO – An advanced time synchronization software package providing time zone offset capabilities, automatic daylight savings time handling, unobtrusive background operation functionality, and many other high-end features.
- TCRSync-NTP – Integrates with TCRSync-Pro for provide enterprise-level network time synchronization utilizing the open standard NTP (network time protocol). Available for Windows NT & 2000.
- TCRSync-N3/N4 – Time synchronization services for Novell Netware 3.x, 4.x, and 5.x file servers.

Hereinafter, TCR500 will refer to the ISA bus version of the card, and TCR500-PCI to the PCI bus version. Where documentation refers to either card model, the abbreviation TCR is used.

## **HARDWARE DETAILS**

### **INPUT/OUT CONNECTIONS**

The TC input is balanced. Polarity is not important. For ISA model, pins 2 and 3 of the DB-15 connector are for input, with pin 1 used for ground. If an unbalanced input is used, ground the other pin. A DB-15 male plug to balanced BNC female adapter ships with the TCR500.

### **INPUT LEVEL**

The input level is controlled via an automatic gain control circuit. The TCR firmware will automatically determine the appropriate gain control setting for your incoming time code dB level.

The TCR can not adjust for time code signal levels outside the range of -15 and +20dB. The card 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-B(1). 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**

All TCR cards require a jumper configuration to set which type of time code will be decoded - SMPTE or IRIG-B(1). The jumper is J3 on the TCR500 (ISA) and J1 on the TCR500-PCI. The jumper should be placed in the off (open) position for SMPTE decoding (factory default setting), and the on (closed) position for IRIG-B(1) decoding.

### **I/O PORT SELECT – TCR500**

Note: The TCR500-PCI card is fully plug and play, and does not have I/O port address selection jumpers.

The TCR card is set at the factory to an address of 310. If another address is used the pin jumpers must be changed. The software configuration will also need to be changed.

#### Configuration Table

Port Address	P5	P6
300	jumper	jumper
310	no jumper	jumper
320	jumper	no jumper
330	no jumper	no jumper

#### INTERRUPT SELECT – TCR500

Note: The TCR500-PCI card is fully plug and play, and does not have an interrupt (IRQ) selection jumper.

The TCR card is set at the factory to an interrupt of 5. If another interrupt is used the pin jumper must be changed. The software configuration will also need to be changed.

Set (close) the interrupt pin jumper vertically across the two pins adjacent the desired interrupt. The interrupt selections are silk-screened onto the board just above the appropriate row.

#### PRE-INSTALLATION TIPS FOR ISA-BUS CARDS

As a first step, verify that the time code selection jumper (J3) is configured for the time code type you intend to use.

When using a TCR500 (ISA) model card, do not install the card into the PC yet. The TCR500's I/O port and interrupt selections are configured by jumper settings. As such, the card is not plug and play compatible. However, Windows knows what configuration combinations are available for the TCR500 card and, during driver installation, will suggest a jumper configuration that should not conflict with other devices in the system.

Special attention must be given to installing a legacy (non-plug and play) card into modern PC computer systems. Windows can provide very little resource arbitration features for legacy devices. Be sure that the interrupt configured on the TCR500 is reserved for legacy use. This is often configured in your PC's system BIOS. Become familiar with the other devices in your computer (both add-in cards and motherboard-integrated peripherals), and write down what resources (I/O ports and interrupts) that they are using.

#### PRE-INSTALLATION TIPS FOR PCI-BUS CARDS

As a first step, verify that the time code selection jumper (J1) is configured for the time code type you intend to use.

When using a TCR500-PCI model card, proceed with installing the card into the PC before installing any drivers. The TCR500-PCI is fully plug and play compatible. Windows (with the exception of NT) will detect this card on the next system boot, automatically configure appropriate I/O port and interrupt settings, then prompt for the driver diskette.

#### INSTALLING TCR500/500-PCI DRIVERS FOR WINDOWS

This section contains information regarding installing or updating TCR500/500-PCI drivers for Windows 95, 98, Me (Millennium Edition), NT 3.51/4.0, and 2000. The instructions are organized relative to the TCR product you have, followed by the Windows platform you are working with.

#### NEW INSTALLATIONS

Follow this procedure if you are installing a TCR card and drivers on your system for the very first time.

## TCR500-PCI

### Windows 95

1. Windows will automatically detect the card during the first system boot after the card is installed, then prompt for a driver.
2. When the *Update Device Driver Wizard* appears, insert the TCR driver diskette into a floppy drive.
3. Select *Next*, then select the *Other Locations* button and browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time.
4. Windows will indicate that it has found an updated driver for your TCR. Select *Finish*.
5. If at this point Windows complains that it cannot find the file ‘vtcrd.vxd’, select *Browse* and browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time.
6. Remove the driver disk from your floppy drive, and follow any prompts to restart your computer.
7. The driver installation process is complete.

### Windows 98/98SE

1. Windows will automatically detect the card during the first system boot after the card is installed, then prompt for a driver.
2. When the *Add New Hardware Wizard* appears, insert the TCR driver diskette into a floppy drive.
3. Select *Next*, choose the option *Search for the best driver for your device (Recommended)*, then select the *Next* button again.
4. Check the *Specify a location* option, then select the *Browse* button.
5. Browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then select *Next*.
6. Windows will indicate that it has found an appropriate driver for your TCR500-PCI card. Select *Next*.
7. If at this point Windows complains that it cannot find the file ‘vtcrd.vxd’, select the *Browse* button and browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time. Select *Finish*.
8. Remove the driver disk from your floppy drive, and follow any prompts to restart your computer.
9. The driver installation process is complete.

### Windows Me

1. Windows will automatically detect the card during the first system boot after the card is installed, then prompt for a driver.
2. When the *Add New Hardware Wizard* appears, insert the TCR driver diskette into a floppy drive.
3. Select the option *Automatically Search for a better driver (Recommended)*, then select *Next*.
4. Windows Me will scan your floppy drive, and will also spend several minutes scanning the Windows system folder. Please allow this process to complete uninterrupted. When scanning is completed, Windows will copy the driver from the diskette onto the computer. Select *Finish* to complete the process.
5. Remove the driver disk from your floppy drive, and follow any prompts to restart your computer.

6. The driver installation process is complete.

#### Windows NT 3.51/4.0

1. Insert the TCR driver diskette into a floppy drive.
2. Using File Manager or the Windows Explorer, browse to the floppy drive where you inserted the driver diskette, then to the 'Winnt' folder.
3. Run the "install.exe" program located in that folder.
4. Follow the instructions and prompts provided by the install program.
5. The driver installation process is complete. Note that the driver installation will place a configuration applet into the Windows NT control panel. This applet can be used to change driver configuration parameters later, if necessary, without re-installing the driver.

#### Windows 2000

1. Windows will automatically detect the card during the first system boot after the card is installed, then prompt for a driver.
2. Select *Next*.
3. Select the *Search for a suitable driver for my device* option, then select *Next*.
4. Insert the driver diskette into a floppy drive.
5. Check the *Specify a location* option then select *Next*.
6. Browse to the floppy drive where your driver diskette is inserted, then to the "win2000" folder. Select *OK*, then *OK* a second time.
7. Plug and play manager will find file 'tcrw2k.sys' on the floppy disk. Select *Next*.
8. Follow the prompts to complete the driver installation. The driver will start automatically. You will be notified at this time if the driver could not start for some reason.

#### TCR500 (ISA)

**Note: if the card is not already installed in the computer, wait until the driver installation process completes before installing it. At the conclusion of driver installation, card configuration parameters will be suggested by Windows, which can then be set before installing the card into the computer. However, Windows NT will not suggest configuration parameters for the TCR500 card. Appropriate settings must be determined by the operator.**

#### Windows 95

1. Insert the TCR driver diskette into a floppy drive.
2. The TCR500 card is not plug and play compatible. You will need to negotiate the driver installation process manually per the following instructions. Go to the Control Panel and open the *Add New Hardware* applet.
3. In the *Add New Hardware Wizard* dialog, select *Next*.
4. Select option *No*, then select *Next*.
5. In the hardware type list, select *Other Devices*.

6. Select the *Have Disk* button.
7. Browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time.
8. A list of driver selections is presented. Choose your card model and select the *Next* button.
8. Windows will suggest an I/O port and interrupt configuration that should not conflict with other devices in the computer. It is suggested that these recommended settings be used when possible. At this time, set the jumpers on your TCR500 card to the recommended settings. Select *OK*.
9. If at this point Windows complains that it cannot find the file ‘vtrcd.vxd’, select the *Browse* button and browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time.
10. At this time Windows will prompt to restart the computer. After Windows has shut down, power off the computer and install the TCR500 card with the new configuration.
11. Remove the driver diskette then restart your computer. The driver and card installation is complete.

#### Windows 98

1. Insert the TCR driver diskette into a floppy drive.
2. The TCR500 card is not plug and play compatible. You will need to negotiate the driver installation process manually per the following instructions. Go to the Control Panel and open the *Add New Hardware* applet.
3. In the *Add New Hardware Wizard* dialog, select *Next*.
4. Select the *No, I want to select the hardware from a list* option, then select the *Next* button.
5. In the hardware type list, select *Other Devices*.
6. Select the *Have Disk* button.
7. Browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time.
8. A list of driver selections is presented. Choose your card model and select the *Next* button.
9. Windows will suggest an I/O port and interrupt configuration that should not conflict with other devices in the computer. It is suggested that these recommended settings be used when possible. At this time, set the jumpers on your TCR500 card to the recommended settings. Select *OK*.
10. If at this point Windows complains that it cannot find the file ‘vtrcd.vxd’, select the *Browse* button and browse to the floppy drive where your driver diskette is inserted, then to the “Win9x” folder. Select *OK*, then *OK* a second time.
11. At this time Windows will prompt to restart the computer. After Windows has shut down, power off the computer and install the TCR500 card with the new configuration.
12. Remove the driver diskette then restart your computer. The driver and card installation is complete.

#### Windows 98SE/Me

1. Insert the TCR driver diskette into a floppy drive.
2. The TCR500 card is not plug and play compatible. You will need to negotiate the driver installation process manually per the following instructions. Go to the Control Panel and open the *Add New Hardware* applet.

3. In the *Add New Hardware Wizard* dialog, select *Next* then *Next* again.
4. Windows will require you to wait while it tries to detect new hardware. (Windows will not auto-detect an ISA-model TCR card, however.) When the process completes, select the option *No, the device isn't on the list*, then select the *Next* button.
5. In the hardware type list, select *Other Devices*.
6. Select the *Have Disk* button.
7. Browse to the floppy drive where your driver diskette is inserted, then to the "Win9x" folder. Select *OK*, then *OK* a second time.
8. A list of driver selections is presented. Choose your card model and select the *Next* button.
9. Windows will suggest an I/O port and interrupt configuration that should not conflict with other devices in the computer. It is suggested that these recommended settings be used when possible. At this time, set the jumpers on your TCR500 card to the recommended settings. Select *Next*.
10. If at this point Windows complains that it cannot find the file 'vtrcd.vxd', select the *Browse* button and browse to the floppy drive where your driver diskette is inserted, then to the "Win9x" folder. Select *OK*, then *OK* a second time. Select *Finish*.
11. At this time Windows will prompt to restart the computer. After Windows has shut down, power off the computer and install the TCR500 card with the new configuration.
12. Remove the driver diskette then restart your computer. The driver and card installation is complete.

#### Windows NT 3.51/4.0

1. Insert the TCR driver diskette into a floppy drive.
2. Using File Manager or the Windows Explorer, browse to the floppy drive where you inserted the driver diskette, then to the 'Winnt' folder.
3. Run the "install.exe" program located in that folder.
4. Follow the instructions and prompts provided by the install program.
5. The driver installation process is complete. Note that the driver installation will place a configuration applet into the Windows NT control panel. This applet can be used to change driver configuration parameters later, if necessary, without re-installing the driver.

#### Windows 2000

1. Insert the TCR driver diskette into a floppy drive.
2. The TCR500 card is not plug and play compatible. You will need to negotiate the driver installation process manually per the following instructions. Go to the Control Panel and open the *Add/Remove Hardware* applet. Select *Next*.
3. Select the *Add/Troubleshoot a device* option, then select *Next*.
4. Select *Add a new device* from the list box, then select *Next*.
5. Select the option *No, I want to select the hardware from a list*, then select *Next*.

6. Select *Other Devices* from the list box, then select *Next*. (Note that you may experience a delay here as Windows 2000 compiles some internal lists.)
7. Select the *Have Disk* button.
8. Select the *Browse* button and browse to the floppy drive where the driver diskette has been inserted, then open the “win2000” folder. Select *OK*.
9. Your browse window should display two files (*tcrisa.inf* and *tcrpci.inf*). Select *Open* then *OK*.
10. Select from the list the model of TCR card that you installed in the computer, then select *Next*.
11. The plug and play manager will inform you that you need to manually specify card configuration.
12. In the list box, double click on *Input/Output Range*.
13. Select an I/O port configuration. If Windows 2000 indicates that your selection is in conflict with another piece of hardware, choose an I/O port setting that is not listed as conflicting.
14. Select *OK*.
15. In the list box, double click on *Interrupt Request*.
16. Select an Interrupt Request (IRQ). If Windows 2000 indicates that your selection is in conflict with another piece of hardware, choose an IRQ that is not listed as conflicting.
17. At this time, set the jumpers on your TCR500 for the I/O port and interrupt selections that you just chose.
18. Select *OK*, then *OK* again.
19. Select *Next*, then wait for files to copy.
20. At this time Windows will prompt to restart the computer. After Windows has shut down, power off the computer and install the TCR500 card with the new configuration.
21. The driver and card installation is complete.

### UPDATING TO A NEW TCR DRIVER

Note: Before updating a driver for a TCR500 (ISA) card, be sure to write down the existing I/O port and Interrupt (IRQ) configuration. You will need this information again when installing the new driver. Also, if the configuration settings for a TCR500 card are changed, the equivalent jumpers must also be changed on the TCR500 board itself.

To update to a newer TCR driver for Windows NT 3.51/4.0, follow the instructions for installing a new driver.

1. For all other Windows platforms, locate the existing TCR device in the Device Manager.
  - To access the Device Manager under Windows 95, 98, and Me – go to the Control Panel and open the *System* applet. Select the *Device Manager* tab. If a TCR device is installed, it will be located under the *Other Devices* category.
  - To access the Device Manager under Windows 2000 – go the Control Panel and open the *System* applet. Select the *Hardware* tab, then the *Device Manager* button. The TCR device will be located under the *Time Code Reader* category.
2. Select the TCR device, then right-click on the device and select *Properties*.
3. Select the *Driver* tab, then the *Update Driver* button.
4. Jump to the instructions for installing a new TCR driver on your Windows platform.

## CHANGING DRIVER CONFIGURATION

Note: TCR500-PCI driver configuration cannot be directly changed. I/O port and Interrupt (IRQ) settings are set by the system BIOS or Windows operating system.

1. Locate the existing TCR device in the Device Manager.

- To access the Device Manager under Windows 95, 98, and Me – go to the Control Panel and open the *System* applet. Select the *Device Manager* tab. If a TCR device is installed, it will be located under the *Other Devices* category.

- To access the Device Manager under Windows 2000 – go to the Control Panel and open the *System* applet. Select the *Hardware* tab, then the *Device Manager* button. The TCR device will be located under the *Time Code Reader* category.

2. Select the TCR device, then right-click on the device and select *Properties*.

3. Select the *Resources* tab.

4. To change a setting, double-click on the item in the list box and choose the desired setting. Note that Windows may disallow some settings if they conflict with another device in the system.

5. You will be prompted to restart the computer when changes are saved. After the computer shuts down, power down the computer and change jumpers on the TCR500 to reflect the new configuration.

6. Restart the computer.

## TCR SOFTWARE TOOLS

The diskette that ships with your TCR card includes a set of programs for use with the card on the Windows platforms.

### INSTALLATION

Using File Manager or Windows Explorer, browse to your TCR driver diskette and then to the “Tools” folder. Run the ‘Setup.exe’ program. Follow the instructions provided by the setup program to complete installation.

### SOFTWARE PROVIDED

#### WinSet

WinSet is a simple program for synchronizing your Windows computer’s time and date to the incoming time code signal.

WinSet can synchronize date only when it is available in the time code signal. Do not enable the date synchronization option unless your time code signal actually provides date, or unexpected date synchronization problems will occur. To determine if date is available, check the documentation for your master clock system or contact the person responsible for same. WinSet can decode date from SMPTE in the Leitch™ format, and IRIG-B in the IEEE1344 format.

WinSet does not perform time zone offsets or special daylight savings time adjustments, and can not run when a user is logged off. For these and other advanced features, consider purchasing the TCRSync-PRO package.

#### Time Code Viewer

Time Code Viewer is a time code display and diagnostic utility. It can be used to view time code (when decoding is active) and determine other operational characteristics of the TCR card such as signal calibration.

#### TCR API

The TCR API is an application programming interface to the TCR card. It runs on all supported Windows platforms. The API can be linked to and called from your own 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 Visual C++ and Visual Basic.

To install the TCR API, select the *Custom* option when installing Tools, then check the API option.

## **PROBLEMS - TROUBLESHOOTING**

All TCR cards are checked for proper operation before shipment and unless physical damage to the card is found, the TCR is probably functional.

### **DRIVER ISSUES**

Software applications (such as Time Code Viewer and WinSet) will not operate when the TCR driver has failed to load. The driver may fail to load due to resource conflicts, incorrect configuration, an incomplete driver install, or (rarely) actual hardware failure.

The procedure for diagnosing driver startup problems varies depending on the Windows platform you are using.

#### **Windows 95/98/Me**

Go to the Control Panel and open the *System* applet. Select the *Device Manager* tab. If a TCR device is installed, it will be located under the *Other Devices* category. Select the TCR device then right-click on it and choose *Properties* from the context menu. Under the *General* tab, in the Device Status box, an error message will be displayed when the driver failed to load.

The key to the error message is in the code number that is returned as part of the reply, such as (Code 24). Some common error codes and their meanings are:

- (Code 10) – The driver could not find the TCR card. Occurs most frequently with TCR500 (ISA) model due to conflict or configuration mismatch of I/O port setting.
- (Code 0e or 29) – There aren't any free I/O port or interrupt settings for the TCR card. Occurs most frequently with interrupt configuration for TCR500 (ISA) model cards. You may need to free an interrupt in your system for the TCR500 to use.
- (Code 30) – There is an interrupt conflict or an interrupt configuration problem. Verify that the TCR500 (ISA) interrupt jumper configuration reflects the Windows configuration. The TCR500 (ISA) may not share interrupts with other devices. If this occurs with a TCR500-PCI, it may indicate that the TCR500-PCI is sharing an interrupt with another PCI device that does not properly support shared interrupts.
- (Code 1d) – Configuration information for the driver is missing from the registry. The TCR driver must be re-installed.
- (Code 8) – Driver files are missing. The TCR driver must be re-installed.

#### **Windows NT/2000**

The TCR driver for Windows NT/2000 reports detailed error messages to the System portion of the event log. To access the event log, open the Event Viewer application. It is located in Administrative Tools. Be sure you are looking at the System portion of the event log, where drivers log their status messages.

The NT/2000 driver may log the following messages. Below each message is an explanation of the typical problem under the circumstances, and a suggested resolution.

#### **Message:**

“TCRDrv: TCRAAddDevice() failed to create a new device object.”

-or-

“TCRDrv: TCRAAddDevice() is unable to create device object.”

-or-

“TCRDrv: Driver did not load due to initialization failure.”

#### **Problem:**

The driver failed when initializing internal structures for the TCR card.

Resolution:

Consult other error messages for details.

Message:

“TCRDrv: Unable to initialize due to an IRQ or I/O port conflict.”

Problem:

A conflict was detected between the resources configured for the TCR card and another device driver already loaded. This occurs more frequently in ISA-series card installations.

Resolution:

Additional error messages provided by the Service Control Manager will explain which resource is in conflict and with which device. Reconfigure I/O port and/or interrupt settings on the TCR card or the conflicting device. When installing ISA-model cards in a PCI-based system, be sure to reserve the legacy interrupts in the system BIOS.

Message:

“TCRDrv: unable to locate time code reader card at I/O address provided.”

Problem:

The driver cannot communicate with the TCR card. This error usually occurs when there is a driver configuration mismatch for the I/O port setting relative to the actual jumper configuration on the card.

Resolution:

Verify that the TCR card has been jumpered for the same I/O port address that has been configured in software.

For ISA-series cards, in rare instances, bus-level I/O port conflicts can arise that Windows 2000/NT does not arbitrate. Try a different I/O port configuration and reconfigure software settings to the new values.

Message:

“TCRDrv: Failure reading configuration from registry. Re-install the drivers from distribution diskette.”

Problem:

Required values are missing from the registry.

Resolution:

Re-install the NT or 2000 drivers from the distribution diskette.

Message:

“TCRDrv: Interrupt (IRQ) test failure. A conflict may exist on configured IRQ or IRQ configuration mismatch.”

Problem:

An interrupt diagnostic procedure failed. Two devices (one usually being legacy ISA) are sharing an interrupt.

Resolution:

Verify that the TCR500/500-PCI is not sharing an interrupt with a legacy ISA device in the system. For TCR500 (ISA), try a different unused interrupt setting. When installing ISA-model cards in a PCI-based system, be sure to reserve the legacy interrupt in the system BIOS.

Message:

“TCRDrv: Unable to determine configuration of TCR500 time code reader card.”

Problem:

The driver could not auto-detect time code decoding configuration on the TCR500 series time code reader card.

Resolution:

Verify that you have a TCR500 series as opposed to TCR200 series time code reader installed in the computer. Reconfigure for the appropriate card model as necessary.

Message:

“TCRDrv: could not find a TCR500-PCI card in the computer.”

Problem:

The driver could not find a TCR500-PCI card in the computer.

Resolution:

Verify that a TCR500-PCI model card, as opposed to an ISA-series card, is actually installed in the computer. Reconfigure for the appropriate card model as necessary.

## TIME CODE DECODING ISSUES

The easiest way to verify that the TCR is decoding time code is to observe the status of the LED on the card itself. The LED will be lit “steady-on” when the TCR is properly decoding time code. If the LED is not lit, or is flashing intermittently, then there is a problem with the time code signal.

Alternately, if drivers and software are installed, the Time Code Viewer utility is a useful diagnostic tool for observing the status of time code calibration and decoding. The Time Code Viewer will indicate “Calibration in progress” when the card has not received a valid time code signal since the last reboot/power cycle. “No Time Code” is indicated when the card was able to detect time code, but has since lost the signal.

Time code decoding problems can include any of the following:

- no time code present
- ground loops or other interference
- bad/intermittent cables, wiring, or connectors
- a signal level that is out of range (too high or too low)
- a signal level that is fluctuating
- a time code type that the TCR does not support

Before concluding that there is a physical problem with time code decoding on the TCR, please rule out all of the above possibilities.

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To the original customer only, Masterclock, Inc. (hereinafter Masterclock) provides the following Limited Warranty.

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- (2) The media on which the SOFTWARE is furnished will be free from defects in materials and workmanship under normal use.

Your sole remedy under the warranty during this sixty (60) day period is that Masterclock will undertake to correct within a reasonable period of time any reported "SOFTWARE Error" (failure of the SOFTWARE to perform substantially the functions described in the documentation), correct errors in the documentation, and replace any magnetic media which proves defective in materials or workmanship on an exchange basis without charge. In order to make a claim under this warranty you must return the defective item with your receipt to Masterclock, postage prepaid, within ten (10) days after the warranty period. If Masterclock is unable to replace defective media or if Masterclock is unable to provide corrected SOFTWARE or corrected documentation within a reasonable time, Masterclock will, at its sole and exclusive option, either replace the SOFTWARE with a functionally equivalent program at no charge to you or refund the license fee of the SOFTWARE. These are your sole and exclusive remedies for any breach of warranty during this sixty (60) day period.

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When returning any Masterclock hardware product for warranty repair please contact the factory for return authorization before returning the item. When you return your hardware product to Masterclock for service, you must prepay all shipping charges, duty, and taxes. Except for products returned by the customer from another country, Masterclock shall pay for return shipment of products to the customer.

### **FCC COMPLIANCE STATEMENT**

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, and can radiate radio frequency energy and, if not installed and used in accordance with standard installation procedures and instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at the user's own expense.