

**MCRPCI and MCRISA**

**REAL TIME CLOCK CARDS**



636 724 3666 Fax: 636 724 3776  
[www.masterclock.com](http://www.masterclock.com)

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

## **INTRODUCTION**

The Master Clock Reference card (MCR) is a PCI or ISA PC card that provides very stable accurate time and date information for a Windows/NT PC. The card uses a Real Time Clock chip and oscillator with temperature compensation to stabilize the PC clock. The MCR maintains PC accuracy to 165 ms per day or 1 minute per year. The onboard clock runs from a backup battery in the absence of power from the PC.

## **INSTALLATION**

### **INSTALLATION STEPS**

Run MCRSETUP.EXE to unpack and install the software files on your computer.

If the MCR card has not yet been installed, shut down your computer and install the card.

### **MCRPCI Card Installation**

- Install MCRPCI card into a free PCI slot.
- The MCRPCI card is plug and play compatible, and thus requires no jumper configuration for port address or IRQ.
- For normal use, J1 pins 1 and 2 should be jumpered.
- The McrDrv device driver uses interrupts to obtain sub-millisecond time precision from the MCR card. The IRQ can be shared with one or more other PCI cards, provided that the other cards and BIOS also support shared IRQs. If you are unsure if such is the case, or if you encounter device conflict problems, try assigning a unique IRQ to the MCR card, via the BIOS. Note that PCI assigns different preferred IRQs to different slots.

### **MCRISA Card Installation**

- Assign a non-conflicting port address and IRQ to the MCRISA card, via the jumpers, and note for future reference.
- For normal use, J1 pins 1 and 2 should be jumpered.
- Install the MCRISA card into a free ISA slot.

## Device Driver Installation

Restart the computer and install the appropriate device driver.

### MCRPCI (Windows 98, Windows ME, Windows 2000)

- Windows should automatically detect the MCRPCI card during the first system boot after the card is installed, and prompt you for a driver. If the card was previously installed, you can force re-detection by starting the Windows Control Panel and selecting "Add/Remove Hardware". After clicking "Next", select "Add/Troubleshoot a device".
- If prompted for a new device driver, select "Search for a suitable driver for my device", then "Next"; then navigate to the following folder:

`<MCR install dir>\drivers\win98_2k`

...where <MCR install dir> is the folder you selected when installing the MCR software (typically C:\Program Files\Masterclock\MCR).

The browse window should display two files, mcrisa.inf and mcrpci.inf. Select "mcrpci.pci", then "Open", then "OK".

- If prompted for the path containing the file "mcrdrv.sys", select the following folder:

`<MCR install dir>\drivers\win98_2k`

...where <MCR install dir> is as described above.

Select the correct path, then click "OK".

- Follow the remaining prompts to finish the device driver installation.

### MCRPCI or MCRISA (Windows NT 4.0)

For Windows NT 4 systems, the McrDrv device driver is installed using its own, self-extracting setup utility. The default location of this setup utility is:

`<MCR install directory>\drivers\winnt4\mcrdrvnt.exe`

To install the McrDrv device driver, simply run mcrdrvnt.exe and follow the prompts.

## MCRISA (Windows 2000)

- Open Control Panel, select "Add/Remove Hardware", then click "Next".
- Select "Add/Troubleshoot a device", then click "Next".
- After Windows completes searching for new hardware, select "Add a new device" from the list, then click "Next".
- Select "No, I want to select the hardware from a list", then "Next".
- Select "Other devices" from the list. Click "Next".
- Click the "Have Disk" button, then click "Browse" and navigate to the following folder:

<MCR install dir>\drivers\win98\_2k

...where <MCR install dir> is the folder you selected when installing the MCR software (typically C:\Program Files\Masterclock\MCR).

The browse window should display two files, mcrisa.inf and mcrpci.inf; either can be selected at this point. Click "Open", then "OK".

- Select "MCRPC-ISA", then click "Next".
- Because the MCRISA card is not a plug and play device, Windows will display a warning stating that you must enter its hardware settings. Manually configure the "Input/Output Range" and "Interrupt Request" to match the jumper settings on your MCRISA card, then click "OK".
- Follow the remaining prompts to finish the device driver installation.

## MCRISA (Windows 98, Windows ME)

- Open Control Panel and select "Add New Hardware".
- Select "Next" for the two dialogs that follow.
- After Windows completes searching for new hardware, a (possibly empty) list of devices will appear. If the MCR card is not listed (on a new install it won't be), select "No, the device isn't in the list". Otherwise, select the MCR card from the list. Click "Next".
- Select "No, I want to select the hardware from a list", then "Next".
- Select "Other devices" from the list, and then click "Next".

- Click the "Have Disk" button, then click "Browse" and navigate to the following folder:

<MCR install dir>\drivers\win98\_2k

...where <MCR install dir> is the folder you selected when installing the MCR software (typically C:\Program Files\Masterclock\MCR).

The browse window should display two files, mcrlsa.inf and mcrlpci.inf. Click "OK".

- Select "OK" to close the "Install from Disk" dialog.
- Select "MCRPC-ISA" and click "Next".
- Windows will assign default values for "Input/Output Range" and "Interrupt Request"; the values displayed will likely be incorrect. These will have to be changed via the Device Manager in a later step. Click "Next".
- If a "Copying Files" dialog appears next, indicating that "mcrdrv.sys" could not be found, simply ensure that the following folder is displayed in the "Copying files from" field...

<MCR install dir>\drivers\win98\_2k

...then click "OK".

- At this point a "finished installing" dialog should appear. Click "Finish".
- Before permitting Windows to shut down the computer, you will probably need to change your driver settings to the correct values. From Control Panel, select "System", then select the "Device Manager" tab.
- Select the "MCRPC-ISA" device (under "Master Clock Reference"), then click "Properties".
- Select the Resources tab. Set the "Input/Output Range" and "Interrupt Request" values per the jumper settings on your MCR card, then click "OK".
- In the "System Settings Change" pop-up dialog that appears, click "Yes" to shut down the system, then reboot.

## OPERATION

Once the device driver installation has been completed, the MCR card software should be ready to use. To confirm proper installation, run

the MCRSET utility ("Set MCR Date and Time" shortcut on your desktop).

## McrSync Service

McrSync is a standard background service that runs on Windows NT-based systems (Windows NT, Windows 2000, or Windows XP). McrSync is installed and started automatically when MCRSETUP is run.

The purpose of McrSync is to keep the operating system clock continuously synchronized to the MCR card's time and date. Ordinarily, McrSync will require no particular action on your part, starting automatically as part of the Windows startup.

However, McrSync does support a few basic control operations from the command prompt, including install, remove, version and status, start, and stop. For a list of the available commands, enter "mcrsync" in a command prompt window. Additional details can be found in McrSync.txt.

Starting with Windows 2000, Microsoft began including a time client service called W32Time, which, like McrSync, is designed to automatically adjust the system time. To avoid a likely conflict between these services, McrSync automatically stops and disables W32Time when it is installed. If McrSync is subsequently removed, W32Time will be returned to its previous startup type.

## MCRSET

Using the MCRSET Utility ("Set MCR Date and Time" shortcut):

Field Descriptions:

MCR date and time

This indicates the current UTC date and time as obtained from the MCR card. It also can be used to enter an updated date and time, in conjunction with the "Set" button. Display updates become frozen while this field is being used for data entry.

System date and time

This indicates the current UTC date and time as obtained from the operating system.

Offset (seconds)

This indicates the instantaneous difference (offset) in time between the operating system and the MCR.

### Peak offset (ms)

This indicates the peak time offset, in milliseconds, as an absolute value. It has a simple constant decay factor.

### Reference (GPS cards only)

This indicates the current active time reference. With an active GPS source, this will display "GPS". If valid GPS time is not available, "Internal" will be displayed (denoting reliance on the internal on-board clock). If "none" is displayed, either the MCR device driver or the card itself is inaccessible.

### Controls:

#### "Set" button

This updates the MCR card date and time per the contents of the "MCR date and time" field. The button is enabled whenever the contents have been edited. (Not applicable if the active time reference is GPS.)

#### "Adjust system time" checkbox

When this box is checked, the system date and time are disciplined to the MCR date and time, once every 10 seconds. If the offset is no more than just a few seconds, the software may make gradual adjustments to avoid abrupt changes to system time.

This box will be grayed-out and disabled if the system time is being kept adjusted by another similar program, or by the McrSync service.

## UNINSTALL

To remove the MCR card software from your system, first start the Windows Control Panel, select "Add/Remove Programs", and remove the "Master Clock Reference card software" item.

Next, remove the MCR card device driver.

To remove the MCR card device driver from Windows 98 or Windows ME, right-click the My Computer icon on the desktop, then select "Properties" from the pop-up menu. Next, select the Device Manager tab, select the MCRPC device icon under "Master Clock Reference", then click the "Remove" button. Follow the remaining prompts.

To remove the MCR card device driver from a Windows 2000 system, start

the Windows Control Panel, select "Add/Remove Hardware", then "Next"; then select "Uninstall/Unplug a device", and follow the remaining prompts.

To remove the MCR card device driver from a Windows NT 4 system, start the Windows Control Panel, select "Add/Remove Programs"; then select "McDrv for Windows NT 4", and follow the remaining prompts.

## INSTALLATION FILES

Files included in this installation

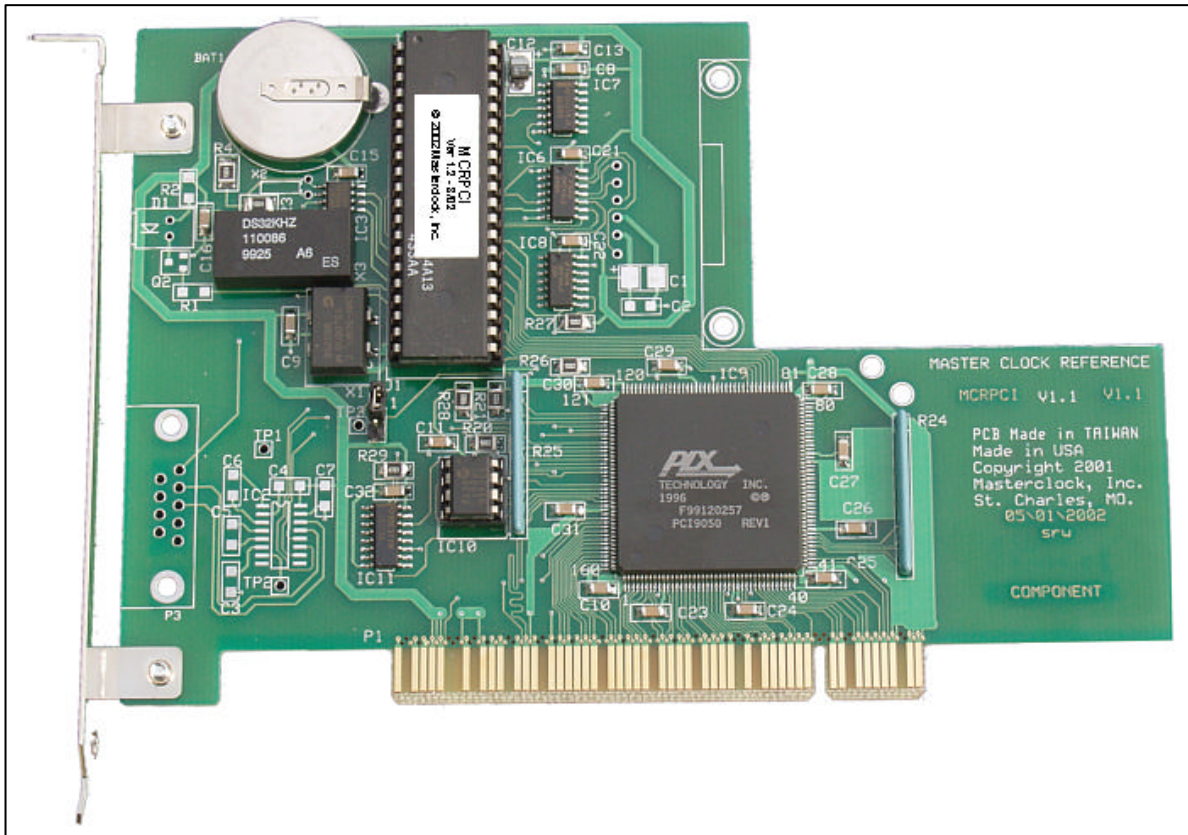
<MCR install directory>

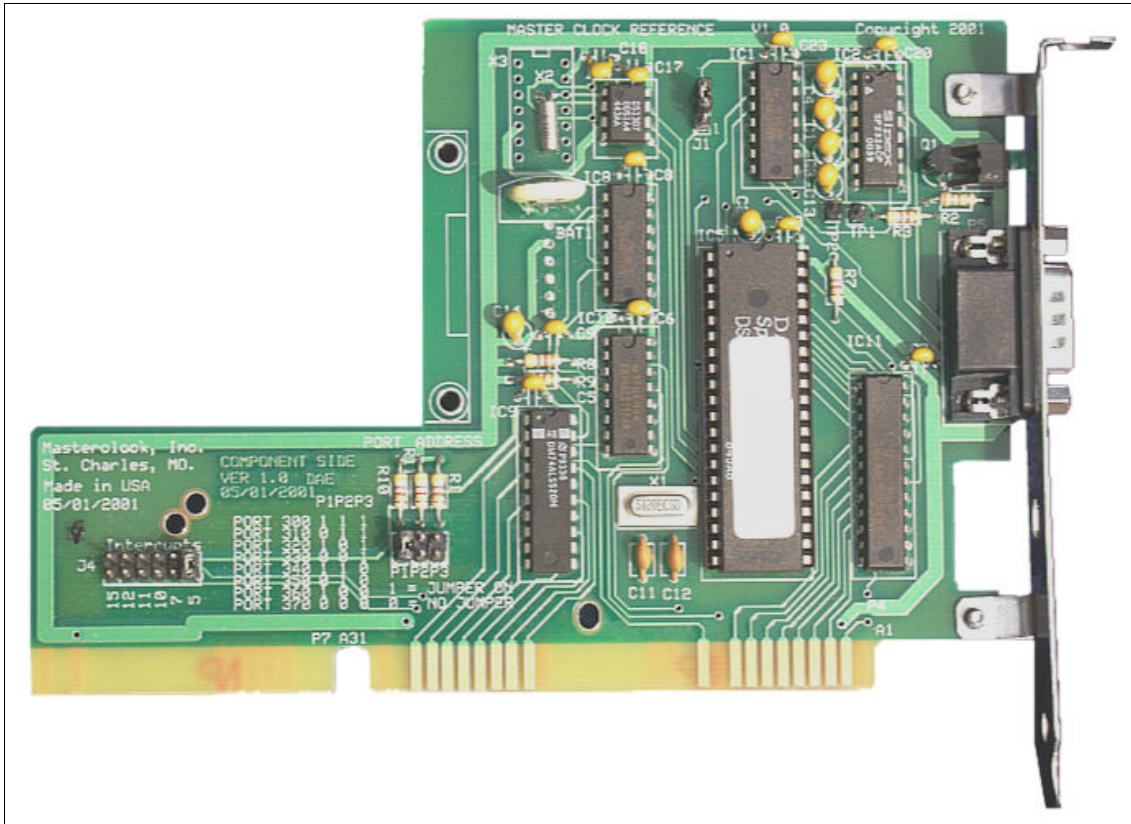
McrSet.exe	MCRSET date/time set utility
readme.txt	This readme file
API\	
mcrtime.h	C++ header file for mcrtime.dll API
mcrtime.lib	Library file for linking to mcrtime.dll
McTime.bas	Visual Basic equivalent to mcrtime.h
drivers\	
win98_2k\	
mcrdrv.sys	Windows 98/2000 device driver (WDM)
mcrisa.inf	Install script for MCRISA
mcrpci.inf	Install script for MCRPCI
winnt4\	
mcrdrvnt.exe	Windows NT 4 device driver setup
mcrdrvnt.txt	Driver installation notes
examples\	
vb\	Visual Basic source code example
McrDemo.frm	Main source (also needs McTime.bas)
McrDemo.vbp	Project file
McrDemo.vbw	Workspace file
McrDemo.exe	Executable
vc\	Visual C++ source code example
McrCmd.cpp	Simple command prompt app source code
McrCmd.dsp	Project file
McrCmd.txt	Build hints
McrCmd.exe	Executable

<windows system32 directory>

mcrtime.dll	Common DLL for accessing MCR card
McSync.exe	McSync service

# PC BOARD LAYOUT





**SPECIFICATIONS**

**OUTPUT**

**TIMING CHARACTERISTICS**

Date in Month, Day, Year  
 Accuracy.....+/- 1 Minute per Year at 0 C to 40 C.

**POWER SUPPLY REQUIREMENTS**

Contains its own CPU and requires only DC power from the PC

**PHYSICAL**

1/3 slot PCI or ISA card

**OPERATING TEMPERATURE**

Temperature.....0 to +70 °



RACK MOUNT – RM-4



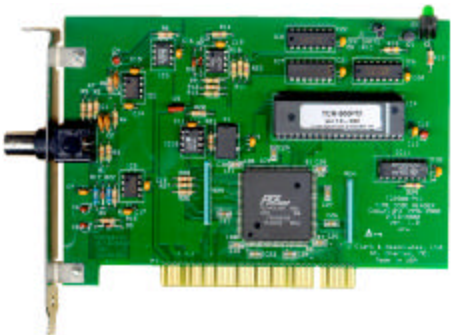
TIME CODE INTERFACE – TCI500



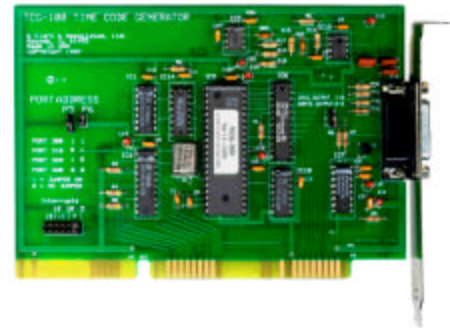
TCD200 - .6" time code driven digital display/counter



TCD46 – 4" time code driven digital display/counter



TIME CODE READER CARD – TCR500-PCI



TIME CODE GENERATOR CARD – TCG100

## **LIMITED WARRANTY**

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

Masterclock warrants the MCR 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.

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## **HARDWARE SERVICE**

You may return your MCR to Masterclock for repair service. Please contact the factory for return authorization before returning the unit.