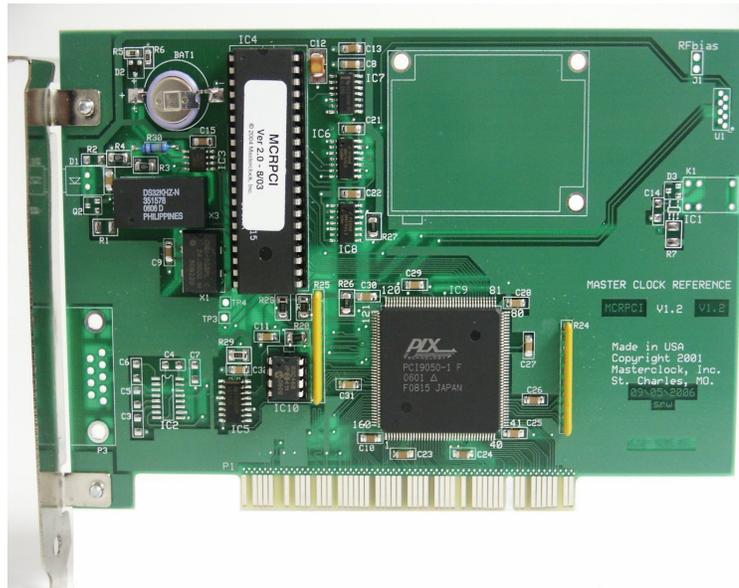


**MCRPCI**  
**Master Clock Reference**  
**- Real Time Clock Card -**



***USER MANUAL***



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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 card that provides very stable accurate time and date information for a Windows PC. The card uses a Real Time Clock chip and oscillator with temperature compensation (TXCO) to stabilize the PC clock. The MCRPCI 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 MCRPCI 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 MCRPCI 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 MCRPCI card, via the BIOS. Note that PCI assigns different preferred IRQs to different slots.

### **Device Driver Installation**

Restart the computer and install the appropriate device driver.

MCRPCI (Windows 98/ME/2000/XP)

- 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 MCRPCI 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 (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.

## OPERATION

Once the device driver installation has been completed, the MCRPCI card software should be ready to use. To confirm proper installation, run the MCRSET utility ("Set MCR Date and Time" shortcut on your desktop). Note: For MCRPCI cards with GPS option installed (GPSPCI cards), GPS lock status is indicated by the LED on the back of the card, with a once per second flash indicating a successful lock. **Note:** The drivers must all be installed successfully before a successful lock will be indicated.

### 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 MCRPCI 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 MCRPCI.

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 MCRPCI device driver or the card itself is inaccessible.

Controls:

"Set" button

This updates the MCRPCI 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 MCRPCI 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 MCRPCI 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 MCRPCI card device driver.

To remove the MCRPCI 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 MCRPCI card device driver from a Windows 2000 or XP 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 MCRPCI 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>

McSet.exe	MCRSET date/time set utility
readme.txt	This readme file
API	
mcrttime.h	C++ header file for mcrttime.dll API
mcrttime.lib	Library file for linking to mcrttime.dll
McTime.bas	Visual Basic equivalent to mcrttime.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\ 	Source code examples

vb\	Visual Basic source code example
McrDemo.frm	Main source (also needs McrTime.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

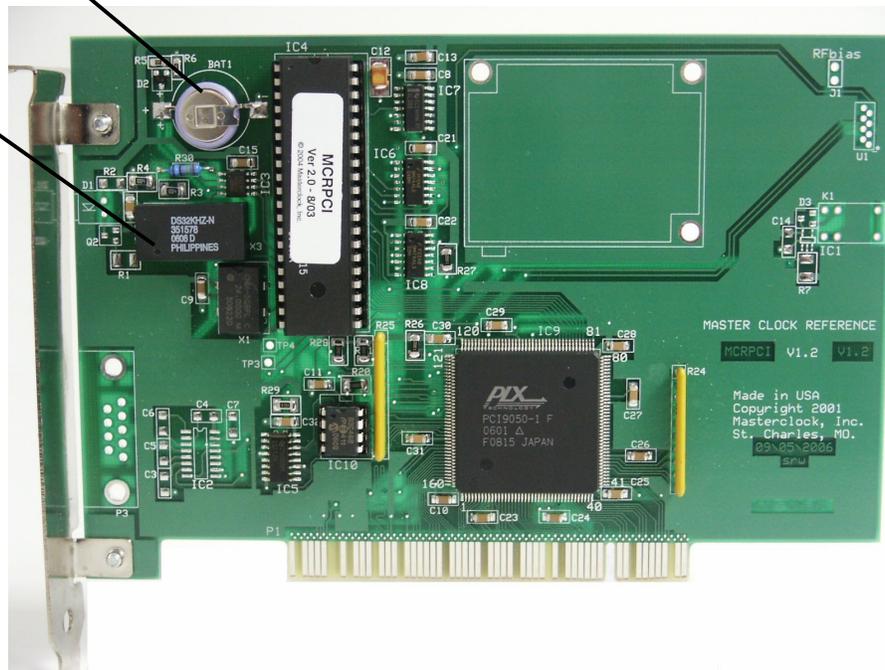
<windows system32 directory>

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

## PC BOARD LAYOUT

Rechargeable battery

TCXO



MCRPCI V1.2

## SPECIFICATIONS

### TIMING CHARACTERISTICS

Date in Month, Day, Year – Stored as UTC reference time  
Accuracy (TCXO).....<165mS/day drift from input time,  
(+/- 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 card , full height.  
Standard PCI bus V2.0, 33MHz, 32 bit, +5VDC

### OPERATING TEMPERATURE

Temperature .....0 to +70 °

## **LIMITED WARRANTY**

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

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

Should Masterclock be unable to repair or replace the product within a reasonable amount of time, the customer's alternate remedy shall be a refund of the purchase price upon return of the product to Masterclock. This warranty gives the customer specific legal rights. Other rights, which vary from state to state or province to province, may be available.

## **EXCLUSIONS**

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## **HARDWARE SERVICE**

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