



Using CE 6.0 OS with J2 650 or 580 Units

Tech Note

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Using CE 6.0 with the J2 650 or 580

Overview

Windows CE 6.0 is the latest release of Microsoft's lowest cost OS. Windows CE is a surprisingly versatile operating system. It is more than capable of supporting high end POS applications. Windows applications need to be rewritten to work on CE, however this usually only requires the changing of a few lines of code and recompiling. Applications that only require a web browser to run are perfect for CE since no change is required to run on CE. One big advantage of CE is that it is very immune to computer viruses.

The J2 650 and 580 POS computers support CE 6.0. A generic porting of CE 6.0 is available from J2 that fits most POS applications. This version has the modules normally required for CE application written for full screen CE devices including .NET framework 2.0, CE Internet Explorer and Persistent memory on a Compact Flash Card. J2 can also provide custom porting of Windows CE if the generic version does not fit the required application.

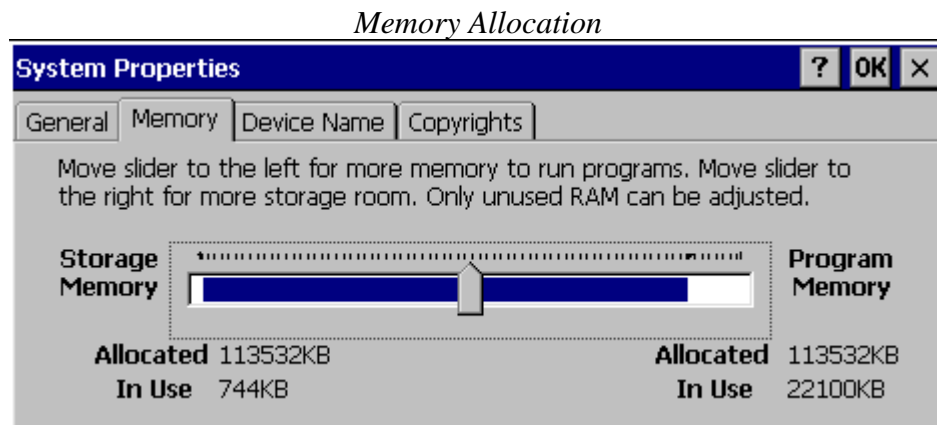
CE on the 580 and 650 is booted from a CF card but can be run on a mechanical hard drive or SSD if a large amount of data storage is required. CE only supports the FAT16 and FAT32 formats, not NTFS.

Windows CE 6.0 Sign-on Screen



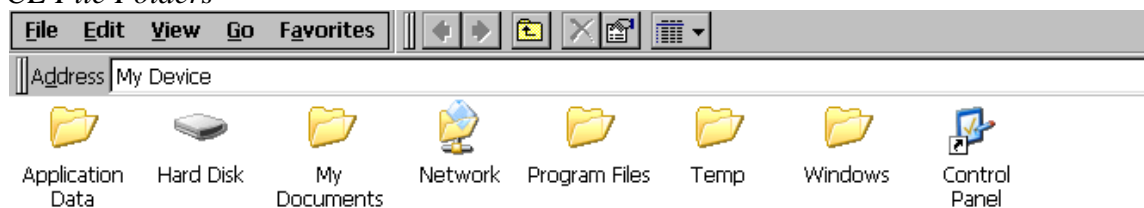
CE Memory and Storage

The standard CE image is loaded on a 1 GB Compact Flash card (CF) on the J2 650 and 580 units. Of this 1GB only about 30MB is used for the OS, while the rest is available for applications and data storage. Both the 650 and 580 come standard with 512MB of RAM memory, some of which is used for the shared Video memory and the rest is available for CE, at least 256MB. This memory is split between Storage Memory and Program Memory. The amount used by each can be set in CE, the default value is 50/50 usage.



The CE operating system is loaded into RAM from the CF card on boot up. The file system for CE is run out of RAM and only the data on the Hard Disk folder (CF card) is persistent. Any folders not stored on the Hard Disk are located in RAM. For example if a file is copied to the Windows folder, which is stored in RAM, it will not be retained after a reboot. Only files written to the Hard Disk will be retained. The CE system registry is stored on the Hard Disk but changes to the registry are only flushed to the Hard Disk during a proper shut down using the *Suspend* dialog button or reboot unless flushed with the correct CE API call. If a registry setting was changed and the unit is switched off without flushing the registry, the registry setting change will be lost.

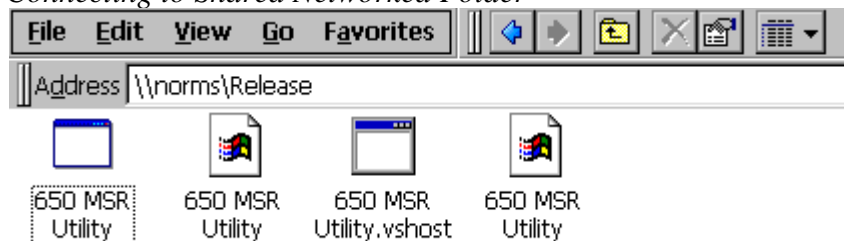
CE File Folders



Loading Files

There are a number of ways to load and copy files to the CF card on the J2 CE device. One of the easiest ways is to copy files from a networked system. To access a shared folder on the network launch Windows Explore and enter the name of the shared folder proceeded with a \\ just like in XP Windows. In the example below, the shared folder is located on the computer as *NORMS* and the folder name is *RELEASE*. If the shared folder is password protected you will be prompted to enter it at this point.

Connecting to Shared Networked Folder



A USB Flash Drive, USB Hard Drive or USB CD ROM can also be used to load files to the system. Just plug in the USB device into any of the USB port and after a few seconds CE will mount the volume. More than one device can be connected at one time. A USB Hard Drive (Flash or Mechanical) must be formatted in FAT16 or FAT32 format. NTFS is not supported by CE.

CD ROM and Flash Drive attached to CE Device



CE does not support sharing of its folders to the network. Network communication is the application's responsibility.

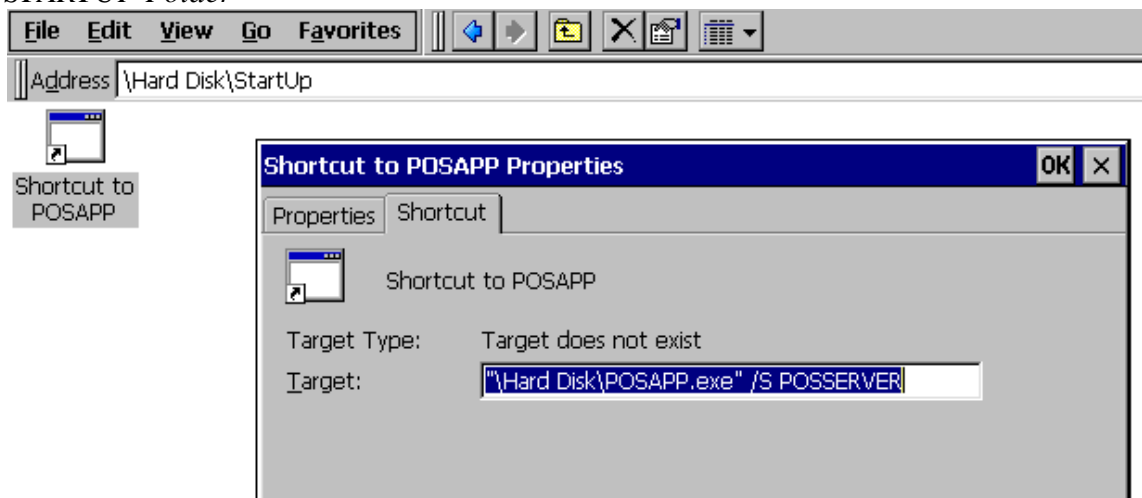
If an external CD ROM or Hard Disk is hooked up, and the 650 or 580 system is rebooted, the system will try to boot from that device. You can either disconnect the device until Windows CE is booted, or enter the BIOS and change the *BOOT ORDER* so that the onboard CF card boots first.

Both ActiveSync and VS2005 remote tools can also be used to load files to the CE device. This is covered later in this document.

Startup Folder

The J2 CE 6.0 build for the 650 and 580 systems has a folder called *STARTUP* which is located on the Hard Disk (CF). This start up folder is similar to the start up folder on XP. A program or short cut added to this folder will be run on start up of the OS. It is recommended that a shortcut be used to launch programs on boot up. In CE 6.0 only shortcuts can have command line parameters added to their icon.

STARTUP Folder



The order that programs located in the Startup folder are run at boot up is not controlled by CE, but could be controlled by a simple application written to run program in the correct sequence. A command line *.BAT* file could also be placed in the *STARTUP* folder to copy file/s to the correct folder, and then run them at boot up.

Updating CE 6.0 OS

The CE 6.0 operating system is contained all in one file on the Hard Disk (CF). This file is named NK.bin. On boot up the boot loader will load the compressed OS files in NK.bin to RAM and pass control to the OS in RAM once the files are loaded. CE will then mount the file system in RAM and on the CF card and load all drivers.

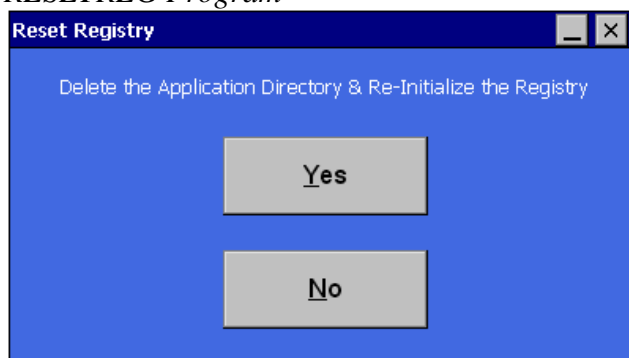
Unlike normal Windows device drivers or OS, modules cannot normally be added to the OS without updating the whole OS by replacing the NK.bin files with a new version. The NK.bin can be updated by just replacing the NK.bin file. This can be done by copying the new NK.bin file to the Hard Disk, overwriting the existing NK.bin. This can be done while CE is running.

Registry

The J2 porting of CE 6.0 uses the persistent Hive-based registry. The registry is stored on a folder on the Hard Disk called *REGISTRY*. The first time CE is booted NK.bin creates this folder and sub-folders and copies a default registry there. When the registry is updated changes are stored here but only when the registry is flushed. If a new version of NK.bin is copied to the Hard Disk the registry will be over written the next time the system is booted with the default values for the registry.

A J2 written program is provided on the Hard Disk folder called *RESETREG.EXE*. This program is used to reset the CE registry back to its defaults. The program will erase the registry files and folders then reboot the system. It will also delete the folder SC if it exists. NK.bin will create a new registry with the default values on boot up. A temporary folder called *ToDelete* will be left on the Hard Disk folder, this may be deleted if desired.

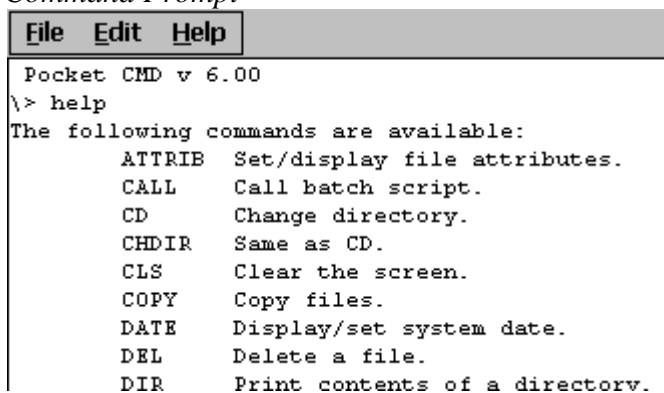
RESETREG Program



Command Prompt

The J2 CE build supports the CE DOS like command prompt module. This can be handy for trouble shooting and for running batch files. A number of CE utilities can be run at the command prompt like ping, ipconfig, net, services and the like. These can also be run from a batch file just as in normal Windows.

Command Prompt



Remote Tools

J2 provides a folder under the Hard Disk folder call *CE TOOLS*. This folder has the software tools needed to form a remote connection to a computer running VS 2005 *Remote Tools* over an Ethernet connection using TCPIP. To use: copy all the files to the \Windows folder, then run *C.BAT* to connect after making the necessary changes to *C.BAT*. The WordPad editor included with the J2 CE built can be used to edit the *C.BAT* file as needed. Please see the Windows CE and VS 2005 documentation for more information.

The VS2005 remote tools allow for a number of functions to be performed. This includes file viewing, screen capture, a registry editor, process viewer, and others.

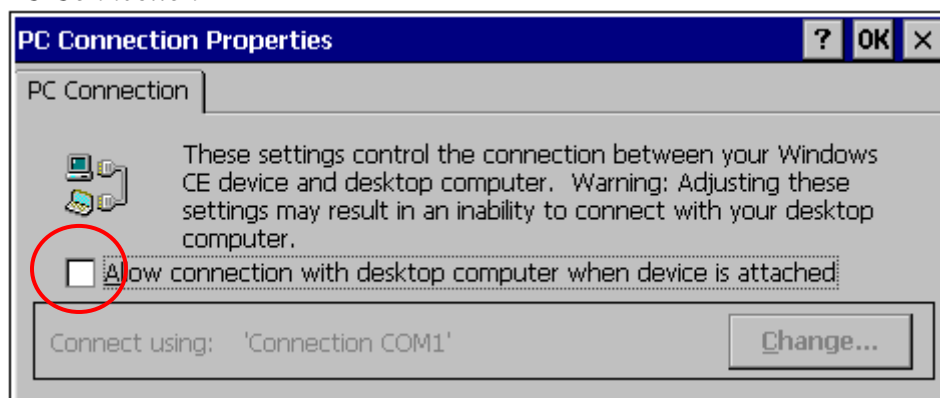
The remote tools can also be used via ActiveSync, as described below.

ActiveSync

ActiveSync can be used to connect to a remote computer via a serial port. Once connected Active Sync can use the Ethernet connection for a high speed connection, using the same basic tools as described above. The advantage of ActiveSync is that it is easy to use. The disadvantage is that ActiveSync requires the use of a serial port connected to the other computer using a null-modem cable.

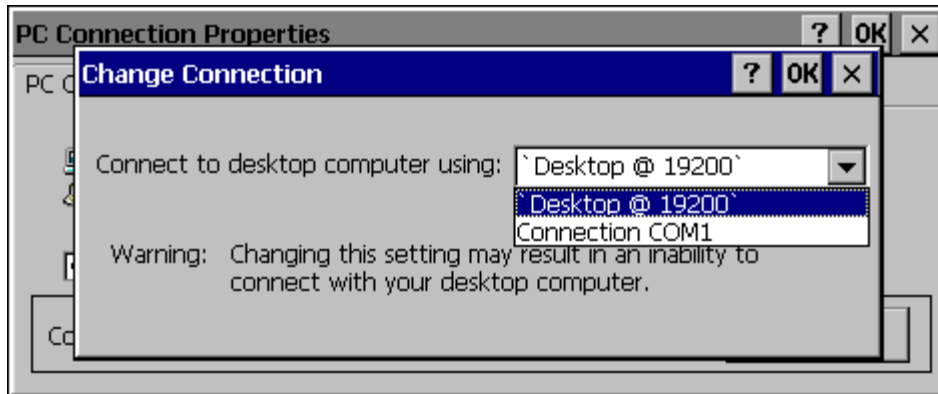
ActiveSync on the CE build for the 650 and 580 is off by default. To enable ActiveSync first enable the *PC Connection* in the Control Panel of the CE device. Under the *PC Connection* icon, check *Allow connection with desktop computer when device is attached*.

PC Connection



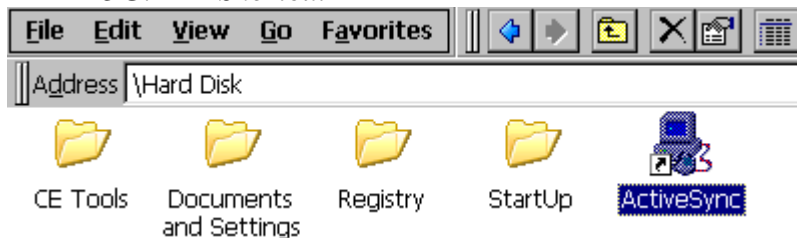
The *Change* dialog button can be used to select the serial port to use with ActiveSync. The default CE selection 'Desktop @ 19200' uses COM4 (serial port 4). Other selections can be created by using the *Network and Dial-up Connections* function in the CE control panel.

Change Connection

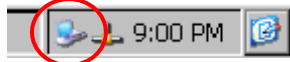


Once the *PC Connection* is enabled and a null-modem cable is connected to the desktop PC, ActiveSync must be run on both sides to form a connection. To run ActiveSync on the CE side *repllog.exe* must be run. J2 has added a shortcut to *repllog.exe* on the Hard Disk folder and called it ActiveSync. Once a connection is established a tone will sound and the connection icon will appear in the task bar status tray.

REPLLOG.EXE Shortcut



Connection Icon



If a connection is needed every time on boot up, simply add the ActiveSync shortcut to the *Startup* folder.

REBOOT.EXE

A program called reboot.exe is included with the J2 CE OS. There is no standard way to reboot CE defined by Microsoft, therefore J2 included this program to allow applications to reboot the systems as needed. Just run reboot.exe, located in the \Windows folder, when required and the system will reboot.

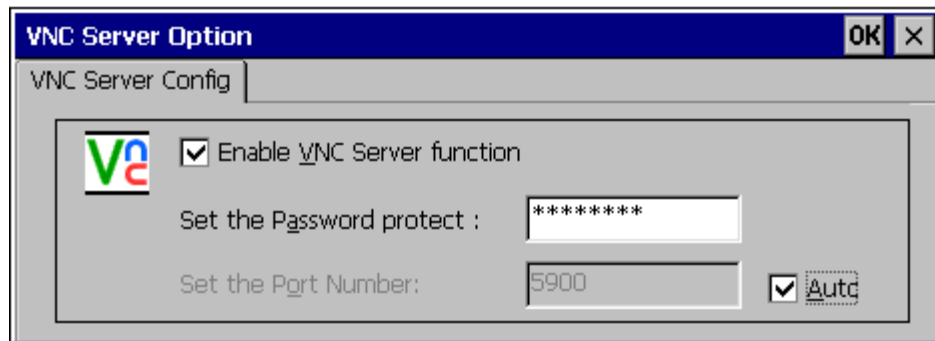
One problem that has been seen on many CE applications is memory leaks. This is less of a problem on CE 6.0, but can still be a problem with complex programs that are not tested 100% for this issue. Sometimes it is easier just to reboot the system once a day to clear out any accumulated memory leaks rather than trying to locate the source of memory leaks.

Memory leaks, whatever the source, normally show up when the system slows down noticeably, then locking up. This happens when CE is running out of memory and tries to allocate it as best it can, slowing the system. A reboot will clear the memory out and eliminate the problem.

VNC Server

The CE build for the 650 and 580 contains a copy of the public domain remote control program VNC Server. The VNC server can be enabled through the VNC Server Icon in Control Panel on the CE device. The TCPIP port number can be changed here, as well as the password. The default port is 5900 and the default password is *password*. The CE will need to be rebooted for the VNC server to start. No status tray icon is displayed to indicate VNC is running.

VNC Server



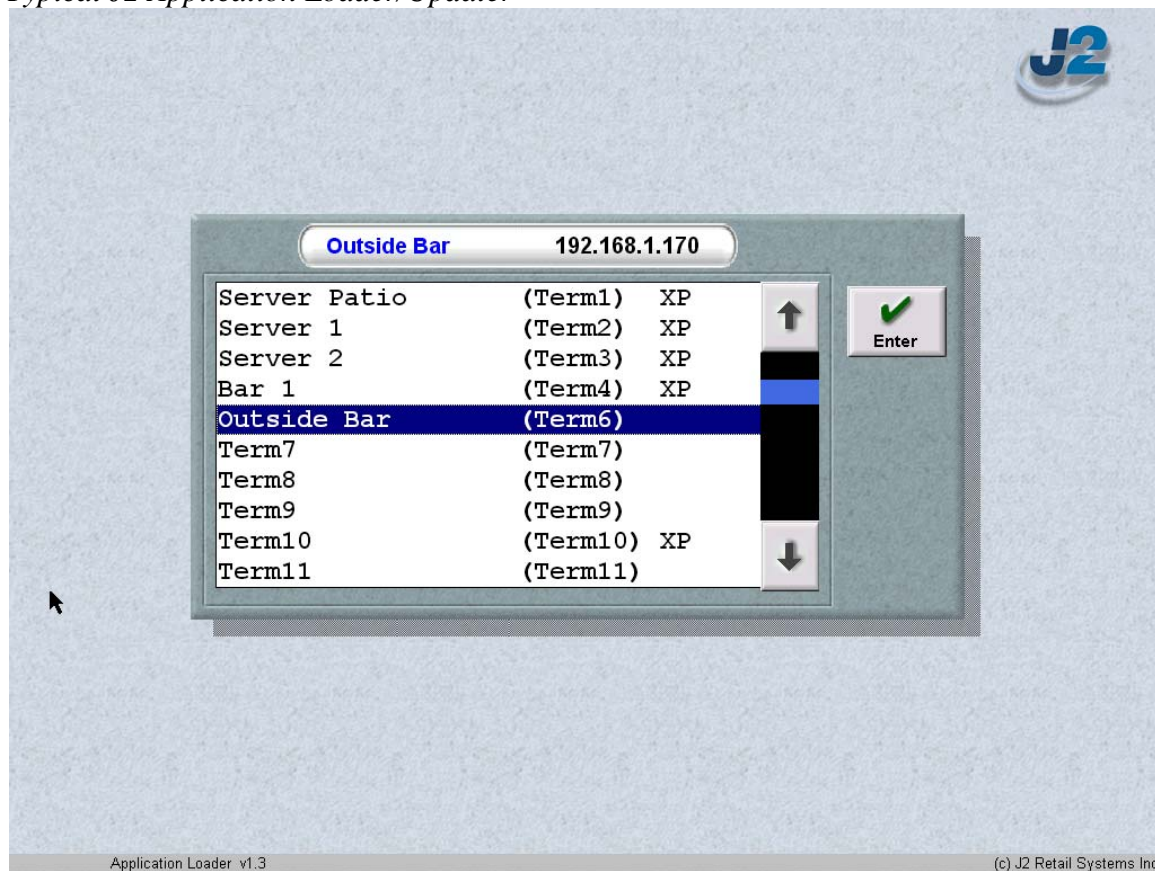
Most any VNC viewer can be used with the CE VNC. J2 has been using UltraVNC with good success. It should be noted that the CE VNC server is somewhat limited and does not use compression of the screen data and would be very slow over an internet connection. Also like all versions of VNC it's security is somewhat lacking. For this reason J2 recommends using VNC only on a local area network and using a program like *LOGMEIN* or *PCANYWHERE* to access an XP based computer on the local network and to run a VNC viewer remotely on that computer to access the CE computers running VNC Server. A great number of J2 customers have used this type of configuration very successfully.

Application Loader/Updater

J2 can provide custom application loaders to help software vendors install and update their application on the J2 CE platforms, J2 has already done this for a number of software vendors.

This loader can drastically reduce the amount of time a user needs to configure and install a POS system. Normally all the user needs to do to install a system is to connect the network and printer cable, turn the unit on and select the register name that terminal should be. Studies have shown installation time has been reduced from an average of 40 minutes to install and configure a terminal, to just 5 minutes. Please contact J2 for more information and note that these application loaders can be made to run on both CE and XP.

Typical J2 Application Loader/Updater



Custom Master Image CE OS

To create a master image for CE, J2 recommends using the DOS version of Symantec Ghost 11.0. Other imaging software can be used, however please note that they have not been tested by J2. To create a master image, simply add your applications and make any register changes required. J2 has a Boot Dongle image available for a USB Flash driver that can be used to boot DOS and run Ghost. When Ghosting CE you need to enable the *Image Boot* option in Ghost, then Ghost the image as you would normally.

Should more than 2GB of storage be required, the CF card or hard drive will need to be partitioned with a 2GB partition in order to boot CE and a FAT16 or FAT32 partition for the rest of the drive. J2's standard CE boot loader only supports FAT16, contact J2 if you require a FAT32 boot loader.

J2 can preload 580 and 650 systems with your custom CE image if required, please contact J2 Retail Systems for more information.