



Windows CE Development Note

2005-04-21

Here are some notes for developers who use Vortex86 BSP to make Windows CE image. They will be helpful for developers to tune Windows CE image on Vortex86 boards.

Install QFE

Microsoft continually provides up-to-date Windows CE security enhancements and bug fixes as QFEs (Quick-Fix Engineering). To be sure you have the most recent updates, download QFE from <http://msdn.microsoft.com/embedded/downloads/ce/wince/default.aspx>.

Compiling Error

Some users download Windows CE 4.2 BSP from <http://www.vortex86.com> and get those error messages after building image:

```
..\cfwpc.c(268) : error C2065: 'CPUID_PAT' : undeclared identifier
..\cfwpc.c(269) : error C4013: 'NKVirtualSetAttributes' undefined; assuming extern returning int
..\cfwpc.c(293) : error C2065: 'PHYSICAL_ADDRESS_UNKNOWN' : undeclared identifier
..\cfwpc.c(293) : error C4047: '!=' : 'int ' differs in levels of indirection from 'void *'
..\cfwpc.c(435) : error C2065: 'CPUID_MSR' : undeclared identifier
..\cfwpc.c(455) : error C2065: 'CPUID_MTRR' : undeclared identifier
```

This is because Vortex86 BSP is based on update Platform Builder. CFWPC.C is patched by Microsoft 2003-08-05 KB815794. User has to install QFE to build image and those messages will not appear.

Set Display Resolution and Color Depth

Open **Vortex.reg** and find them:

```
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\SIS550]
; ===== Display Setting =====
; "Resolution"=dword:1 ; 0:640x480; 1:800x600; 2:1024x768; 3:1280x1024
; "ColorDepth"=dword:20
; "RefreshRate"=dword:46 ;3C:60Hz, 46:70Hz, 55:85Hz
```

In this example registry, resolution and color depth are disabled. They can be set by boot loader. Ex: use "loadcepc /l:800x600x16 nk.bin" to pass parameters to Windows CE. If resolution and color depth are enabled in registry, the parameter from boot loader will be ignored.



If user wants to set resolution of display, remove the ";" at start of the "**Resolution**" line to enable it. Refer to the remark: "0" is for 640x480 and "1" is for 800x600, etc. Remove the ";" at start of "**ColorDepth**" line to enable it. In this example, the 20 is in hex and mean 32-bit color. For 16-bit color, set it to 10 and 8 for 256 colors. The display refresh rate also can be set by registry setting.

For some LCD monitor only support low refresh rate, set "RefreshRate" to 3C and make most LCD monitor work properly.

Use 128M RAM

The default setting of Vortex86 BSP is using 64M RAM. To use all memory on a 128M board, follow those steps:

1. Open **config.bib** and find "**IF IMGRAM64**" section.
2. Change 03400000 to 0680000 (128-8-16=104=68H).
3. For Platform Builder 5.0, modify "%_WIN_DIR%\public\common\oak\csp\x86\oal\oeminit.asm".
For Platform Builder 4.2, modify "%_WIN_DIR%\public\common\oak\csp\i486\oal\oeminit.asm".
Find "**_OEMAddressTable:**",
change "dd 80000000h, 0, 04000000h"
to "dd 80000000h, 0, 08000000h"
4. Platform Builder -> Build -> Open Build Release Directory.
5. Change work directory to "%_WIN_DIR%\public\common\oak\csp\x86" in Platform Builder 5.0.
Change work directory to "%_WIN_DIR%\public\common\oak\csp\i486" in Platform Builder 4.2.
6. Run "**build -cf**".
7. Platform -> Setting -> Build Options -> Enable "**Enable Images Larger than 32MB**".
8. Build your image.

Disable Debug Serial Port

User can find the I/O address of COM1 in **platform.reg** is 0x2F8 and IRQ is 3. This is because WinCE .NET uses the first serial port as debug port. Here is the table of serial ports setting in Windows CE:

WinCE .NET	I/O Address	IRQ	Normal PC
Debug Serial	0x3F8		COM1:
COM1:	0x2F8	3	COM2:
COM2:	0x3E8	4	COM3:
COM3:	0x2E8	5	COM4:

If user open "COM1:" to send data in WinCE .NET, data will be sent to serial port 2. Follow those steps to disable debug serial port in Windows CE.



Open "%_WIN_DIR%\PUBLIC\COMMON\OAK\CSP\X86\OAL\debug.c" in Platform Builder 5.0 to add this line: (or %_WIN_DIR%\PUBLIC\COMMON\OAK\CSP\I486\OAL\debug.c in Platform Builder 4.2)

```
void OEMInitDebugSerial(void)
{
    pBootArgs = (BOOT_ARGS *) ((ULONG)((PBYTE *)BOOT_ARG_PTR_LOCATION) | 0x80000000);

    if ( ! pBootArgs->ucBaudDivisor ) {
        pBootArgs->ucBaudDivisor = 6; // Default to 19.2 if nothing specified.
    }

    pBootArgs->ucComPort = 0; //-- add this line

    switch ( pBootArgs->ucComPort ) {
    case 1:
        IoPortBase = (PUCHAR)COM1_BASE;
        break;
    }
}
```

For 2 serial ports Vortex86 boards, it is okay now. Just add first and second serial ports component into For 4 serial ports, also modify registry setting in platform.reg:

1. Modify [HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Serial] in platform.reg

```
"SysIntr"=dword:14      ; 14 -> IRQ 4, 1a -> IRQ 10.
"IOBase"=dword:03F8
```

2. Modify [HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Serial2] in platform.reg

```
"SysIntr"=dword:13      ; 13 -> IRQ 3, 1b -> IRQ 11.
"IOBase"
```

3. Modify [HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Serial3] in platform.reg

```
"SysIntr"=dword:1a      ; 14 -> IRQ 4, 1a -> IRQ 10.
"IOBase"
```

4. Duplicate [HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Serial3] section and modify "3" to "4", DeviceArrayIndex to "3" for COM4:

```
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Serial4]
"SysIntr"=dword:1b      ; 13 -> IRQ 3, 1b -> IRQ 11.
"IOBase"=dword:02E8
```



```
"IoLen"=dword:8
"DeviceArrayIndex"=dword:3
"Prefix"="COM"
"Dll"="Com16550.Dll"
"Order"=dword:0

[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\Serial4\Unimodem]
"Tsp"="Unimodem.dll"
"DeviceType"=dword:0
"FriendlyName"="COM4"
"DevConfig"=hex: 10,00, 00,00, 05,00,00,00, 10,01,00,00,
```

Now rebuild your Windows image and debug serial port is disabled.

Enable Stylus for Touch Panel

After add Stylus into your Windows CE 4.2 image and it does not appear in your control panel. Open **cesysgen.bat** to find **SYSGEN_TOUCH** and add this line:

```
// from 4.1
if "%SYSGEN_TOUCH%"=="1" set CPLMAIN_COMPONENTS=%CPLMAIN_COMPONENTS% stylus
// something wrong in 4.2
if "%__SYSGEN_TOUCH_CURSOR%"=="1" set CPLMAIN_COMPONENTS=%CPLMAIN_COMPONENTS% stylus
```

Enable Slave IDE Device

Open "%_WIN_DIR%\PUBLIC\COMMON\OAK\DRIVERS\BLOCK\ATAPI\genericide.reg" and remove the ";" of "[\$(PCI_BUS_ROOT)\Template\GenericIDEDevice?]" sections to enable other IDE device.

Enable ICOP-6085 PCMCIA Module

The vendor ID of ICOP-6085 is **104C-AC55** and it can not be found at Windows CE registry to load correct driver. Edit "%_WIN_DIR%\PUBLIC\COMMON\OAK\DRIVERS\PCMCIA\TI1250\ ti1250.reg" to add them:

```
[$(PCI_BUS_ROOT)\Template\PCMCIA]
"Dll"="pcmcia.dll"
"Order"=dword:0
"Class"=dword:06
"SubClass"=dword:07
"ProgIF"=dword:0
"VendorID"=multi_sz:"104c", "104c", "1180"
```



```
"DeviceID"=multi_sz:"ac55", "ac1c", "0476"  
"IsrDll"="ti1250isr.dll"  
"IsrHandler"="ISRHandler"  
"IClass"=multi_sz: "{6BEAB08A-8914-42fd-B33F-61968B9AAB32}=PCMCIA Card Services"  
"ConfigEntry"="PCIBus_Config"  
"ConfigDll"="pcmcia.dll"
```

Use Static IP Address

Vortex86 BSP will use DHCP to get IP address. Add them into **project.reg** to use static IP address.

```
[HKEY_LOCAL_MACHINE\Comm\PCI\RTL81391\Parms\TcpIp]  
"EnabledDHCP"=dword:0  
"DefaultGateway"=multi_sz:"192.168.0.1"  
"UseZeroBroadcast"=dword:0  
"IpAddress"=multi_sz:"192.168.0.236"  
"Subnetmask"=multi_sz:"255.255.128.0"
```

Remove Old BSP

If user can not remove old BSP to install new one, try to run "**\Program Files\Windows CE Platform Builder\4.2(5.0)\CEPB\BIN\CLEANDB.BAT**".

Technical Support

For more technical support, please visit <http://www.dmp.com.tw/tech> or mail to tech@dmp.com.tw.