

为 Pentium4 的 PC 机移植 VxWorks 6.x (7/8/9) BSP

准备材料

- Pentium4 的主板，1~2 个 RTL8139 网卡，9 Pin 的串口线(2 -> 3、3 -> 2、5 -> 5)，CF 卡（包括 CF 转 IDE 的适配器）
- VxWorks 6.x (7/8/9) 安装软件，主机 PC（Wind XP / Vista / Windows 7）

安装调试步骤

1. 在主机 Windows XP 上安装 WorkBench 开发环境
2. 创建 Pentium4 目标机的 BSP
3. 基于 BSP 创建目标机引导 VxWorks 的 bootrom 文件
4. 将引导加载程序 bootrom 部署到 CF 卡上
5. 引导加载程序 boorom 的设置和启动
6. 创建 vxWorks 6.9 内核镜像
7. 设置网络下载 vxWorks 所需的 ftp 服务器
8. 通过以太网（RTL8139）加载 vxWorks 内核镜像来执行
9. 连接 Target Server
10. 创建并下载“Hello World”应用程序镜像
11. 在 WorkBench 3.3 中进行“Hello World”应用程序的源代码级调试
12. 将 vxWorks 内核镜像部署到 CF 卡上并启动

注意点

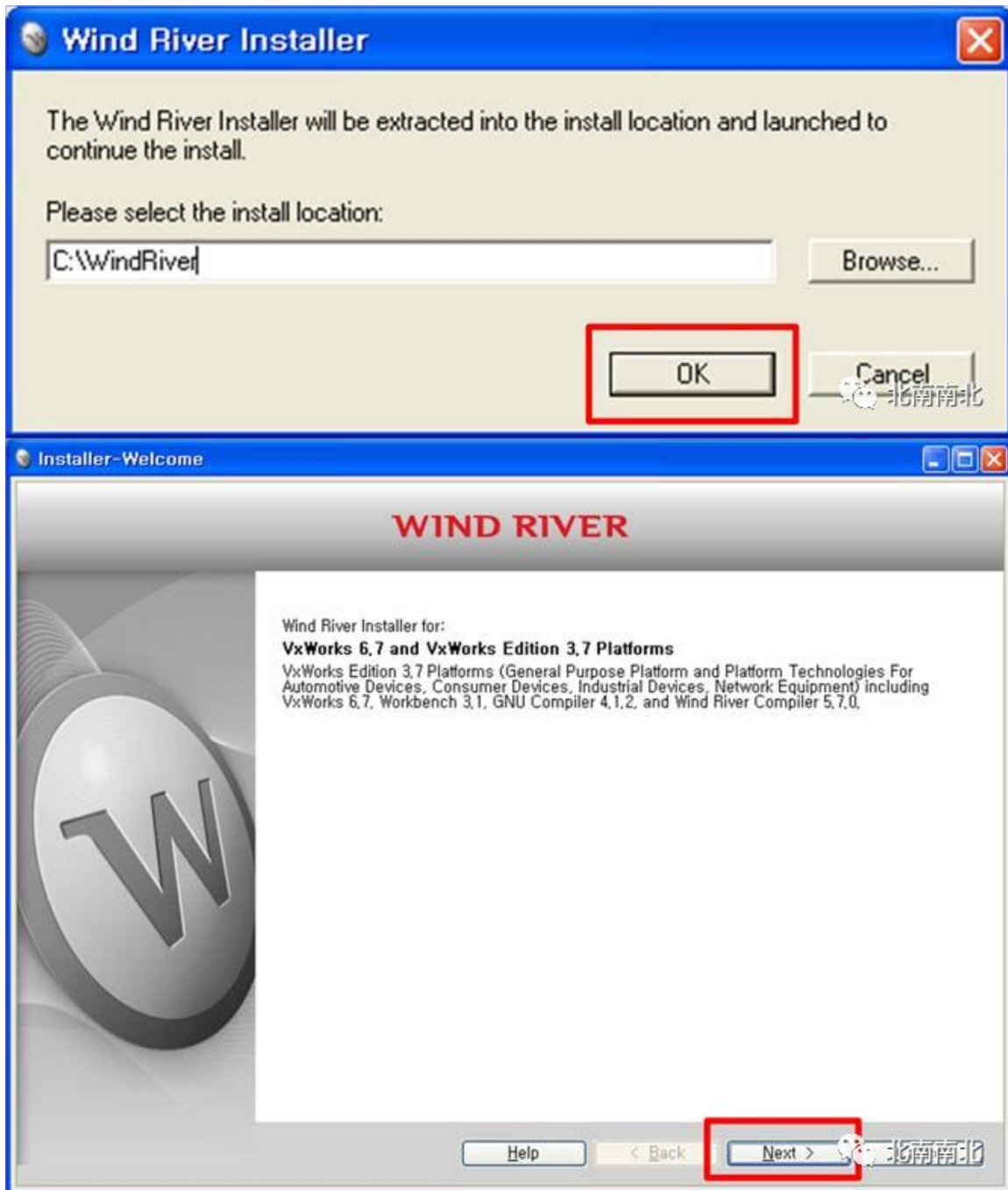
- VxWorks 6.7, VxWorks 6.8 移植的是 Pentium PC
- VxWorks 6.9 移植的是 Pentium4 PC
- 当 CF 卡是 ATA（IDE）Primary Master 引导时：
 - 对于 VxWorks 6.7、6.8，DEFAULT_BOOT_LINE 为:

```
"ata=0,0(0,0)host:/ata0a/vxWorks h=192.168.1.102 e=192.168.1.88  
g=192.168.1.1 u=vx pw=vx f=0x00 tn=x86v67 o=rtl"
```

- 对于 VxWorks 6.9，DEFAULT_BOOT_LINE 为:

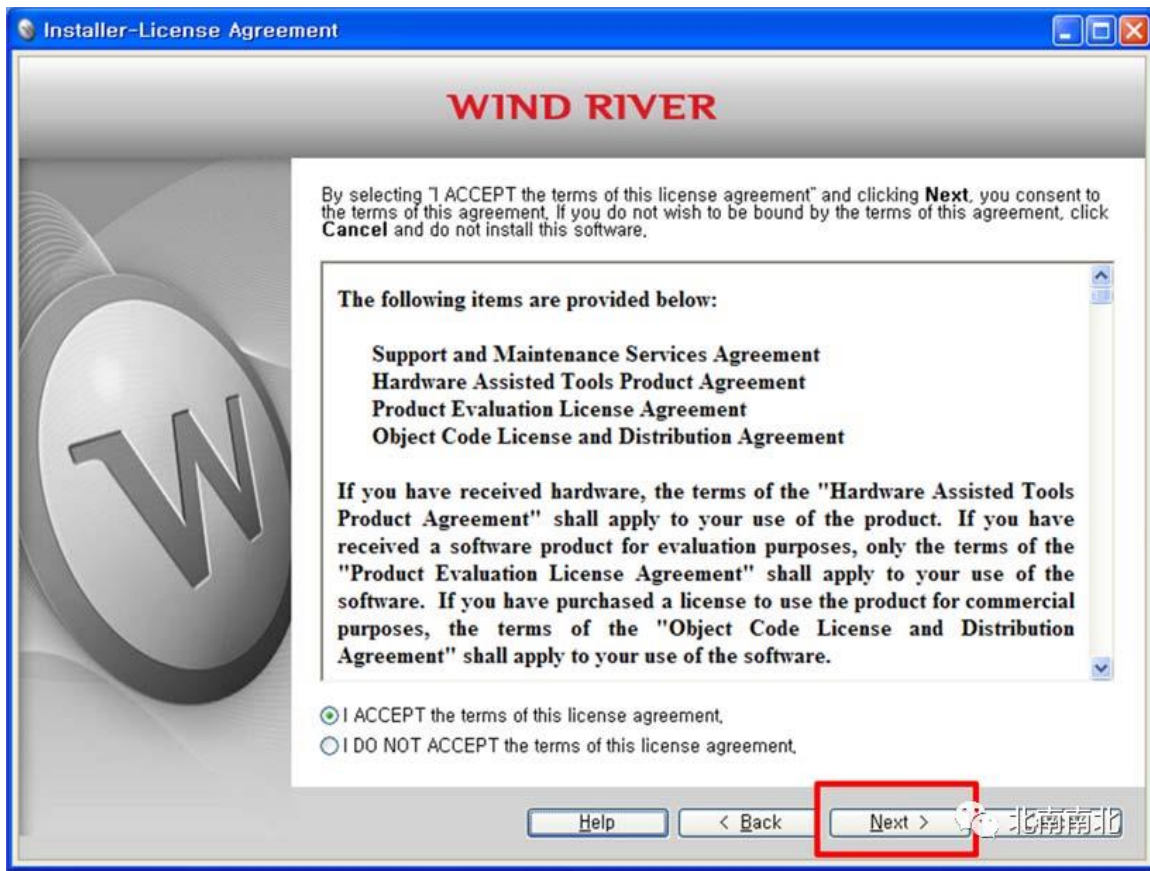
```
"ata=0,0(0,0)host:/ata00:1/vxWorks h=192.168.1.102 e=192.168.1.88  
g=192.168.1.1 u=vx pw=vx f=0x00 tn=x86v67 o=rtl"
```

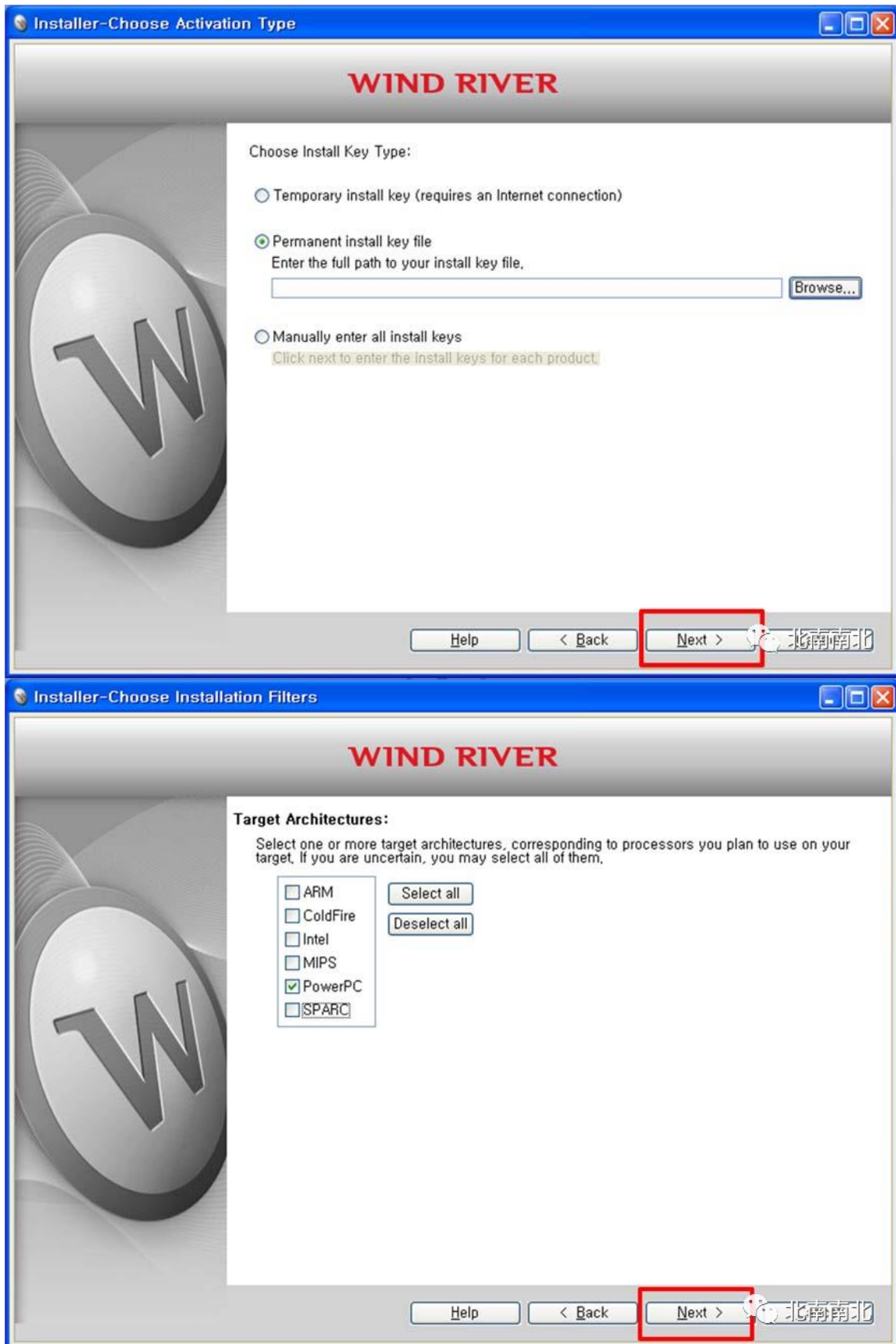
1. 在主机 Windows XP 上安装 WorkBench 开发环境

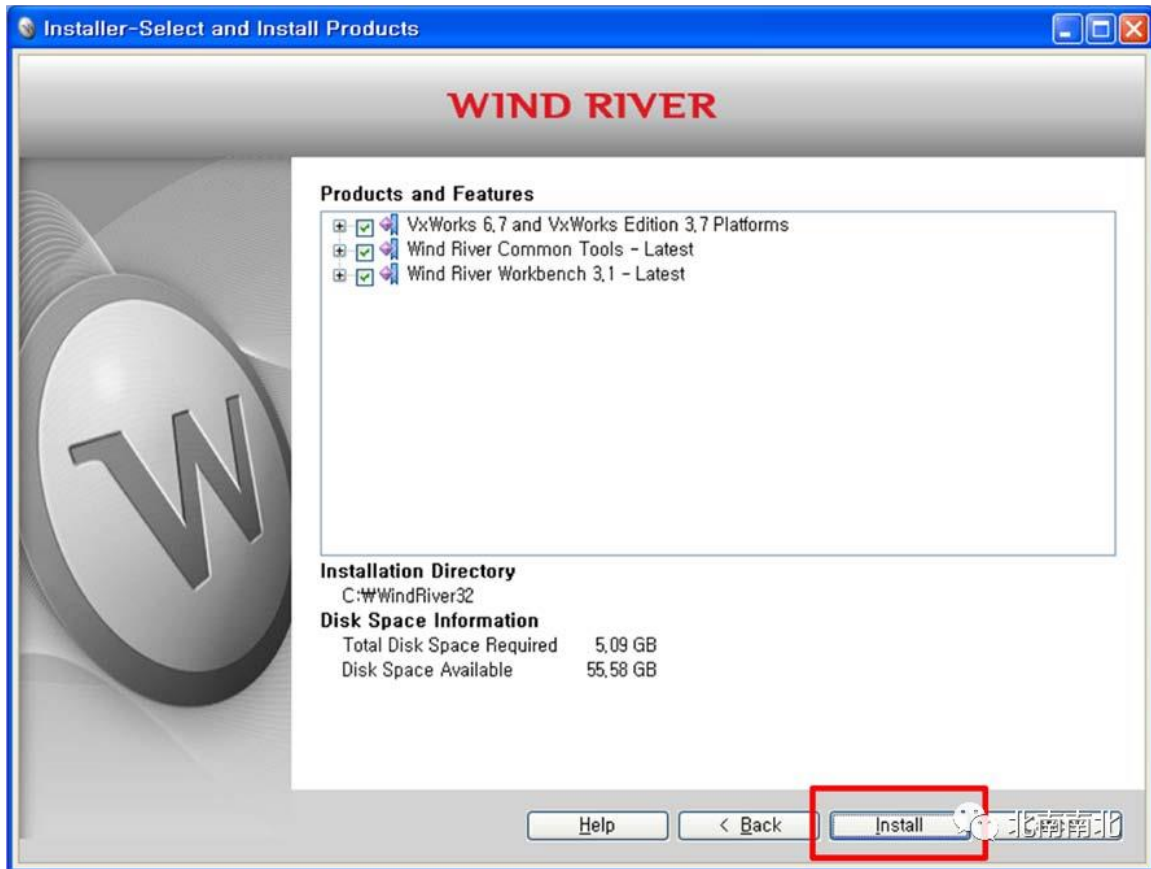




<https://www.>







Note: VxWorks 6.7、6.8、6.9 的安装方法相同

2. 创建目标机 Pentium4 的 BSP

2.1 创建 BSP 的目录

在 C:\WindRiver\vxworks-6.9\target\config 目录中创建 vt82c693 目录。
(由于没有主板的名称, 因此用芯片组的名称来作为 BSP 的名字)

2.2 复制与准备好的主板最相似的 pcPentium4 BSP

复制 C:\WindRiver\vxworks-6.9\target\config\pcPentium4*. * (所有文件) 到 C:\WindRiver\vxworks-6.9\target\config\vt82c693 目录下

2.3. 修改 Makefile 文件

2.3.1 修改 Makefile 中的目标机目录, 供应商和主板的名称:

```
TARGET_DIR = vt82c693VENDOR = allVenderBOARD = VT82C693
```

2.3.2 更改 Makefile 文件中的 rom 大小值设定

```
ROM_SIZE = 00090000
```

将上面的设定更改为 8 MByte

```
ROM_SIZE = 00800000 # ROM 空间的字节数
```

2.4 修改 config.h 文件

2.4.1 修改 config.h 文件的 DEFAULT_BOOT_LINE

对于网络启动:

```
"rtl (0,0) 主机: vxWorks h = 192.168.1.102 e = 192.168.1.88 g = 192.168.1.1  
u = vx pw = vx f = 0x00 tn = x86v67"
```

当 CF 卡是 ATA (IDE) Primary Master 作为引导时:

对于 vxWorks 6.7、6.8:

```
"ata=0,0(0,0)host:/ata0a/vxWorks h=192.168.1.102 e=192.168.1.88  
g=192.168.1.1 u=vx pw=vx f=0x00 tn=x86v67 o=rtl"
```

对于 vxWorks 6.9:

```
"ata=0,0(0,0)host:/ata00:1/vxWorks h=192.168.1.102 e=192.168.1.88  
g=192.168.1.1 u=vx pw=vx f=0x00 tn=x86v67 o=rtl"
```

***** 例子 *****

```
#if (CPU == I80386)  
#define DEFAULT_BOOT_LINE \  
"fd=0,0(0,0)host:/fd0/vxWorks.st h=90.0.0.3 e=90.0.0.50 u=target"  
#elif (CPU == I80486)  
#define DEFAULT_BOOT_LINE \  
"fd=0,0(0,0)host:/fd0/vxWorks.st h=90.0.0.3 e=90.0.0.50 u=target"  
#elif (CPU == PENTIUM)  
#define DEFAULT_BOOT_LINE \  
"fd=0,0(0,0)host:/fd0/vxWorks.st h=90.0.0.3 e=90.0.0.50 u=target"  
#elif (CPU == PENTIUM2)
```



```
#define DEFAULT_BOOT_LINE \
    "fd=0,0(0,0)host:/fd0/vxWorks.st h=90.0.0.3 e=90.0.0.50 u=target"
#elif (CPU == PENTIUM3)
#define DEFAULT_BOOT_LINE \
    " fd=0,0(0,0)host:/fd0/vxWorks.st h=90.0.0.3 e=90.0.0.50 u=target "
#elif (CPU == PENTIUM4)
#define DEFAULT_BOOT_LINE \
    "ata=0,0(0,0)host:/ata00:1/vxWorks h=192.168.1.102 e=192.168.1.88 g=192.168.1.1
u=vx pw=vx f=0x00 tn=x86v67 o=rtl"
#endif /* (CPU == I80386) */
```

*****示例结尾*****

2.4.2 SYS_WARM_TYPE 和 Boot 的相关修改

将热启动设备从软盘修改成 CF 卡

```
#define SYS_WARM_TYPE SYS_WARM_FD
```

将上面的语句改成:

```
#define SYS_WARM_TYPE SYS_WARM_ATA /* 热启动设备 */
```

*****例子*****

```
#define SYS_WARM_TYPE SYS_WARM_ATA /* warm start device */
#if TRUE
#define BOOTROM_DIR "/vxboot"
#else
#define BOOTROM_DIR "/fd0"
#endif
#if TRUE
#define BOOTROM_BIN "/vxboot/bootrom.sys"
#else
#define BOOTROM_BIN BOOTROM_DIR "/bootrom.sys"
#endif
#if TRUE
#define BOOTROM_AOUT "/vxboot/bootrom.dat"
#else
#define BOOTROM_AOUT BOOTROM_DIR "/bootrom.dat"
#endif
/* driver and file system options */
#ifndef _WRS_CONFIG_SMP
#define INCLUDE_FD /* include floppy disk driver */
#undef INCLUDE_FD /* include floppy disk driver */
#endif
```



```
#define INCLUDE_ATA /* include IDE/EIDE(ATA) hard disk driver */
```

```
*****示例结尾*****
```

2.4.3 修改网络驱动组件，选择 **INCLUDE_RTL8139_VXB_END**

```
***** 例子 *****
```

```
/* Network driver options: VxBus drivers */
#undef INCLUDE_AM79C97X_VXB_END
#undef INCLUDE_AN983_VXB_END
#undef INCLUDE_FEI8255X_VXB_END
#undef INCLUDE_GEI825XX_VXB_END
#undef INCLUDE_MVYUKONII_VXB_END
#undef INCLUDE_MVYUKON_VXB_END
#undef INCLUDE_NS8381X_VXB_END
#define INCLUDE_RTL8139_VXB_END
#undef INCLUDE_RTL8169_VXB_END
#undef INCLUDE_TC3C905_VXB_END
#undef INCLUDE_NE2000_VXB_END
/* PHY and MII bus support */
#define INCLUDE_MII_BUS
#define INCLUDE_GENERICPHY
#undef INCLUDE_DM9191PHY
#undef INCLUDE_LXT972PHY
#undef INCLUDE_MV88E1X11PHY
#undef INCLUDE_RTL8201PHY
#undef INCLUDE_RTL8169PHY
#undef INCLUDE_VSC82XXPHY
#endif /* INCLUDE_VXBUS */
#define INCLUDE_END /* Enhanced Network Driver Support */
#undef INCLUDE_DEC21X40_END /* (END) DEC 21x4x PCI interface */
#undef INCLUDE_EL_3C90X_END /* (END) 3Com Fast EtherLink XL PCI */
#undef INCLUDE_EL_T_3C509_END /* (END) 3Com EtherLink III interface */
#undef INCLUDE_ENE_END /* (END) Eagle/Novell NE2000 interface */
#undef INCLUDE_ULTRA_END /* (END) SMC Elite16 Ultra interface */
#undef INCLUDE_GEI8254X_END /* (END) Intel 82543/82544 PCI interface */
#undef INCLUDE_LN_97X_END /* (END) AMD 79C97x PCI interface */
#undef INCLUDE_BSD /* BSD / Netif Driver Support (Deprecated) */
#undef INCLUDE_EEX /* (BSD) Intel EtherExpress interface */
#undef INCLUDE_EEX32 /* (BSD) Intel EtherExpress flash 32 */
#undef INCLUDE_ELC /* (BSD) SMC Elite16 interface */
#undef INCLUDE_ESMC /* (BSD) SMC 91c9x Ethernet interface */
#undef INCLUDE_AR521X_END /* Atheros AR521X WLAN Support */
#ifndef INCLUDE_VXBUS
#define INCLUDE_FEI_END /* (END) Intel 8255[7/8/9] PCI interface */
#endif /* !INCLUDE_VXBUS */
```

*****示例结尾*****

2.4.4 修改 NV_RAM_SIZE

***** 例子 *****

```
/* memory addresses, offsets, and size constants */
#if (SYS_WARM_TYPE == SYS_WARM_BIOS) /* non-volatile RAM size */
# define NV_RAM_SIZE (NONE)
#else
/* # define NV_RAM_SIZE (0x1000) */
# define NV_RAM_SIZE (NONE) /* ysp non-volatile RAM size */
#endif
```

*****示例结尾*****

2.4.5 修改 SYSTEM_RAM_SIZE 和 ROM_SIZE

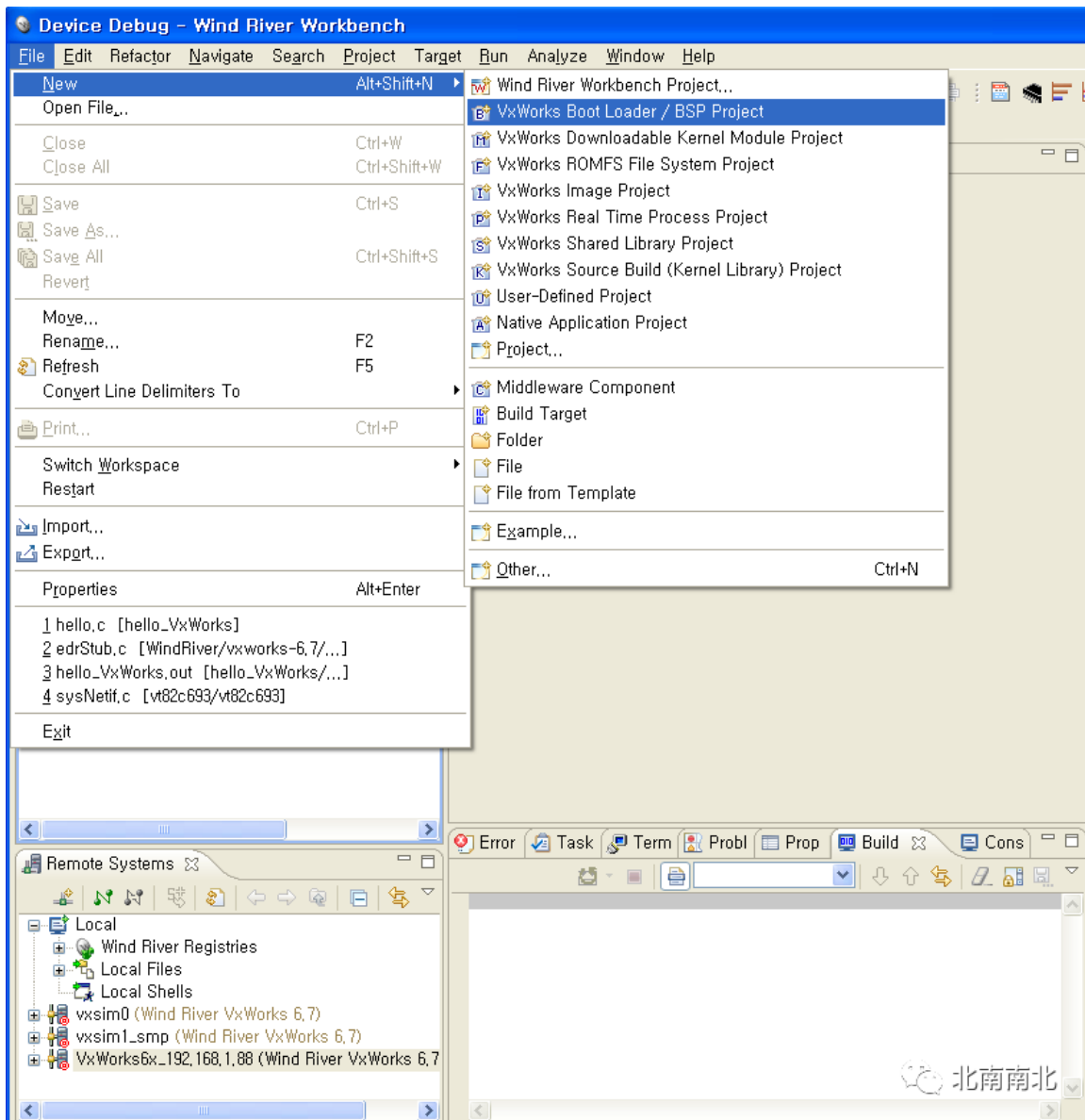
***** 例子 *****

```
#if (VM_PAGE_SIZE == PAGE_SIZE_4KB) /* 4KB page */
# define SYSTEM_RAM_SIZE (0x02000000) /* 32MB minimum 8MB system RAM */
#else /* PAGE_SIZE_[2/4]MB */ /* [2/4]MB page */
# define SYSTEM_RAM_SIZE (0x02000000) /* minimum 32MB system RAM */
#endif /* (VM_PAGE_SIZE == PAGE_SIZE_4KB) */
#ifdef BOOTCODE_IN_RAM
# undef ROMSTART_BOOT_CLEAR
# define ROM_BASE_ADRS (0x00008000) /* base address of ROM */
# define ROM_TEXT_ADRS (ROM_BASE_ADRS) /* booting from A: or C: */
# define ROM_SIZE (0x00800000) /* 8MB size of ROM */
#else
# define ROM_BASE_ADRS (0xffff2000) /* base address of ROM */
# define ROM_TEXT_ADRS (ROM_BASE_ADRS) /* booting from EPROM */
# define ROM_SIZE (0x0007fe00) /* size of ROM */
#endif
```

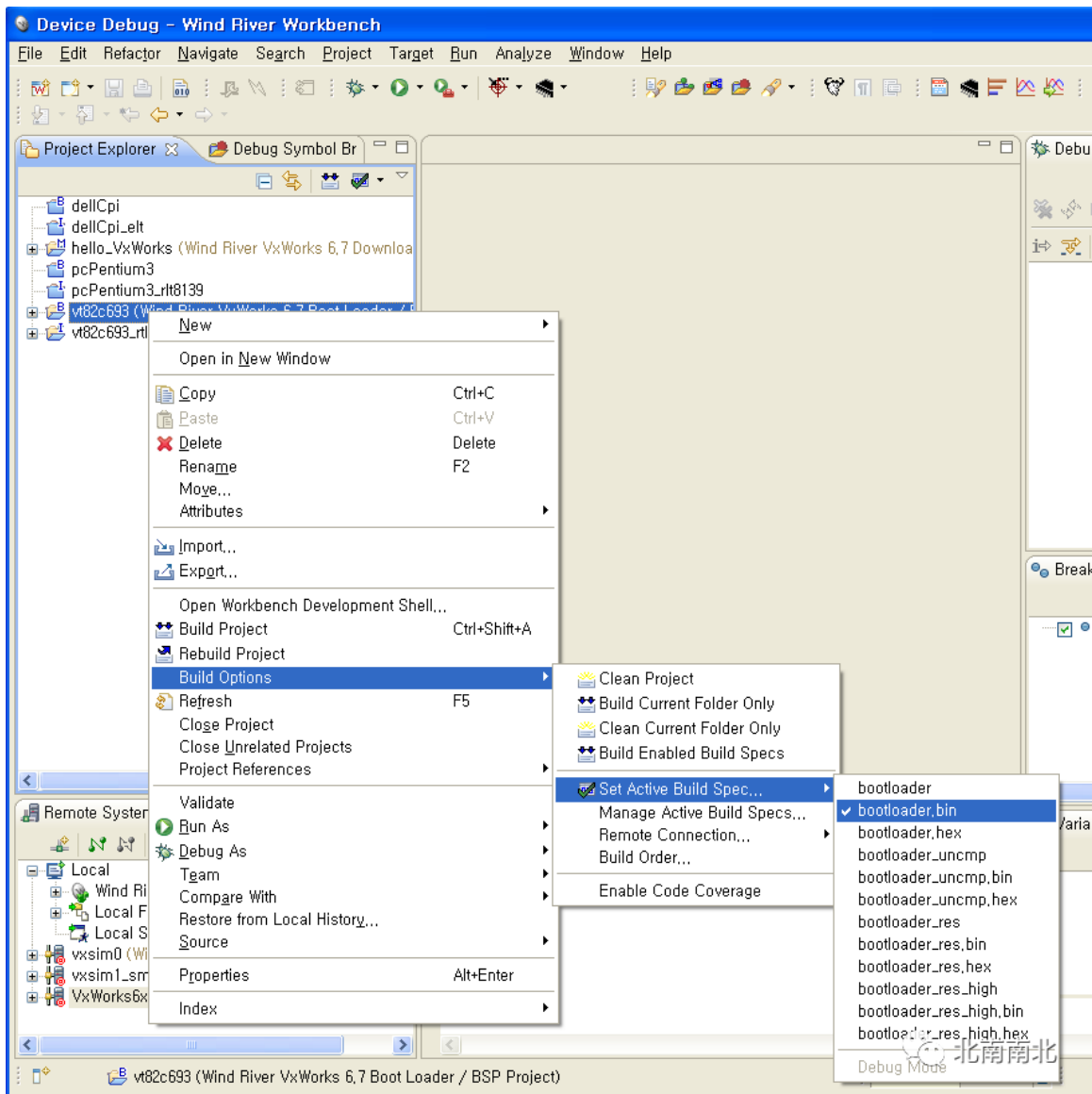
*****示例结尾*****

3. 基于 BSP 创建目标机引导 VxWorks 的 bootrom 文件

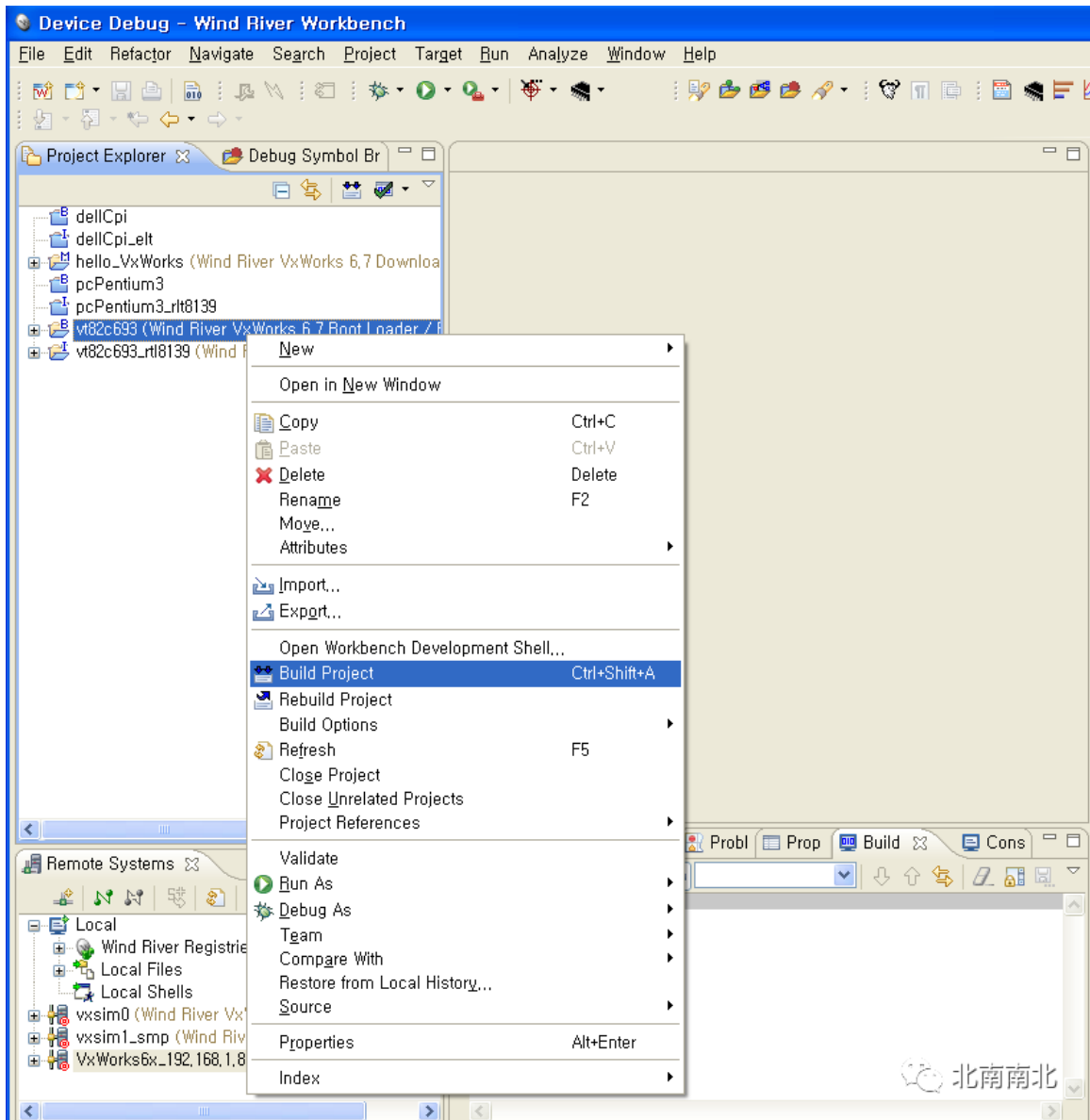
3.1 基于 BSP 创建项目（在 Workbench 开发环境中）



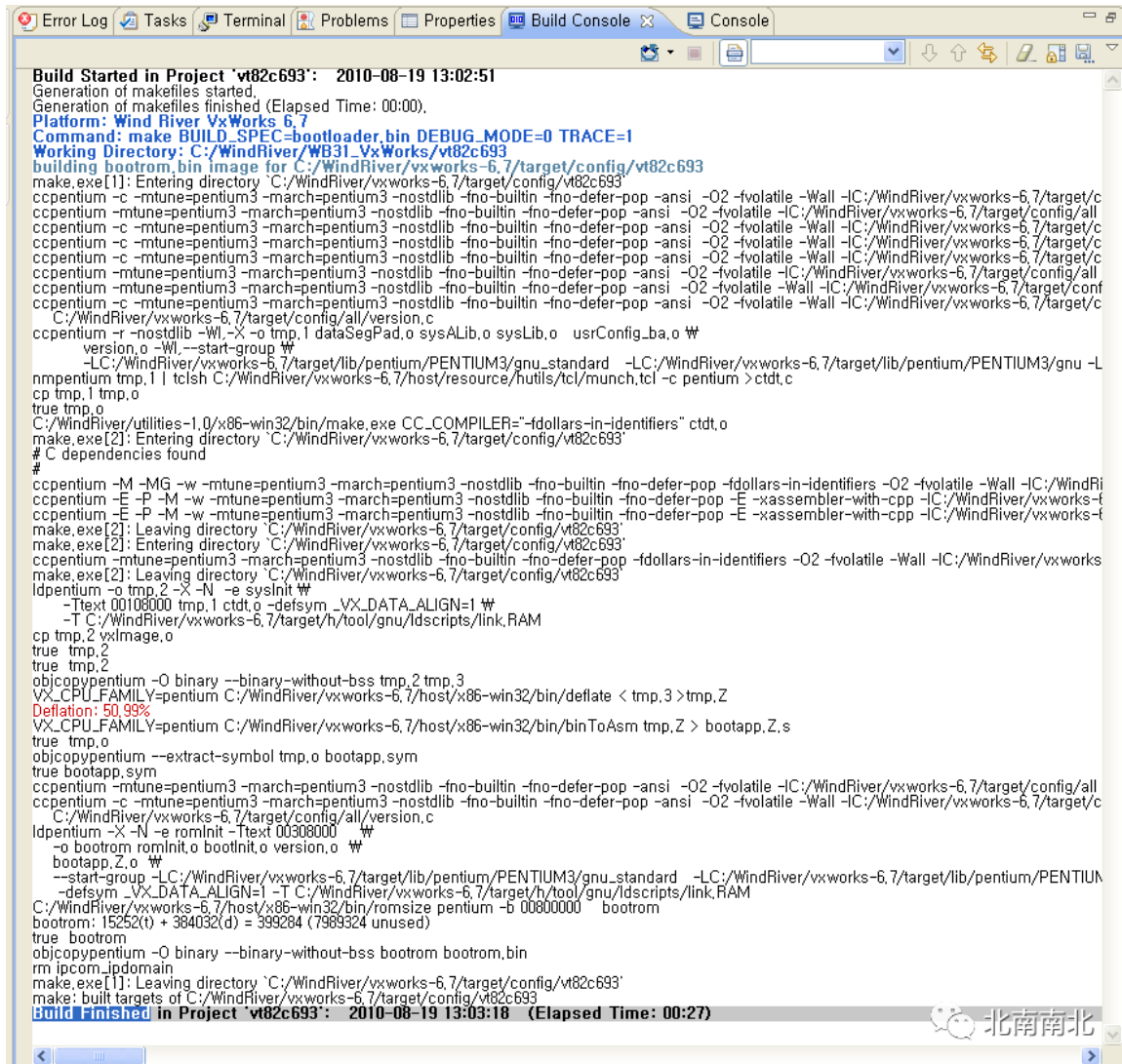
3.2 BSP 编译选项的设置



3.3 BSP 项目的编译

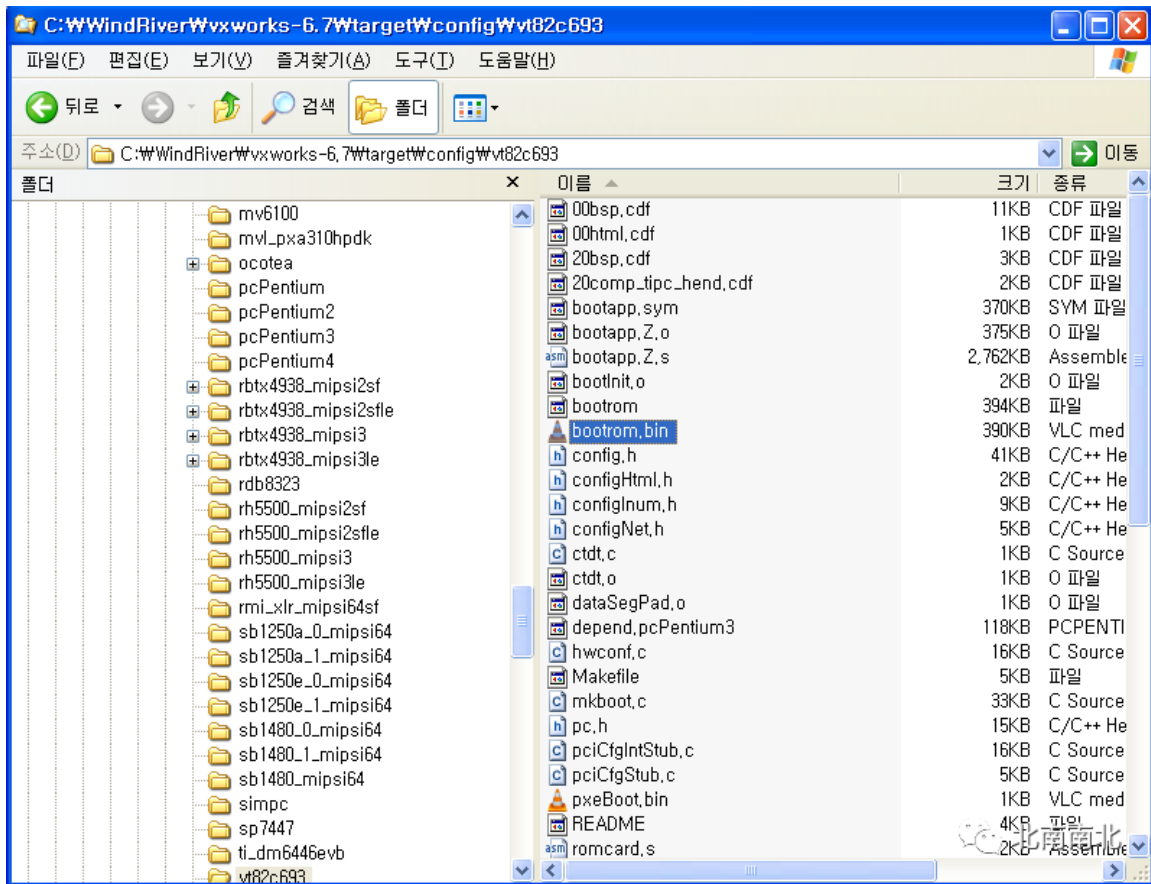


3.4 BSP 编译完成



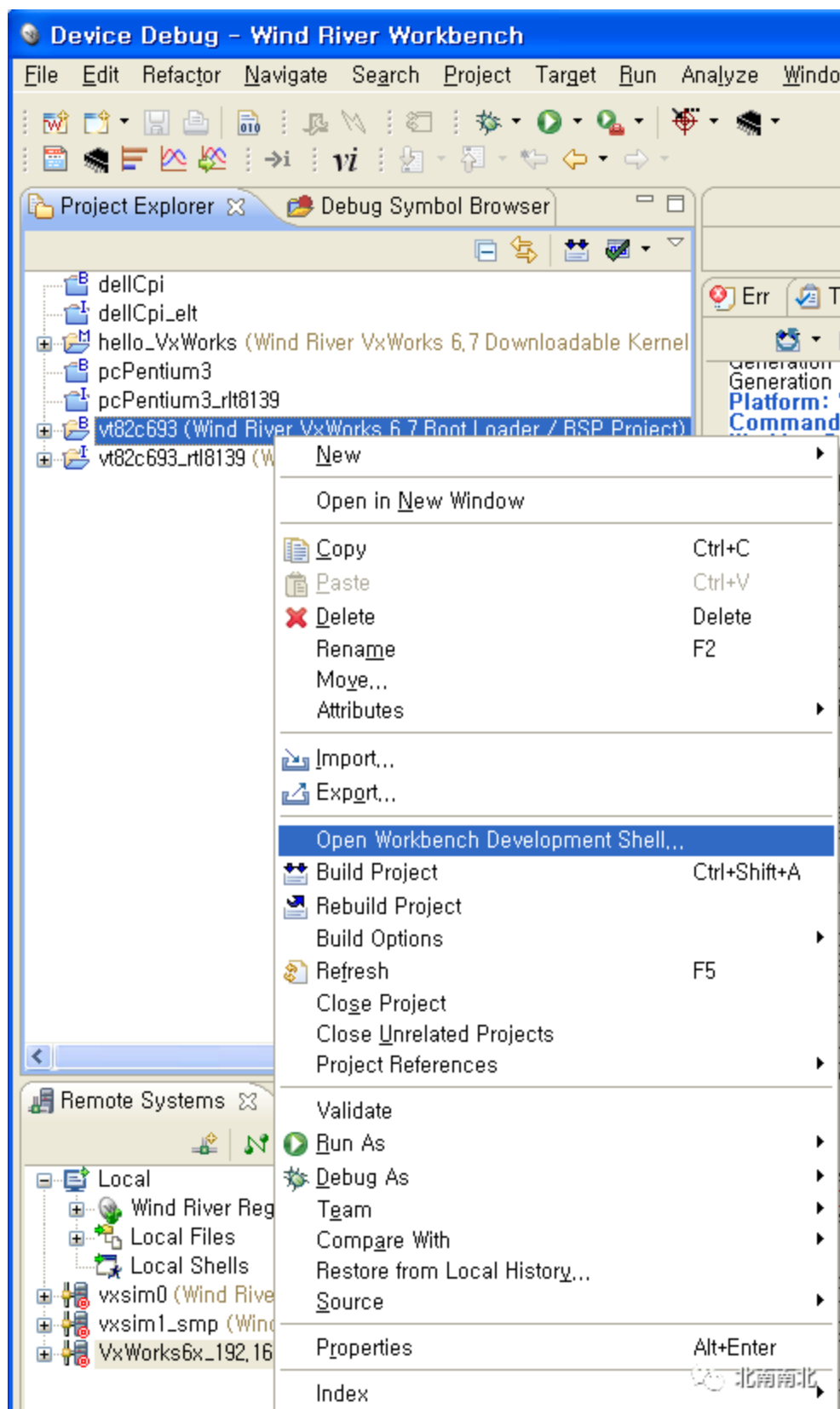
```
Build Started in Project 'vt82c693': 2010-08-19 13:02:51
Generation of makefiles started.
Generation of makefiles finished (Elapsed Time: 00:00).
Platform: Wind River VxWorks 6.7
Command: make BUILD_SPEC=bootloader.bin DEBUG_MODE=0 TRACE=1
Working Directory: C:/WindRiver/WB31_VxWorks/vt82c693
building bootrom.bin image for C:/WindRiver/vxworks-6.7/target/config/vt82c693
make.exe[1]: Entering directory 'C:/WindRiver/vxworks-6.7/target/config/vt82c693'
ccpentium -c -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/c
ccpentium -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -IC:/WindRiver/vxworks-6.7/target/config/all
ccpentium -c -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/c
ccpentium -c -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/c
ccpentium -c -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/c
ccpentium -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -IC:/WindRiver/vxworks-6.7/target/config/all
ccpentium -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/conf
ccpentium -c -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/c
C:/WindRiver/vxworks-6.7/target/config/all/version.c
ccpentium -r -nostdlib -Wl,-X -o tmp.1 dataSegPad.o sysALib.o sysLib.o usrConfig.ba.o W
version.o -start-group W
-LC:/WindRiver/vxworks-6.7/target/lib/pentium/PENTIUM3/gnu_standard -LC:/WindRiver/vxworks-6.7/target/lib/pentium/PENTIUM3/gnu -L
nmpentium tmp.1 | tcldsh C:/WindRiver/vxworks-6.7/host/resource/hutils/tcl/munch.tcl -c pentium > ctdt.o
cp tmp.1 tmp.o
true tmp.o
C:/WindRiver/utilities-1.0/x86-win32/bin/make.exe CC_COMPILER="fdollars-in-identifiers" ctdt.o
make.exe[2]: Entering directory 'C:/WindRiver/vxworks-6.7/target/config/vt82c693'
# C dependencies found
#
ccpentium -M -MG -w -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -fdollars-in-identifiers -O2 -fvolatile -Wall -IC:/WindRi
ccpentium -E -P -M -w -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -E -xassembler-with-cpp -IC:/WindRiver/vxworks-6.7/target/c
ccpentium -E -P -M -w -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -E -xassembler-with-cpp -IC:/WindRiver/vxworks-6.7/target/c
make.exe[2]: Leaving directory 'C:/WindRiver/vxworks-6.7/target/config/vt82c693'
make.exe[2]: Entering directory 'C:/WindRiver/vxworks-6.7/target/config/vt82c693'
ccpentium -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -fdollars-in-identifiers -O2 -fvolatile -Wall -IC:/WindRiver/vxworks
make.exe[2]: Leaving directory 'C:/WindRiver/vxworks-6.7/target/config/vt82c693'
ldpentium -o tmp.2 -X -N -e sysInit W
-T C:/WindRiver/vxworks-6.7/target/h/tool/gnu/ldscripts/link.RAM
cp tmp.2 vxImage.o
true tmp.2
true tmp.2
objcopypentium -O binary --binary-without-bss tmp.2 tmp.3
VX_CPU_FAMILY=pentium C:/WindRiver/vxworks-6.7/host/x86-win32/bin/deflate < tmp.3 > tmp.Z
Deflation: 50.93%
VX_CPU_FAMILY=pentium C:/WindRiver/vxworks-6.7/host/x86-win32/bin/binToAsm tmp.Z > bootapp.Z.s
true tmp.o
objcopypentium --extract-symbol tmp.o bootapp.sym
true bootapp.sym
ccpentium -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -IC:/WindRiver/vxworks-6.7/target/config/all
ccpentium -c -mtune=pentium3 -march=pentium3 -nostdlib -fno-builtin -fno-defer-pop -ansi -O2 -fvolatile -Wall -IC:/WindRiver/vxworks-6.7/target/c
C:/WindRiver/vxworks-6.7/target/config/all/version.c
ldpentium -X -N -e romInit -Text 00308000 W
-o bootrom romInit.o bootInit.o version.o W
bootapp.Z.o W
--start-group -LC:/WindRiver/vxworks-6.7/target/lib/pentium/PENTIUM3/gnu_standard -LC:/WindRiver/vxworks-6.7/target/lib/pentium/PENTIUM
-ldfsym -VX_DATA_ALIGN=1 -T C:/WindRiver/vxworks-6.7/target/h/tool/gnu/ldscripts/link.RAM
C:/WindRiver/vxworks-6.7/host/x86-win32/bin/romsize pentium -b 00800000 bootrom
bootrom: 15252(t) + 384032(d) = 399284 (7989324 unused)
true bootrom
objcopypentium -O binary --binary-without-bss bootrom bootrom.bin
rm ipcom_ipdomain
make.exe[1]: Leaving directory 'C:/WindRiver/vxworks-6.7/target/config/vt82c693'
make: built targets of C:/WindRiver/vxworks-6.7/target/config/vt82c693
Build Finished in Project 'vt82c693': 2010-08-19 13:03:18 (Elapsed Time: 00:27)
```

3.5 编译完成后得到 bootrom.bin



4. 将引导加载程序 bootrom 部署到 CF 卡上

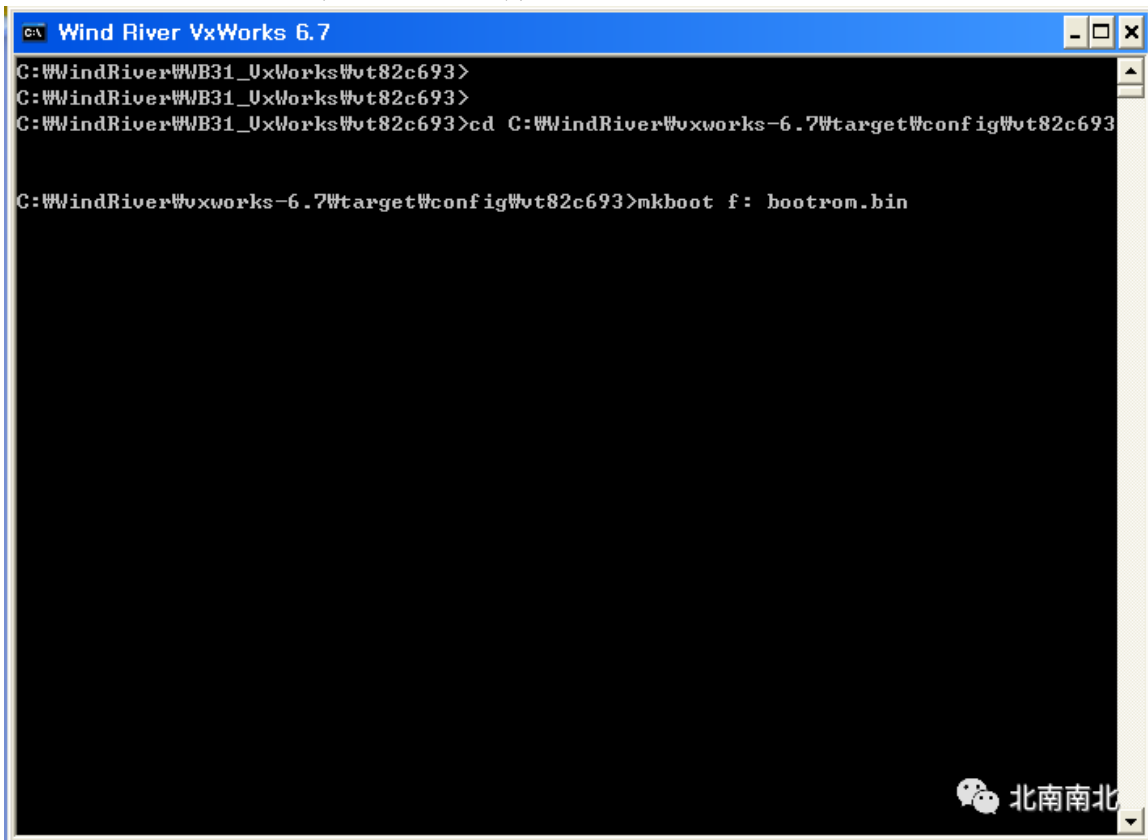
4.1 打开 Workbench Development shell 终端



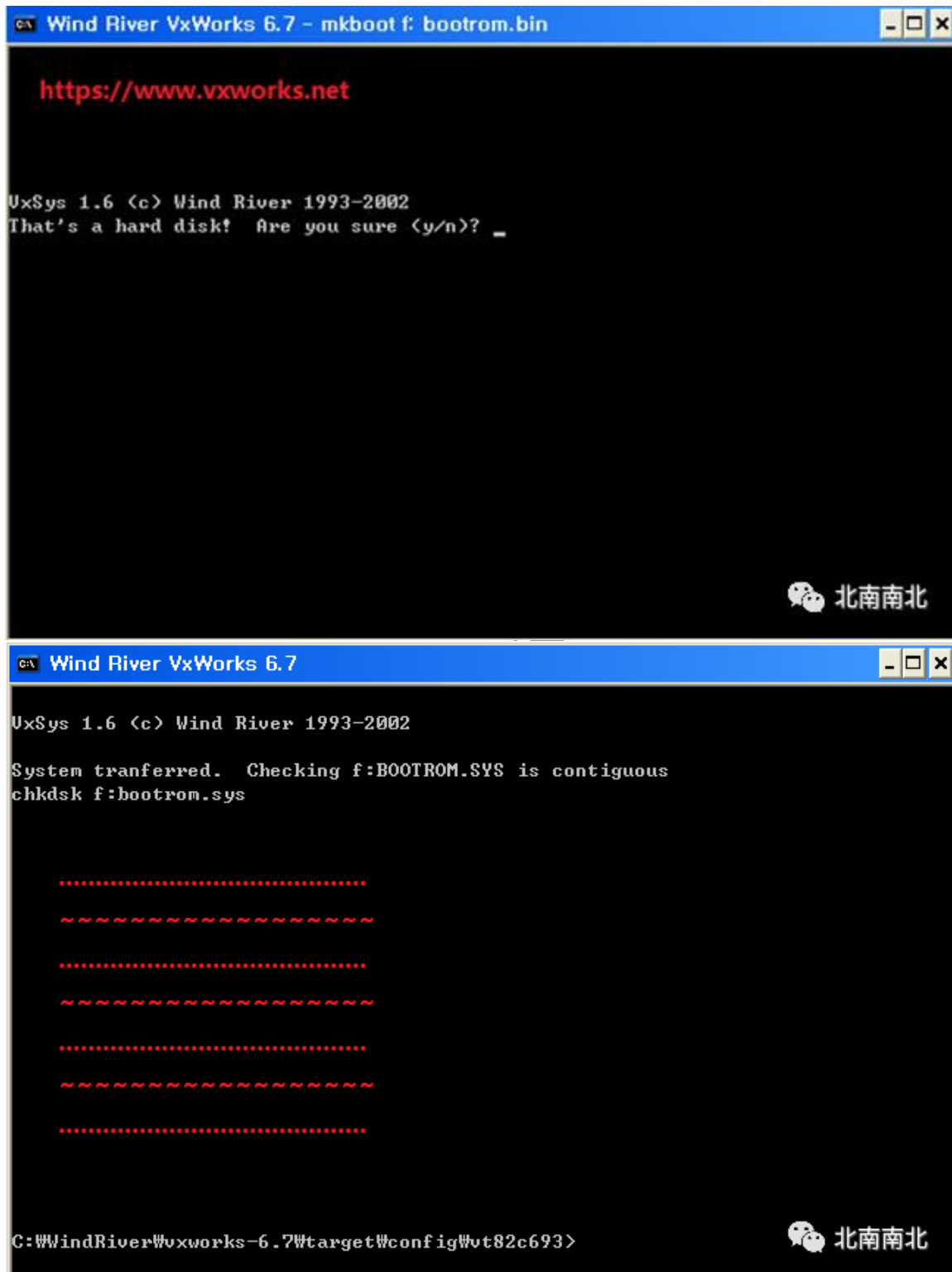
4.2 用 mkboot 创建启动盘

```
cd C:\WindRiver\vxworks-6.9\target\config\vt82c693C:\WindRiver\vxworks-6.9\target\config\vt82c693>mkboot f: bootrom.bin
```

注：f: 盘为 CF 卡在主机 PC 上的盘符

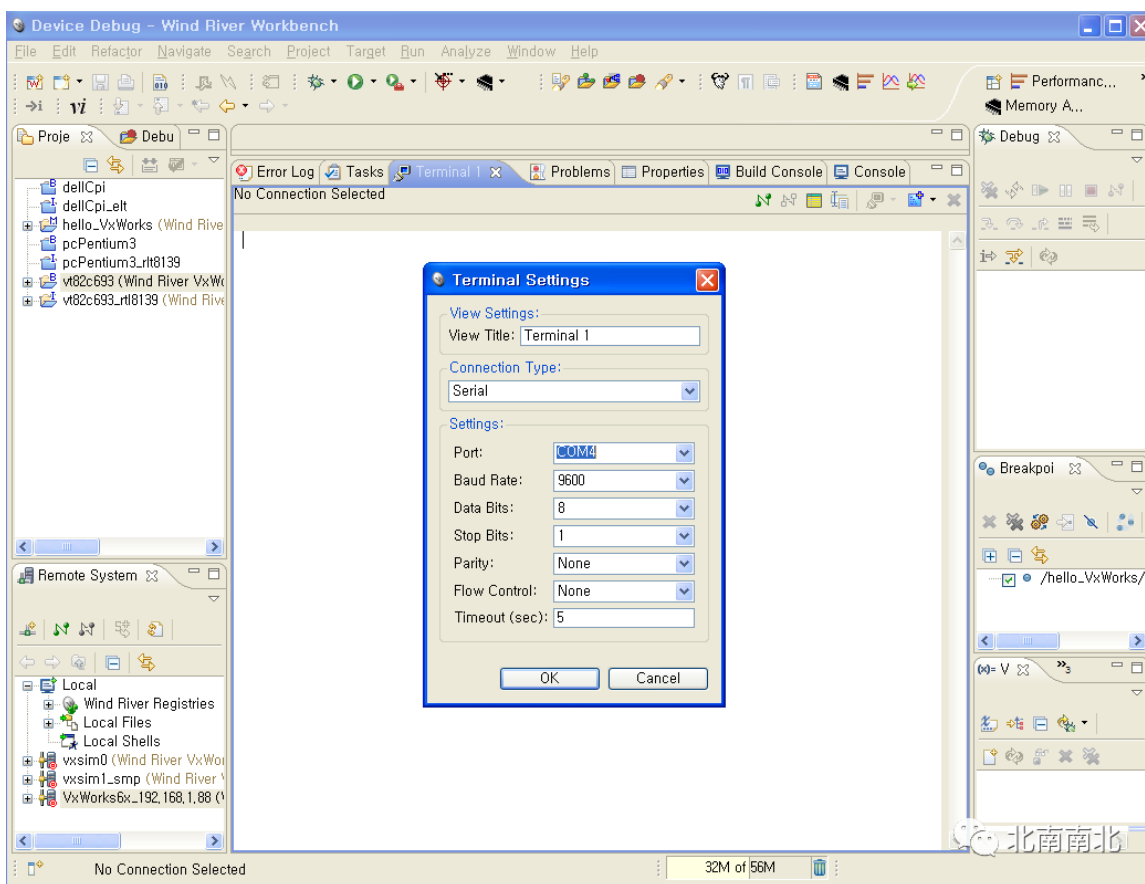


<https://www.vxworks.net>

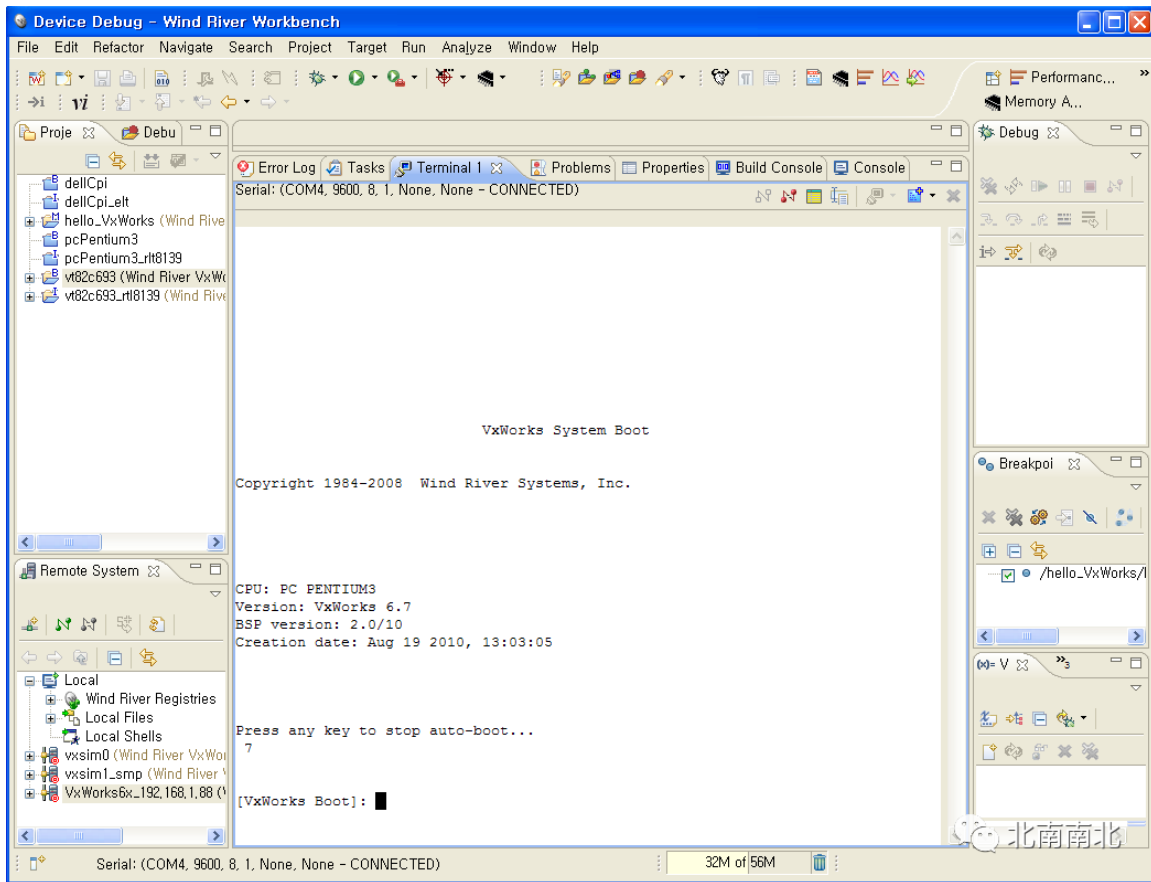


5. 引导加载程序 boorom 的设置和启动

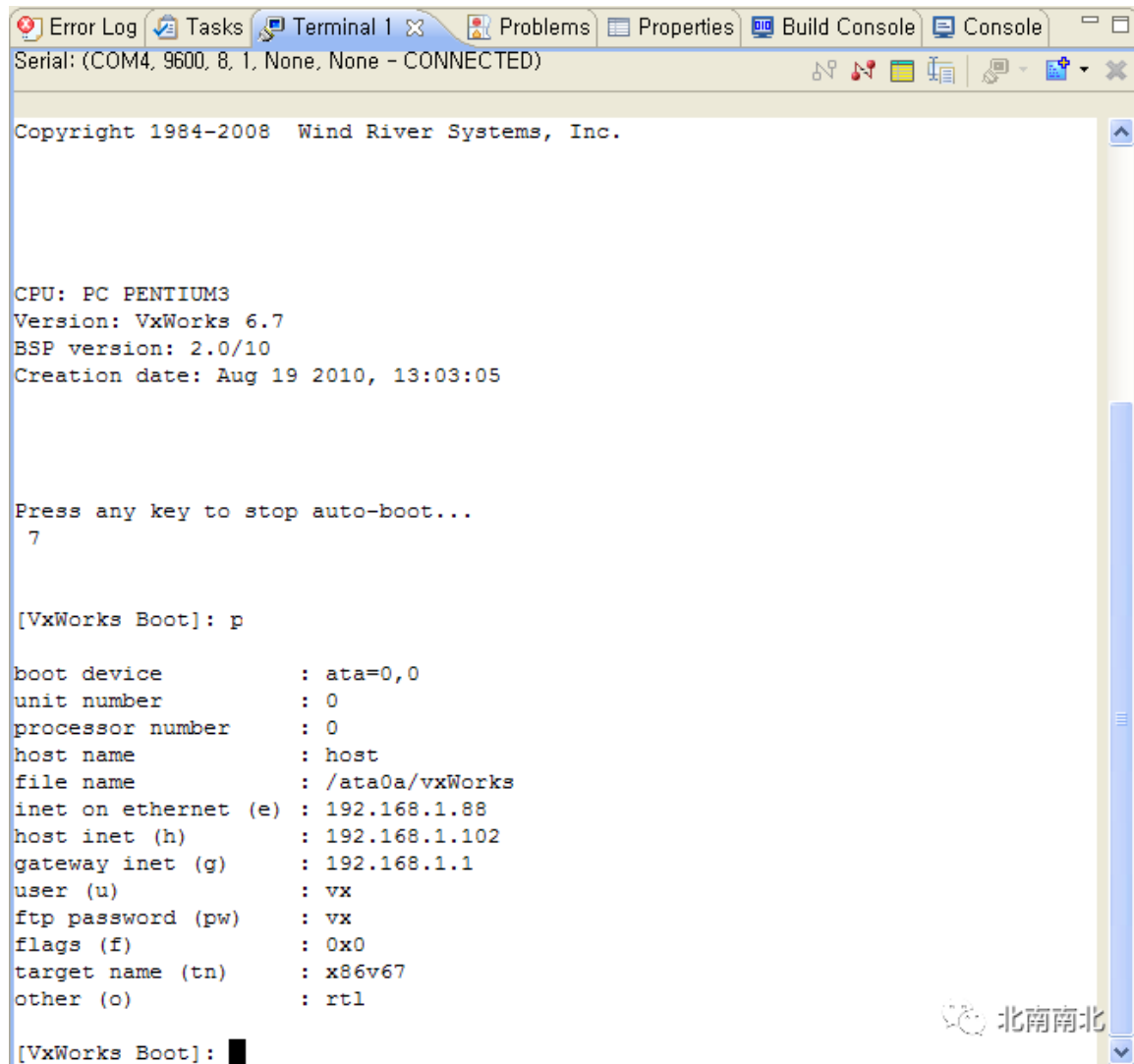
5.1 串口端口 COM 的设置，波特率 9600，8 位数据为，1 位停止位



5.2 串口终端的连接



5.3 [VxWorks Boot]: 用 p 命令查看引导参数



The screenshot shows a VxWorks terminal window with the following content:

```
Serial: (COM4, 9600, 8, 1, None, None - CONNECTED)

Copyright 1984-2008 Wind River Systems, Inc.

CPU: PC PENTIUM3
Version: VxWorks 6.7
BSP version: 2.0/10
Creation date: Aug 19 2010, 13:03:05

Press any key to stop auto-boot...
7

[VxWorks Boot]: p

boot device      : ata=0,0
unit number     : 0
processor number : 0
host name       : host
file name       : /ata0a/vxWorks
inet on ethernet (e) : 192.168.1.88
host inet (h)    : 192.168.1.102
gateway inet (g) : 192.168.1.1
user (u)        : vx
ftp password (pw) : vx
flags (f)       : 0x0
target name (tn) : x86v67
other (o)       : rtl

[VxWorks Boot]:
```

对于 VxWorks 6.9, 修改成如下:

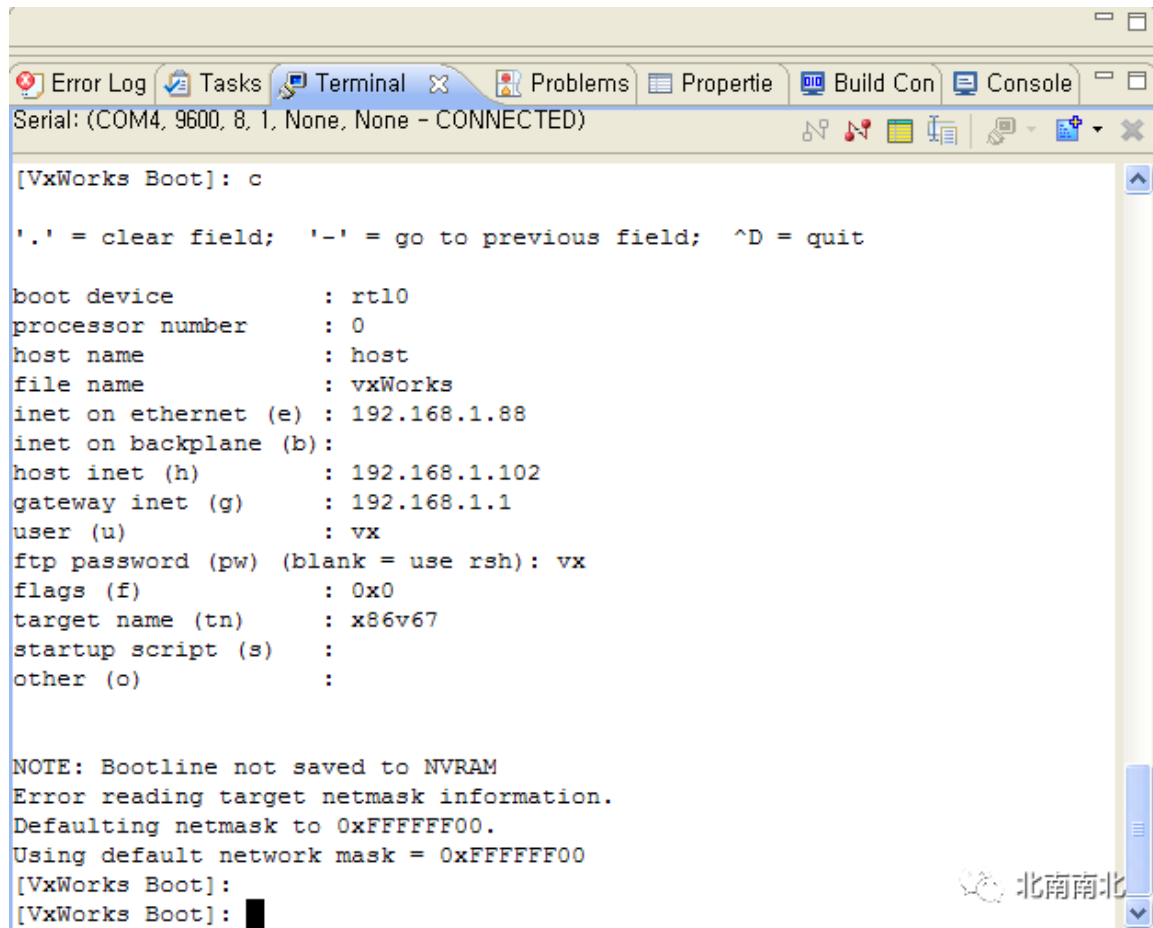
```
[VxWorks Boot]: p
boot device : ata=0,0
unit number : 0
processor number : 0
host name : host
file name : /ata00:1/vxWorks
inet on ethernet (e) : 192.168.1.88
host inet (h) : 192.168.1.102
gateway inet (g) : 192.168.1.1
user (u) : vx
ftp password (pw) : vx
flags (f) : 0x0
target name (tn) : x86v69
other (o) : rtl
```

[VxWorks Boot]:

5.4 [VxWorks Boot]: 用 c 命令修改 Boot Parameter

将启动设备更改为 rtl0 -> (RTL8139) 以太网

将加载的文件名更改为 vxWorks



The screenshot shows a terminal window titled "Serial: (COM4, 9600, 8, 1, None, None - CONNECTED)". The terminal displays the VxWorks Boot prompt "[VxWorks Boot]: c". Below the prompt, a list of boot parameters is shown, including boot device (rtl0), processor number (0), host name (host), file name (vxWorks), and various network settings. A note indicates that the bootline was not saved to NVRAM and that the default network mask is 0xFFFFFFFF. The terminal also shows the prompt "[VxWorks Boot]: " followed by a cursor.

```
[VxWorks Boot]: c

'.' = clear field; '-' = go to previous field; ^D = quit

boot device      : rtl0
processor number  : 0
host name        : host
file name        : vxWorks
inet on ethernet (e) : 192.168.1.88
inet on backplane (b):
host inet (h)    : 192.168.1.102
gateway inet (g) : 192.168.1.1
user (u)         : vx
ftp password (pw) (blank = use rsh): vx
flags (f)        : 0x0
target name (tn)  : x86v67
startup script (s) :
other (o)         :

NOTE: Bootline not saved to NVRAM
Error reading target netmask information.
Defaulting netmask to 0xFFFFFFFF00.
Using default network mask = 0xFFFFFFFF00
[VxWorks Boot]:
[VxWorks Boot]:
```

对于 VxWorks 6.9, 修改成如下:

[VxWorks Boot]: p

boot device : rtl0

unit number : 0

processor number : 0

host name : host

file name : vxWorks

inet on ethernet (e) : 192.168.1.88

host inet (h) : 192.168.1.102

gateway inet (g) : 192.168.1.1

user (u) : vx

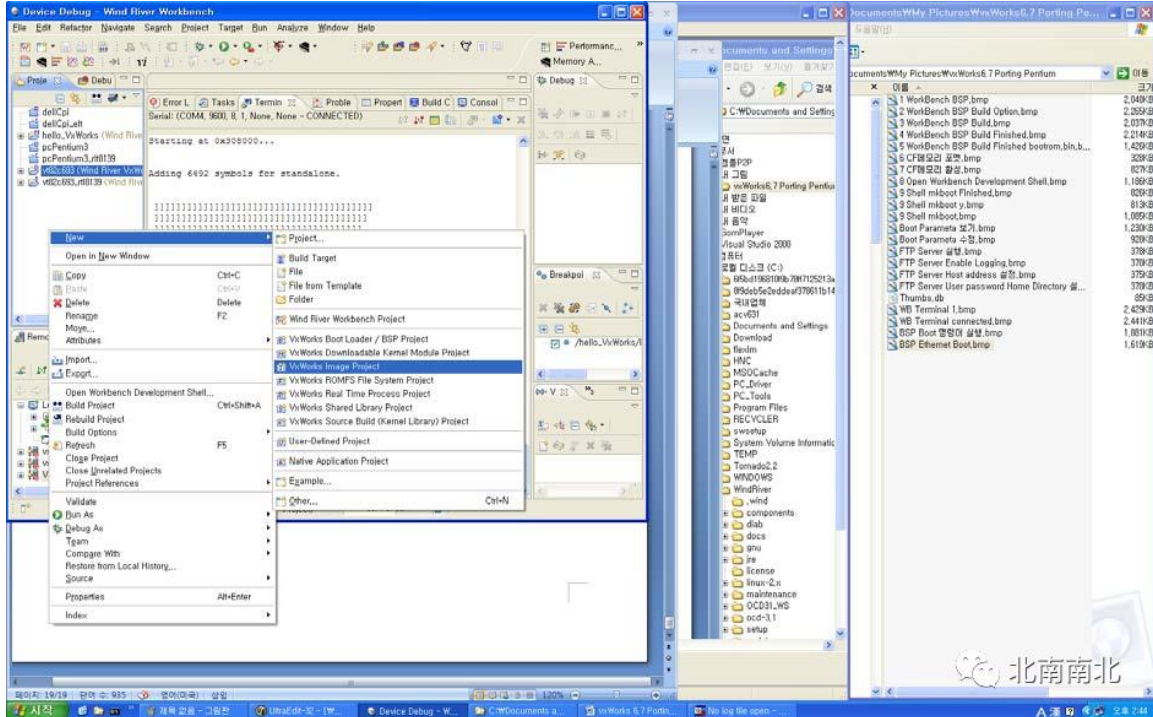
ftp password (pw) : vx

flags (f) : 0x0

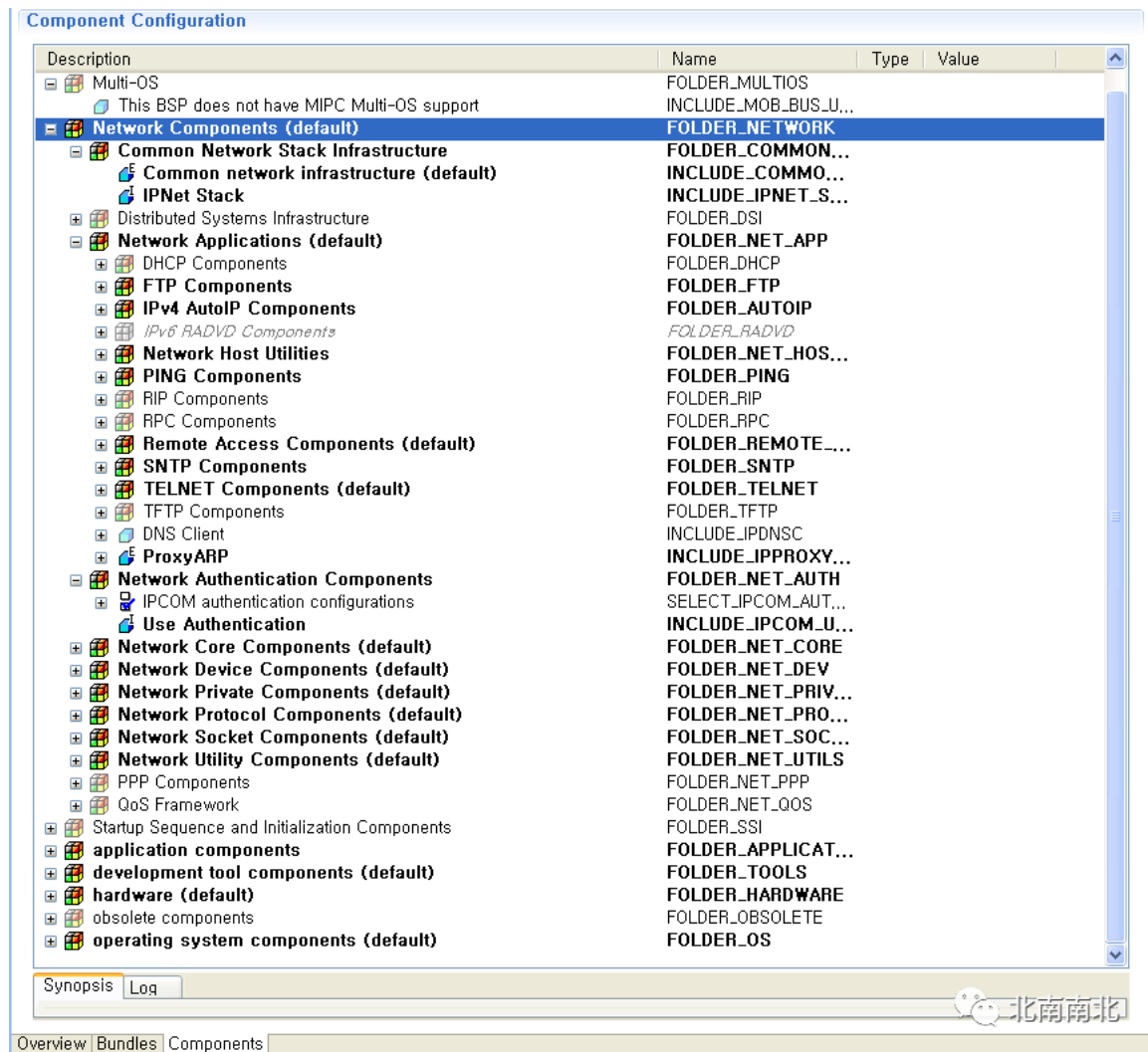
target name (tn) : x86v69
other (o) : rtl
[VxWorks Boot]:

6. 创建 vxWorks 6.9 内核镜像

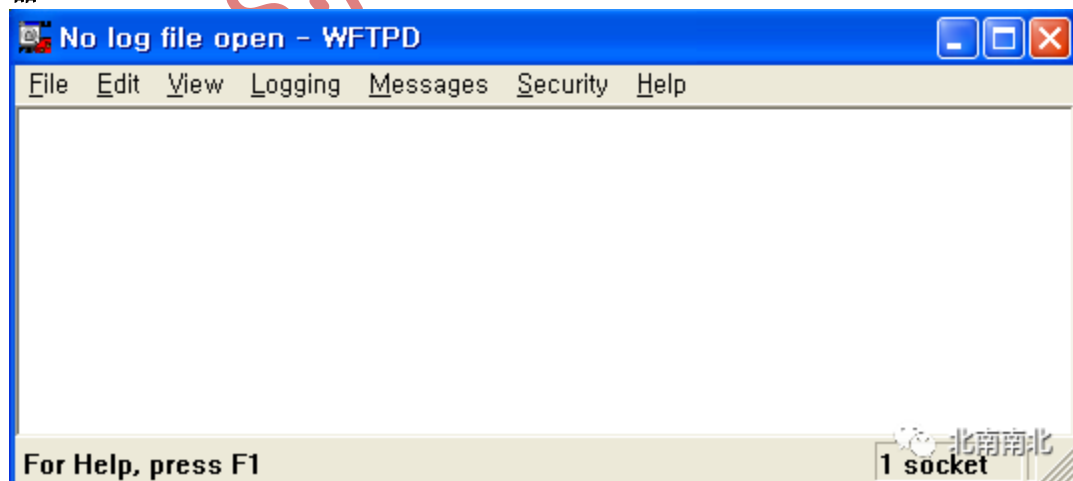
6.1 创建 vxWorks 6.9 项目



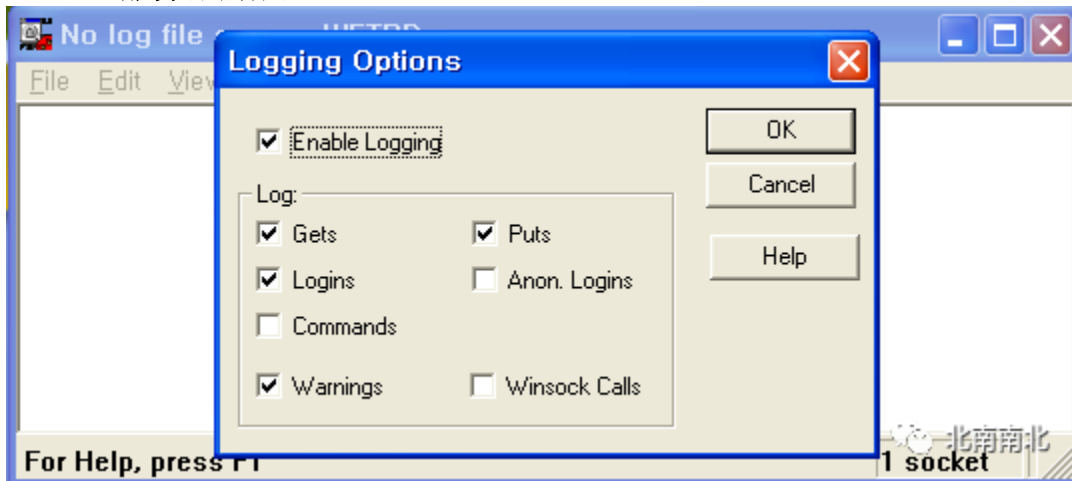
6.2 vxWorks 项目组件的配置



7. 设置网络下载 vxWorks 所需的 ftp 服务器 7.1 启动并运行 FTP 服务器



7.2 FTP 服务器的配置



7.3 FTP 服务器用户名，密码，主目录的设定

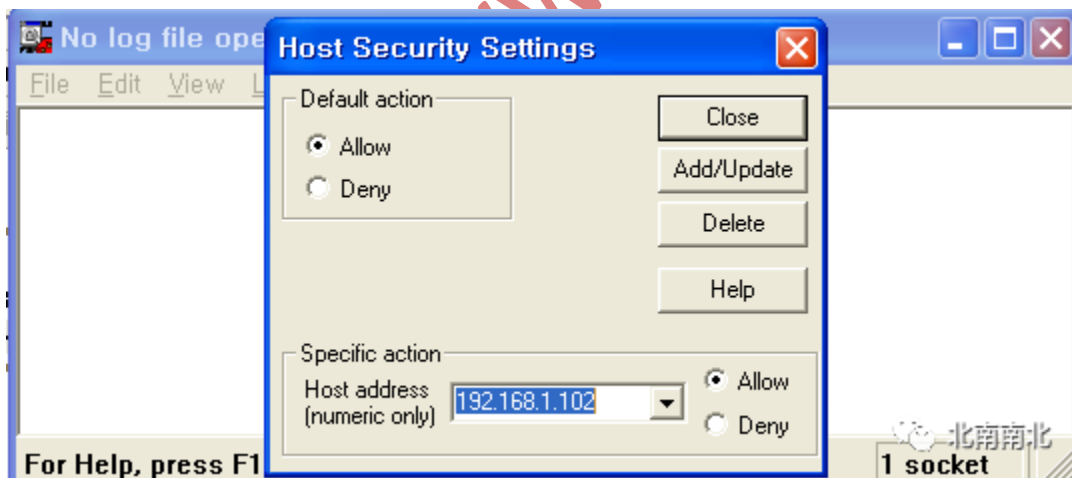
User Name: vx

Password: vx

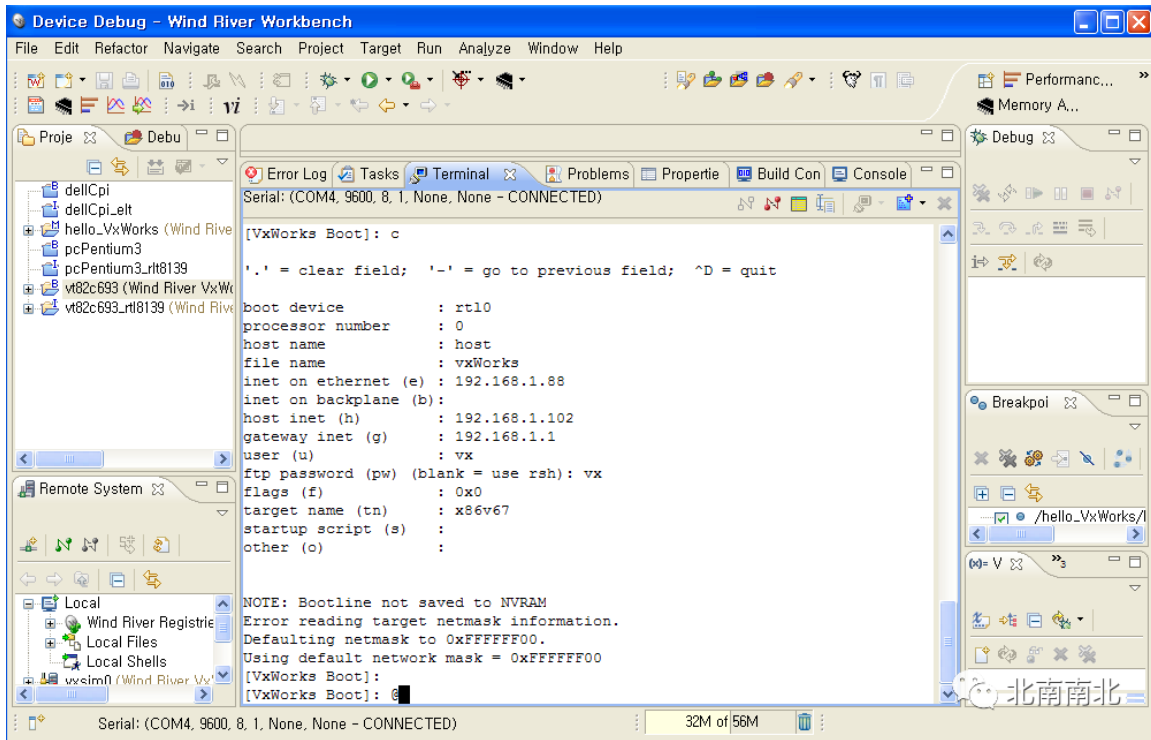
Home Directory: C:\WindRiver\WB31_VxWorks\vt82c693_rtl8139\default (将路径设置为创建 vxWorks ELF 镜像文件的文件夹)

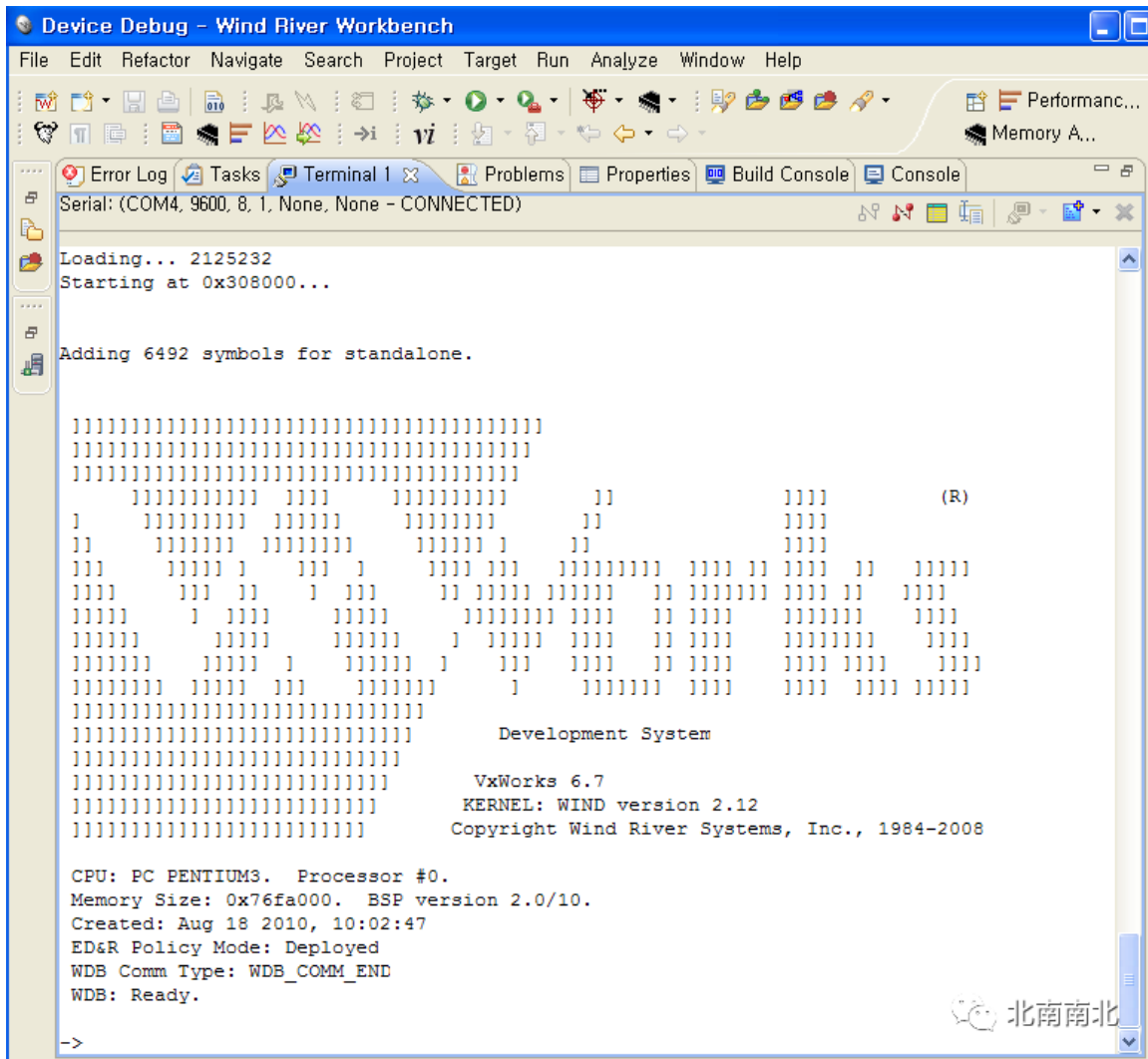
7.4 FTP 服务器主机地址的设置

主机地址: 192.168.1.102 点击 Add/Update 进行更新



8. 通过以太网（RTL8139）加载 vxWorks 内核镜像并执行 8.1 输入 @ 进行下载并引导
[VxWorks Boot]: @





https://www...

对于 vxWorks 6.9

[illegible]

Memory Size: 0x3fefa000 (~1022Mb). BSP version 6.9/0.

Created: Jul 29 2012, 16:16:44

ED&R Policy Mode: Deployed

WDB Comm Type: WDB_COMM_END

-> devs

drv name

0 /null

1 /tyCo/0

1 /tyCo/1

2 /aioPipe/0x45d6d60

3 /ata00:1

8 host:

9 /vio

value = 25 = 0x19

-> ataShow

device type : ATA/ATAPI-1 ATA device

XBD device_t : 0x1

drive type : Direct-access device

removable media: NO

intCount =254 intStatus =0x58

ataTypes

cylinders =1966 heads =16

sectorsTrack =63 bytesSector =512

precomp =0xff

ataParams

cylinders =1966 heads =16

config =0x44a specConfig =0x0

sectorsTrack =63

serial number =TSS25015070703205651

rev =20070312

model =CF 1GB

capacity =0x0000001e3d20 sectors

multiSecs =0x8001 capability =0x300

valid =0x3 curr-cyl =1966

curr-head =16 curr-sector =63

capacity0 =0x3d20 capacity1 =0x30

multiSet =0x100 sectors0 =0x3d20

sectors1 =0x1e singleDma =0x0

multiDma =0x407 advancedPio =0x3

cycleDma =120 cycleMulti =120

cyclePio-wo =120 cyclePio-w =120

Capability

MULTI: TRUE, IORDY: FALSE, DMA: TRUE, LBA: TRUE

multiSectors =0x1 pioMode =0x2

```

singleDma =0x0 multiDma =0x2
ultraDma =0xff
Configuration
rwMode =PIO_W_2 rwBits =16BITS
value = 0 = 0x0
-> ls "/ata00:1"
/ata00:1/vxWorks
/ata00:1/BOOTROM.SYS
value = 0 = 0x0

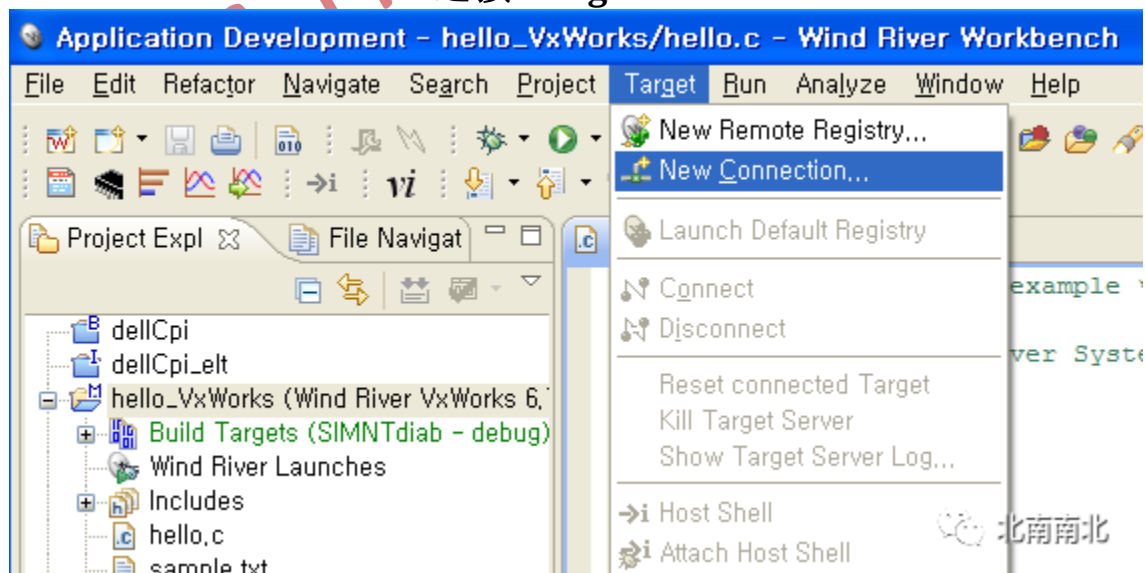
```

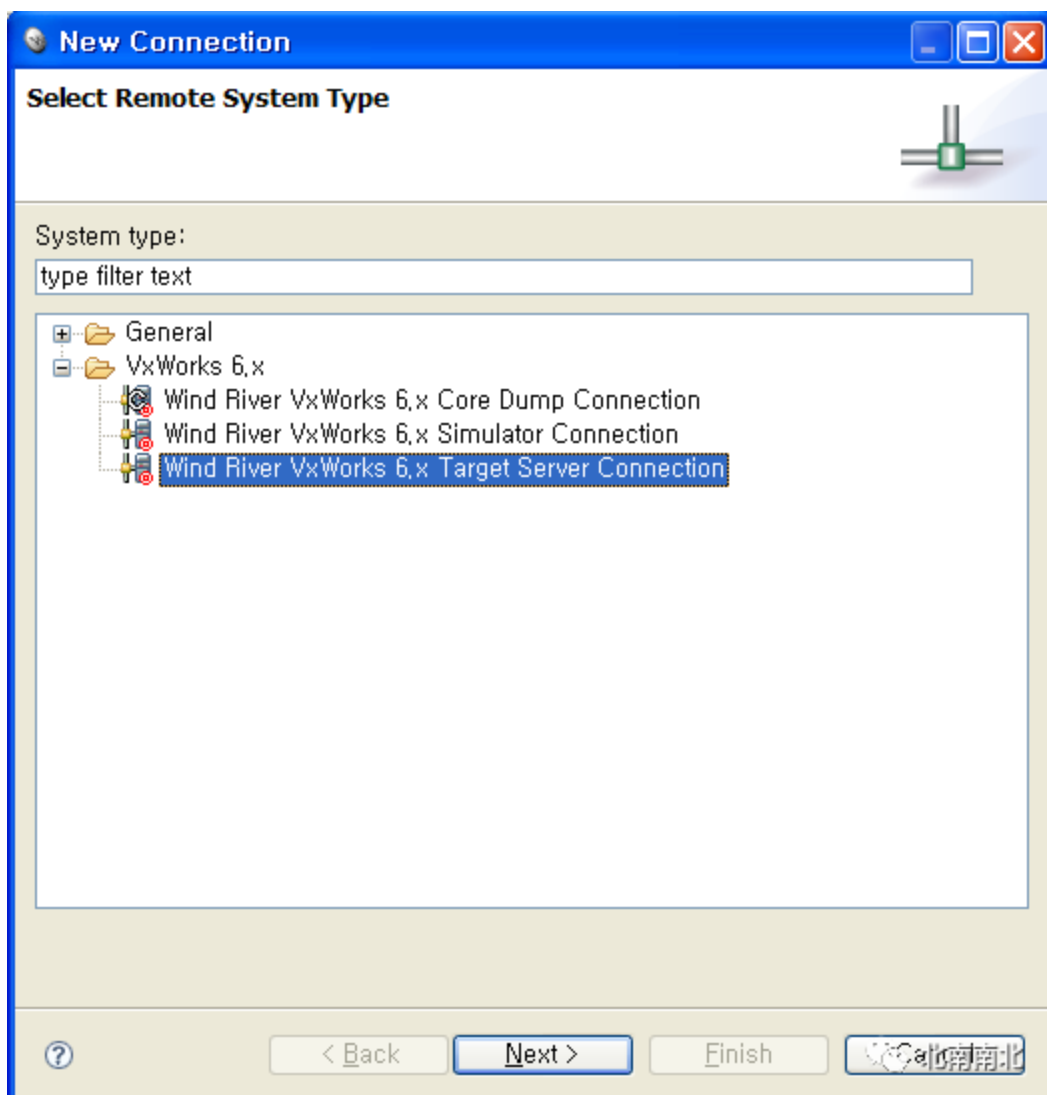
```

-> ioHelp
cd "path" Set current working path
pwd Print working path
ls ["wpat"[,long]] List contents of directory
ll ["wpat"] List contents of directory - long format
lsr ["wpat"[,long]] Recursive list of directory contents
llr ["wpat"] Recursive detailed list of directory
rename "old","new" Change name of file
copy ["in"][, "out"] Copy in file to out file (0 = std in/out)
cp "wpat","dst" Copy many files to another dir
xcopy "wpat","dst" Recursively copy files
mv "wpat","dst" Move files into another directory
xdelete "wpat" Delete a file, wildcard list or tree
attrib "path","attr" Modify file attributes
xattrib "wpat","attr" Recursively modify file attributes
chkdsk "device", L, V Consistency check DOS file system
dosfsDiskFormat "device" DOSFS file system format.
hrfsDiskFormat "device", N HRFS file system format.
commit "device" Commit current transaction

```

9. 连接 Target Server





New Connection

Target Server Options
Review and customize the target server options.

Backend settings

Backend: Processor:

Target name / IP address: Port:

Kernel image

☒ File path from target (if available)

☐ File:

☐ Bypass checksum comparison

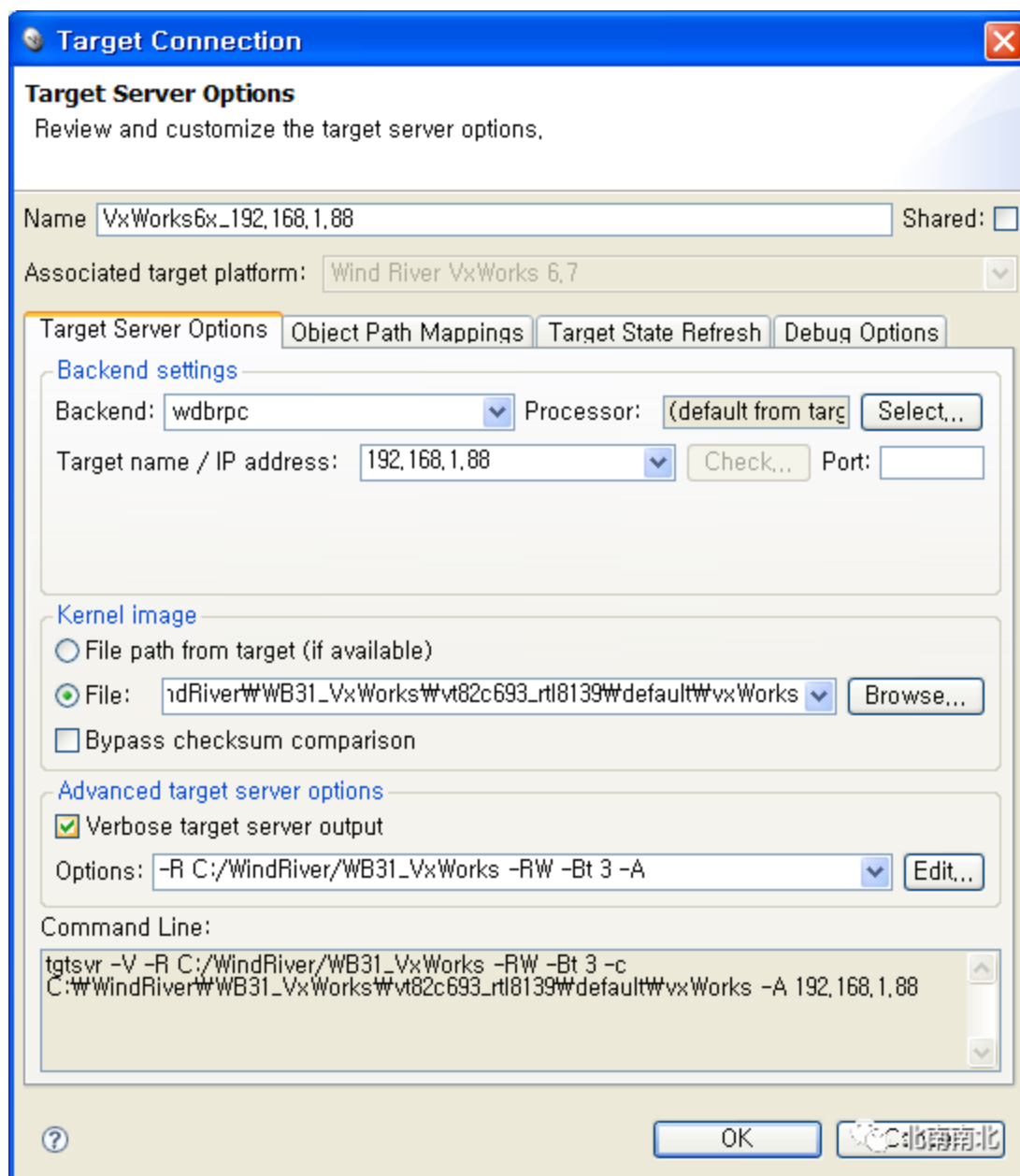
Advanced target server options

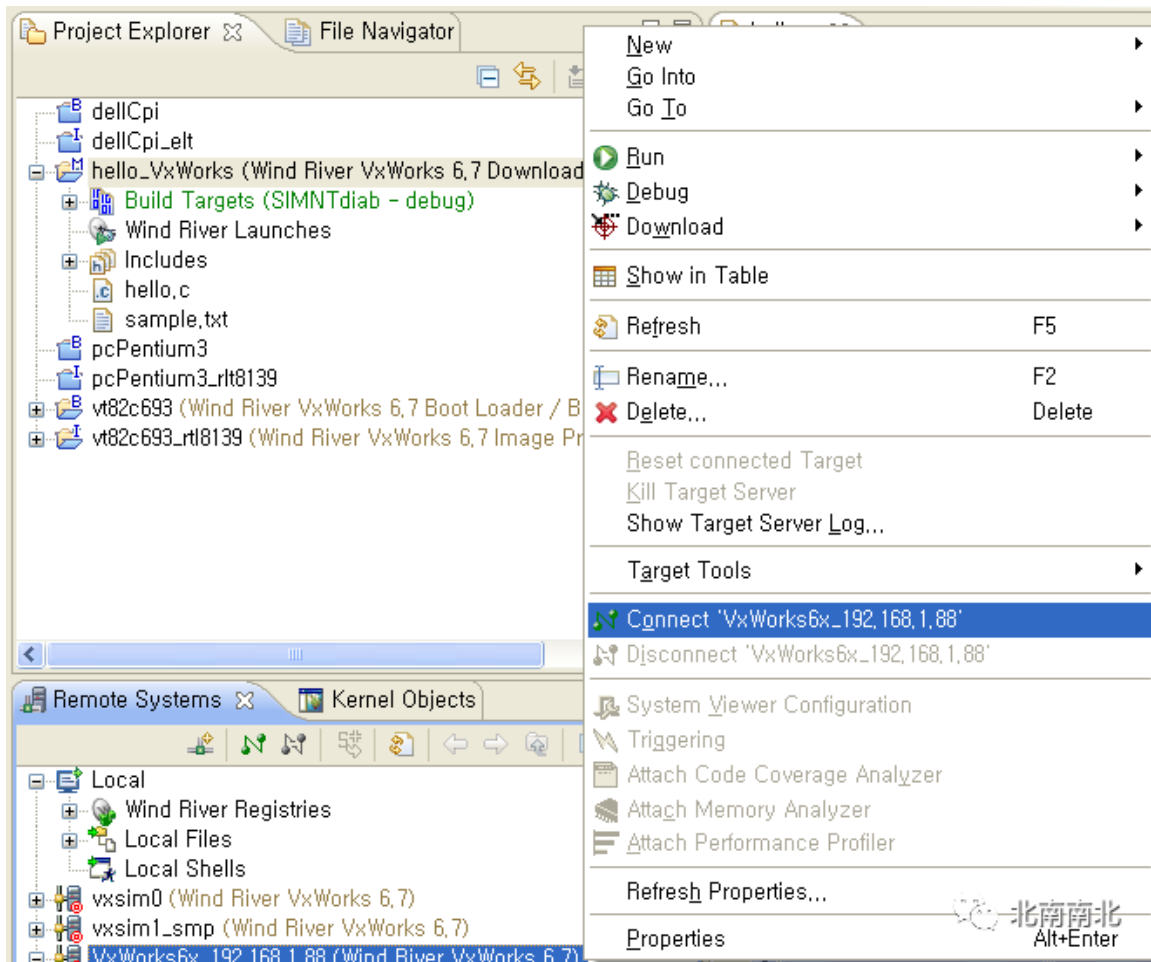
☒ Verbose target server output

Options:

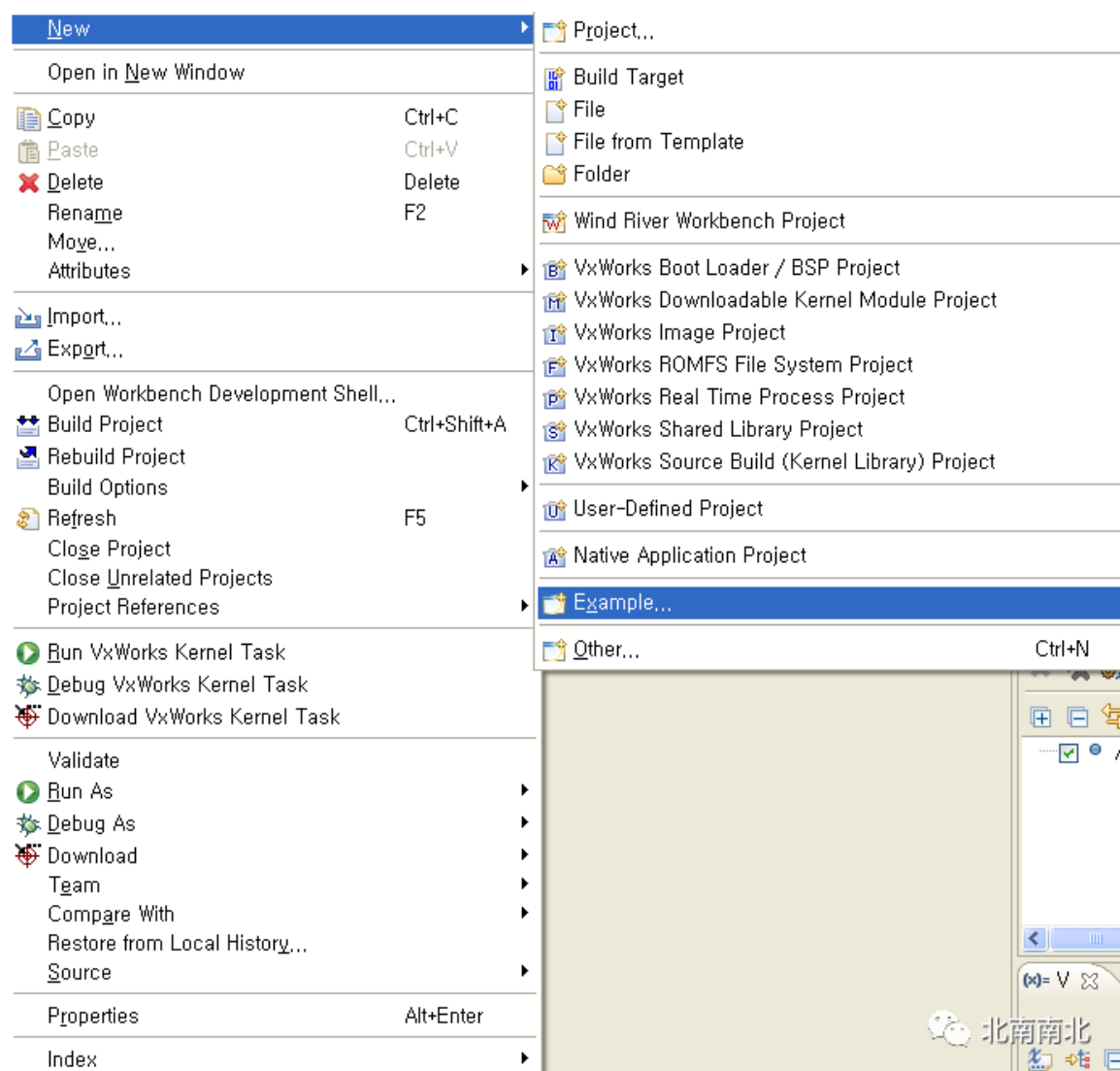
Command Line:

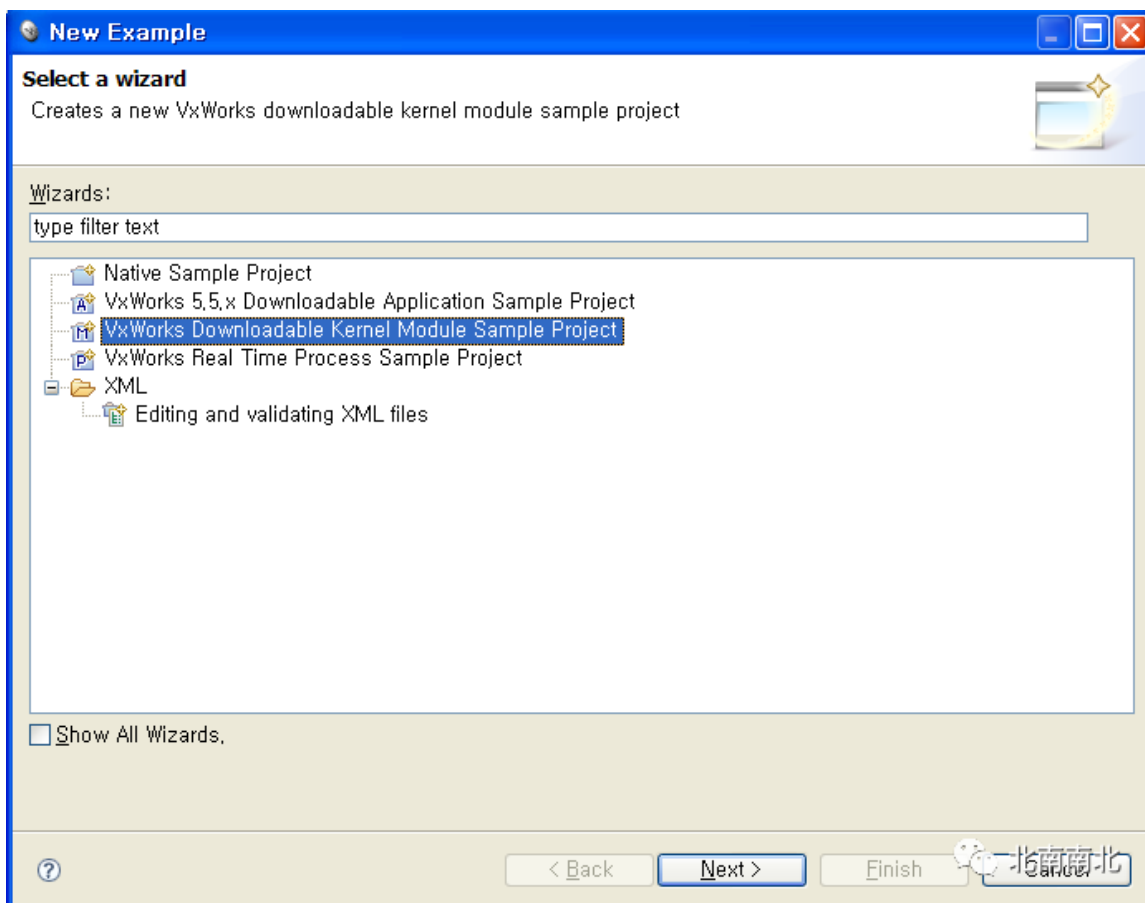
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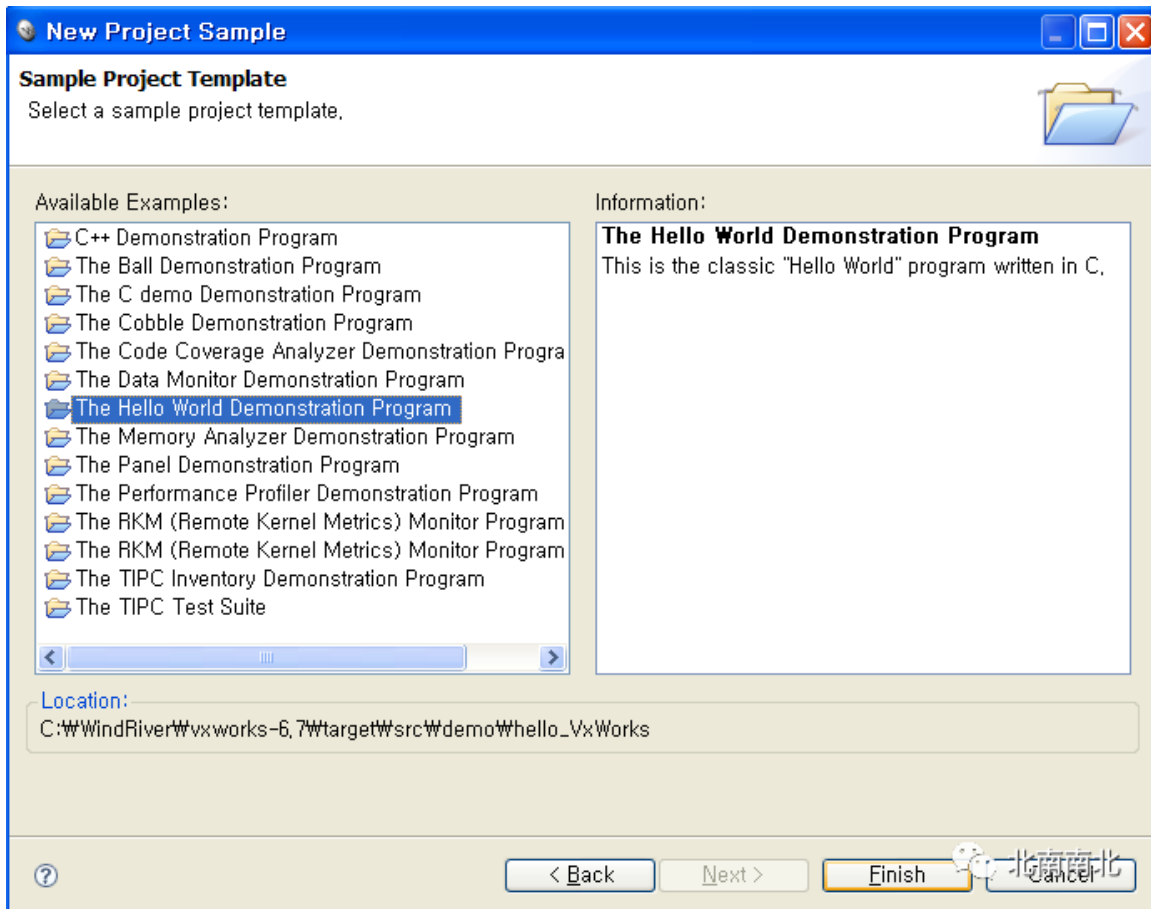


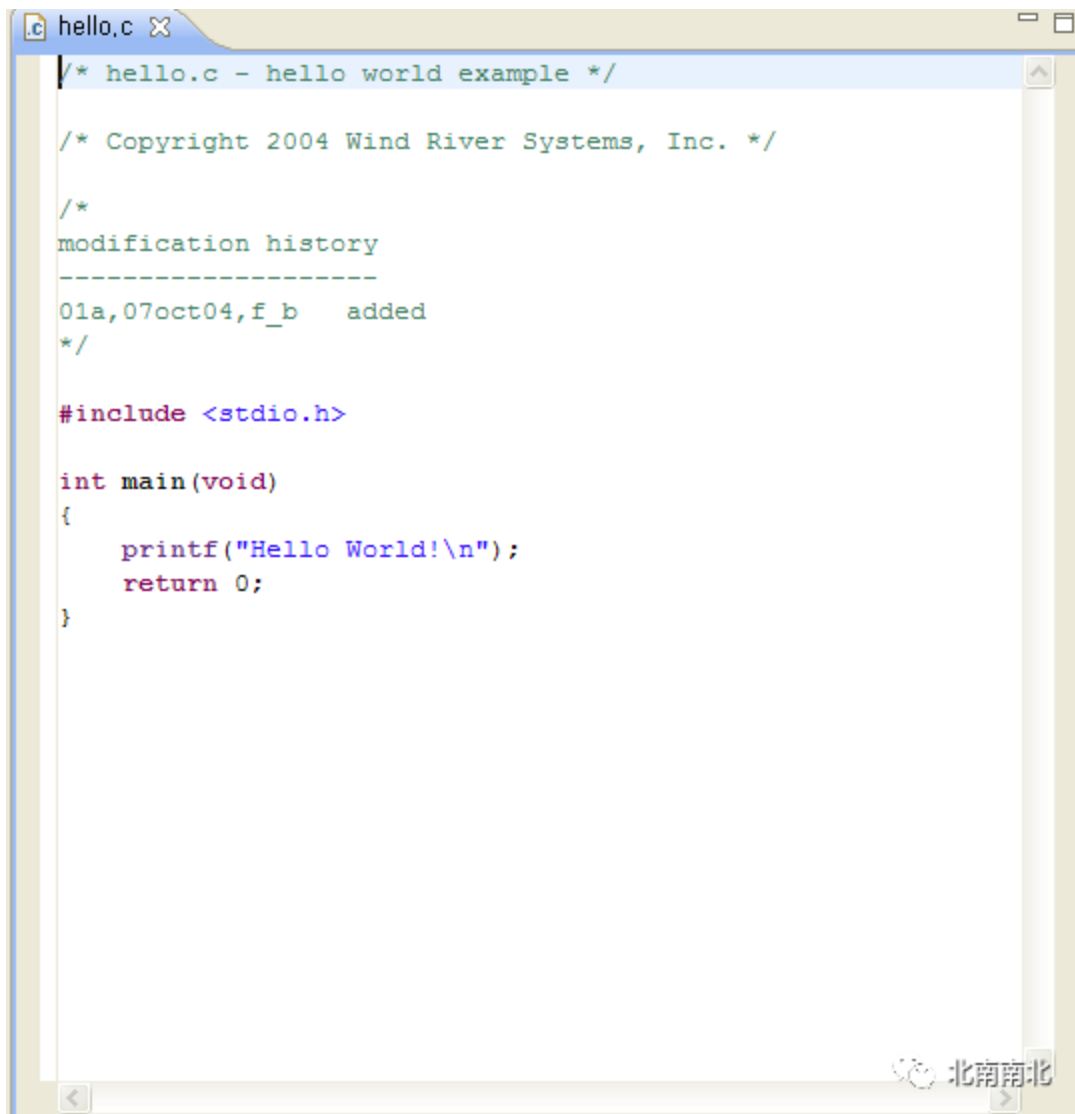


10. 创建并下载“Hello World”应用程序镜像







A screenshot of a VxWorks IDE window titled 'hello.c'. The window contains the following C code:

```
/* hello.c - hello world example */

/* Copyright 2004 Wind River Systems, Inc. */

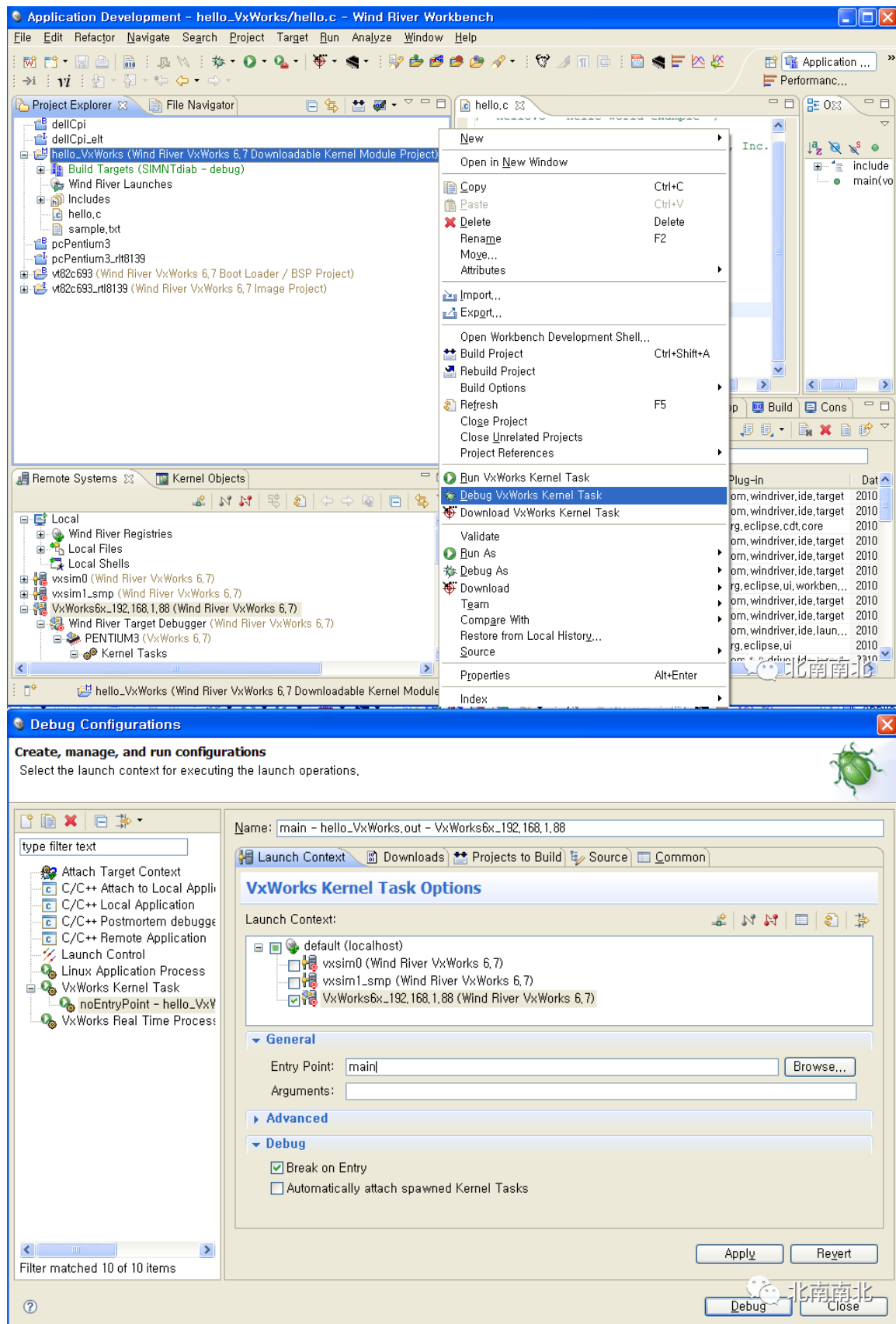
/*
modification history
-----
01a,07oct04,f_b   added
*/

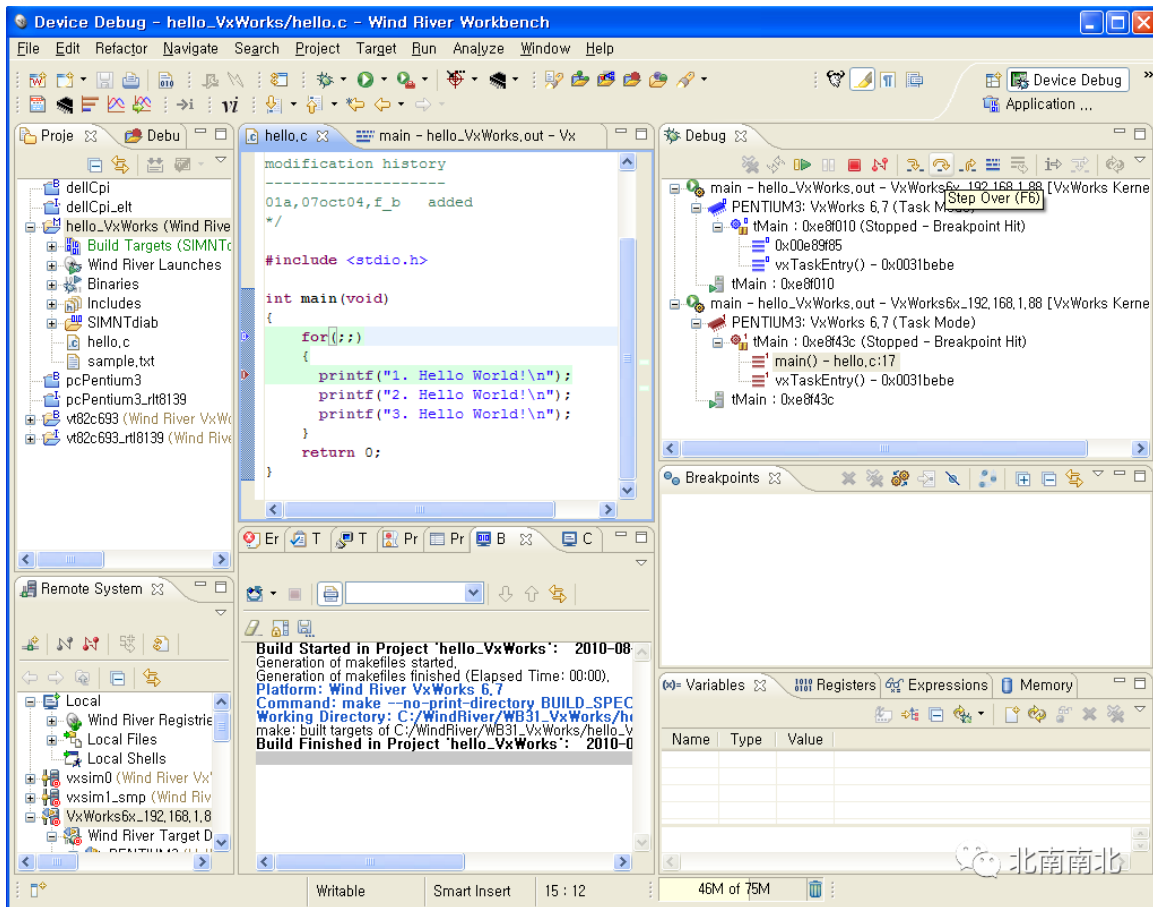
#include <stdio.h>

int main(void)
{
    printf("Hello World!\n");
    return 0;
}
```

The code is color-coded: comments are green, preprocessor directives are purple, and function/variable names are blue. The window has a standard Windows-style title bar and a vertical scrollbar on the right. A red watermark 'http://www.vxworks.net' is visible across the bottom of the image.

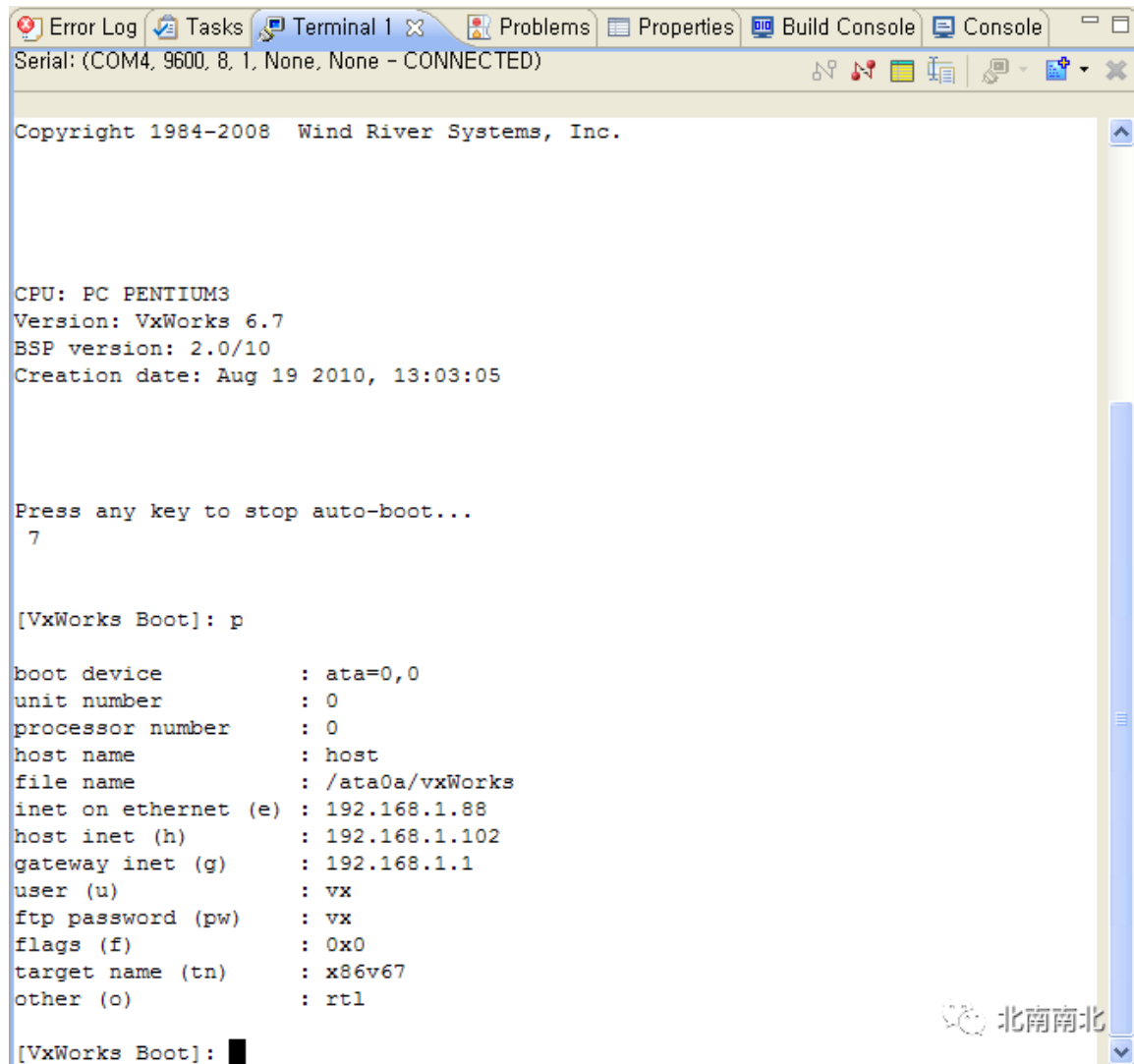
11. 在 WorkBench 3.3 中进行“Hello World”应用程序的源代码级调试





12. 将 vxWorks 内核镜像部署到 CF 卡上并启动

将生成的 vxWorks 文件复制到 CF 卡中，并修改启动参数



The screenshot shows a VxWorks terminal window with the following content:

```
Serial: (COM4, 9600, 8, 1, None, None - CONNECTED)

Copyright 1984-2008 Wind River Systems, Inc.

CPU: PC PENTIUM3
Version: VxWorks 6.7
BSP version: 2.0/10
Creation date: Aug 19 2010, 13:03:05

Press any key to stop auto-boot...
7

[VxWorks Boot]: p

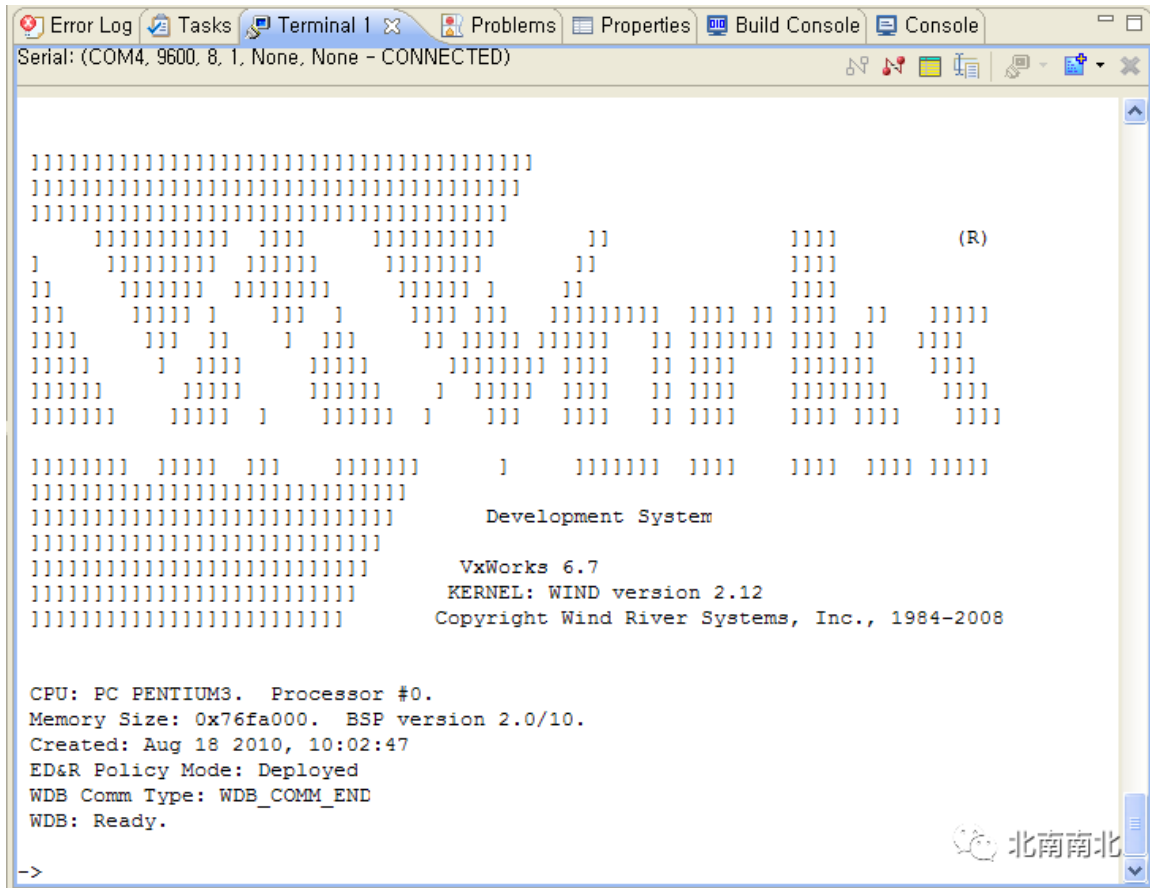
boot device      : ata=0,0
unit number     : 0
processor number : 0
host name       : host
file name       : /ata0a/vxWorks
inet on ethernet (e) : 192.168.1.88
host inet (h)    : 192.168.1.102
gateway inet (g) : 192.168.1.1
user (u)        : vx
ftp password (pw) : vx
flags (f)       : 0x0
target name (tn) : x86v67
other (o)       : rtl

[VxWorks Boot]:
```

A large red watermark "https://www.vxworks.net" is overlaid diagonally across the bottom half of the image.

输入@从 CF 卡引导并启动 vxWorks

[VxWorks Boot]: @



The screenshot shows a VxWorks terminal window with the following content:

```
Serial: (COM4, 9600, 8, 1, None, None - CONNECTED)

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Development System
VxWorks 6.7
KERNEL: WIND version 2.12
Copyright Wind River Systems, Inc., 1984-2008

CPU: PC PENTIUM3. Processor #0.
Memory Size: 0x76fa000. BSP version 2.0/10.
Created: Aug 18 2010, 10:02:47
ED&R Policy Mode: Deployed
WDB Comm Type: WDB_COMM_END
WDB: Ready.
```

At the bottom right of the terminal window, there is a small icon and the text "北南南北".