



Downloading the LOCE_SH7727-20_BETA_002 WincCE® BSP Image to the SH7727-20 SDK

Application Note 190

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Abstract

This document outlines the steps to download a Windows CE 4.2 image to Logic Product Development's SH7727-20 card engine SDK (Starter Development Kit).

REVISION HISTORY

| REV | EDITOR | DESCRIPTION | APPROVAL | DATE |
|-----|---------------|-------------|----------|----------|
| A | Mike Aanenson | Release | MA | 12/12/03 |

1 Introduction: Noteworthy Points

Assumptions:

- Platform Builder 4.2 is installed on your machine with support for SH3 processors.
- The LoCE_SH7727-20_beta_002 BSP is installed on your machine. See the following documents:
 - Installing the LoCE_SH7727-20_beta_002 BSP, App Note 188
 - Creating an Example WinCE® Image for the SH7727-20, App Note 189
- You are using a Logic Product Development Display Kit. If a display is not connected to the kit, the image will still work but no video output will be seen.
- You are using LogicLoader as your bootloader on a SH7727-20 card engine.
- The proper cables are connected to the SH7727-20 SDK. (Serial, Ethernet, Power, Display)
- You have an Ethernet connection to Network that allows DHCP. If directly connected to the PC, or if there is a need for specified network connections, read the LogicLoader User's Manual for use of correct commands.

Documentation Note:

Platform Builder and Windows CE are products of Microsoft; these programs are shipped with excellent documentation. The 'Help' section for Platform Builder is very useful, not only for Platform Builder, but also for Windows CE in general.

Logic Product Development provides documentation for the use of LogicLoader and a Logic Product Development BSP on our website downloads section.

LPD Support for Platform Builder Requires a Contract

You must have a contract with Logic Product Development (LPD) in order for LPD to support Platform Builder; similarly, you must have a contract with LPD in order for LPD to provide support for general Windows CE questions. To get a Support Contract, visit our website at www.logicpd.com

For free support, visit Logic's FAQ and Technical Discussion Group on our website.

2 A Step by Step Guide

1. Open Tera Term or other terminal application of your choice. If using Tera Term, ensure it is setup correctly – see Figure 1 below for proper settings.

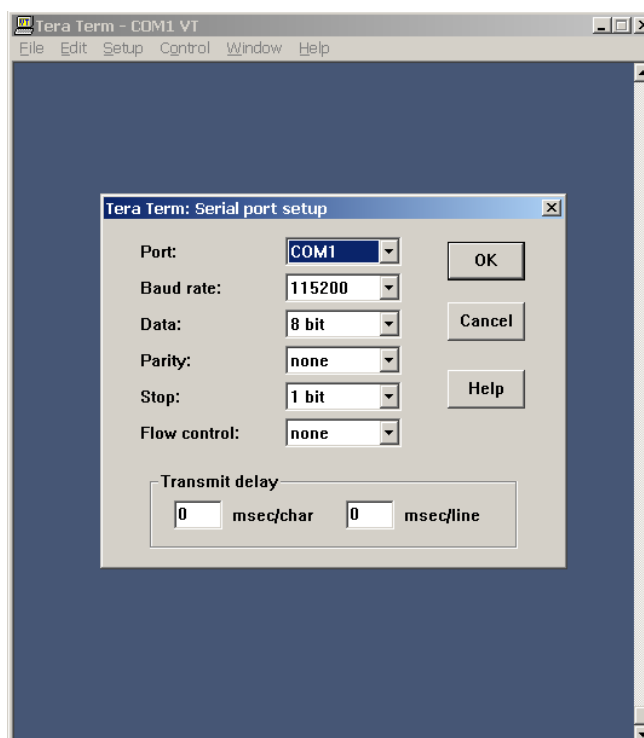


Figure 1: Tera Term Settings

2. Power on the SH7727-20 SDK. The LogicLoader menu appears in the terminal window.

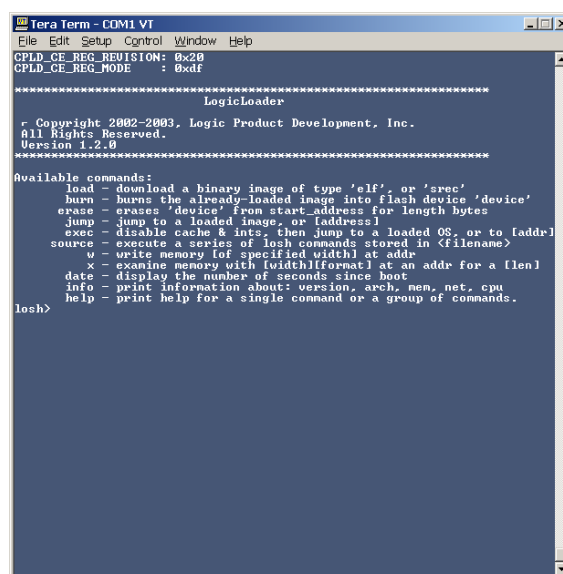


Figure 2: LogicLoader in the Terminal Window

3. The EEPROM on the SH7727-20 card engine needs to have a proper script that will be passed to Platform Builder and to Windows CE during boot-up. In the following steps we will use an example script that allows for a RAM image to download with debug ethernet and serial connections: use the 'store_boot_script.losch' file located in the BSP's 'platform folder' under 'logicloader/example_scripts.'

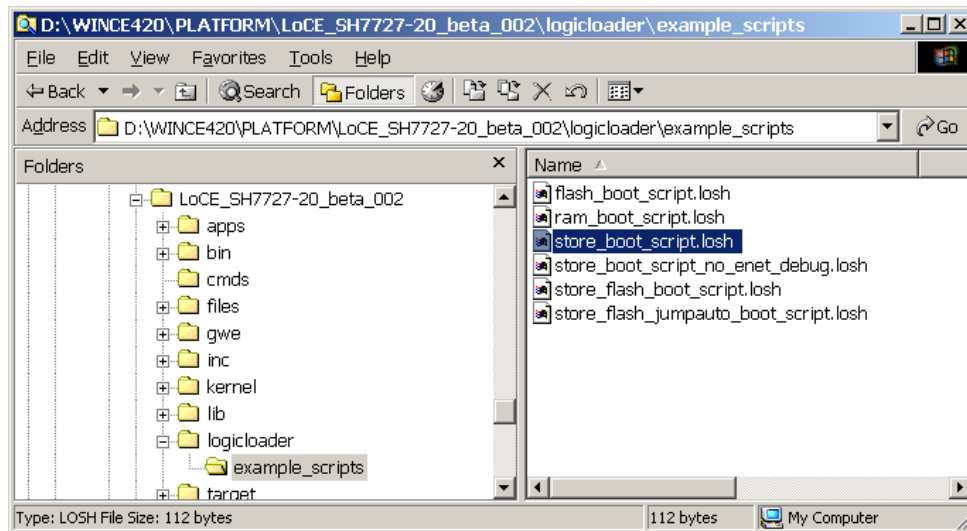


Figure 3: Locate the 'store_boot_script.losch' File

4. Open the 'store_boot_script.losch' file with a text editor; the command that is passed into LogicLoader is displayed in Figure 4 below.

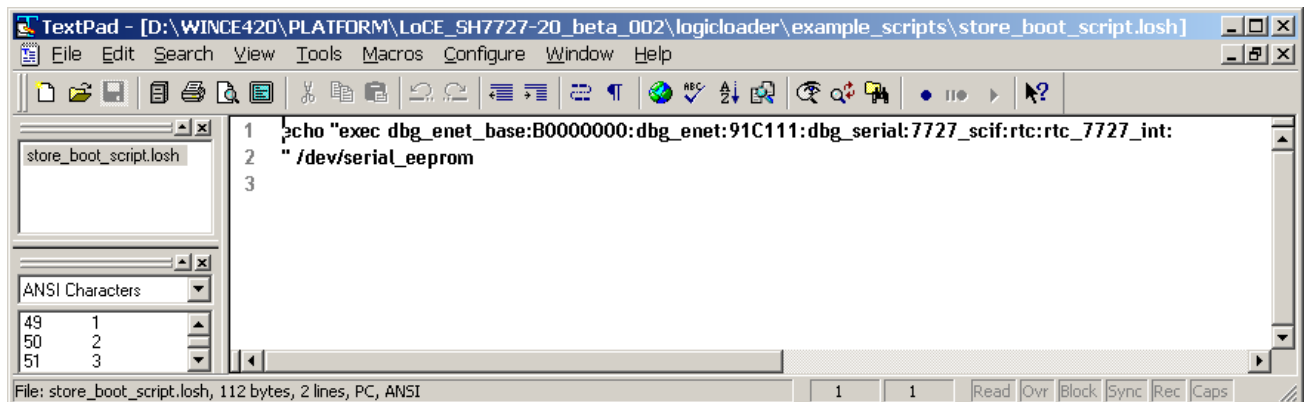


Figure 4: Open 'store_boot_script.losch' with a Text Editor

5. Pass the script to LogicLoader by selecting the 'File' menu, then click 'Send File.'

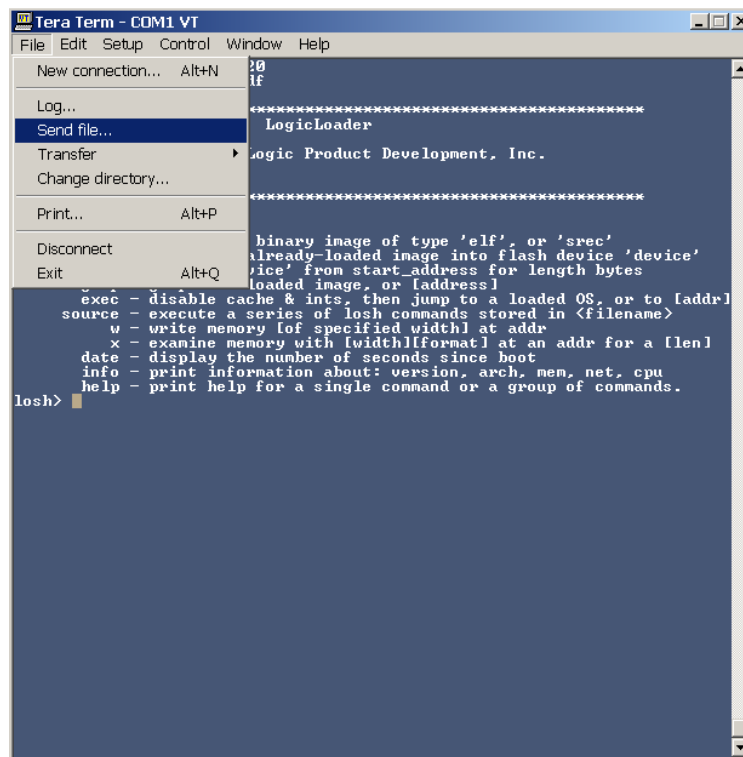


Figure 5: Pass the Script to LogicLoader

6. Select the 'store_boot_script.losch' file. Click 'Open.'

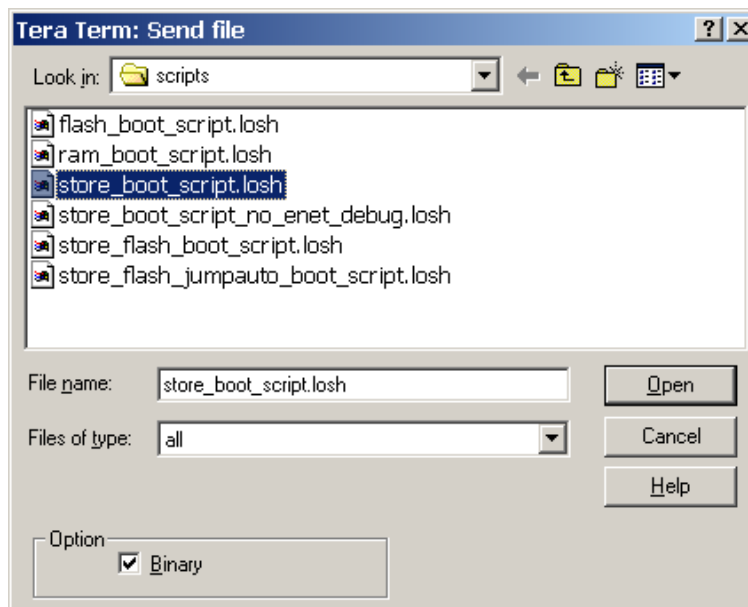
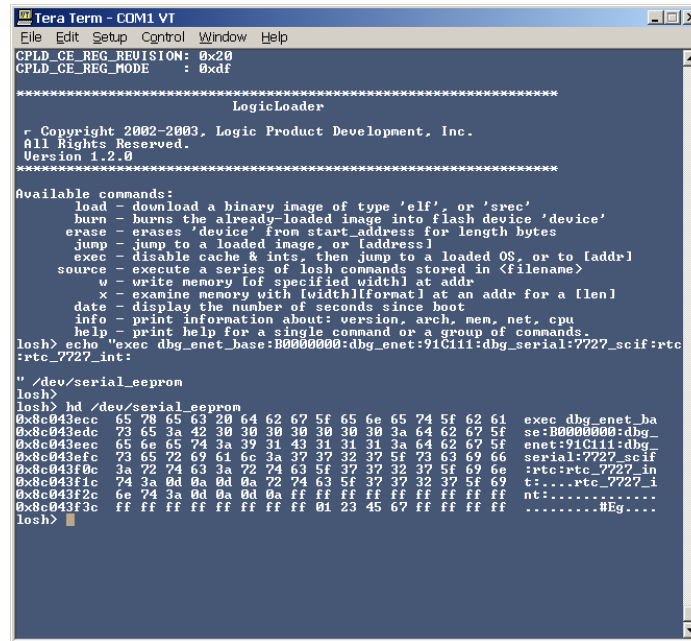


Figure 6: Open 'store_boot_script.losch'

7. If the 'hd /dev/serial_eeprom' command is executed in LogicLoader, the contents of the eeprom are printed out. The script passed is shown below in Figure 7.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
CPLD_CE_REG_REVISION: 0x20
CPLD_CE_REG_MODE: 0xdf

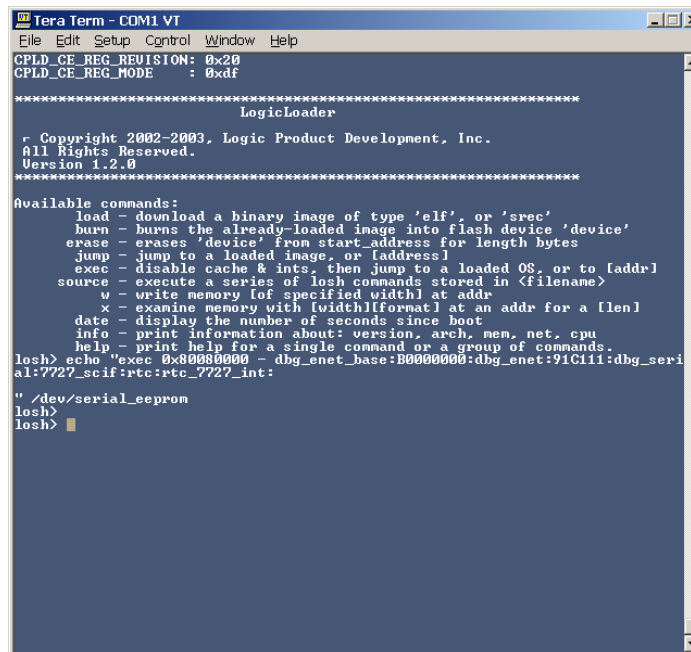
*****
LogicLoader

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All Rights Reserved.
Version 1.2.0
*****

Available commands:
load - download a binary image of type 'elf', or 'src'
burn - burns the already-loaded image into flash device 'device'
erase - erases 'device' from start_address for length bytes
jump - jump to a loaded image, or [address]
exec - disable cache & ints, then jump to a loaded OS, or to [addr]
source - execute a series of losh commands stored in <filename>
w - write memory [of specified width] at addr
x - examine memory with [width][format] at an addr for a [len]
date - display the number of seconds since boot
info - print information about: version, arch, mem, net, cpu
help - print help for a single command or a group of commands.
losh> echo "exec dbg_enet_base:00000000:dbg_enet:91C111:dbg_serial:7727_scif:rtc
:rtc_7727_int;"
" /dev/serial_eeprom
losh>
losh> hd /dev/serial_eeprom
0x8c043ecc 65 78 65 63 20 64 62 67 5f 65 6e 65 74 5f 62 61 exec dbg_enet_ba
0x8c043edc 73 65 3a 42 30 30 30 30 30 30 3a 64 62 67 5f se:B0000000:dbg_
0x8c043eec 65 6e 65 74 3a 39 31 43 31 31 31 3a 64 62 67 5f enet:91C111:dbg_
0x8c043efc 73 65 72 69 61 6c 3a 37 37 32 37 5f 73 63 69 66 serial:7727_scif
0x8c043f0c 3a 72 74 63 3a 72 74 63 5f 37 37 32 37 5f 69 6e :rtc:rtc_7727_in
0x8c043f1c 74 3a 0d 0a 0d 0a 72 74 63 5f 37 37 32 37 5f 69 t:...rtc_7727_i
0x8c043f2c 6e 74 3a 0d 0a 0d 0a ff ff ff ff ff ff ff ff nt:.....
0x8c043f3c ff ff ff ff ff ff ff ff 01 23 45 67 ff ff ff ff .....#Eg....
losh>
```

Figure 7: hd /dev/serial_eeprom

8. If a Flash Image will be downloaded, a different script must be passed. An example script for a Flash download is also located in the 'example_scripts' folder. The difference is that the flash script lists an address to start from.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
CPLD_CE_REG_REVISION: 0x20
CPLD_CE_REG_MODE: 0xdf

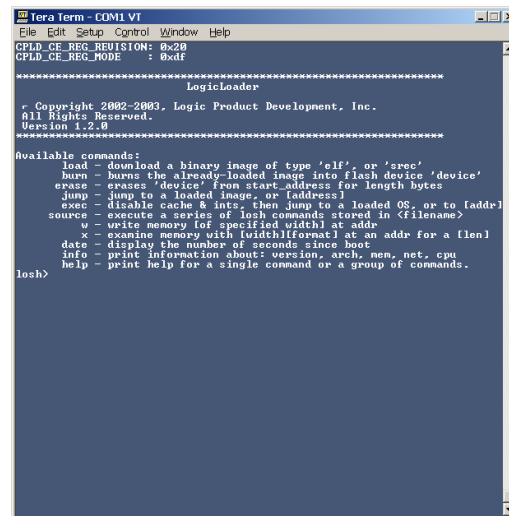
*****
LogicLoader

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All Rights Reserved.
Version 1.2.0
*****

Available commands:
load - download a binary image of type 'elf', or 'src'
burn - burns the already-loaded image into flash device 'device'
erase - erases 'device' from start_address for length bytes
jump - jump to a loaded image, or [address]
exec - disable cache & ints, then jump to a loaded OS, or to [addr]
source - execute a series of losh commands stored in <filename>
w - write memory [of specified width] at addr
x - examine memory with [width][format] at an addr for a [len]
date - display the number of seconds since boot
info - print information about: version, arch, mem, net, cpu
help - print help for a single command or a group of commands.
losh> echo "exec 0x00000000 - dbg_enet_base:00000000:dbg_enet:91C111:dbg_seri
al:7727_scif:rtc:rtc_7727_int;"
" /dev/serial_eeprom
losh>
losh>
```

Figure 8: ***Flash Image Download Only

9. For the sake of maintaining a clean workspace, lets return to a fresh screen in LogicLoader.



```
Tera Term - COM1.VT
File Edit Setup Control Window Help
CPLD_CE_REG_REVISION: 0x20
CPLD_CE_REG_MODE : 0xdf

*****
LogicLoader

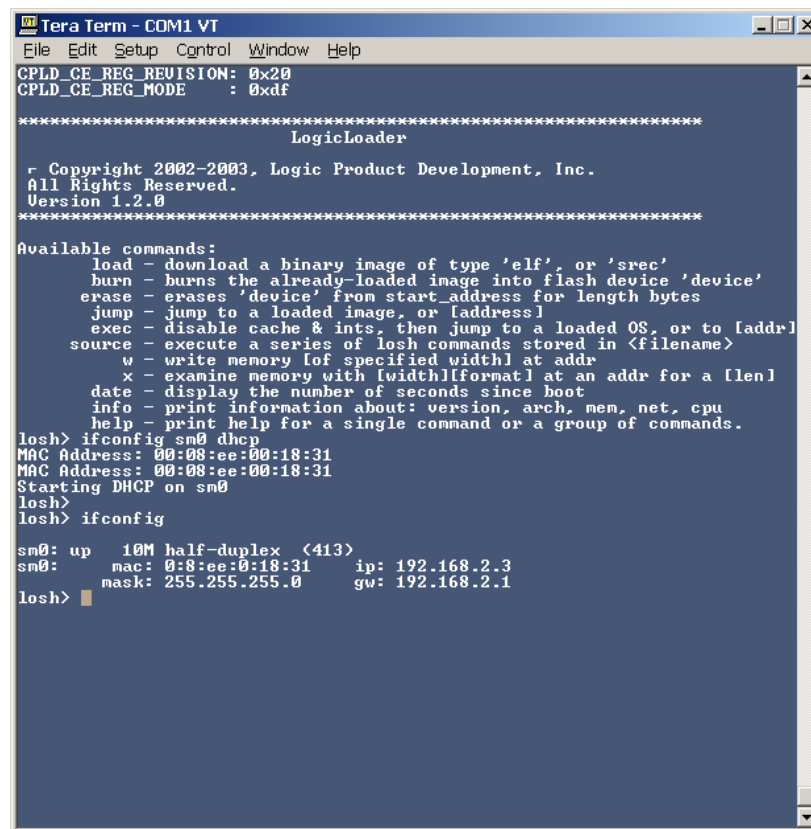
r Copyright 2002-2003, Logic Product Development, Inc.
All Rights Reserved.
Version 1.2.0
*****

Available commands:
load - download a binary image of type 'elf', or 'srec'
burn - burns the already-loaded image into flash device 'device'
erase - erases 'device' from start_address for length bytes
jump - jump to a loaded image, or [address]
exec - disable cache & ints, then jump to a loaded OS, or to [addr]
source - execute a series of losh commands stored in <filename>
w - write memory [of specified width] at addr
x - examine memory with [width][format] at an addr for a [len]
date - display the number of seconds since boot
info - print information about: version, arch, mem, net, cpu
help - print help for a single command or a group of commands.

losh>
```

Figure 9: Fresh Screen

10. Type the following command: 'ifconfig sm0 dhcp' then click the Enter key. LogicLoader will read "Starting DHCP on sm0."



```
Tera Term - COM1.VT
File Edit Setup Control Window Help
CPLD_CE_REG_REVISION: 0x20
CPLD_CE_REG_MODE : 0xdf

*****
LogicLoader

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All Rights Reserved.
Version 1.2.0
*****

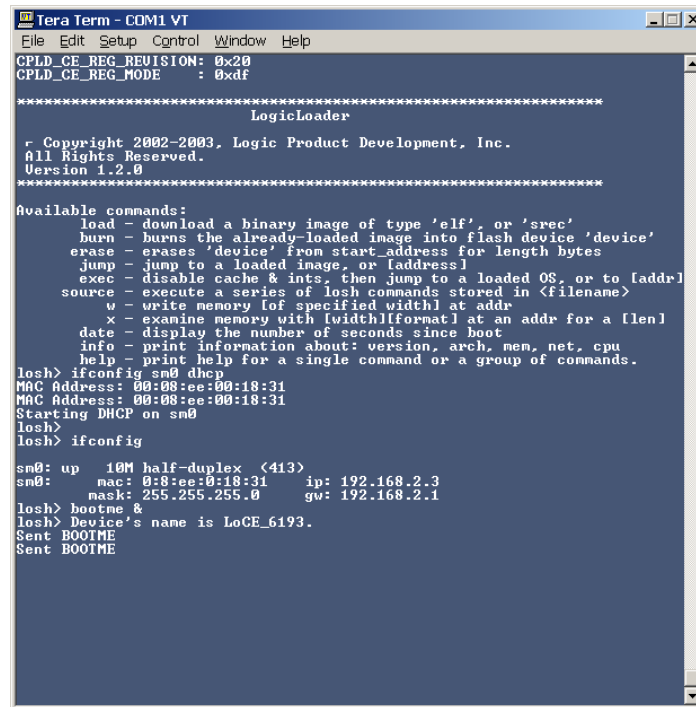
Available commands:
load - download a binary image of type 'elf', or 'srec'
burn - burns the already-loaded image into flash device 'device'
erase - erases 'device' from start_address for length bytes
jump - jump to a loaded image, or [address]
exec - disable cache & ints, then jump to a loaded OS, or to [addr]
source - execute a series of losh commands stored in <filename>
w - write memory [of specified width] at addr
x - examine memory with [width][format] at an addr for a [len]
date - display the number of seconds since boot
info - print information about: version, arch, mem, net, cpu
help - print help for a single command or a group of commands.

losh> ifconfig sm0 dhcp
MAC Address: 00:08:ee:00:18:31
MAC Address: 00:08:ee:00:18:31
Starting DHCP on sm0
losh>
losh> ifconfig

sm0: up 10M half-duplex <413>
sm0: mac: 0:8:ee:0:18:31 ip: 192.168.2.3
mask: 255.255.255.0 gw: 192.168.2.1
losh>
```

Figure 10: Type the command: 'ifconfig sm0 dhcp'

11. Type 'ifconfig' and click enter. LogicLoader should print out the network connection info.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
CPLD_CE_REG_REVISION: 0x20
CPLD_CE_REG_MODE : 0xdf

*****
LogicLoader

r Copyright 2002-2003, Logic Product Development, Inc.
All Rights Reserved.
Version 1.2.0
*****

Available commands:
load - download a binary image of type 'elf', or 'srec'
burn - burns the already-loaded image into flash device 'device'
erase - erases 'device' from start_address for length bytes
jump - jump to a loaded image, or [address]
exec - disable cache & ints, then jump to a loaded OS, or to [addr]
source - execute a series of loosh commands stored in <filename>
w - write memory [of specified width] at addr
x - examine memory with [width|format] at an addr for a [len]
date - display the number of seconds since boot
info - print information about: version, arch, mem, net, cpu
help - print help for a single command or a group of commands.

losh> ifconfig sn0 dhcp
M0C Address: 00:08:ee:00:18:31
M0C Address: 00:08:ee:00:18:31
Starting DHCP on sn0
losh>
losh> ifconfig

sn0: up 10M half-duplex <413>
sn0: mac: 0:8:ee:0:18:31 ip: 192.168.2.3
mask: 255.255.255.0 gw: 192.168.2.1
losh> bootme &
losh> Device's name is LoCE_6193.
Sent BOOTME
Sent BOOTME
```

Figure 11: Type 'ifconfig' and Click Enter

12. Type 'bootme &' and click enter. LogicLoader starts to send out 'BOOTME's. Then open Platform Builder.

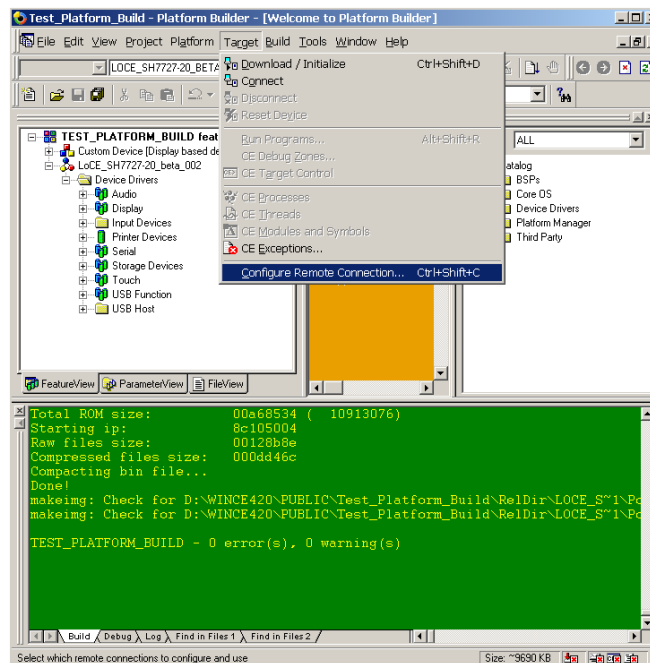


Figure 12: Open Platform Builder

13. To connect, select the 'Target' menu and click 'Configure Remote Connection.' The 'Configure Remote Connection' window appears.

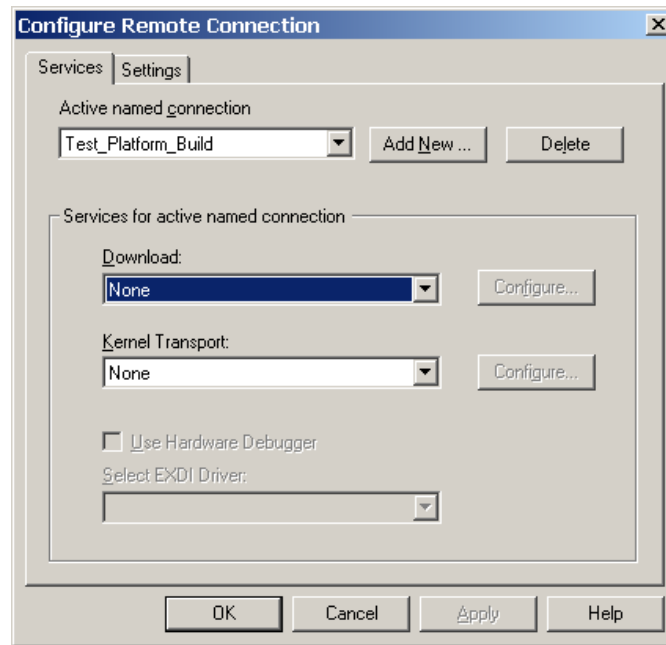


Figure 13: 'Configure Remote Connection'

14. Change 'Download' and 'Kernel Transport' Service to Ethernet.

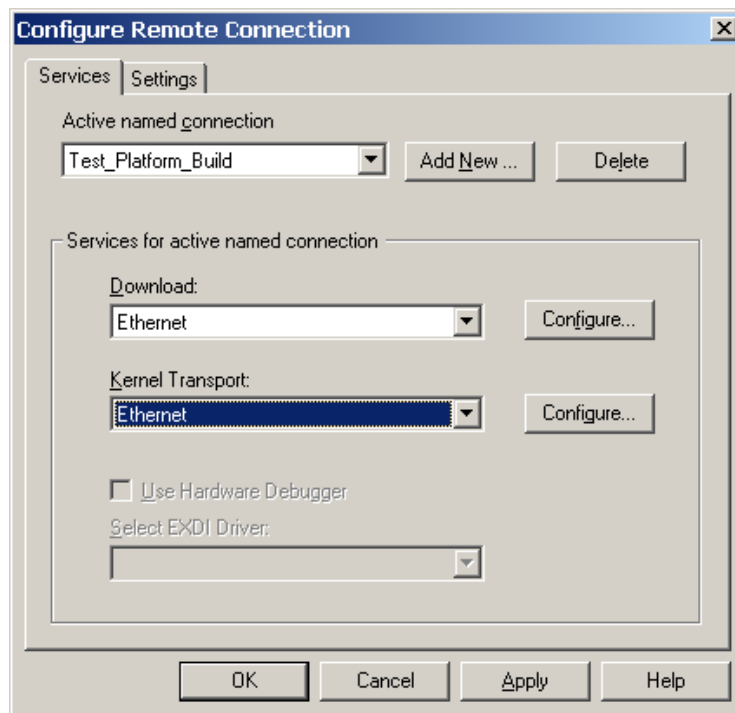


Figure 14: Change 'Download' and 'Kernel Transport' Service to Ethernet

15. Click the 'Configure' button. Either of the two 'Configure' buttons will work.

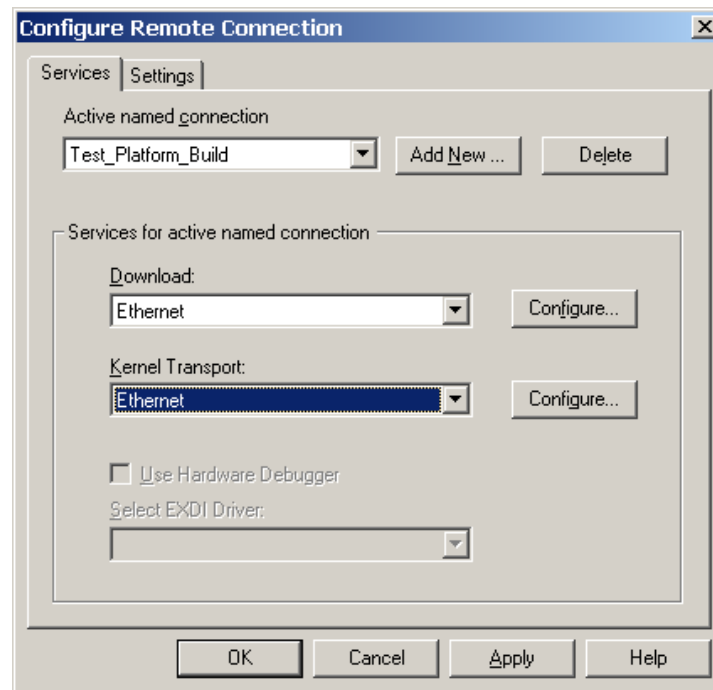


Figure 15: Click 'Configure'

16. The Device's ID should show in the 'Configure Ethernet Download Service' window.

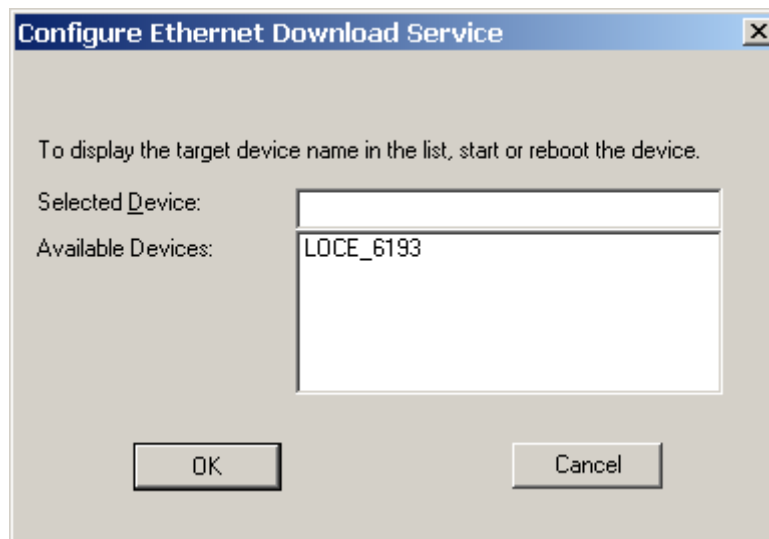


Figure 16: Configure Ethernet Download Service Window

17. Select the Device's ID and click 'OK.'

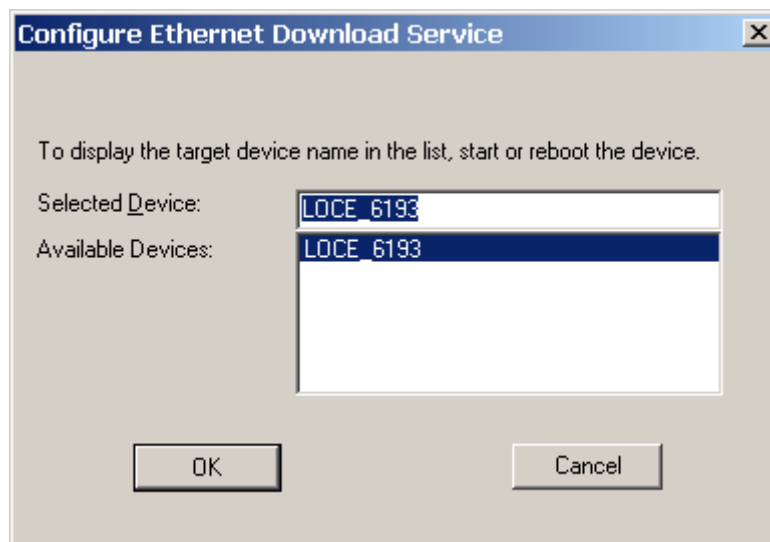


Figure 17: Select the Device's ID and click 'OK'

18. Then click 'OK' in the 'Configure Remote Connection' window.

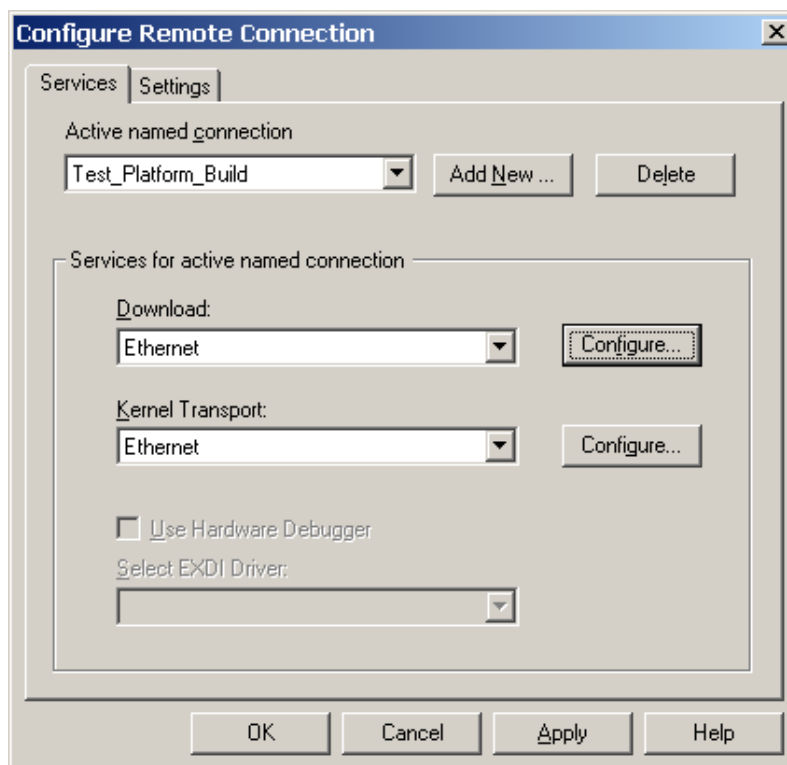


Figure 18: Click 'OK'

- Next, download the image (nk.bin file). Select the 'Target' menu and click '**Download / Initialize.**'

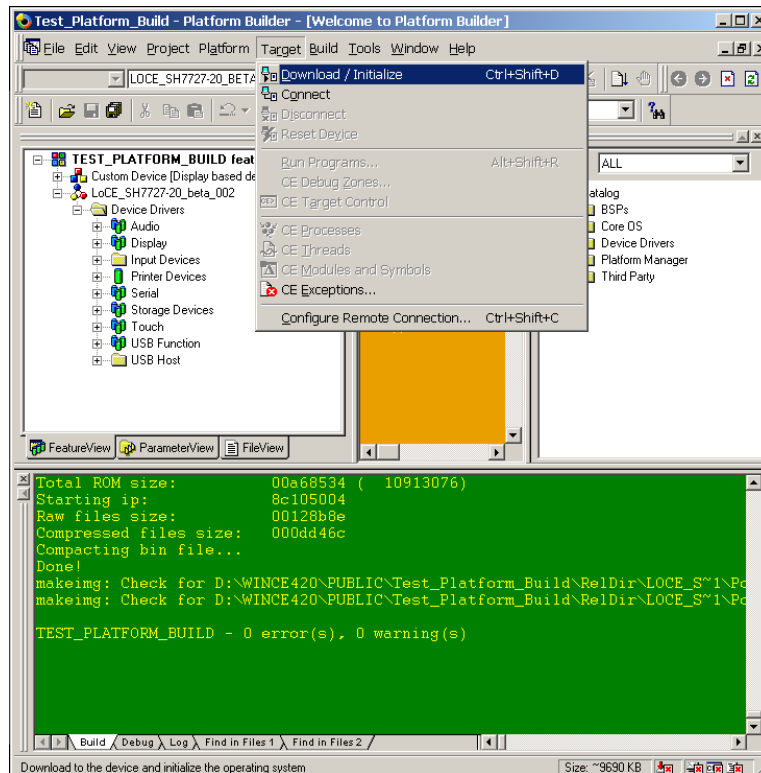


Figure 19: Download the image (nk.bin file)

20. The LogicLoader window should show that it got a response from Platform Builder and that is downloading to memory. (R=ram)

If a Flash image is being sent, a F will be displayed.

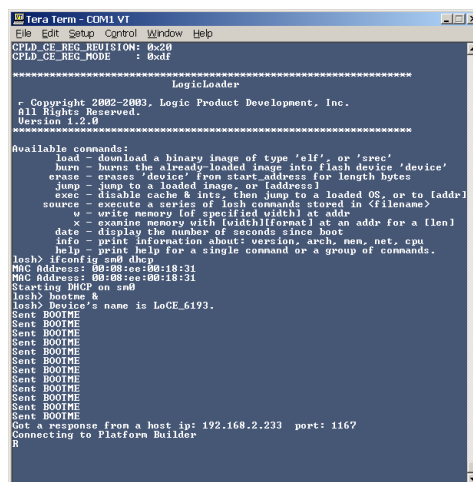


Figure 20: LogicLoader Shows that it has a Response from Platform Builder

21. While it is downloading, the 'Download status' window will pop up from Platform Builder.

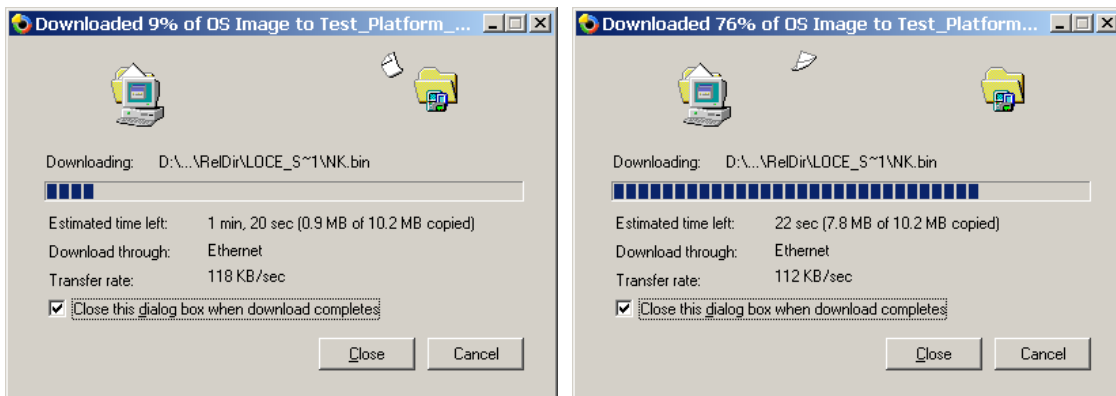


Figure 21: Download Status

22. When it is done downloading, LogicLoader will say "BOOTME: Got jump command."

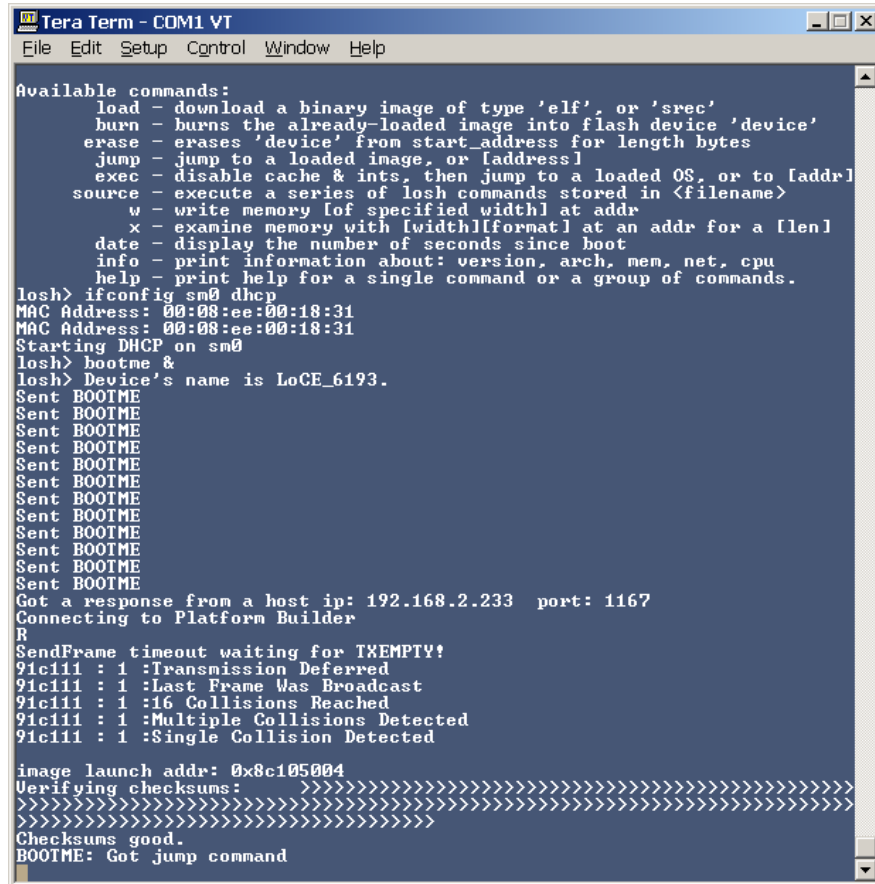


Figure 22: BOOTME: Got jump command

23. For a **Flash** Image, the 'burn' command must be executed in LogicLoader in order to burn the image from RAM to Flash before continuing.

[illegible]

Figure 23: *Flash Image Only**

24. Click Enter for a 'losh' prompt, then type: `source /dev/serial_eeprom`

```
Tera Term - COM1 VT
File Edit Setup Control Window Help

SendFrame timeout waiting for TXEMPTY!
91c111 : 4 -:Transmission Deferred
91c111 : 4 -:Last Frame Was Broadcast
91c111 : 4 -:16 Collisions Reached
91c111 : 4 -:Multiple Collisions Detected
91c111 : 4 -:Single Collision Detected
SendFrame timeout waiting for TXEMPTY!
91c111 : 5 -:Transmission Deferred
91c111 : 5 -:Last Frame Was Broadcast
91c111 : 5 -:16 Collisions Reached
91c111 : 5 -:Multiple Collisions Detected
91c111 : 5 -:Single Collision Detected

image launch addr: 0x8c105004
Verifying checksums: >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Checksums good.
BOOTime: Got jump command

losh> source /dev/serial_eeprom
losh> exec dbg_enet_base:B0000000:dbg_enet:91C111:dbg_serial:7727_scif:rte:rte_7727_int:
kernel cmdline: 'dbg_enet_base:B0000000:dbg_enet:91C111:dbg_serial:7727_scif:rte:rte_7727_int::kitl:true:ip_addr:192.168.2.3' at 8c0c210059fDebug serial initial
ized. Using driver 7727_scif

Windows CE Kernel for Hitachi SH Built on Mar 13 2003 at 22:45:35
SH-3 Kernel. FQCR=a101
CCR=0005

WinCE firmware init (LoCE).
Kernel Arguments: dbg_enet_base:B0000000:dbg_enet:91C111:dbg_serial:7727_scif:rte:crtc_7727_int::kitl:true:ip_addr:192.168.2.3.
Initializing system-tick.
System-tick initialized.
Initializing interrupts.
Interrupt initialization complete.
Initializing KILL.
Remote host present.
Debug enet initialized. Using driver 91C111
Debug enet base read as 0xB0000000

No debug ethernet IP Address specified.
SnSC Ethernet controller detected: 0xB0000000
```

Figure 24: Type the following command: `source /dev/serial eeprom`

25. The debug output from the device will be output up until the 'KITL' connection is made for ethernet debug.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Checksums good.
BOOTIME: Got jump command

losh> source /dev/serial_eprom
losh> exec dbg_enet_base:B0000000:dbg_enet:91C111:dbg_serial:7727_scif:rte::rte_7727_int::
kernel cmdline: 'dbg_enet_base:B0000000:dbg_enet:91C111:dbg_serial:7727_scif:rte::rte_7727_int::kitl:true:ip_addr:192.168.2.3' at 8c0e21005f Debug serial initialized. Using driver 7727_scif

Windows CE Kernel for Hitachi SH Built on Mar 13 2003 at 22:45:35
SH-3 Kernel. FQCR=a101
CCR=0005

WinCE firmware init (LoCE).
Kernel Arguments: dbg_enet_base:B0000000:dbg_enet:91C111:dbg_serial:7727_scif:rte::rte_7727_int::kitl:true:ip_addr:192.168.2.3.
Initializing system-tick.
System-tick initialized.
Initializing interrupts.
Interrupt initialization complete.
Initializing KITL.
Remote host present.
Debug enet initialized. Using driver 91C111
Debug enet base read as 0xB0000000

No debug ethernet IP Address specified.
SmSC Ethernet controller detected: 0xB0000000
MAC Address: 00:08:EE:00:18:31
91C111: 100 Mbits half-duplex.
*pckt_list_init(): 0xADFD0400 = 0x00002800

Device Name: LoCE_6193, IP: 192.168.2.3, Port: 981

KITL Ethernet transport initialized
Host connected.
Host IP: 192.168.2.233, port 1166
KITLGlobalState == 0x61
KITL initialized.
Firmware initialization complete.

KITL: Leaving polling mode...
Enabling debug ethernet interrupts.
Enabling SmSC 91C111 receive interrupt.
```

Figure 25: ‘KITL’ Connection

26. Platform Builder's debug windows will be shown once the 'KITL' connection is established.

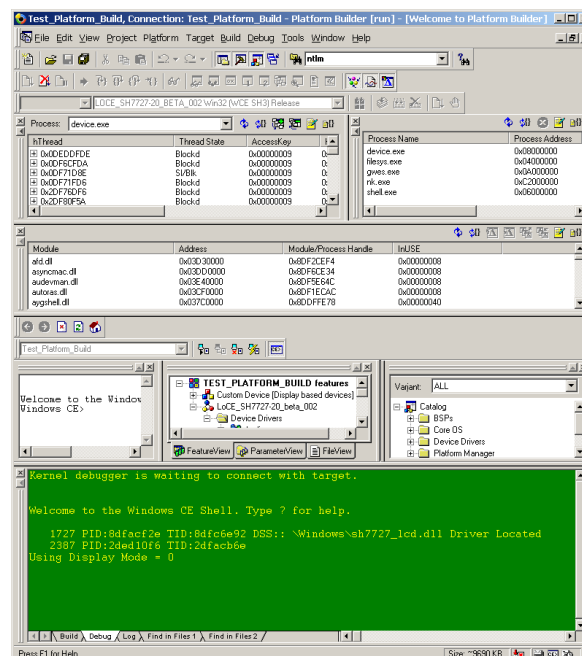


Figure 26: Platform Builder's Debug Windows

27. If a display is connected to the SDK, the Windows CE desktop will be shown on the display.



Figure 27: Windows CE Desktop

3 Summary

Congratulations, you have downloaded the LOCE_SH7727-20_BETA_002 WincCE BSP image to the SH7727-20 SDK.