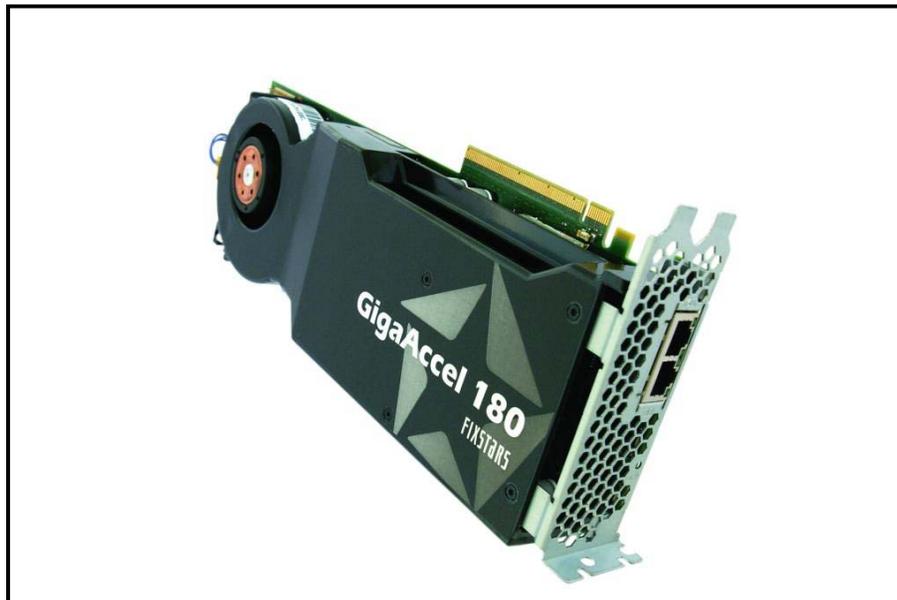




IBM PowerXCell™ 8i Accelerator Board

GigaAccel 180

User's Manual



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Thank you for purchasing GigaAccel 180.

This “GigaAccel 180 User’s Manual” describes how to set up, configure, and start up the GigaAccel 180.

Included accessories

Please confirm that the following items are included in the package.

- (1) GigaAccel 180
- (2) Serial cable
- (3) Ethernet crossover cable
- (4) Yellow Dog Enterprise Linux Install DVD
(For customers who bought the license)

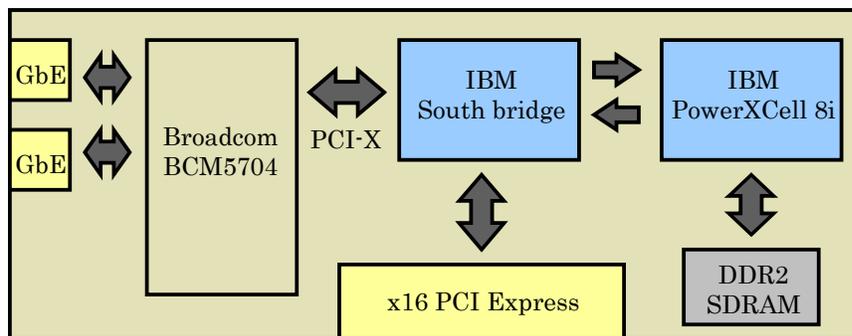
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1 Introduction

GigaAccel 180 is an accelerator board based on IBM's PowerXCell 8i processor. The board has 4GB of DDR2 SDRAM, two 1 Gigabit Ethernet Ports, one x16 PCI Express interface, and it can run Linux. This makes it possible to put the vastly superior floating-point calculation capabilities of PowerXCell 8i on a standard workstation. Since this accelerator board does not have a hard disk drive, it network boots by obtaining the boot image from the boot server through a TCP/IP network.

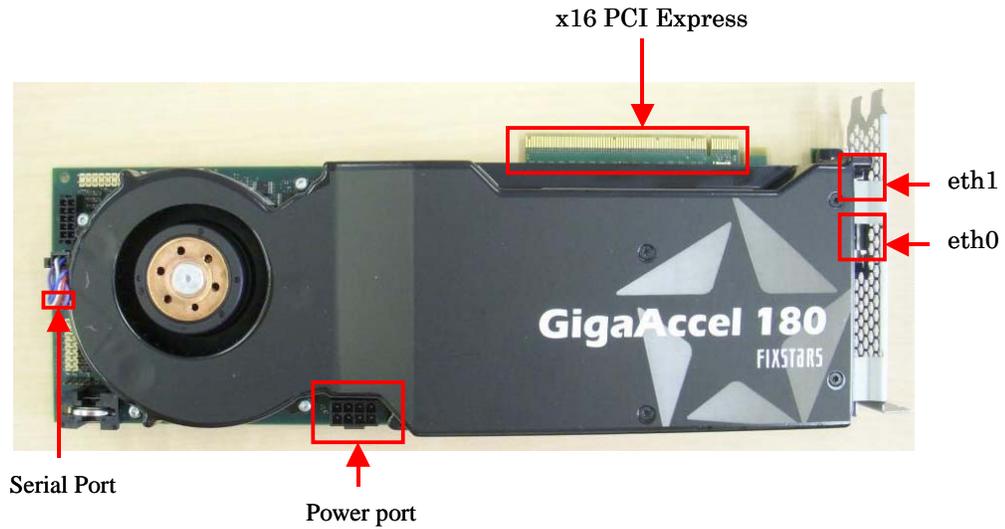


GigaAccel 180 System Block Diagram

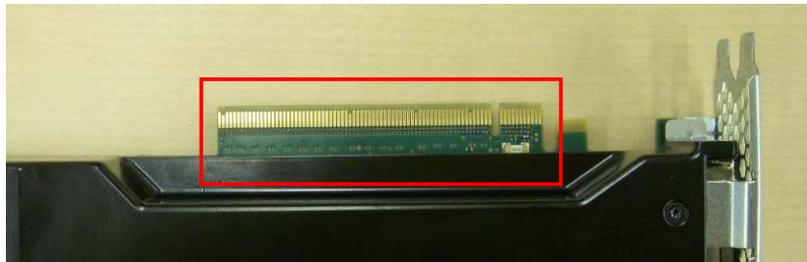
2 Names of Each Parts

2.1 Interfaces

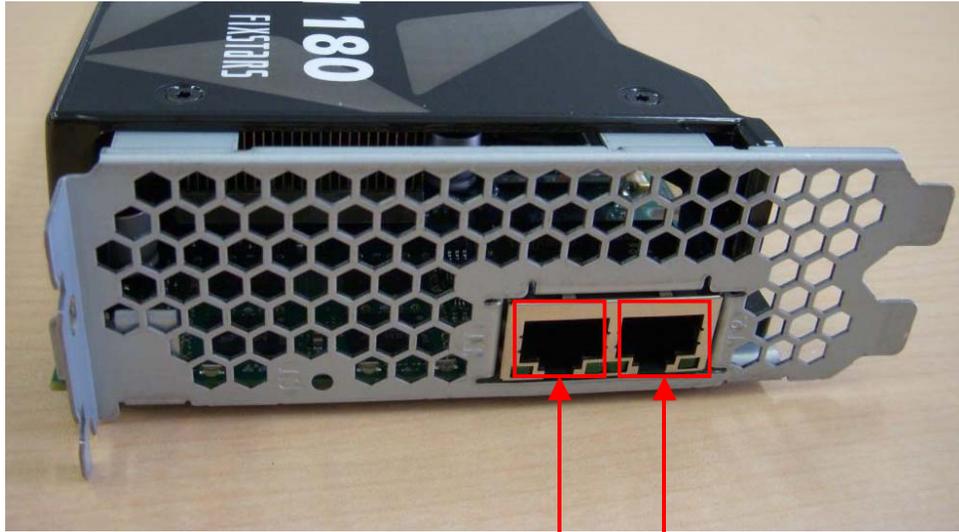
Main interfaces are as follows.



(1) x16 PCI Express: Connector to host machine

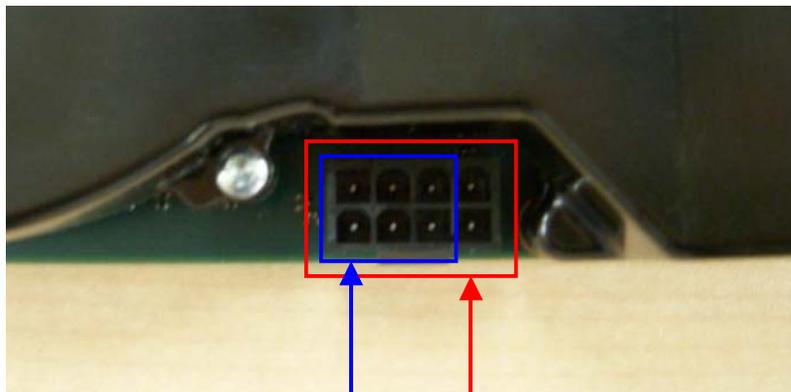


- (2) eth0, eth1: Network interfaces
eth0 is used for network booting and hard disk mounting.



eth0(T1) eth1(T2)

- (3) Power port: Connector for AUX 12V 8-pin
This board is also compatible with 2x3 power connectors, please use the pins outlined in blue when using a 2x3 connector.

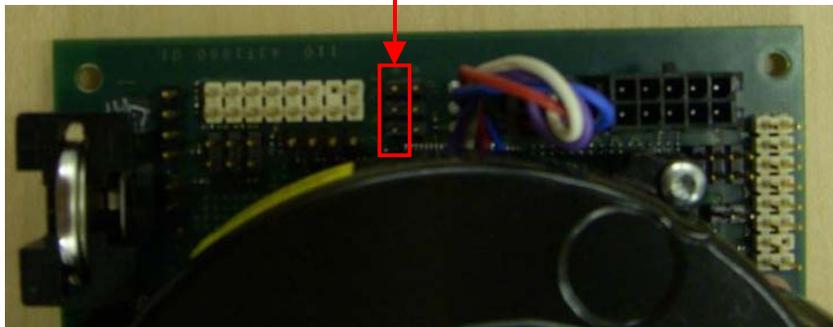


Power port (2x3pin) Power port (2x4pin)

- (4) Serial port (3 pin): RS232C cable connector part

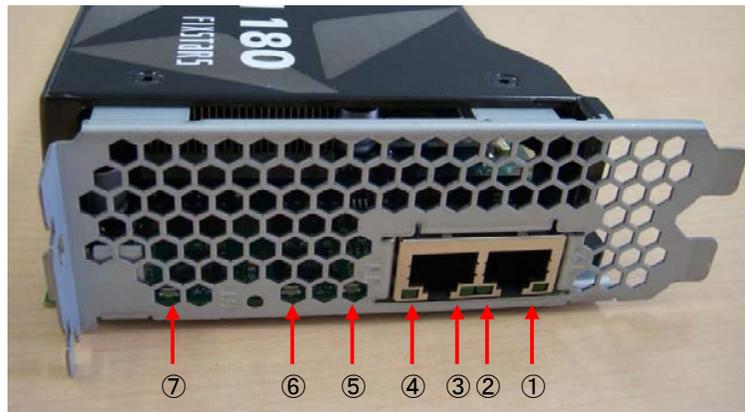
Pins are “T2OUT”, “GND”, and “R2IN” from top to bottom in the picture below.

Serial port



2.2 LED descriptions

Various LEDs light up on the side of the board with Ethernet ports when GigaAccel 180 is powered on. These LEDs indicate the current status of GigaAccel 180.



- (1) eth1 activity light: Turns on or flashes when there is activity.
- (2) eth2 link light: Turns on when cable is connected.
- (3) eth0 activity light: Turns on or flashes when there is activity.
- (4) eth0 link light: Turns on when cable is connected.
- (5) Error light (orange light): Turns on when there is hardware error. Check cable and other parts for interference.
- (6) Normal status light (green light)
- (7) Normal status light (green light)

3 Connection of GigaAccel 180

This section explains the instructions for connecting GigaAccel 180 onto the host machine. The target host machine must have a x16 PCI Express interface (2 slots), and an AUX 12V 6-pin power connector for PCI Express.

3.1 Preparations

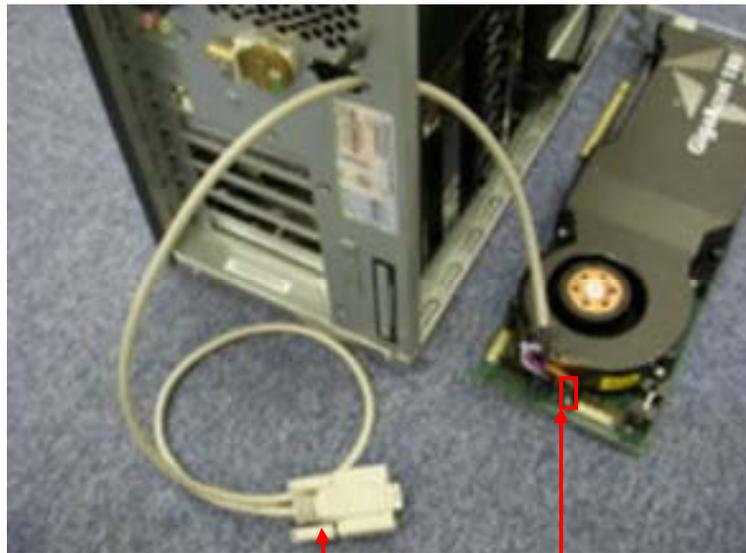
Prepare the following cables which are included in the packaging.

- Serial cable
- Ethernet crossover cable

If possible, please work by using "Static electricity prevention wristband (SANWA SUPPLY TK-SE6)" etc. to prevent damage due to static electricity when connecting GigaAccel 180.

3.2 Directions of connection

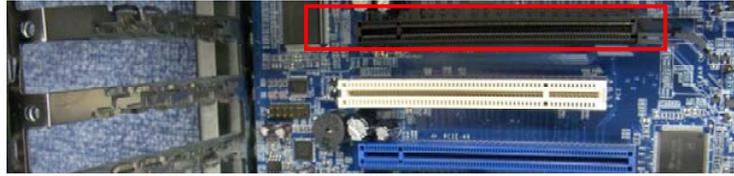
- (1) Connect the 3-pin end of the serial cable to the board's serial port. 9-pin side is put out from an empty slot to the outside of the host machine.



Serial connector(9-pin) Serial connector(3-pin)
* Connect the marked end to the outside

[Note] If the host machine has no serial port(9-pin side), please connect the serial cable to the USB port by using USB-serial conversion cable.

- (2) Open the computer case, confirm that an x16 PCI Express slot is available, then remove that slot cover and the slot cover below it.



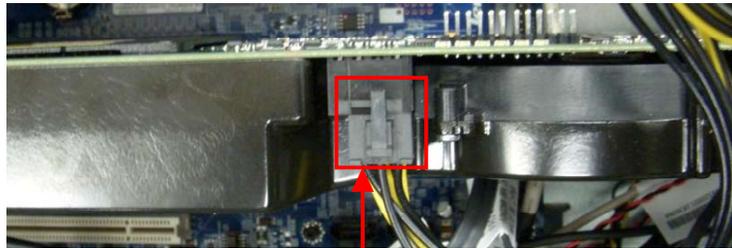
- (3) Insert GigaAccel 180 into the empty x16 PCI Express slot.

x16 PCI Express slot



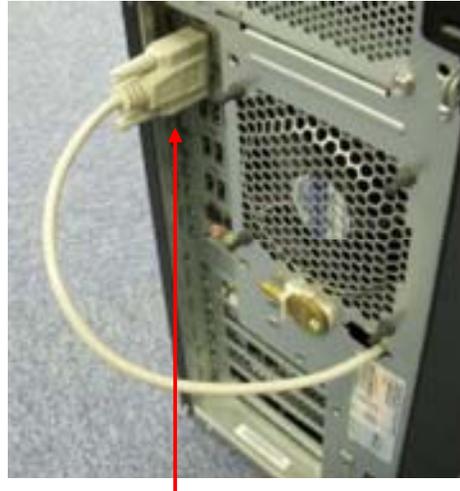
[Note] PCI-express connectors must be handled with care. If the connector is not installed firmly on the slot, GigaAccel180 may not function correctly.

- (4) Attach the PCI Express AUX 12V 6-pin power connector to GigaAccel 180.



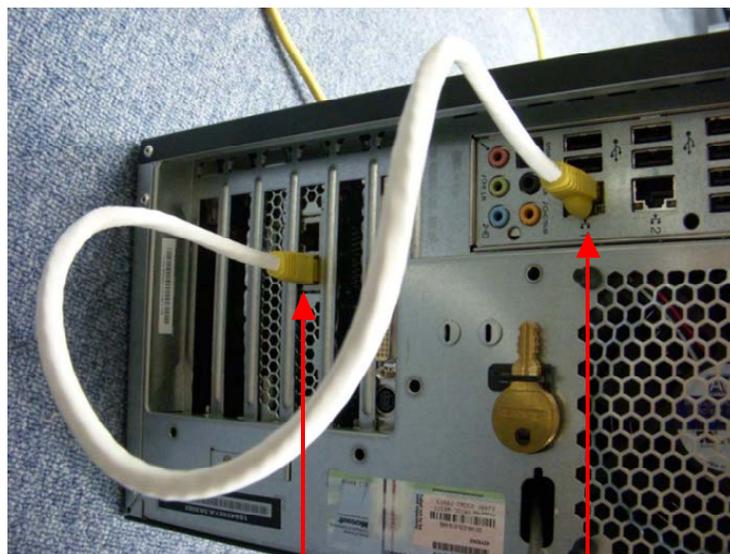
AUX12V 6-pin power connector

- (5) Connect serial port (9pin) that was left outside of the host machine. When you use USB-serial conversion cable, please connect it to the usb port on the host machine.



Serial Connector(9pin)

- (6) Connect the Ethernet cable (crossover) to the eth0 port of GigaAccel 180. The port will be used for network booting and NFS mounting. In the following picture, the host machine has DHCP server, TFTP server and NFS server.



GigaAccel 180 eth0

Host machine eth0

4 Installation of GigaAccel 180 (NFS)

This section describes how to create the GigaAccel 180 disk image and how to install it to GigaAccel 180. If you are using an OS other than Yellow Dog Enterprise Linux for GigaAccel 180, please skip this section.

Also, this instruction assumes that CentOS5.4 is installed on the host machine (x86, 64 bit). For connecting GigaAccel 180, please refer to “3 Connection of GigaAccel 180”.

[Note] Ensure that the kernel version of the host machine is the latest version. This is necessary for the PCI-Express driver.

4.1 Preparations

Prepare the following items for this section.

- Yellow Dog Enterprise Linux for GigaAccel 180 Install DVD
- IP address for external network connection

Establish external network connection as described below. Have an IP address ready for the host to make the external network connection.

“4.5 Installation of necessary services”

4.2 Disable services

Disable the host machine firewall.

```
# service iptables stop
# chkconfig iptables off
```

Disable SELinux on the host machine.

```
# setenforce 0
# vi /etc/selinux/config
(setting value)
SELINUX=disabled
```

4.3 Network settings

Perform host machine network configurations as follows. eth0 will be used for communications (NFS mount, etc.) with GigaAccel 180. Assign the IP address (192.168.2.10) beforehand.

```
# vi /etc/sysconfig/network-scripts/ifcfg-eth0
(setting value)
DEVICE=eth0
ONBOOT=yes
BOOTPROTO=static
IPADDR=192.168.2.10
NETMASK=255.255.255.0
```

4.4 Prepare to create boot image and disk image

Set the DVD (Yellow Dog Enterprise Linux for GigaAccel 180) into the host machine.

Create the installer directory, and mount the DVD drive to the installer directory.

```
# mount /dev/cdrom /mnt -o ro
# mkdir -p /nfsroot/ydlinstaller
# mount /mnt/iso/ydel-X.X.X-cell.iso /nfsroot/ydlinstaller -o loop
```

Copy the installer boot image to “/tftpboot”.

```
# mkdir -p /tftpboot
# cp /nfsroot/ydlinstaller/images/netboot/ppc64.img /tftpboot
```

4.5 Installation of necessary services

Install necessary services which are dhcp, nfs-utils, rpcbind, xinetd, and tftp-server. Also, enable these services to start automatically upon start up.

```
# yum install dhcp nfs-utils rpcbind xinetd tftp-server
# chkconfig dhcpd on
# chkconfig xinetd on
# chkconfig nfs on
```

4.6 NFS service settings

Edit the NFS service configuration file as follows.

```
# vi /etc/exports
(setting value)
/nfsroot 192.168.2.11(rw, sync, no_root_squash, no_all_squash)
/nfsroot/ydlinstaller 192.168.2.11(rw, sync, no_root_squash, no_all_squash)
```

Restart the NFS services after editing the configuration file.

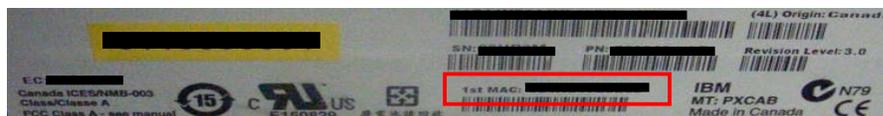
```
# service nfs restart
```

4.7 DHCP service settings

Edit the DHCP configuration file as follows.

```
# cp /usr/share/doc/dhcp-*/dhcpd.conf.sample /etc/dhcpd.conf
# vi /etc/dhcpd.conf
(setting value)
ddns-update-style ad-hoc;
subnet 192.168.2.0 netmask 255.255.255.0 {
  host gal80 {
    hardware ethernet 01:23:45:67:89:A0; ← GigaAccel 180 eth0 MAC address
    fixed-address 192.168.2.11; ← IP address assigned to GigaAccel 180
    next-server 192.168.2.10; ← IP address of TFTP server
    filename "ppc64.img"; ← Boot image file name
  }
}
```

GigaAccel 180 eth0 MAC address is printed on the side of GigaAccel 180 as “1ST MAC:---”.



Set the DHCP service start up option as follows.

```
# vi /etc/sysconfig/dhcpd
(setting value)
DHCPDARGS=eth0
```

Restart the DHCP service after editing the configuration file.

```
# service dhcpd restart
```

4.8 TFTP service settings

Edit the xinetd configuration file as follows so that the TFTP service will start automatically.

```
# vi /etc/xinetd.d/tftp
(setting value)
service tftp
{
    disable = no ← change "yes" to "no"
    (Do not change other parameters)
}
```

Restart xinetd after editing its configuration file.

```
# service xinetd restart
```

4.9 Restart GigaAccel 180

Restart GigaAccel 180 from the serial console (minicom). The serial baud rate is 115200. For serial console settings, please refer to “Appendix C – Using Serial Console”.

Start up the serial console.

```
# minicom
```

Pressing ‘s’ while GigaAccel 180 is running will display the command prompt.

*** When you configure the host machine, GigaAccel 180 may fail to boot. In this case, press ‘Enter’ key and then the command prompt is displayed.**

Set the environment variables using the following command.

```
0 > setenv boot-file root=/dev/ram
```

Reboot GigaAccel 180.

```
0 > reboot
```

After the reboot is complete, Yellow Dog Enterprise Linux installer screen will be displayed on screen.

*** For the common console commands, please refer to “Appendix D – Common Console Commands”.**

4.10 Installation of Yellow Dog Enterprise Linux

About installation of Yellow Dog Enterprise Linux, refer to URL http://us.fixstars.com/support/solutions/ydel_6.x/ydel_configure_host_nohd.sh tml.

4.11 Start up GigaAccel 180

If the installation of GigaAccel 180 is complete, GigaAccel 180 will start up during the host machine start up. Follow the instructions below to login to GigaAccel 180.

(1) Console login

Shortly after the host machine has started up the GigaAccel 180 OS will also start up, and a login prompt appear in the console window. Then you can login as follows.

Login name: "root"
Password: Password entered during installation process

*** To login GigaAccel 180 and to operate, we recommend ssh login described in the following.**

(2) SSH login

Shortly after the host machine has started up the GigaAccel 180 OS will also start up. After Giga Accel 180 has booted, you can perform SSH login.

Login IP address: 192.168.2.11
Login name: "root"
Password: Password entered during installation process

Also, the current GigaAccel 180 status can be confirmed using serial console. Please refer to "E.2 Start up troubleshooting" for troubleshooting.

4.12 Network installation of additional packages

This section describes how to network install using yum. Ensure that configuration settings allow GigaAccel 180 to connect to an external network. Also, make sure to have on hand the Yellow Dog Enterprise Linux user name and password which were notified separately.

- * To connect to the external network, login to GigaAccel 180, and then, configure “/etc/sysconfig/network-scripts/ifcfg-eth1” file, activate eth1 (by “ifup eth1” command). About setting, please refer to manual related to Linux.**

Please input your Yellow Dog Enterprise Linux user name and password in baseurl in the following 3 files. And then, please save them.

```
# vi /etc/yum.repos.d/yellowdog-base.repo
[base]
name=Yellow Dog Linux 6 Base
baseurl=http://USERNAME:PASSWORD@www.ydl.net/cell/yum/6.0/base/
enabled=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

```
# vi /etc/yum.repos.d/yellowdog-extras.repo
[extras]
name=Yellow Dog Linux 6 Extras
baseurl=http://USERNAME:PASSWORD@www.ydl.net/cell/yum/6.0/extras/
enable=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

```
# vi /etc/yum.repos.d/yellowdog-updates.repo
[updates]
name=Yellow Dog Linux 6 Updates
baseurl=http://USERNAME:PASSWORD@www.ydl.net/cell/yum/6.0/updates/
enabled=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

- * In the above example, Yellow Dog Enterprise Linux user name is “USERNAME” and password is “PASSWORD”.**

Now, if your Network has proxy server, you need to configure the proxy server. According to the environment of the proxy server, add the following.

```
# vi /etc/yum.conf
proxy=http://(PROXY Server Address):(Port Number)
proxy_username=(username for proxy server)
proxy_password=(password for proxy server)
```

Similarly, if you get the file by wget, it is necessary to configure the proxy server. According to the environment of the proxy server, add the following.

```
# vi /etc/wgetrc
http_proxy=http://(PROXY Server Address):(Port Number)
proxy_user=(username for proxy server)
proxy_passwd=(password for proxy server)
```

After the configuration is complete, install package(s) with the **yum** command. Install the necessary package(s) at this time. In the following example, the gcc package is being installed.

```
# yum install gcc
```

4.13 DVD installation of additional packages

This section describes how to install packages from DVD using the yum command. Ensure that the installer DVD is placed in the host machine DVD drive.

Create the mount directory on the host.

```
# mkdir -p /nfsroot/media/DVD
```

Add the following line to the NFS service configuration file.

```
# vi /etc/exports  
(setting value)  
#/nfsroot/media/DVD 192.168.2.11(rw,sync,no_root_squash,no_all_squash)
```

After editing the configuration file, restart the NFS service.

```
# service nfs restart
```

Mount the installer DVD and the installer image on the host.

```
# mount /dev/cdrom /mnt -o ro  
# mount /mnt/iso/ydel-X.X.X-cell.iso /nfsroot/media/DVD -o loop
```

*** The following actions will be performed on the GigaAccel 180.**

Create the mount directory on the host.

```
# mkdir -p /media/DVD
```

Mount the installer DVD on the GigaAccel 180.

```
# mount 192.168.2.10:/nfsroot/media/DVD /media/DVD -o ro
```

Create the yum repo file.

```
# vi /etc/yum.repos.d/yellowdog-dvd.repo  
[dvd]  
name=Yellow Dog Linux DVD  
baseurl=file:///media/DVD  
enable=1  
gpgcheck=0  
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

Disable other yum repo files.

```
# cd /etc/yum.repos.d  
# mv yellowdog-base.repo yellowdog-base.repo.disabled  
# mv yellowdog-extras.repo yellowdog-extras.repo.disabled  
# mv yellowdog-updates.repo yellowdog-updates.repo.disabled
```

Install package(s) using the yum command. Install the necessary package(s) at this time.

*** In this example, the gcc package is installed.**

```
# yum install gcc
```

Following the installation of necessary packages, unmount the installer DVD from GigaAccel 180.

```
# umount /media/DVD
```

*** The following actions will be performed on the host.**

Comment out or delete the one line added to NFS service configuration file.

```
# vi /etc/exports
(setting value)
#/nfsroot/media/DVD 192.168.2.11(rw,sync,no_root_squash,no_all_squash)
```

After editing the configuration file, restart NFS service.

```
# service nfs restart
```

Unmount the installer image and the installer DVD from host.

```
# umount /nfsroot/media/DVD
# umount /mnt
```

Finally, remove the installer DVD from the DVD drive.

5 Installing GigaAccel 180 (CIFS)

This section describes how to set up CIFS boot in GigaAccel 180. If you are using nfs boot, there is no need to read this section.

The OS is Yellow Dog Enterprise Linux on GigaAccel 180.

It is assumed that Windows XP Professional is installed on the host machine(x86, x86_64). For connecting GigaAccel 180, please refer to “3 Connection of GigaAccel 180”.

5.1 Preparations

Have the following items on hand for this section

- File system for CIFS(ga180-ydel6.0-cifsroot.ext3.192.168.2.11)
- boot file for CIFS(ga180-cifsroot-X.X.XX-X.ydl.X.img)
(2 files above is in
GigaAccel 180 Install DVD > WindowsSupport > CIFS)
- IP addresses for connecting to the external network

Follow the instructions below to connect eth1 port to the external network. IP address must be available to connect to the external network from both the host and GigaAccel 180.

“5.4 Installation of necessary services”

*** The file name for CIFS is "ga180-ydel6.0-cifsroot.ext3." + "IP address of GigaAccel 180". This IP address is assigned by the DHCP server when GigaAccel180 boots up. Therefore, you must prepare a CIFS file system for each GigaAccel180 installed. If you have multiple GigaAccel180s installed, please copy the CIFS file system and use it.**

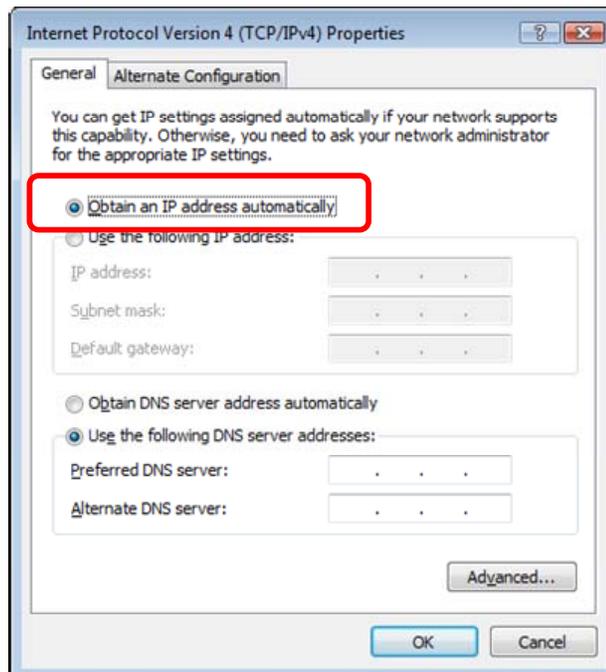
5.2 Creating new account

Create new account to access to CIFS in the host machine. If you set default value to the boot file for CIFS, create account which name is “root”, and password is “passw0rd”.

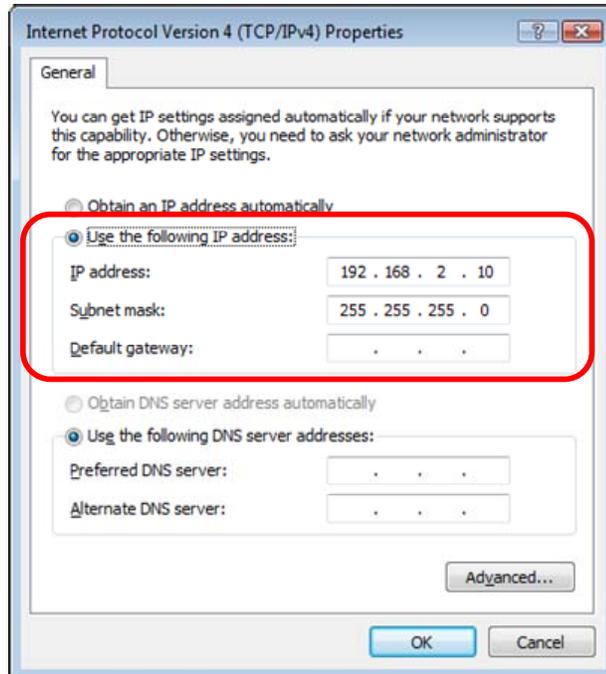
5.3 Network settings

Perform host machine network configurations. Open “Control Panel” > “Network and Internet Connections” > “Network Connections”.

“Local Area Connection” will be used for the external network connection (assigned IP address by DHCP server) and “Local Area Connection 2” will be used for communications with GigaAccel 180. In “Local Area Connection 2”, assign the IP address (192.168.2.10) beforehand.



Local Area Connection

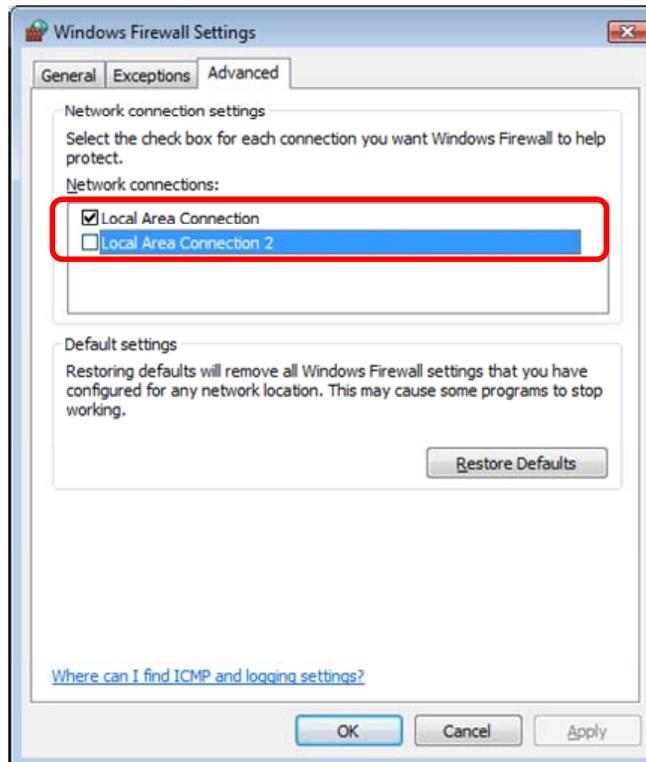


Local Area Connection 2

5.4 Firewall settings

Turn off Windows Firewall for communications with GigaAccel 180. Open “Control Panel” > “Security” > “Windows Firewall”.

Open “Advance” tab and clear the check box for “Local Area Connection 2”.



5.5 Create boot file and file system

Perform creating CIFS boot file and file system for CIFS of GigaAccel 180. Insert “GigaAccel 180 Install DVD” in the host machine.

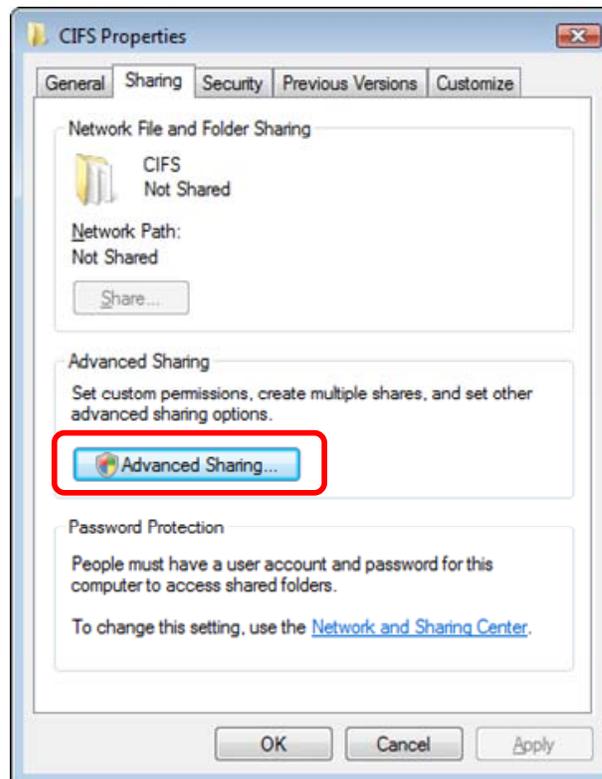
Copy boot file (ga180-cifsroot-X.X.XX-X.ydl.X.img) for CIFS to “c:\¥tftpboot” folder. (If this folder does not exist, create this folder.)

Copy file system for CIFS to “c:\¥CIFS” folder. (If this folder does not exist, create this folder.)

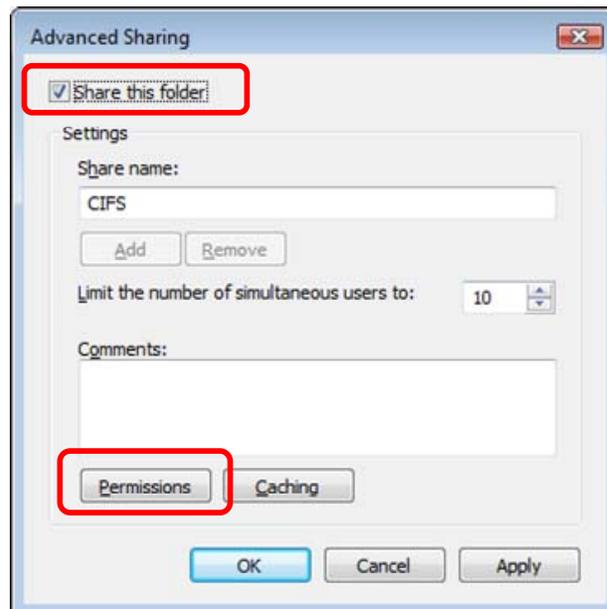
5.6 Configuration of Folder Sharing

Perform sharing the folder(c:\¥CIFS) which you created and put the file system in it. Here is how to configure file sharing.

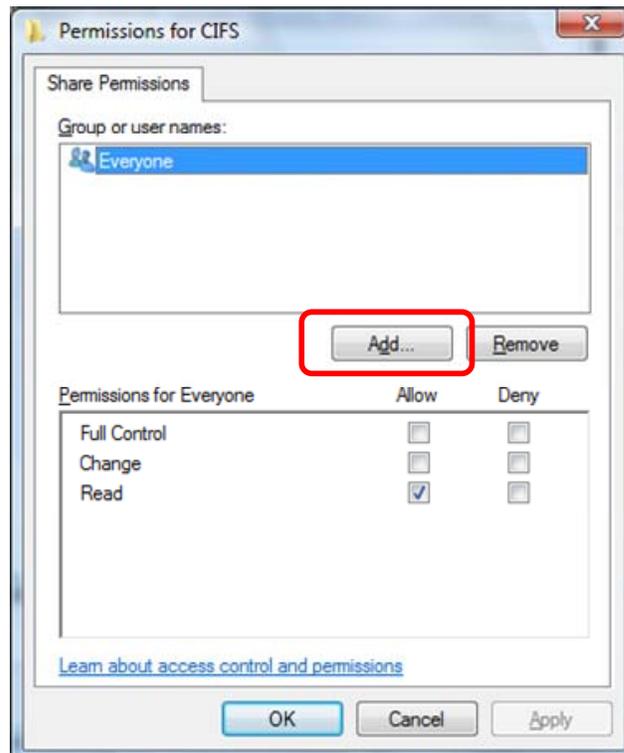
1. Right click CIFS folder.
2. Select “Share...”
3. Then opened “Sharing” tab in “CIFS Properties”. Click “Advanced Sharing...”.



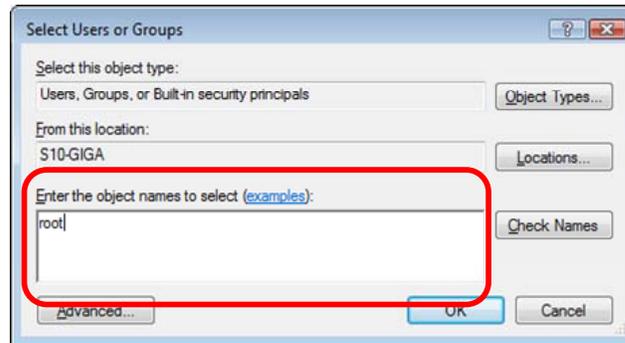
- Then opened “Advanced Sharing” window.
Select “Share this folder”, and then click “Permissions” button.



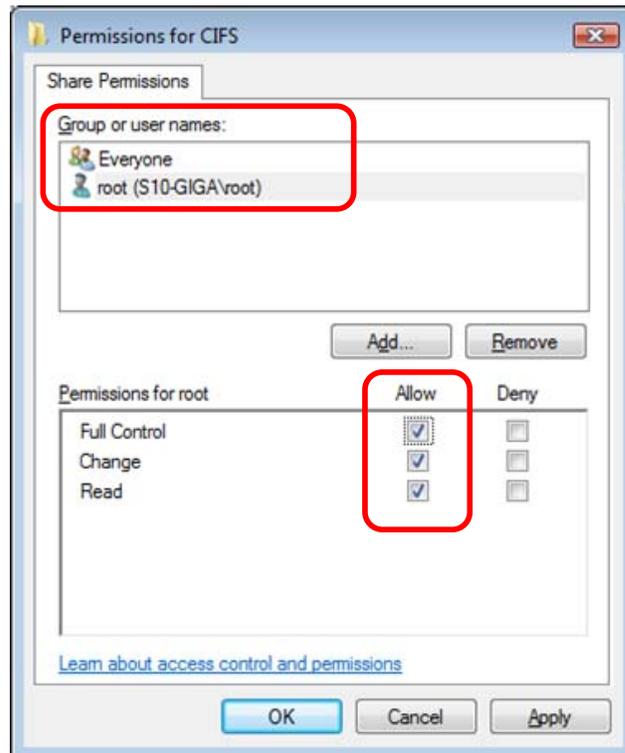
- Then opened “Permissions for CIFS” window.
Click “Add...” button.



6. Type “root” in the object names to select, and then click “OK” button.



7. Select “root” user and check the “Full Control” box.



* You are recommended to delete “Everyone” user in security.

5.7 Installation of TFTP Service

This section describes the procedures to install the tftpd32 service edition that is a free software. Go to tftpd32 download page, and download “tftpd32 service edition” (zip file format).

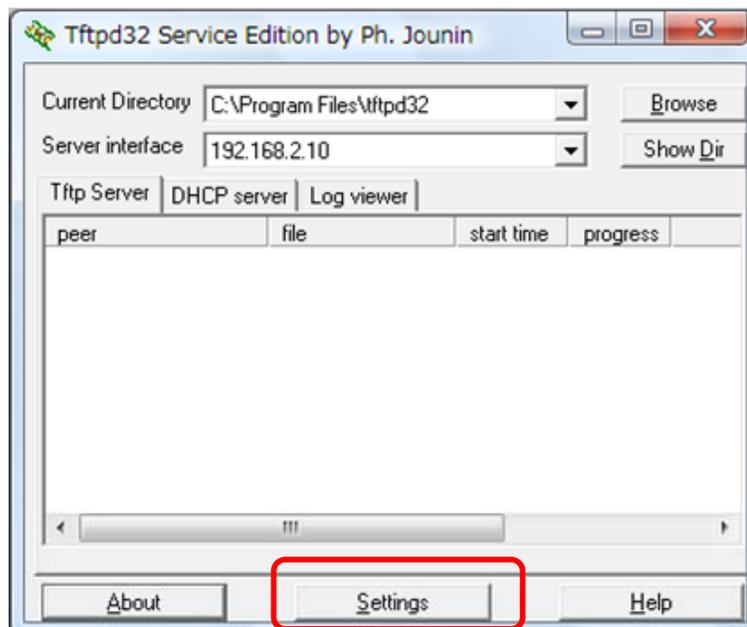
After downloading tftpd32, unpack the .zip archive and install tftpd32 along the install guide. (You can install by the following command. “tftpd32_svc –install”) The service name is ”Tftpd32 service edition”.

After complete installation, start tftpd32 service. Open “Control Panel” > “System and Maintenance” > “Administrative Tools” > “Services”. You can start it in the Services page.

5.8 TFTP Service settings

Run tftpd32_gui.exe in the unpacked folder and configure as follows. If the firewall warning appears, close firewall warning.

After tftpd32 start, click “Setting” button.



tftpd32 start page

In the setting window, configure as follows.

Parameter 1	Parameter 2	Value 1
Base Directory	-	C:\tftboot
Global Settings	-	TFTP Server
		DHCP Server
Syslog server	-	Turn off all
DHCP Options	-	Persistent leases
		Bind DHCP to this address (192.168.2.10)
TFTP Security	-	Read Only
TFTP configuration	Timeout	3
	Max Retransmit	6
	Tftp port	69
	Local ports pool	Empty
Advanced TFTP Options	Option negotiation	Check
	PXE Compatibility	Uncheck
	Show Progress bar	Check
	Translate Unix file names	Check
	Bind TFTP to this address	Check(192.168.2.10)
	Allow * As Virtual root	Check
	Use anticipation window of	Check(8192 byte)

After configuration click “OK” button and re-start “tftpd32_gui.exe”.

The next section describes the DHCP setup. Click “DHCP Server” tab, and then configure as follows. After configuration, click “Save” button and save the settings.

Parameter	Value
IP pool starting address	192.168.2.11
Size of pool	1
Boot File	ga180-cifsroot-X.X.XX-X.ydl.X.img
WINS/DNS Server	Empty
Default router	Empty
Mask	255.255.255.0
Domain Name	Empty
Additional Option	Empty

***1 If you install two GigaAccel 180, set Size of pool to 2.**

***2 If “Additional Option” is left blank, IP address of host workstation will be set to “192.168.2.10”, CIFS mount account will be “root” and the password will be “passw0rd”.**

If you want to modify them, set all of them as follows.

```

Additional Option
The first field : 17
The second field : //{Host IP Address}/{Shared Folder} /cifs -o user={Account
name},password={Password}
(ex:default value)
The second field : //192.168.2.10/CIFS /cifs -o user=root,password=passw0rd

```

[Note] You can enter the second field in less than 63 characters. If an invalid value is entered, GigaAccel 180 can not boot. If GigaAccel 180 can not boot, please refer to the troubleshooting.

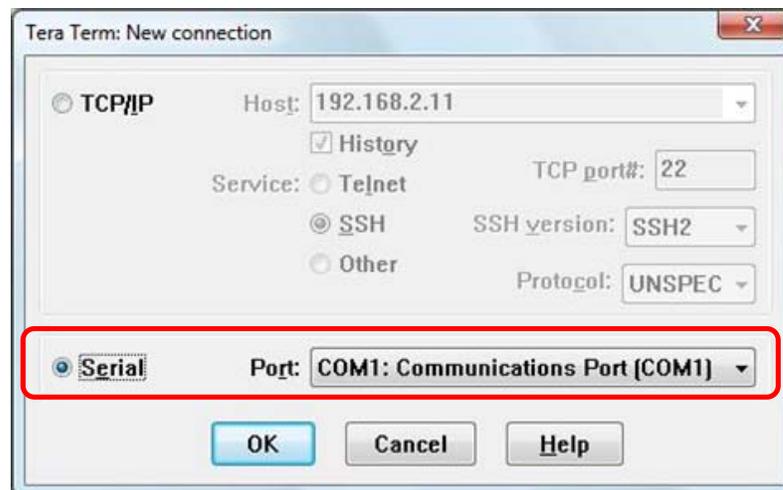
5.9 Installation of Terminal Software

To confirm the boot status of GigaAccel 180 (to show Serial Console), terminal software is necessary. This section describes the installation of “Tera Term Pro”(http://tssh2.sourceforge.jp/index.html.en). Go to the download page and download the installer. Run the installer and install with the default settings.

5.10 Start up Terminal Software

After install, a shortcut icon will be created. Double-click it and run teraterm.

First setup the serial port. In “New Connection” window, select “Serial (Port: COM1)”, and then click “OK” button.



New connection window

After serial console appears, Select menu “Setup” > “Serial port...”. Then “Serial port setup” window is opened.

In “Serial port setup” window, configure as follows.

Parameter	Value
Port	COM1
Baud rate	115200
Data	8 bit
Parity	none
Stop	1 bit
Flow control	none
Transmit delay	0msec/char 0msec/line

Click “OK” button, and select menu “Setup” > “Save setup...”. Then complete setting.

5.11 Start up GigaAccel 180

The following operation is needed when we boot GigaAccel180 for the first time. Once Giga Accel 180 boots successfully, there is no need to set it again.

*** When GigaAccel180 fails to boot, please investigate the reason.**

1. Start up teraterm

Start up teraterm. And in “New connection” window, select “Serial (Port: COM1)” and click “OK” button.

Console window is opened. Then press “Enter” key. Command prompt “0 >” of GigaAccel 180 appears.

*** If the command prompt does not appear, open “Control Panel” > “System and Maintenance” > “Administrative Tools” > “Services”, and then right-click “Tftpd32 service edition”, select “Properties”. In “Startup type”, select “Manual” from the drop down menu (to prevent from starting up automatically with starting up the host machine). And reboot the host machine. Then, open serial console window by tera term, and type “Esc” key.**

2. Configure boot option

To boot GigaAccel 180 in CIFS mode, it is necessary to configure the boot option. Type the following command.

```
0 > setenv boot-file root=/dev/ram ramdisk=131072
0 > reboot
```

3. Console login.

In the console window, boot logs will appear. If “ga180 login:” appears, it means the boot was successful. In default configuration you can log in as the “root” user and password is “passw0rd”. (“0” is zero.)

*** When GigaAccel 180 is running you can log in by ssh. The default IP address of GigaAccel 180 is “192.168.2.11” (this is assigned by the DHCP feature of tftpd32).**

5.12 Network installation of additional packages

It is possible that CIFS doesn't have packages needed in your environment. In this case, you can use yum to add packages. Ensure that configuration settings allow GigaAccel 180 to connect to the external network. Also, make sure to have on hand the Yellow Dog Enterprise Linux user name and password which were notified separately.

Please input your Yellow Dog Enterprise Linux user name and password in baseurl in the following 3 files. And then, please save them.

```
# vi /etc/yum.repos.d/yellowdog-base.repo
[base]
name=Yellow Dog Linux 6 Base
baseurl=http://USERNAME:PASSWORD@www.ydl.net/cell/yum/6.0/base/
enabled=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

```
# vi /etc/yum.repos.d/yellowdog-extras.repo
[extras]
name=Yellow Dog Linux 6 Extras
baseurl=http://USERNAME:PASSWORD@www.ydl.net/cell/yum/6.0/extras/
enable=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

```
# vi /etc/yum.repos.d/yellowdog-extras.repo
[extras]
name=Yellow Dog Linux 6 Extras
baseurl=http://USERNAME:PASSWORD@www.ydl.net/cell/yum/6.0/extras/
enable=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

*** In the above example, Yellow Dog Enterprise Linux user name is "USERNAME" and password is "PASSWORD".**

Now, if your Network has proxy server, you need to configure the proxy server. According to the environment of the proxy server, add the following.

```
# vi /etc/yum.conf
proxy=http://(PROXY Server Address):(Port Number)
proxy_username=(username for proxy server)
proxy_password=(password for proxy server)
```

Similarly, if you get the file by wget, it is necessary to configure the proxy server. According to the environment of the proxy server, add the following.

```
# vi /etc/wgetrc
http_proxy=http://(PROXY Server Address):(Port Number)
proxy_user=(username for proxy server)
proxy_passwd=(password for proxy server)
```

After the configuration is complete, install package(s) with the **yum** command. Install the necessary package(s) at this time. In the following example, the gcc package is being installed.

```
# yum install gcc
```

5.13 DVD installation of additional packages

This section describes how to install packages from DVD using the yum command. Ensure that the installer DVD is placed in the host machine DVD drive(d:).

Now we will configure the sharing of the DVD drive(d:). The shared name is “DVD”.

*** The following actions will be performed on the GigaAccel 180.**

Create the mount directory.

```
# mkdir -p /media/DVD
```

CIFS Mount the Installer DVD and mount install image on the GigaAccel 180.

```
# mount -t cifs //192.168.2.10/DVD /mnt -o ro
# mount /mnt/iso/ydel-X.X.X-cell.iso /media/DVD -o loop
```

Create the yum repo file.

```
# vi /etc/yum.repos.d/yellowdog-dvd.repo
[dvd]
name=Yellow Dog Linux DVD
baseurl=file:///media/DVD
enable=1
gpgcheck=0
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY
```

Disable other yum repo files.

```
# cd /etc/yum.repos.d
# mv yellowdog-base.repo yellowdog-base.repo.disabled
# mv yellowdog-extras.repo yellowdog-extras.repo.disabled
# mv yellowdog-updates.repo yellowdog-updates.repo.disabled
```

Install package(s) using the yum command. Install the necessary package(s) at this time.

*** In this example, the gcc package is installed.**

```
# yum install gcc
```

Following the installation of necessary packages, unmount the installer DVD and the install image from GigaAccel 180.

```
# umount /media/DVD
# umount /mnt
```

Finally, remove the installer DVD from the DVD drive in the host workstation.

6 Upgrading YDEL

About upgrading YDEL, please refer to URL

http://us.fixstars.com/support/solutions/ydel_6.x/upgrade_6_0_to_6_1.shtml.

[Note] If you use Windows enviroment, you can not upgrade from YDEL6.0 to YDEL6.1.

7 Start Up PCI Express Driver (for Linux host)

This section describes how to start up PCI Express driver for Linux host. If you are using Windows host, please skip this section.

7.1 PCI Express driver overview

If the OS of the host machine is Linux, installing the PCI Express driver will allow TCP/IP communications with GigaAccel 180 via PCI Express. However, to conduct TCP/IP communications, the driver must be running on both the host machine and GigaAccel 180.

[Note] Currently, the compatible kernel version is 2.6.18-164.6.1.el5.

Please download the following files from <http://www.fixstars.com/products/gigaaccel180/support/index.html>. You must have the GigaAccel180 support site account in order to access the web site. The account information should be sent separately.

- PCI Express driver source RPM
triblade-kmod-2.6.28-1.ydl.1.src.rpm
axon-1.0.18-1.ydl.1.src.rpm

7.2 Host machine set up

Install packages necessary for the build.

```
# yum install rpm-build kernel-devel gcc
```

Decompress the downloaded triblade-kmod-2.6.28-1.ydl.1.src.rpm.

```
# rpm -ivh triblade-kmod-2.6.28-1.ydl.1.src.rpm
```

Build the pxcab driver that is compatible with kernel version.

```
# cd /usr/src/redhat
# rpmbuild -bb --define 'kversion X.X.X-X.X.X.X' \
--define 'kvariants ""' SPECS/triblade-kmod.spec
```

When the build succeeds, install it.

```
# rpm -ivh RPMS/x86_64/kmod-triblade-2.6.28-1.ydl.1.\
x86_64.rpm
```

Install the downloaded axon-1.0.18-1.ydl.1.src.rpm.

```
# rpm -ivh axon-1.0.18-1.ydl.1.src.rpm
# rpmbuild -bb SPECS/axon.spec
# rpm -ivh RPMS/x86_64/axon-1.0.18-1.ydl.1.x86_64.rpm
```

When the installation succeeds, load modules.

```
# modprobe axon
# modprobe apnet
# lsmod | grep apnet
apnet  xxxxx  0
axon   xxxxx  1  apnet
```

7.3 Start up PCI Express

Start driver using the following command. Enter the following command on both the host side and the GigaAccel 180 side.

```
# service pxcab start
```

To change the PCI Express driver IP address, edit the following file.

*** The default IP addresses are set to “192.168.1.1” for the host and “192.168.1.2” for GigaAccel 180.**

```
# vi /etc/sysconfig/network-scripts/ifcfg-apnet0
```

Restart the driver if the IP address was changed.

```
# service pxcab restart
```

7.4 Stop PCI Express driver

Stop the PCI Express driver with the following command. (On both the host and GigaAccel 180)

```
# service pxcab stop
```

[Note] If the driver was stopped on both the host and GigaAccel 180, then use the following command on both the host and GigaAccel before starting the drivers again.

```
# modprobe axon
# modprobe apnet
# lsmod | grep apnet
apnet  xxxxx  0
axon   xxxxx  1  apnet
```

7.5 Reset PCI Express driver

Resetting the PCI Express driver will reboot GigaAccel 180.

*** Perform this only on the host.**

```
# service pxcab reset
```

Appendix A – Installing GigaAccel 180 (Fedora7)

This section describes how to create the GigaAccel 180 disk image and how to install GigaAccel 180 so that it can start up. If you are using an OS other than Fedora 7 for GigaAccel 180, then skip this section.

It is assumed that Fedora 7 is installed on the host machine. For connecting GigaAccel 180, please refer to “3 Connection of GigaAccel 180”.

[Note] Ensure that the kernel version of the host machine is between 2.6.22-5 ~ 2.6.23-17.

This is necessary for the PCI-Express driver, later on.

A.1 Preparations

Have the following items on hand for this section.

Download the following files from

[ftp://linuxpatch.ncsa.uiuc.edu/pxcab/Fedora7/ppc64/](http://linuxpatch.ncsa.uiuc.edu/pxcab/Fedora7/ppc64/).

- GigaAccel 180 kernel boot image(zImage file).
zImage-X.X.XX-X.YYYYMMDD.pxcab.img. (Please use the latest file.)
- Fedora7 file system for GigaAccel 180
Fedora-7-image-pxcab-UI.tgz
- GigaAccel 180 kernel RPM
kernel-X.X.XX-X.YYYYMMDDpxcab.ppc64.rpm (Please use the latest file.)

IP addresses for connecting to the external network

Follow the instructions below to connect to the external network. 2 IP addresses must be available to connect to the external network from both the host and GigaAccel 180.

“A.4 Installation of necessary services”

A.2 Host settings

Disable the host machine firewall.

```
# service iptables stop
# chkconfig iptables off
```

Disable SELinux on the host machine.

```
# setenforce 0
# vi /etc/selinux/config
(setting value)
SELINUX=disabled
```

A.3 Network settings

Perform host machine network configurations. eth0 will be used for communications (NFS mount, etc.) with GigaAccel 180. Assign the IP address (192.168.2.10) beforehand.

```
# vi /etc/sysconfig/network-scripts/ifcfg-eth0
(setting value)
DEVICE=eth0
ONBOOT=yes
BOOTPROTO=static
IPADDR=192.168.2.10
NETMASK=255.255.255.0
```

A.4 Installation of necessary services

Install necessary services which are dhcp, nfs-utils, rpcbind, xinetd, and tftp-server. Also, enable these services to start automatically upon start up.

```
# yum install dhcp nfs-utils rpcbind xinetd tftp-server
# chkconfig dhcpd on
# chkconfig xinetd on
# chkconfig nfs on
```

A.5 Prepare disk image

Decompress the Fedora7 file system for GigaAccel 180 which was downloaded beforehand into “/nfsroot” folder.

```
# mkdir -p /nfsroot
# cd /nfsroot
# tar zxf Fedora-7-image-pxcab-UI.tgz
```

Copy GigaAccel 180 kernel RPM into the file system for GigaAccel 180.

```
# cp kernel-X.X.XX-X.YYYYMMDDpxcab.ppc64.rpm /nfsroot/Fedora7-pxcab-UI/tmp
```

A.6 NFS service settings

Edit the NFS service configuration file as below.

```
# vi /etc/exports
(setting value)
/nfsroot 192.168.2.11(rw,sync,no_root_squash,no_all_squash)
```

Restart the NFS services after editing the configuration file.

```
# service nfs restart
```

A.7 Prepare the boot image

Prepare the boot image for GigaAccel 180. Copy GigaAccel 180 kernel boot image downloaded beforehand to “/tftpboot” folder.

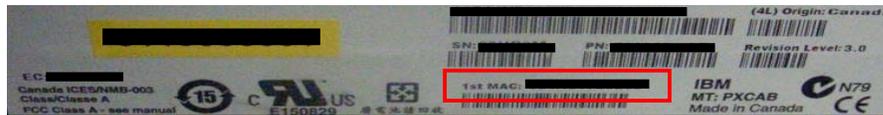
```
# ls /tftpboot
zImage-X.X.XX-X.YYYYMMDD.pxcab.img
```

A.8 DHCP service settings

Edit the DHCP configuration file as follows.

```
# cp /usr/share/doc/dhcp-*/dhcpd.conf.sample /etc/dhcpd.conf
# vi /etc/dhcpd.conf
(setting value)
ddns-update-style ad-hoc;
subnet 192.168.2.0 netmask 255.255.255.0 {
  host gal80 {
    hardware ethernet 01:23:45:67:89:A0; ← GigaAccel 180 eth0 MAC address
    fixed-address 192.168.2.11; ← IP address assigned to GigaAccel
180
    next-server 192.168.2.10; ← IP address of TFTP server
    option root-path "192.168.2.10:/nfsroot/Fedora7-pxcab-UI,
      tcp,hard,nfsvers=3,rsize=32768,wsize=32768"; ← NFS mount Path
  }
}
```

MAC address of GigaAccel 180 eth0 is printed on the side of GigaAccel 180 as “1ST MAC: ~”



Set the DHCP service start up option as follows.

```
# vi /etc/sysconfig/dhcpd
(setting value)
DHCPDARGS=eth0
```

Restart the DHCP service after editing the configuration file.

```
# service dhcpd restart
```

A.9 TFTP service settings

Edit the xinetd configuration file as below so that TFTP service will start automatically.

```
# vi /etc/xinetd.d/tftp
(setting value)
service tftp
{
    disable = no ← change "yes" to "no"
    (Do not change other parameters)
}
```

Restart xinetd after editing its configuration file.

```
# service xinetd restart
```

A.10 Start up GigaAccel 180

This section describes how to network boot GigaAccel 180.

(1) Restart host machine

The power source of GigaAccel 180 needed to start it up comes from the host machine, so it needs to be rebooted.

(2) Perform SSH login

Shortly after the host machine has started up the GigaAccel 180 OS will also start up. When that is complete you can perform SSH login into GigaAccel 180 through such methods as terminal software.

Login IP address: 192.168.2.11
Login name, password: “root”, “passw0rd” (passw0rd contains a ‘0’ – zero)

Also, the current GigaAccel 180 status can also be confirmed using serial console. Please refer to “Appendix C – Using Serial Console” if using serial console. Please refer to “E.2 Start up troubleshooting” for troubleshooting.

(3) Installing kernel module

In this step, we assume there is the GigaAccel 180 RPM in /tmp. First, we install it.

```
# cd /tmp  
# rpm -ivh kernel-X.X.XX-X.YYYYMMDDpxcab.ppc64.rpm
```

(4) Restart the host machine

Log out of GigaAccel 180, and then, restart the host machine.

Appendix B – GigaAccel 180 Specifications

GigaAccel 180 hardware specifications are as follows.

GigaAccel 180 complies with “PCI Express Card Electromechanical Specification” and “PCI Express x16 Graphics 150W-ATX Specification” in almost all cases.

Hardware specifications

CPU	Main Processor	IBM PowerXCell 8i Processor
	Processor count	1
	Core clock	2.8GHz
	PPU core count	1
	SPU core count	8
	Memory interface clock	800MHz
Main memory	Memory	PC800 DDR2 SDRAM
	Volume	4GB
	Channel count	2
	Data path	16 bytes / channel
	Peak transfer rate	25.6 GB/s (total)
	ECC	Yes
Cell companion chip	Type	IBM Southbridge
I/O interface	16x PCI Express	1
	1Gbps Ethernet	2
	Serial port	1
Power	Maximum power consumption	150W
	Auxiliary power supply	Yes (12V 8-pin power connector)
Cooling	Fan	Blower fan with heatsink
	Fan controller	Yes
External frame	Length	111mm
	Width	312mm
	Slot count	2

Operating environment

GigaAccel 180 operating environment is as below.

Temperature:	10 ~ 40 °C
Humidity:	5 ~ 95 % (Non condensing)
Altitude:	-400 ~ 3000 m

Appendix C – Using Serial Console

The status check of GigaAccel 180 can be done by using the serial console (minicom). To use the serial console, a serial cable is necessary.

*** Skip Appendix B if the host doesn't use a Linux OS.**

minicom is configured as follows.

```
# minicom -s
Serial port setup
  A - Serial Device      : /dev/ttyS0
  F - Hardware Flow Control : No
    (Do not change other parameters)
Modem and dialing parameter setup
  A - Init string ... (space)
  B - Reset string ... (space)
  C - Dialing prefix #1 ... (space)
  D - Dialing suffix #1 ... (space)
  E - Dialing prefix #2 ... (space)
  F - Dialing suffix #2 ... (space)
  G - Dialing prefix #3 ... (space)
  H - Dialing suffix #3 ... (space)
  I - Connect string ... (space)
  J - No connect strings ... (space)
  K - Hang-up string ... (space)
  L - Dial cancel string ... (space)
    (Do not change other parameters)
Save setup as dfl
Exit
```

After completing minicom configurations, start minicom.

```
# minicom
```

Appendix D – Common Console Commands

Press the 's' key during GigaAccel 180 start up to display the command prompt.
The following describes the common commands.

Command	Description
boot	Start from the reading of boot image.
reset-all (or 'reboot')	Restart from the open firmware boot.
version	Display open firmware version.
printenv	Display environmental information of the open firmware.
setenv [parameter] [value]	Set environmental variables of the open firmware.

Appendix E – Troubleshooting

This section contains solutions for various cases. Please refer to this when faced with problems.

E.1 Connection troubleshooting

- GigaAccel 180 does not fit into host machine
 - Confirm that the workstation is compatible and that it is operational.

E.2 Start up troubleshooting

- GigaAccel 180 does not power on (LED doesn't light)
 - Confirm that power connector is attached.
See “3.2 Directions of connection”
- GigaAccel 180 OS does not start up (cannot make SSH connection)
 - Confirm that host eth0 and GigaAccel 180 eth0 are both connected with an Ethernet crossover cable.
See “3.2 Directions of connection”
 - Confirm that DHCP server, TFTP server, NFS server, and other services are running.
See “4.5 Installation of necessary services”
 - Confirm that NFS server settings are correct.
See “4.6 NFS service settings”
 - Confirm that DHCP server settings are correct.
See “4.7 DHCP service settings”
 - Confirm that TFTP server settings are correct.
See “4.8 TFTP service settings”
 - If none of the above solutions solve the problem, then confirm start up from console screen by connecting via serial cable. Refer to “E.4 Console screen errors” for console screen errors.
- Permission error when performing SSH login into GigaAccel 180
 - Confirm that SELinux is disabled in GigaAccel 180.
See “4.2 Disable services”

E.3 Operational troubleshooting

- “rpmdb: mmap: Input/output error” error message during “yum” or “rpm” command.
 - Delete all “/var/lib/rpm/__db.00*” files, and try the command again.
- “conflicts” error during “yum update”
 - Use the “rpm -e” command to uninstall the appropriate package.

E.4 Console screen errors

Listed here are common errors that appear on the serial console.

- Freezes while displaying the message “Trying to load: root=/dev/ram ... Bootloader 1.6”.(*1)
 - Confirm that the host eth0 and GigaAccel 180 eth0 are connected with an Ethernet crossover cable.

***1 When the host OS is Windows, freezes while displaying the message “Trying to load: root=/dev/ram ramdisk=131072 from: net ... Bootloader 1.6”.**

See “3.2 Directions of connection”
- Freezes during the countdown after the “Press CTRL-A Z for help on special keys” message
 - Confirm that DHCP service is running.

See “4.5 Installation of necessary services”
 - Confirm that DHCP service settings (GigaAccel 180 MAC address) are correct.

See “4.7 DHCP service settings”
- “E3005 (net) ICMP ERROR “port unreachable”” message
 - Confirm the settings (“/etc/init.d/tftp”) of TFTP server (Linux).

See “4.8 TFTP service settings”
- “E3008 (net) Can’t obtain TFTP server IP address” message
 - TFTP boot is failing since no IP address was assigned from DHCP server. Confirm DHCP server settings. Also confirm that it is not connected to another DHCP server.

See “4.7 DHCP service settings”
- “IP-Config: Got DHCP answer from 0.0.0.0, . . .” message
 - Attempting to obtain IP address from a DHCP server other than the one intended. Remove the Ethernet cable connected to eth1, or enter “> setenv

boot-file root=/dev/ram>(*2) in console command prompt and press enter, then reboot. The reboot command is "> reboot".

***2 When the host OS is Windows, enter "> setenv boot-file root=/dev/ram ramdisk=131072".**

See "Appendix D – Common Console Commands"

- "E3407 : Load failed" message
 - Failed to read boot image. Confirm TFTP server settings and firewall settings.

See "4.2 Disable services"
See "4.8 TFTP service settings"
- "Root-NFS : Server returned error" message
 - Error occurred during NFS mount. Check the NFS server error log (/var/log/message)
- "kernel panic – not syncing : No init found" message
 - GigaAccel 180 disk image is incorrect. Confirm the directory structure at NFS mount path.
- "mount: Mounting /cifs/ga180root-cifs.ext3.xxx.xxx.xxx on /sysroot failed: No such file or directory" message appear, and reboot over again.
 - Confirm the configuration of tftpd32 Additional Option.

Confirm that the shared folder name is correct.
Confirm that user account or password is correct.
See "5.8 TFTP service settings"
- Freezes while displaying the message "Mounting CIFS filesystem ..."
 - Confirm the configuration of tftpd32 Additional Option.

Confirm that host IP address is correct.
See "5.8 TFTP service settings"

- The contents of this document may change without notice.

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