TB168 (Rev4) - Networking Linux Based Controls

Creating a Network

- If not already connected, create the network using cables, switches, routers, etc. To successful connect a DHCP network you will require a Cable/DSL Router which automatically generates IP addresses. Static IP networks work with a switch/hub.
- Simple network configurations: Control and one or more computers, via Cable/DSL Router: Use Cat 5 straight-through Ethernet cables.
- You should have lighted "link" indicator lights on all switch and computer connections. This is a good indication that you have connectivity but it is not a guarantee.
- Consult Windows XP Help and other resources for network setup assistance and trouble-shooting.
- Make sure that the computers can share files with one another before attempting to access shared folders from CNC10. If the computers cannot access each other's shared network files, neither will CNC10.
- Verify that all network cables and equipment connecting the control to the network are working before you physically hook up the control.
- **Note**: Software versions 2.36 and below do not support active directory networking. Versions 2.61 and up do support active directory networking.
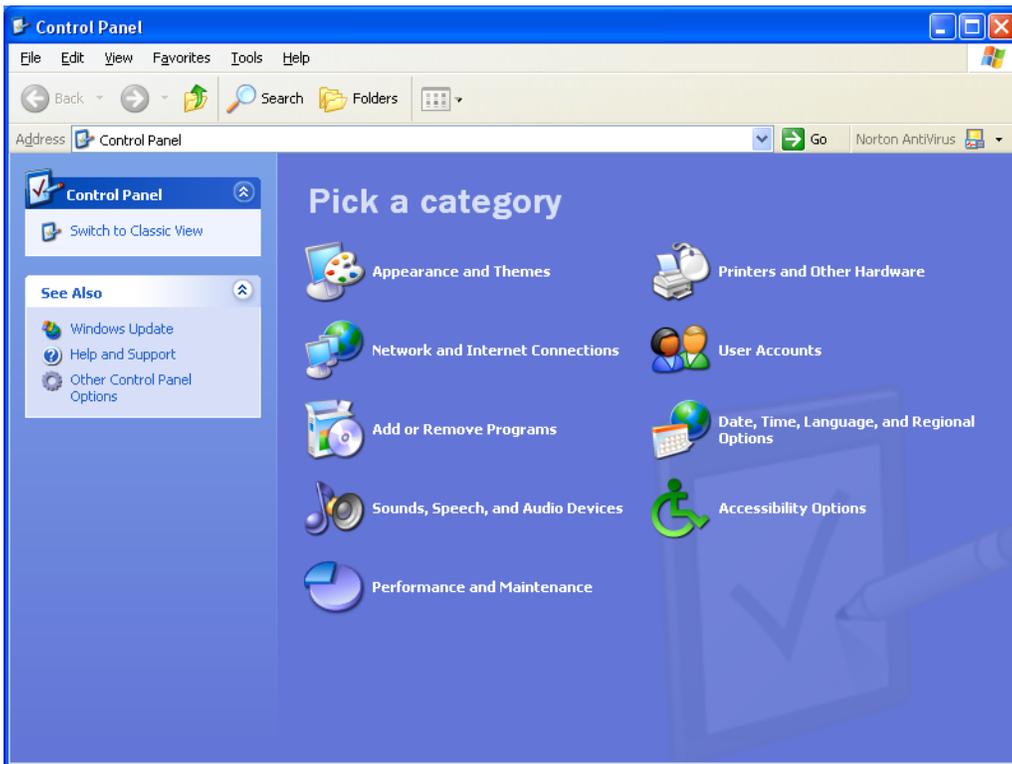
Setting up the Remote PC

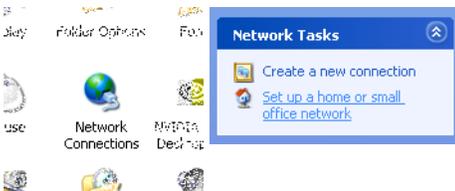**Using the XP Network Setup Wizard**

1. On your Windows XP machine, go to "Start", "Control Panel".
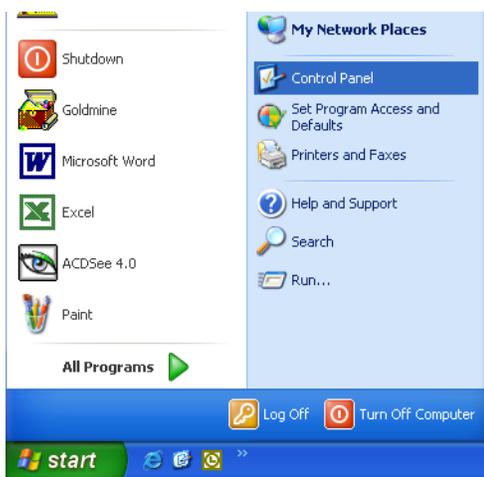
2. If viewing by category, as shown below, click on "Network and Internet Connections". Click on "Setup or change your home or small office network".

3. If using the "classic" view, as shown below, double-click on "Network Connections". Click on "Set up a home or small office network".
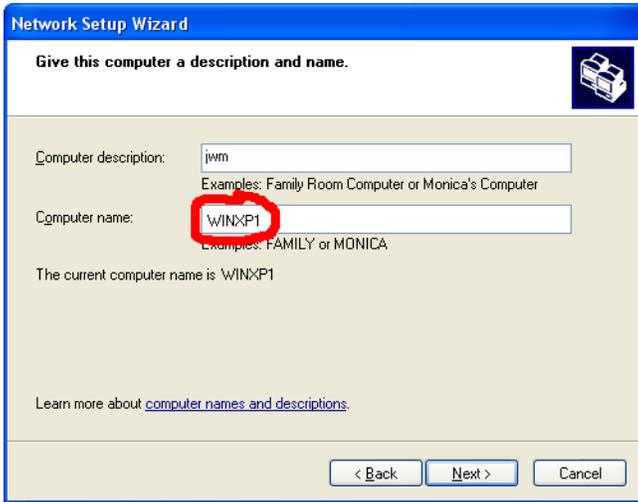

4. The Network Setup Wizard will start.

5. Click "Next" and answer all the questions about your network. All scenarios listed in the Network Setup Wizard are compatible with CNC10. If you do not have an Internet connection through your computer or another computer on the network or you are connecting direct from the control to a laptop computer, you may select "Other" when asked how to best describe your network.

6. When the following screen appears, be sure to note the Computer Name (circled in red, below.) CNC10 will need the computer name in order to connect to it. Note: Make sure the computer name is all one word with no spaces or symbols.

7. When the "File and printer sharing" window comes up make sure you have it checked to turn on file and printer sharing.

8. You will be required to restart your computer after the Network Setup Wizard completes.

Making a Network Setup Disk

When the Network Setup Wizard is near completion, it will ask you if you wish to create a Network Setup Disk. You should make a Network Setup Disk if any computer on your network is running Windows 98, 2000 or ME. To run the disk on another computer, insert the disk into the computer and double-click on the NETSETUP.EXE file on the Network Setup Disk.

It is possible to create a Network Setup Disk without running the Network Setup Wizard. For information on how to do this, go to Windows XP Help and Support and search for "network setup disk".

Note: There are 2 ways of configuring network file sharing in v.2.60 and above: 1.) Using a Windows file server (the only way to set up a pre-2.60 control), 2.) Using the control as a file server.

Setting up the Linux Control

If using a Cable/DSL Router follow the DHCP Network Setup. If using a switch, follow the Static IP Address Network. Centroid recommends using a Cable/DSL Router and using the DHCP network.

Sharing Files with CNC10 with a Windows File Server

The following example demonstrates how to set up the Shared Documents folder as a shared folder on the network. Click on "Start" then "My Computer".

Right-click on the "Shared Documents" folder and select "Sharing and Security".
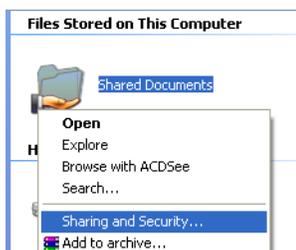
Check the box "Share this folder on the network". Check the "Allow network users to change my files" if you want CNC10 to be able to save files in this folder.

Note: The Share Name circled in red, above. CNC10 will need to know both the Computer Name and Share Name in order to access files in this folder. The example above uses the "Shared Documents" folder; however, you may share any folder on your computer. Refer to Windows XP Support and Help for more information.

Setting up CNC Linux File sharing

Accessing Windows Shared Folders from CNC10:
1. Press **ALT-F6** to bring up a command prompt.
2. From the CNC10 directory type the following: **edit cnc10.net** (press **enter**)
   (Absolute path is "/cncroot/c/cnc10/cnc10.net".) Note: If a message appears that the file doesn't exist, just select "New File".
3. Add lines for each share. Each line must contain:
   c//mputer-name/**share-name drive-letter** "**options**"
4. For example: //winxp1/shareddocs g "username=guest"
   //winserver/cnc e "username=joe,password="
 Note: The username and password are your login into XP.
5. Save the file and close the edit screen by pressing **CTRL + Q**
6. Type **exit** and press **enter** to go back into CNC10 software.
7. If using version CNC10 v1.51 or less you have to make sure that the "Remote Drive & Directory" is set to the drive letter used in the cnc10.net file in the Control Configuration **F1-Setup**, **F3-Config**, password **137**, and **F1-Contrl**.

(Ex. g:) Note: Do not call the shared directory from the control configuration, only call drive letter.

8. Shut down and restart the control. Shares will be mounted at startup.

9. Access a share by its "drive" letter from the CNC10 load menu.

* *All trademarks are the property of their respective owners. "Windows" and related trademarks are the property of Microsoft.*

Active Directory Networking

Note: Active directory networks are only supported in software version 2.60 and higher.

This section describes how to configure CNC Linux v2.6x with an Active Directory network.

The cnc10.net file format is the same as described in the "Setting up CNC Linux File sharing" section in this document. For an Active Directory network, the username and password must be the username and password for the Active Directory account that the control is using to connect to the network shares. For example, we used "username=centroid1,password=Evaluation1" in the cnc10.net options. These are specific to the network in which the control is to operate.

The control does not need to "join" the Active Directory network. Every share that the control must connect to must have the username and password specified in the cnc10.net file for that share.

If shares in different domains need to be accessed by the control, an additional option may need to be added to the option list for a particular share to specify what domain the account is located in. So, the above example would be changed to "username=centroid1,password=Evaluation1,domain=ADSNET.local" where "ADSNET.local" is the domain that "centroid1"is located in. In our testing, this option was not required (this testing involved only a single domain).

Setting up a Static IP Address Network under Windows

1. Open the Control Panel.
2. Open Network Connections
3. Open Local Area Connection
4. Open Properties
5. Click on Internet Protocol (TCP/IP) and open its properties
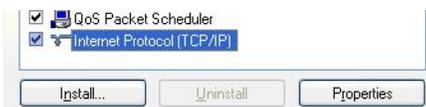
6. Select "Use the following IP address" and enter the following IP address, Subnet mask, and Default gateway.

The address 192.168.0.2 is an example. If this address is already used, you can use any address from 192.168.0.2 through 192.168.0.254.
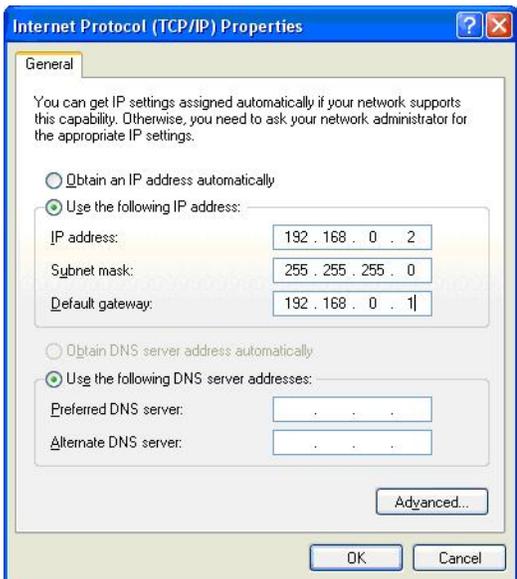
Setting up a Static IP Address Network under CNC Linux - For Software versions 1.0 to 2.38

*** Changing the file below should only be done by a qualified tech rep. Centroid recommends using DHCP. If your configuration requires Static IP addressing then contact your qualified tech rep or local IT professional.

1. Edit the "**ifcfg-eth0**" file by typing: **edit /etc/sysconfig/network-scripts/ifcfg-eth0**
2. Change the line "**BOOTPROTO=dhcp**" to "**BOOTPROTO=none**".
3. Start a windows command window by clicking start, then run. At the prompt, type "**cmd**" and press **enter**.
4. You now type the following: **ipconfig** and then press **enter**.
5. You should now see information similar to the following:

6. Take note of this information since it will be needed during the configuration of CNC Linux.
7. Change the "**NETWORK=**" to "**NETWORK=192.168.0.0**".
 Note: If you chose a different IP address other than that shown in the above examples, use the first 3 numbers in the IP address followed by "0". For instance, if you chose "10.11.12.13" as your IP address, your network line would be "NETWORK=10.11.12.0".
8. Change the "**BROADCAST=**" line to "**BROADCAST=192.168.0.255**".
   Note:if you chose a different IP address other than that shown in the above examples, use the first 3 numbers in the IP address followed by "255". For instance, if you chose "10.11.12.13" as your IP address, your broadcast line would be "
BROADCAST=10.11.12.255".
9. Change the "**IPADDR=**" line to "**IPADDR=192.168.0.3**".
 Note 1: The first three numbers in the IP address should match the first three numbers of the "IP Address" line shown in the Windows ipconfig screen.
   Note 2: The IP address chosen chosen for CNC Linux must not be an IP address already in use (use an address that is NOT the Windows machine's address and is NOT the default gateway's address). In this example, any address from 192.168.0.3 through 192.168.0.254 would be acceptable.
 Note 3: If networking multiple controls you will need a different IP address for each control.

10. Change the "**GATEWAY=**" line to "**GATEWAY=192.168.0.1**". The IP address specified here should be the same as the address on the "Default Gateway" line shown in the Windows ipconfig screen.

11. Change the "**NETMASK=**" line to "**NETMASK=255.255.255.0**". The IP address specified here should be the same as the address on the "Subnet Mask" line shown in the Windows ipconfig screen.

Below is what the final configuration for CNC Linux should look like.

```
 File   Edit   Search   Preferences   Shell   Macro   Windows
/etc/sysconfig/network-scripts/ifcfg-eth0 180 bytes
DEVICE=eth0
 BOOTPROTO=none
 ONBOOT=yes
 TYPE=Ethernet
 USERCTL=no
 NETWORK=192.168.0.0
 BROADCAST=192.168.0.255
 PEERDNS=yes
 IPADDR=192.168.0.3
 GATEWAY=192.168.0.1
 NETMASK=255.255.255.0
```

Note: If networking multiple controls you will need a different IPaddress for each control. Everything else would be the same.

Setting up a Static IP Address Network under CNC Linux - For Software versions 2.60 & up

If you upgraded a system to 2.6x from a previous version that was using a Static IP address, then changes need to be made to not only the ifcfg-eth0 file but the ifroute-eth0 file as well. The BOOTPROTO, BROADCAST, IPADDR, NETMASK, and NETWORK should be modified in the ifcfg-eth0 file and the GATEWAY will be modified in the ifroute-eth0 file. The following steps should be followed only if a network has been established before the upgrade. If not, please follow the Static IP instructions earlier in this document to gather the information needed to setup a Static IP.

Editing the ifcfg-eth0 file:

1. Type: **edit /etc/sysconfig/network/ifcfg-eth0**
2. Under BOOTPROTO, change "**dhcp**" to "**static**"
3. Enter the Broadcast address under BROADCAST
4. Enter the IP address under IPADDR
5. Enter the Subnet Mask address under NETMASK
6. Enter the Network address under NETWORK

The default ifcfg-eth0 file will look like this:

BOOTPROTO='dhcp'
BROADCAST=''
ETHTOOL_OPTIONS=''
IPADDR=''
MTU=''
NAME='Ethernet Adapter'
NETMASK=''
NETWORK=''
REMOTE_IPADDR=''
STARTMODE='auto'
USERCONTROL='no'

If the control was using a static IP address of 192.168.0.3 on the network 192.168.0.0, the ifcfg-eth0 file would look like this:

BOOTPROTO='static'
BROADCAST='192.168.0.255'
ETHTOOL_OPTIONS=''
IPADDR='192.168.0.3'

MTU=''
NAME='Ethernet Adapter'
NETMASK='255.255.255.0'
NETWORK='192.168.0.0'
REMOTE_IPADDR=''
STARTMODE='auto'
USERCONTROL='no'

Editing the ifroute-eth0 file:

1. Type: **edit /etc/sysconfig/network/ifroute-eth0**
2. Delete the # that is located in front of the default 192.168.0.1
3. Change the 192.168.0.1 to your current Default Gateway address

The default ifroute-eth0 file is set up to use DHCP and looks like this:

route gateway remote_network device

======= =========== =============== ======

default 192.168.0.1 - -

If the control was using a static IP address of 192.168.0.3 on the network 192.168.0.0, the ifroute-eth0 file would look like this:

route gateway remote_network device

======= =========== =============== ======

default 192.168.0.1 - -

Connecting to the Control's Shares with the Control acting as a File server

This is a new option that is available for controls running software version 2.60 and newer.

Connecting to the shares provided by the control is no different than connecting to the shares provided by any other file server on a network.

- In windows explorer or "My Computer", click on "Address".
- Type: **\\centroid_cnc** (the default control name).
- Enter the username: "**root**", and password: "**centroid**" (the default password).
- The available shares on the Centroid control will be displayed.
- Right-click on the share that you want to attach to a drive letter.
- Select "Map network drive...".
- Assign a free drive letter on the "Map Network Drive" window and make sure that "Reconnect at logon" is selected.

Changing the Control's Password, Name & Shares

Note: This section only applies to software version 2.60 and up.

- The cnc10.net file will still need to be created, just like in the "Setting up CNC Linux File sharing" section earlier in this document.
- The default username is "root" and default password is "centroid".
- In order to access individual controls on a multi-control shop network, each control will need its own unique computer name.

Changing the default password (centroid):

- Press **ALT-F6** on the control to start a command prompt.
- Type:**smbpasswd**
- Enter the new password when prompted.

Changing the default computer name (centriod_cnc):

- Press **Alt+F6** on the control to bring up a Linux prompt.
- Change to the "**/etc/samba**" directory by typing: **cd /etc/samba**
- Edit the "**smb.conf**" file by typing: **edit smb.conf**
- In the "[global]" section, find the line that says "netbios name =". The name to the right of the "=" sign is the name of the control. The new name must be 15 characters or less and can include any combination of characters except for spaces and the following: \/:*?";|. After changing the control's name, save the file and exit the editor.
- Type: **netgo** (Below is the default "[global]" section.)

```
[global]
# workgroup = NT-Domain-Name or Workgroup-Name
# server string = the equivalent of the NT Description field
   workgroup = MSHOME
   netbios name = centroid_cnc
   server string = Centroid Control
   security = user
   log file = /var/log/samba/%m.log
   max log size = 50
   dns proxy = no
```

Changing the Shares provided by the Control:

Changing the share can be done by editing the "**/etc/samba/smb.conf**" file. After saving the contents of the file, the command "**netgo**" will need to be run to make the changes take effect. The share definitions are below the line "===== Share Definitions =====". Each share is defined as five lines and separated from other shares by a blank line.

1. "[mill_intercon]", is the share name.
2. "comment = Mill Intercon Files", is the comment that is shown when you select the properties of the share in the Windows Explorer/My Computer window.
3. "path = /cncroot/c/intercon", is the path to the shared directory.
4. "browsable = yes", is if you can see the share when you browse the control's shares.
5. "writable = yes", is if the share's files are read-only or writable.

Below is an example of a share:

```
[mill_intercon]
   comment = Mill Intercon Files
   path = /cncroot/c/intercon
   browsable = yes
   writable = yes
```

Neither the "smb.conf" file nor the share password are preserved when creating a report for the control. If the flash-card is replaced, these settings will need to be manually restored (re-edit the file and re-enter the password using smbpasswd).

Document History

Rev4 Created on *2009-07-21* by *#240*
Rev3 Created on *2008-06-23* by *#240*
Rev2

Created on *2008-06-10* by *#240*
Rev1 Created on *2004-09-29* by *#000*