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PIXIL Thin Client Support

You may contact Century Software for support of your PIXIL Thin Client product. Live telephone support is available Monday through Friday, 8am – 5pm mountain time.

Telephone Support: 801-268-3088, and select option 5
Email: support@centurysoftware.com
www.centurysoftware.com

PIXIL Thin Client Hardware Support

The following machines from Dell are currently certified for running PIXIL Thin Client:
OptiPlex GX270, SX270
OptiPlex GX280, SX280
OptiPlex GX1, GX60
OptiPlex 170L

HARDWARE NOTES

GX280 & SX280

For the GX280 and SX280, there is currently a hardware limitation of the USB bus that will not allow a USB boot from certain types of flash drives if they are inserted in one of the ports of the main unit. Drives supplied by Dell are fully functional. However, if you are using your own hardware, please use the USB ports located on the keyboard or an external USB hub as a temporary workaround.

SOUND

Sound support is limited to the GX270, SX270, GX280, SX280 and 170L. Additional drivers for other sound cards can be made available for specific hardware installations.

Client Setup

BIOS OPTIONS

There are a number of BIOS options that must be set to gain full advantage of the hardware in the Dell OptiPlex units. Setting these options on the different units vary from unit to unit, but all are accomplished from the BIOS setup screen, reached by pressing F2 during the hardware check phase machine startup.

Normally in units shipped from Dell for the purposes of PIXIL Thin Client these options will have been pre-configured from the factory.
VIDEO MEMORY

In the BIOS, video memory must be set to the highest value. On older versions of the BIOS this was set to 1MB which only allows very low display resolutions. For most versions of the BIOS, you can set this to 8MB. If there is a higher setting, you may use it as well.

USB BOOT

For booting from USB keys, two options must be set. One, USB booting must be enabled in the hardware section of the BIOS. This is normally on by default. Two, you must ensure that USB devices are placed above any other viable boot options (such as a hard drive) in the boot order screen.

Some BIOS revisions have boot order settings that allow only hard drives to be selected. For these types, another setting is provided that allows you to choose which hard drive is “drive C”, the one that will be used for booting.

PXE BOOTING

For PXE booting, ensure that PXE boot is enabled for your built in Ethernet card in the hardware section of your BIOS setup. After this, ensure that PXE booting is at the top of the list of boot options in the boot order screen.

COMMAND LINE OPTIONS

When booting a PIXIL Thin Client, there are a number of configuration items that may be set by passing them on the command line before the boot process. There are two ways in which this is done depending on how the client is booting (either PXE, hard drive, USB drive, etc.)

PASSING OPTIONS, PXE BOOTING

When PXE booting, command line options are provided in the boot descriptor file for each client. In a simple configuration, this file is called default and is located (from the top of your TFTP server directory) in pxelinux.cfg/default. It is possible (and often desirable) to have differing boot descriptor files for use with different groups of clients. However, passing options is the same for all of these.

The contents of a typical boot descriptor file:

```
label PIXIL-PXE
    kernel bzImage
    append ramdisk _size=65536 root=/dev/ram0 initrd=/pixil-initrd.gz
    init=/linuxrc rw
default PIXIL-PXE
```

To set command line options, we add them to the end of the “append” line. For instance, if you wanted to set the option for a wheel mouse, you’d add “wheel-mouse” to the end of the append line, separated with a space from the previous option.
PASSING OPTIONS, HARD DRIVE, USB KEY, CD BOOTING

For this style of booting, options for the command line are given directly on the client. Soon after turning on the client, a prompt will appear: LILO Boot: It is at this prompt where options may be entered. All options using this method must start with the word “pixil”. For instance, to change the type of graphics card, you’d end up with a line like this:

    LILO Boot: pixil i810-graphics

at which point you’d hit the enter key. It is only necessary to enter the word “pixil” once, and it must come first, before any options..

Unlike command line options for use in PXE booting, options to machines booting from local storage will keep any changed settings permanently. For instance, if you set the mouse type to a wheel mouse, this setting will remain the default for all future boots of the machine, without having to type “pixil wheel-mouse” at the boot prompt every time.

OPTION REFERENCE

GRAPHICS DRIVERS

    i810-graphics
    vesa-graphics
    fbdev-graphics

Description:

These select the type of graphics driver for use. For all supported Dell OptiPlex machines, the i810 graphics driver will work. VESA and fbdev are generic graphics drivers that can be used with other hardware for which PIXIL Thin Client does not yet have a specific driver to.

The i810 driver uses full hardware acceleration for drawing, in contrast with the VESA and fbdev drivers, which provide no hardware-specific drawing routines.

Please see the troubleshooting section of this document for information on when using the fbdev and VESA modes may be appropriate if the client is not displaying correctly.

Defaults To:

    i810-graphics
MONITOR SETTINGS

- lcd-monitor
- lowsync-monitor
- medsync-monitor
- highsync-monitor

Description:

These settings allow the selection of various types of monitors and refresh rates. This is useful for use with monitors that have limited refresh rates, or you wish to raise the default refresh rate.

- lcd-monitor has no refresh rate associated with it. PIXIL Thin Client attempts to determine which refresh rate is most appropriate for the connected monitor. This automatic detection works only with DVI-connected LCD panels.
- lowsync-monitor has a refresh rate of 50-60Hz
- medsync-monitor has a refresh rate of 50-85Hz
- highsync-monitor has a refresh rate of 50-130Hz

Defaults to:

- lowsync-monitor

DISPLAY RESOLUTION

- 640x480
- 800x600
- 1024x768
- 1280x1024

Description:

These settings change the physical display resolution of the PIXIL Thin Client. This does not have an effect on the size of the remote displays connected to using either the Citrix or RDP clients.

Defaults To:

- 1024x768
DISPLAY COLOR DEPTH

- 8bpp-display
- 16bpp-display
- 24bpp-display

*Description:*

These settings control the color depth of the physical display of PIXIL Thin Client. This effectively limits the number of colors that may be displayed on the screen at one time. If the number of colors exceeds the number allowed for the display, a color is chosen automatically that is closest to the actual color requested.

- 8bpp-display can display 256 colors
- 16bpp-display can display 65536 colors
- 24bpp-display can display 16777216 colors

All of the currently supported Dell OptiPlex can easily display 24bpp. This option is most useful for testing with other hardware.

*Defaults To:*

- 24bpp-display

KEYBOARD LANGUAGE

- en-keyboard
- de-keyboard
- it-keyboard
- it142-keyboard
- fr-keyboard

*Description:*

These settings allow keyboard for specific languages to be supported, including English (en), German (de), Italian (it), Italian-142 (it142), and French (fr).

Setting this is the same as changing the setting in the Login Manager on the Terminal tab.

*Defaults To:*

- en-keyboard
CONFIGURATION RETRIEVAL

???-config

Description:

This option allows the retrieval via TFTP of a specified configuration file. For instance, if you passed 
“/rdpdemo-config” on the command line, PIXIL Thin Client will attempt to retrieve the file called 
/rdpdemo from the TFTP server and use it for configuration of the Login Manager. Please see the section 

These configuration files are currently limited to configuring connections to remote servers and their 
parameters (i.e., Connect on Launch.)

PIXIL Thin Client uses the TFTP server specified in the “next-server” portion of the DHCP response 
when booting. If this option is specified, PIXIL Thin Client will attempt to retrieve a DHCP address 
even if it is configured for use with a static IP address. After retrieving the configuration file, normal 
network startup is resumed.

Like the other options, this one is permanent for machines booting locally (not from PXE.) However, 
on subsequent boots, the configuration is not retrieved using TFTP, the local copy stored on the client is 
used (unless, of course, the ???-config option is given again.)

The remote filename of the configuration cannot contain any dashes (“-“)

Defaults To:

No default

TIMESERVER (NTP)

???-timeserver

Description:

Allows the specification of an NNTP timeserver. For instance:

LILO Boot: pixil time.censoft.com-timeserver

will cause PIXIL Thin Client to use the timeserver at time.censoft.com to set it’s local clock. This is the 
same as the Timeserver setting on the Terminal tab of the Login Manager.

Defaults To:

time.censoft.com-timeserver
SOUND

  sound-rdp
  nosound-rdp

_Description:

  Turns sound on and off for all RDP connections. It is useful to turn sound off if you do not have speakers, or are on a platform with no sound support as it reduces the load on the network and server.

_Defaults To:

  sound-rdp

MOUSE TYPES

  wheel-mouse
  nowheel-mouse

_Description:

  Selects the type of mouse used on the system. While PIXIL Thin Client automatically detects whether a USB or PS/2 style mouse is in use, it cannot accurately determine whether or not the mouse has a scroll wheel or not.

_Defaults To:

  wheel-mouse

RDP WINDOWS

  windowed-rdp
  fullscreen-rdp

_Description:

  Selects whether or not RDP connections default to full screen or windowed. Windowed mode is useful for starting up multiple connections to RDP servers, but somewhat limits the keys that may be used.

_Defaults To:

  fullscreen-rdp
**RDP COLOR DEPTH**

- 8bpp-rdp
- 16bpp-rdp
- 24bpp-rdp
- serverbpp-rdp

*Description:*  
Selects the default color depth of the RDP client. This setting is independent of the actual display color depth. If you select, say, 24bpp-rdp and your display is actually running 8bpp, PIXIL Thin Client will automatically downgrade the colors to match the display.

serverbpp-rdp allows the server to choose what color depth the client will use.

Running with the fewest number of colors for this setting reduces network and server load. Also keep in mind that some RDP servers will not allow connections if the color depth is not set correctly. See the Troubleshooting section of this document for more details.

*Defaults To:*  
24bpp-rdp

**INTERFACE SELECTION**

- useica
- usepixil

*Description:*  
Selects either the Citrix ICA Manager client (useica) or the PIXIL Thin Client Login Manager (usepixil) to be started upon client boot up. Regardless of what is selected using this option, you can start either manager from the background right-click context menu.

If using the Citrix ICA Manager as a default, the Connect on Launch setting of the Login Manager will not be used until it is started by hand.

*Defaults To:*  
usepixil
CONFIGURATION LOCKDOWN

config-lock
config-unlock

Description:

Use these options to lock or unlock use of the Login Manager user interface. When locked, connections may be launched, but no other settings may be changed, only viewed. This is useful after configuration of the terminal to ensure no changes are made accidentally by end users.

Defaults To:

config-unlock

DEBUG PROMPT

prompt
noprompt

Description:

These options allow access to the command line without starting up the graphical user interface. This is mainly used for low-level debugging and isn't something that is commonly used.

Prompt mode doesn't start the GUI, noprompt does.

Defaults To:

noprompt

CREATING A BOOTABLE HARD DRIVE

mkboot

Description:

This option allows you to create a bootable hard drive from a USB flash key. This option is very dangerous as it will automatically overwrite the primary hard drive in the system, regardless of what is on it.

This option is typically used when deploying large numbers of hard drive-based PIXIL Thin Clients. An administrator will configure a unit using a USB Flash key, setting all appropriate options. Then, booting from the USB flash key and using this option, a hard drive version of the USB flash key will be created. This will include all options that were present on the flash key, including configuration and hardware information.

Defaults To:

No default
CONFIGURATION FILE FORMAT

This section describes the format of the configuration file that PIXIL Thin Client uses to configure connections that appear in the Login Manager.

LOCATION

The configuration file is called lmgr-config, and is located in /persist/config in the PIXIL Thin Client filesystem. If you have a PIXIL TC SDK, it is possible to change this file directly and build new filesystem images for use with your hardware.

STRUCTURE

A typical entry in a configuration file looks like this:

```
[Sales Server]
Username=stevej
Password=thisisnotmypassword
Hostname=rdp.censoft.com
Launch=1
Type=Microsoft
```

For every connection that appears in the Login Manager, there will be a section similar to the above, starting with the name of the connection, enclosed in square brackets (“[Sales Server]”)

Following the entry’s name, username, password, and hostname are supplied. These should be self-explanatory. The Launch keyword indicates whether or not to launch this configuration automatically when the PIXIL Thin Client starts. A value of “1” will force a launch, a “0” means it will not be launched. If more than one entry has a “1” set for Launch, each one will be launched in turn. It is not possible to configure this situation from the Login Manager.

The last keyword, Type, indicates what type of connection will be made. Valid values for these entries are: Microsoft (for RDP connections), Citrix (for Citrix ICA connections), Browser (for web browser connections), TELNET (for generic TELNET and terminal emulation), TN3270 and TN5250 (for IBM connections.)

Linux PIXIL Configuration Server

This portion of the document describes the procedure for setting up a Linux PIXIL configuration server to work with a given network setup. This procedure assumes some familiarity with network configuration and use of a UNIX-style text editor.
Prerequisites

There are a few things that are needed that this setup procedure assumes:

1. A Dell OptiPlex GX60 desktop machine.

   This will be used as the server for this setup. The original copy was made based on the hardware contained in this server, and must be used if it is to run properly. The 3Com network card must be removed – the built-in network adapter is being used. This is consistent with using the GX60 as a PIXIL Thin Client.

   -- or --

   A Dell 1750 or 1850 Rackmount Server

   The default hardware can be used for this procedure. It assumes that you will be using network port 0.

2. Network settings.

   You will need some general network settings to properly configure the server. You will need a static IP address, the network gateway address, DNS address, and a free range of IP addresses.

3. Network environment.

   The PIXIL Configuration Server assumes that it is the only DHCP server on the network. There cannot be another DHCP server accessible to the local subnet. If there is another DHCP server locally, this must be disabled before using the PIXIL Configuration Server.

Setup

SERVER HARDWARE

ETHERNET CARD

As mentioned above, you must remove the 3Com ethernet card from the GX60 system. After removing this card, plug a network cable in to the built-in ethernet connection on the rear of the machine.

HARD DRIVE

The hard drive containing the PIXIL Configuration Server (PIXIL CS) must be placed in the GX60 and attached as the primary IDE drive. If there is another drive already in the chassis, this must be disconnected. Attach the PIXIL CS drive to the first IDE controller on the first channel. The drive is already setup to be the only drive connected to this controller, so ensure that that there is nothing else connected. This is consistent with the initial setup of the hardware arriving from DELL.
**BIOS**

If this machine has previously been used as a PIXIL Thin Client demonstration machine, the BIOS settings may need reset to allow booting from a hard drive.

**SERVER SOFTWARE**

**LOGGING IN**

After booting the machine, you can login using the following username and password in order to configure the server:

Username: root
Password: pixilcs

**NETWORK CONFIGURATION**

The default network address installed with PIXIL CS is 192.168.0.101. This may need to be changed to allow use on a demonstration network. In addition to merely changing this address, there are other network parameters and options that depend on this address that will need to be changed.

**CHANGING THE IP ADDRESS**

After logging in (using the username and password listed above), run the following command:

```
[root@PIXILCS root]# redhat-config-network
```

The first part of the text above is part of the prompt. The part you should enter is after the `#` character. You should press the ENTER key after typing the above command.

On the screen that appears, select the Ethernet device (it should already be highlighted) using the arrow keys. Then use the TAB key to select the Configure button and hit ENTER. On the following screen, use the TAB key to move the cursor to the Static IP field and enter your new IP address. Again, use the TAB key to move to the Netmask field and enter your new netmask (if needed.) Using the TAB key, move to the Default gateway IP field and enter your gateway address. One last time, use the TAB key to move the highlight to the Ok button and hit ENTER. You will arrive back at the first screen. Move the highlight to the Exit button and hit ENTER. This will save your configuration.

**DNS SETTINGS**

Using your favorite editor, edit the file `/etc/resolv.conf`. It will look something like this:

```ini
nameserver 192.168.0.2
```

Change the IP address to point to your DNS server on the network and save this file.
DHCPD SETUP

The DHCPD server is needed to assign PIXIL Thin Clients network addresses and to tell them where to retrieve their boot files. To properly function, the DHCPD server must be setup to work with your new network settings issued above. To do this, we need to edit the configuration file, /etc/dhcpd.conf.

You can use your favorite editor to view and change this file. It will look something like this:

```
ddns-update-style ad-hoc;
shared-network home {
    next-server 192.168.0.101;
    filename "pxelinux.0";
    subnet 192.168.0.0 netmask 255.255.255.0 {
        range 192.168.0.170 192.168.0.199;
        option routers 192.168.0.1;
        option domain-name-servers 192.168.0.2;
        option domain-name "censoft.com";
    }
}
```

We need to update several things in this file to reflect our new network setup. It is very important to leave the formatting and punctuation (the curly brackets and semicolons) intact while editing this file. If while editing this file it gets corrupted, there is a backup file called /etc/dhcpd.conf.backup that you can copy over top of the existing /etc/dhcpd.conf.

1. Change the next-server address to be the same address that you used for the machine in the network setup. This is used to indicate to the PIXIL Thin Clients where to retrieve its startup files.

2. Change the subnet line to reflect your real subnet and change the netmask to be the same as your settings used for your network setup.

3. Update the range IP addresses to give and appropriate range of IP’s to assign your clients. You will need a range of at least one IP per client. These IP settings must be contained within the subnet entered above.

4. Change the option routers IP address to be the same as your gateway address entered during network setup.

5. Change the domain-name-servers IP address to be the IP of your DNS server. This should be the same as that entered when assigning DNS settings to the server above.

6. Change the domain-name line to the network suffix of your network. This is important if you use names like “salesserver” that refer to machines on your local network. Without this, the name lookups may fail.

Now save this file and exit your editor.
TFTP SERVER

The TFTP server is what serves up the boot files for the PIXIL Thin Client. By default, it will deliver a version of PIXIL TC with a Mozilla browser. However, there are actually two PIXIL TC images stored on the PIXIL CS hard drive. Only one of these images can be active at a time. To switch between them, you need to edit a file, /etc/xinet.d/tftp

Load this file up in your favorite editor. It should look something like this:

```
service tftp
{
    socket_type = dgram
    protocol = udp
    wait = yes
    user = root
    server = /usr/sbin/in.tftpd
    server_args = -c -s /pixil-1.12-moz
    disable = no
    per_source = 11
    cps = 100 2
    flags = IPv4
}
```

One line needs to be changed in this file, the one reading “server_args.” These are the settings the TFTP server uses when PIXIL TC is asking for files. You need to change the path on the end of the line to one of either:

- `/pixil-1.12-moz` For the Mozilla browser version of PIXIL TC
- `/pixil-1.12-nb` For the browser-less version of PIXIL TC

Save this file when you are done.

REBOOT

Now that these settings have been changed, you need to reboot the server. Issue the following command:

```
[root@PIXILCS root]# reboot
```

This will reboot your server. When it restarts, it should be ready for operation with a PIXIL Thin Client.
Troubleshooting

This section describes common problems encountered when setting up the PIXIL CS and using the PIXIL Thin Clients.

CLIENT WON’T BOOT

This section describes several error messages displayed during boot time before the PIXIL Thin Client image is loaded, and their possible resolutions.

PXE BOOTING

PXE-E51: No DHCP or proxy DHCP offers were received.

The PIXIL Thin Client cannot find a DHCP server on the network.

1. Check all network cabling to the server and the client. Ensure that network activity lights are present for both.

2. Check the configuration of the PIXIL CS /etc/dhcpd.conf file. Proper IP addresses are vital to the proper operation of DHCPD. If you make changes to this file, reboot the server for them to take effect. Remember, a backup file is present (/etc/dhcpd.conf.backup) if you make a mistake.

PXE-E53: No boot filename received.

The thin client found a DHCP server, but couldn’t get information pertaining to it’s boot files.

1. Check to make sure that the PIXIL CS server is the only DHCP server on the network. If another DHCP server is present, it can preempt the needed responses from the PIXIL CS server.

2. Check the /etc/dhcpd.conf file to ensure that the line that reads:

   `filename "/pxelinux.0";`

is present in the file in the same location and is formatted as in the example file shown in the DHCPD Setup section above. If necessary, copy the backup configuration file (/etc/dhcpd.conf.backup) over top of the old one and reedit it with your proper network settings. Make sure you reboot after changing these settings.

PXE-E11: ARP timeout

PXE-E32: TFTP open timeout

PXE-E38: TFTP cannot open connection

The PIXIL thin client could not find the server with the proper boot files on it.

1. Check the /etc/dhcpd.conf file to ensure that the “next-server” line has the proper IP address on it. This should be the same as the IP address of the PIXIL CS server that you set. Make sure you reboot after changing these settings.
PXE-T01: File not found

PXE-E3B: TFTP Error – File Not found

The PIXIL thin client located a TFTP server, but couldn’t find the appropriate files.

1. Check the /etc/dhcpd.conf file to ensure that the “next-server” line has the proper IP address on it. This should be the same as the IP address of the PIXIL CS server that you set. Make sure you reboot after changing these settings.

2. Check the /etc/xinetd.d/tftp file. The “server_args” line must contain the path to the PIXIL files. Please see the TFTP Setup section above for the options on this line.

Could not find kernel image: bzImage

Could not find kernel image: linux

Could not find ramdisk image: /pixil-initrd.gz

The PIXIL thin client located a TFTP server, but couldn’t find the appropriate files.

1. Check the /etc/xinetd.d/tftp file. The “server_args” line must contain the path to the PIXIL files. Please see the TFTP Setup section above for the options on this line.

2. This indicates either a missing kernel or filesystem image on the PIXIL CS TFTP server. This means that there are files missing from your PIXIL CS, which may mean your drive is corrupt.

HARD DRIVE, USB FLASH, OR CD BOOTING

PTC-V01: PIXIL TC invalid video setup

The PIXIL Thin Client could not set the correct video mode. This has two possible explanations:

1. In the BIOS settings (hit F2 during boot), set the “Onboard Video Buffer” setting in Integrated Devices to 8MB (or greater.)

2. For the DELL OptiPlex BIOS revisions prior to June 2004 cannot be used. These versions have a bug that prevents proper video modes from being selected. Please download the latest BIOS revision from Dell’s website at:

http://support.dell.com/
CLIENT BOOTS, BUT DOESN’T FUNCTION

See the penguin, but no graphical screen appears.

Boot hangs and you can see the penguin, boot continues after a couple of minutes.

This indicates a DHCP failure. This can mean that there is more than one DHCP server on your network. The PIXIL CS server can be the only DHCP server available on the local subnet.

Quickly scrolling text display of “cannot connect to Display” or similar

An invalid video driver or mode has been selected. For all supported Dell OptiPlex hardware, the i810 graphics driver (see “Graphics Drivers” on page 7.) For other untested hardware, try using the fbdev driver and setting your resolution to 800x600 (“Display Resolution”, page 8.) This is generally a safe mode that all machines support.

“Cannot Display This Video Mode” or similar displayed on the monitor

Monitor turns off and cannot be reactivated

This generally means that the refresh rate being used by PIXIL Thin Client is set too high for the current hardware. PIXIL Thin Client defaults to a generally safe 60Hz refresh rate. However, with DVI connections to certain LCD panels, this setting may not be appropriate. You should try using the lcd-monitor setting (“Monitor Settings, page 7) or try lowering the refresh rate if you’ve raised it.

Cannot connect to Citrix Server, Microsoft RDP server, or Web Sites

This can be one of several problems. First try the following:

Instead of using host names for going to web sites or attaching to RDP/ICA servers, try using the equivalent IP address to connect.

If this works:

1. The DNS settings in the /etc/dhcpd.conf file on the PIXIL CS server is probably incorrect. Check the line reading “option domain-name-servers” to ensure that it has the proper IP address entered. This should be the same address entered in the /etc/resolv.conf file. Reboot after changing this.

2. Check for proper DNS functionality on the server. After ensuring that the DNS IP addresses are set properly on the server, try to ping the RDP/ICA server or website by name. If you receive a "ping: unknown host <hostname>" error, your DNS server may not be available.

If this doesn’t work:

1. Check your network settings in the /etc/dhcpd.conf file on the PIXIL CS server. In particular, check the “option routers” line for the correct default gateway and the “option domain-name” for the correct domain name suffix.

2. If trying to reach servers outside of your subnet, check the network gateway to be sure it is functioning properly.

3. Certain RDP servers will silently reject connections from clients that don’t have the appropriate color depth settings. Check to see what your RDP server requires and set PIXIL Thin Client accordingly (see “RDP Color Depth”, page 10.)