

Document Name	Enstore Console Server System
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1 Summary:

This document describes the Enstore serial console system.

Serial consoles are used to troubleshoot and configure machines when network connections are not working or unavailable. This allows remote connection and control at a very basic level. Boot information may be watched without visiting the physical machine.

Power for machines is controlled from the console server interface. This allows machines to be switched off or rebooted.

In addition to the ability to connect to the serial port of machines, a log of communication on each console port is kept. This is intended to aid troubleshooting when systems fail.

A description of the console server system is presented. Detailed configuration instructions for components are included along with step-by-step setup and use procedures.

2 System description:

Two Linux machines, running SLF4, act as console servers. These two machines run the Conserver application. Conserver creates network connections to Cyclades terminal server ports throughout the Enstore system. The terminal server ports are connected via serial cables to the serial ports of the Enstore machines. The serial ports are configured as the console port of the machine.

To provide redundancy, the two console servers run independently and each connects to all terminal servers in the system. Each console server keeps full logs of each console port on all terminal servers. Either console server may be used to connect to any console port. One is located in GCC and the other in FCC. The console server console ports are available via the Conserver application as well. Configuration of the console servers and Conserver application is done with the Enstore cfengine.

The terminal servers control Cyclades PMxx IPDUs (Intelligent Power Distribution Units). These provide remote power switching capability for the machines connected to that terminal server. The power may be manipulated via the console connection window provided by the Conserver application.

The terminal servers are connected to the console servers via a private network. This simplifies the authentication and security – thus enhancing the integrity and robustness of

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the system. The console servers contain a list of the private network machines and terminal servers in their `/etc/hosts` file.

Terminal servers are physically distributed as dictated by the proximity of racks of servers. High density racks typically have a dedicated terminal server. Low density racks may share a terminal server with nearby racks. The IPDUs are distributed such that each rack has enough power controllers for the machines in that rack. The IPDUs are controlled by the same terminal server which provides console services to the machines in that rack.

The terminal server's console port is connected via another terminal server such that access to its console is available via the Conserver application on the console server. Where possible, the terminal server power is interconnected to allow power cycling for terminal servers via the console connection in the same manner as for machines.

3 Procedures:

Connecting to a console

All connections to consoles must be made from one of the Console servers. First, log on to `ssasrv4` or `ssasrv6`. After you are logged on, simply type `"cons machinename"` to be connected to the console port of a machine. Do NOT use the fully qualified domain name. If the machine hostname is `stkenmvr140a.fnal.gov`, type `cons stkenmvr140a`.

Terminal server connections are by serial cable and do not care about network names. Conserver looks the correct terminal server and port number up in its internal table.

For detailed connection options see section 6.

Switching power on/off from the console connection

You may access the power menu from the console terminal. Connect to the machine using Conserver by typing `"cons machinename"`. Type `"ctrl+p"`. The power control menu for that machine will appear.

Type the number which corresponds to the power function you wish to execute. When finished with the menu, enter `"1"` and you will be returned to the console port.

```
Scientific Linux Fermi LTS release 4.4 (Wilson)
Kernel 2.6.9-55.0.12.ELsmp on an i686

ssasrv4.fnal.gov login:
-----
Cyclades Corporation - Power Management Utility
-----
 1 - Exit      2 - Help      3 - On
 4 - Off       5 - Cycle     6 - Lock
 7 - Unlock    8 - Status    9 - Interval
10 - Other

Please choose an option: █
```

The power menu and actions are recorded in the log file for the console port.

Serial settings for Linux

To ensure that Linux pcs recognize and use the serial port as a console port the `/etc/inittb`, `/etc/securetty` and `/etc/grub.conf` files must be modified.

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Some machines may also need the serial hardware enabled in the Bios. Bios changes are beyond the scope of this document as the settings will vary with manufacturer. Check the manufacturer's data for the particular machine.

To force agetty to listen on the serial port, add the following line to `/etc/inittab`:

```
co:2345:respawn:/sbin/agetty ttyS0 115200 vt100-nav
```

By default in SLF4, root is not allowed to log on via the serial port. To ensure that root can log on to the serial port, the `/etc/securetty` file must exist and have `ttyS0` in it.

To redirect console output to the serial port add these kernel options to the `/etc/grub.conf` file. This will allow the boot and shutdown messages to be seen on the serial port:

```
console=tty0 console=ttyS0,115200
```

Machines with the Enstore configuration will normally have these setting installed by cfengine.

Steps to add new machine consoles

1. Install cable to new machine/s and configure the terminal server port/s as described in Section 4.
2. Add racks/machines with proper terminal server/port information to `/etc/conserver.cf`. See Section 6.
3. Update Enstore master copy and all console servers.
4. Restart Conserver to load new configuration.
`/etc/init.d/conserver restart`

NOTE: *Restarting* Conserver does NOT break any existing user connections. *Stopping* Conserver DOES break any existing user connections

Steps to add new terminal servers

1. Request an IP address on the Enstore private network from the ssa-group. Update `/etc/hosts` file. The master hosts file is stored on `ssasrv1` at `/dats/systems/hosts/hosts`. This file is normally installed using cfengine.
2. Add new terminal server definitions to `/etc/conserver.cf` as described in Section 6.
3. Update Enstore master copy of `conserver.cf` and all console servers.
4. Restart Conserver. `/etc/init.d/conserver restart`

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5. Configure the terminal server. Refer to Section 4 for setup instructions.

Initial configuration steps

1. Request an IP address for the terminal servers and console servers on the Enstore private network from the ssa-group. Update master `/etc/hosts` file with the IP information. The master hosts file is stored on `ssasrv1` at `/dats/systems/hosts/hosts`. This file is normally installed using `cfengine`.
2. Cable and configure terminal servers as instructed in Section 4.
3. Install and configure console servers. Console server configuration is covered in Section 6.
4. Install Conserver on console servers.

```
yum --enablerepo=dag install conserver
```
5. Edit Conserver files. Refer to Section 6 for details
 - a. Edit the `/etc/init.d/conserver` file. Add “-dF” option.

```
# Clear or Set debug flags here
# -d Force daemon mode
# -D Debug output (multiple for more verbose)
# -F Do not automatically reinitialize failed consoles
ConserverOptions="-dF"
```
 - b. Add terminal server definitions to `/etc/conserver.cf`.
 - c. Set trusted access for console servers in `/etc/conserver.cf`:

```
### list of clients we allow
access * {
    trusted 127.0.0.1;
    trusted ssasrv4 ssasrv6;
}
```
 - d. Add racks/machines with proper terminal server/port information to `/etc/conserver.cf`
 - e. Edit `/etc/conserver.password` to allow any user:

```
# This line allows anyone access
# bpassing password checking for any user
any:
```
 - f. Copy the `cons` script from the master location to `/usr/local/bin/cons`.
 - g. Update Enstore master copies.
 - h. Restart Conserver. `/etc/init.d/conserver restart`

4 Cyclades terminal server setup:

Description

Cyclades ACS advanced terminal servers are implemented as remotely manageable, dedicated, PPC based, Linux computers with multiple configurable serial ports. They are available with 1,4,8,16,32 or 48 ports. They are constructed as 1U rack mount units. There is provision for PCMCIA communication or memory cards. The OS and configuration is stored in on-board flash memory. When booted, the contents of flash are copied to a RAM disk from which the system operates.

The Cyclades ACS product has been sold by two subsequent companies. Alterpath and Avocent. Units will have any or all of these brand names. This document will refer to all units as Cyclades ACS terminal servers.

Requirements

A pc with terminal emulation software and a serial port is required for initial setup. After the initial network set up a web browser may be used for configuration using the GUI. The GUI requires Java 2 Runtime Environment (JRE) version 1.4.2 or later.

A straight through cable with RJ45 connectors and a RJ45 to DB9 adapter (ADP-001A00-8W) for pc serial ports are required. The adapter configuration is shown in Appendix A. These are used to connect to the console port of the terminal server. The same adapters and cables will be needed to connect the terminal server ports to the DB9 serial ports of the pcs.

A terminal emulation program such as Minicom or Hyperterminal is required to communicate with the console port.

Initial setup

Connect to the console port using the proper adapter as described above. Using terminal emulation software, log on to the terminal server as root. If you do not have the correct password, see the section on password recovery below. Type the command “wiz” at the prompt. The following screen will appear.

```
*****
***** C O N F I G U R A T I O N W I Z A R D *****
*****
Current configuration:
Hostname : CAS
DHCP : enabled
System IP : #
Domain name : #
Primary DNS Server : #
Gateway IP : eth0
Network Mask : 255.255.255.0

Set to defaults? (y/n) [n] :n
```

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The current setting is displayed in square brackets. To accept the current setting, press enter. To change the setting, type the correct data. If the settings are correct type “y” if not press the enter key. You will then be prompted for each setting.

Enter the network name by which you want the terminal server to be known.

```
Hostname[CAS] :gcents3
```

Answer “n” at this prompt to configure the IP address.

```
Do you want to use dhcp to automatically assign an IP for  
your system? (y/n) [n] :n
```

Enter the IP address.

```
System IP[] :192.168.89.243
```

Because the terminal server is on a private network the rest of the network settings may be left at their defaults. The settings will be redisplayed and a request for confirmation displayed when finished. If the settings are correct type “y”. If not, type “n” and the process will begin again.

The following prompt appears after the settings are accepted:

```
Do you want to activate your configurations now? (y/n) [y] :y
```

Type yes at this prompt and the settings will take effect.

To save the settings to flash memory type y at this prompt:

```
Do you want to save your configurations to flash? (y/n) [n] :y
```

NOTE: If you do not type “y” at the last prompt, your settings will be lost at the next reboot!

General Configuration

Because the Cyclades ACS is being used on a private network – accessible only through a secure gateway – advanced security and authentication protocols are not needed. Only configuration settings and features that are required for our application are discussed in this document. All other settings are factory defaults.

After the network is set up in the initial procedure above, the remaining configuration is performed via a web browser using the GUI interface. The web browser must be running on the console server gateway machine and the IP address of the terminal server must be in its hosts file. Open a web browser (from the gateway) and type <https://192.168.89.xxx> where xxx is the last octet of the IP number assigned to the terminal server. The log on page of the terminal server will appear. Log on using the root account and password.

The GUI displays configuration information in a browser frame. The frame contains basic information and the navigation controls. All configuration of the terminal server may be accomplished via the GUI.

In the upper right corner is the **logout** button, the **Host Name**, **IP address** and Cyclades model name.



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The top of the frame contains the main tabs.



These tabs become highlighted as they are selected.

The bottom of the frame contains the actions buttons and indicators for configuration settings.



try changes causes selected settings to take effect.

cancel changes cancels any pending changes. It does not remove any that have taken effect.

apply changes causes selected settings to take effect and also writes them to flash memory. Changes are not permanent and will not live through a reboot until this button is used.

reload page refreshes the browser window.

unsaved changes is an indicator. If you have made changes but not saved them to flash memory this indicator is red. If there are no unsaved changes it will be green.

On the left side of the frame is the submenu list. This list changes to display contextual menus for each major tab.

Administration tab

Under the **Administration** tab, click **System Information** to see key system parameters. The uptime for the unit is also reported here.

Only the **Time/Date** submenu requires changes.

Select GMT 06h West from the **Timezone** dropdown. Because the terminal servers are on a private network without DNS or routers, NTP will not work. Leave it disabled. Set the correct date and time.

The image shows a configuration form for system information. It includes a 'Timezone' dropdown menu set to 'GMT 06h West' with an 'Edit Custom' button next to it. Below that is a 'Network Time Protocol' dropdown menu set to 'Disable'. There are two sections for date and time: 'Date' with fields for Month (6), Day (4), and Year (2008); and 'Time' with fields for Hour (14), Minute (31), and Second (07).

Ports tab

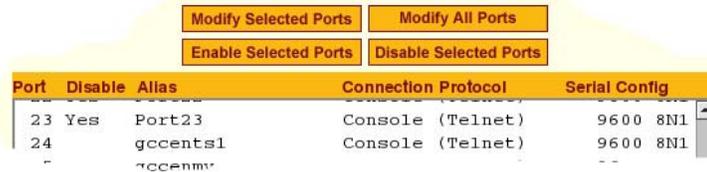
Basic serial port settings and power strip (IPDU) settings are configured in the **Ports** tab. The **Ports Status** submenu displays alias and serial line status for each port. **Ports Statistics** shows communication statistics for each port. **Virtual Ports** are not implemented.



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All ports are configured via the **Physical Ports** submenu. Most settings are common to all ports. Only the communication settings, alias, multiuser setting and power management are configured. All other settings are factory defaults.

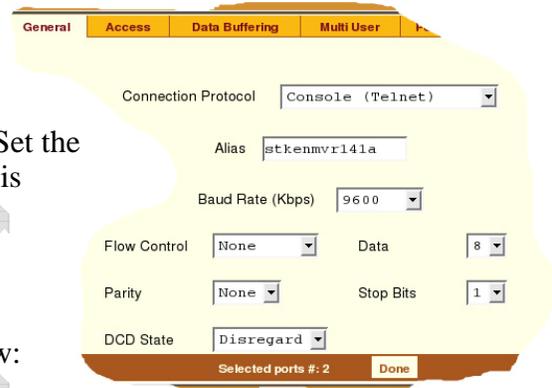
Ports must first be enabled. Select the port number/s to be configured and click **Enable Selected Ports**.



Buttons: **Modify Selected Ports**, **Modify All Ports**, **Enable Selected Ports**, **Disable Selected Ports**

Port	Disable	Alias	Connection Protocol	Serial Config
23	Yes	Port23	Console (Telnet)	9600 8N1
24		gccents1	Console (Telnet)	9600 8N1
		gccenm1		

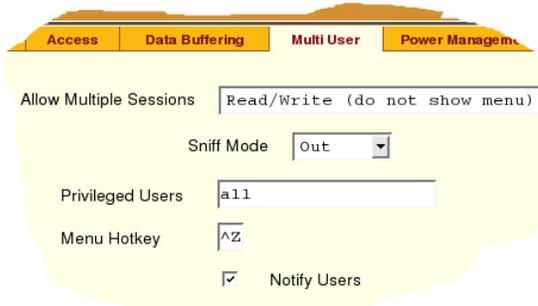
Next select a port to configure and click **Modify Selected Ports**. The **General** port configuration menu will be presented. Enter the name of the machine connected to this port in the **Alias** box. Set the correct baud rate for the machine. Normally this is 115200 for Enstore machines.



Connection Protocol: Console (Telnet)
Alias: stkenmvr141a
Baud Rate (Kbps): 9600
Flow Control: None, Data: 8
Parity: None, Stop Bits: 1
DCD State: Disregard
Selected ports #: 2, Done

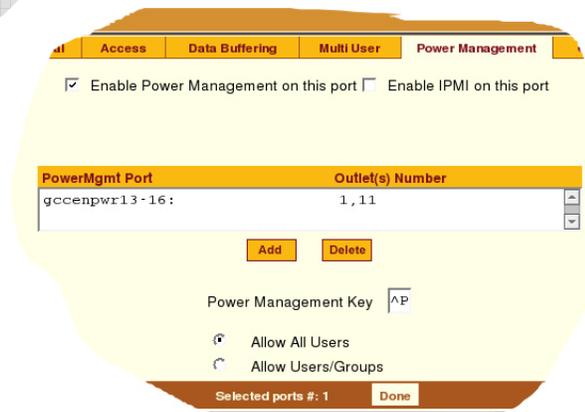
The settings are configured as shown at right:

Next select the **MultiUser** tab. Configure as below:



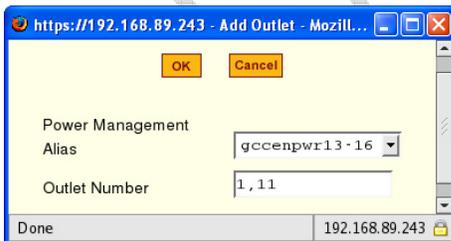
Access, Data Buffering, Multi User, Power Management
Allow Multiple Sessions: Read/Write (do not show menu)
Sniff Mode: out
Privileged Users: all
Menu Hotkey: ^Z
 Notify Users

Select the **Power Management** tab. Settings are shown at right:



Access, Data Buffering, Multi User, Power Management
 Enable Power Management on this port Enable IPMI on this port
PowerMgmt Port: gccenpwr13-16: Outlet(s) Number: 1, 11
Add, Delete
Power Management Key: ^P
 Allow All Users
 Allow Users/Groups
Selected ports #: 1, Done

Click **Add**, Select the alias and enter the outlet number/s of the power strip/s which control the machine connected to this serial port.



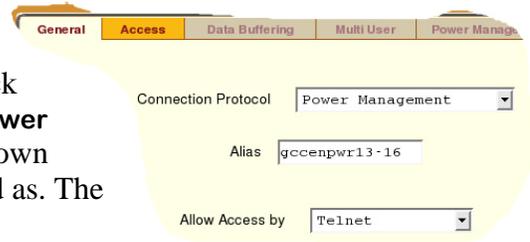
https://192.168.89.243 - Add Outlet - Mozill...
OK, Cancel
Power Management Alias: gccenpwr13-16
Outlet Number: 1, 11
Done 192.168.89.243

Access, Data Buffering and **Other** are not configured. Click the **Done** button when finished.

NOTE: A serial port must be defined as Power Management before outlets can be assigned. Be sure you know the correct outlets to assign. Instructions for configuring a power management port are below.

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To configure a port for power management (using Cyclades PM IPDU), select the port and click **Modify Selected Ports**. In the **General** tab select **Power Management** from the **Connection Protocol** drop down box and type the **Alias** the IPDU is to be designated as. The other tabs are not configured.



General Access Data Buffering Multi User Power Management

Connection Protocol Power Management

Alias gccenpwr13-16

Allow Access by Telnet

Security tab

The Security tab submenus control the authentication and user management functions of the terminal server. **Users and Groups** and **Authentication** submenus are left with the factory defaults.

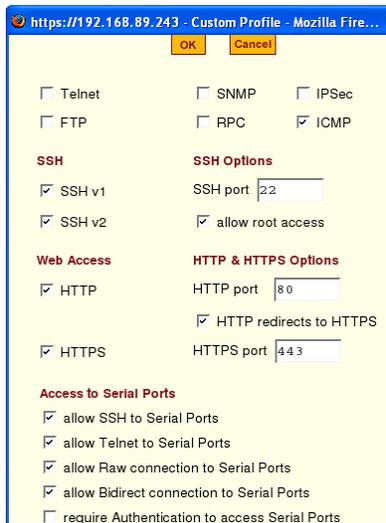
Active Ports Sessions does not require configuration. This submenu is used to check for active sessions and, optionally, kill them. Below is an example status line.



Uptime: 2 days # users: 1

User	TTY	From	Login@	IDLE	JCP
NONE	ttyS9	192.168.89.1:18411	11:50am		

The **Security Profile** submenu contains important settings.



OK Cancel

Telnet SNMP IPSec
 FTP RPC ICMP

SSH **SSH Options**
 SSH v1 SSH port 22
 SSH v2 allow root access

Web Access **HTTP & HTTPS Options**
 HTTP HTTP port 80
 HTTPS HTTPS port 443 HTTP redirects to HTTPS

Access to Serial Ports
 allow SSH to Serial Ports
 allow Telnet to Serial Ports
 allow Raw connection to Serial Ports
 allow Bidirect connection to Serial Ports
 require Authentication to access Serial Ports

First click **Custom**. Check the **allow root access** check box. Click **OK**. Now **apply changes** using the button on the bottom of the frame. When the save has finished, click the **Moderate** button in the **Security Profile** submenu. This will set the defaults for all security settings except **allow root access** which will remain checked. Be sure to **apply changes** again after clicking **Moderate**.



Secured Moderate Open

Profile is set to: **MODERATE**

- "Moderate" is the recommended Security Level.
- This profile enables: SSH v1, SSH v2, HTTP, HTTPS, Telnet, SSH and Raw connections to Serial Ports, ICMP and HTTP redirection to HTTPS.
- Authentication to access Serial Ports is not required.

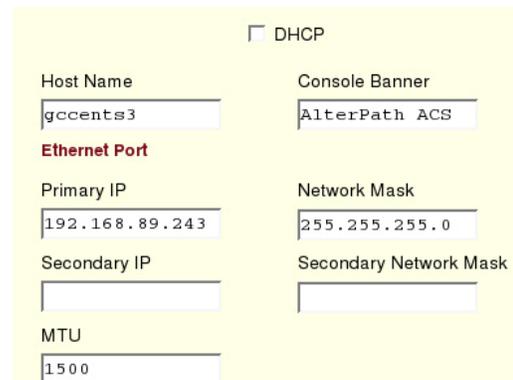
Custom Default

allow root access is required to allow the terminal server to open a terminal window to itself using the **Applications** tab, **Connect** submenu.



Network tab

Only the **Host Settings** submenu requires non-



DHCP

Host Name Console Banner
gccents3 AlterPath ACS

Ethernet Port

Primary IP Network Mask
192.168.89.243 255.255.255.0

Secondary IP Secondary Network Mask

MTU
1500

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default settings for this tab.

The **PCMCIA Management** and **Host Tables** submenus provide useful information but do not require special settings. See the section on backing up the configuration for more about the **PCMCIA Management** submenu.

Of the items in the **Host Settings** submenu, only the **Host Name** and **Primary IP** are required. All other settings in this submenu may be left at the factory defaults.

Applications tab

The first three submenu items provide control functions. The last two submenu items are not used in our implementation.

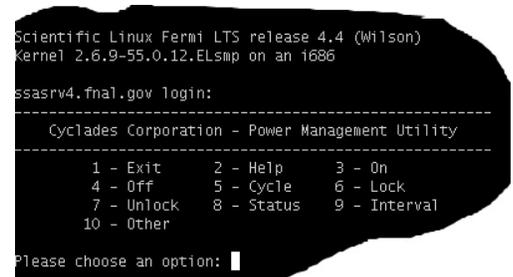


The **Connect** submenu provides terminal access to the terminal server and to individual serial ports. To access the terminal server click the **Connect to ACS32** radio button, then click **Connect**. A

sequence of dialog boxes requesting permission to launch a Java application and security warnings will be presented. After these are approved a black terminal window will appear. To use the terminal it's necessary to click in the window. Press "Enter" on your keyboard. The terminal server command line prompt will appear. While connected, the window will display status messages regarding connections through the terminal server. To end the session, click **Disconnect** and close the window.

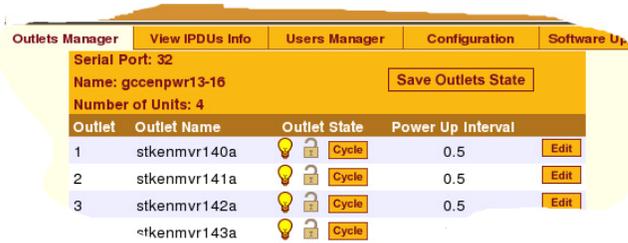
To connect to any serial port, select the machine name in the **Serial** drop down box and click **Connect**. The procedure is the same as the connection to the terminal server - with the exception that a log on prompt from the machine served by the selected serial port will appear. Remember to log off the remote machine before closing this window.

If the machine connected to the serial port is also defined as having a power strip (IPDU) outlet controlled by this terminal server, power may be manipulated from the terminal connection by using the control sequence defined in the **Ports** tab for that IPDU. See the **Ports** tab section above for instructions on configuring the IPDU port and associating a particular serial port console with it.



NOTE: On newer units you must edit the `/etc/daemon.d/pmd.sh` file. Change `DNAME` from `pmd_ng` to `pmd`. Don't forget to run "saveconf" after making the change.

The menu presented includes basic commands such as *on*, *off*, *cycle* and *status*. Type the number of the function you wish and press enter.



The **IPDU Power Mgmt** submenu displays Intelligent Power

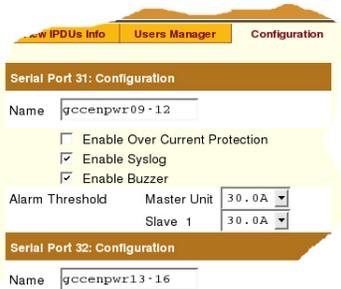
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Distribution Unit (IPDU) information for Cyclades PM series power strips. Individual outlets may be power cycled from this submenu.

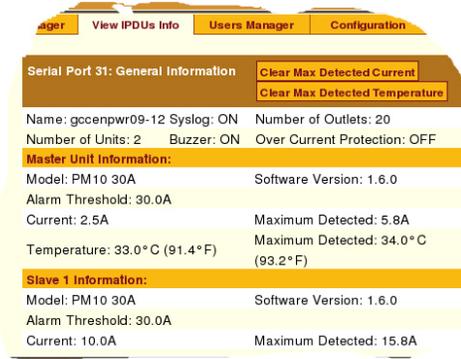
Use the **Outlets Manager** tab to view power strips and outlet status. The light bulb indicates power status. Use the **Cycle** button to cycle power for the outlet. The **Edit** button opens a configuration dialog to set the **Power Up Interval** of the outlet.

NOTE: The power interval set here does not refer to the duration of the power off (cycle time) at the outlet. This control sets the delay between power on of outlets in a multi-outlet set on chained power strips.

The **View IPDUs Info** tab displays details about the power strip – including temperature and current.



Configuration of the alarms and current thresholds is done in the **Configuration** tab.



To view IPDU information sorted by the controlled machines, use the **IPDU Multi-Outlet Ctrl** submenu. This menu allows lookup by machine name. If the machine has multiple power supplies, the outlets for all power supplies for that machine are shown. They may be cycled together by using the **Cycle** button. Status is shown by the light bulb icon.



NOTE: Power can only be *cycled* from these menus. To turn an outlet *off* or *on* you must access the power strip through the terminal window command line interface for its serial port. See the Cyclades PMxx IPDU section for details.

IPMI Power Mgmt. and **Terminal Profile Menu** submenus are not applicable to our configuration.

Backup the configuration using a PCMCIA adapter and flash card.

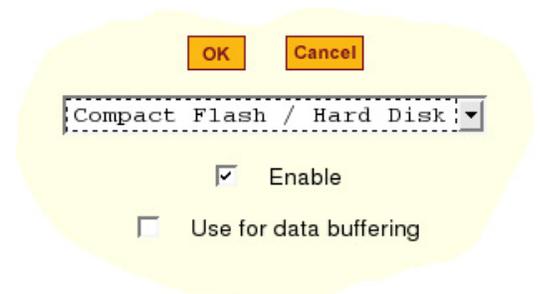
This procedure requires a PCMCIA flash card adapter. The minimum size card required is 128 MB. Larger cards are recommended to allow backup of multiple configurations and additional files.

Before using a standard flash memory card the `/etc/pcmcia/ide.opts` file must be modified. Be sure you run “`saveconf`” after making the change. Using `vi` change the `FSTYPE` to `vfat`. There are two instances in the file:

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```
# ATA/IDE drive adapter configuration
#
# The address format is "scheme,socket,serial_no[,part]".
#
# For multi-partition devices, first return list of partitions in
# $PARTS. Then, we'll get called for each partition.
#
case "$ADDRESS" in
*,1,*,1)
    #INFO="IDE HDA2 setup"
    DO_FSTAB="y"
    DO_MOUNT="y"
    FSTYPE="vfat"
    MOUNTPT="/mnt/ide"
    [ -d $MOUNTPT ] || mkdir $MOUNTPT
    ;;
*,*,*,1)
    #INFO="Sample IDE setup"
    DO_FSTAB="y" ; DO_MOUNT="y"
    DO_FSCK="y"
    FSTYPE="vfat"
    #OPTS=""
    MOUNTPT="/mnt/ide"
    [ -d $MOUNTPT ] || mkdir $MOUNTPT
    ;;
*,*,*)
    PARTS="1"
    # Card eject policy options
    NO_CHECK=n
    NO_FUSER=n
    ;;
esac
```

PCMCIA slots are on the side opposite the serial ports. Remove the dummy card and insert the PCMCIA flash adapter into the terminal server. Using the GUI interface select **Network** tab **PCMCIA Management** submenu. The card will appear in one of the slots. Click **Configure**. Select **Compact Flash** from the drop down list and check **Enable**. Now click **OK**.



The Compact Flash card appears as an IDE hard drive attached to the system at `/mnt/ide`. Open a terminal session using the GUI or the console port. Create a directory and copy the contents of `/mnt/flash/` to the new directory on the flash card. The `/mnt/flash/` directory contains the OS image and configuration files.

```
[root@CAS root]# mkdir /mnt/ide/gccents3
[root@CAS root]# cp /mnt/flash/* /mnt/ide/gccents3
[root@CAS root]# ls -l /mnt/ide/gccents3
-rwxr-xr-x  1 root  root      65536 Jun 13 13:20 boot_alt
-rwxr-xr-x  1 root  root        109 Jun 13 13:20 boot_conf
-rwxr-xr-x  1 root  root    130047 Jun 13 13:20 boot_ori
-rwxr-xr-x  1 root  root     50145 Jun 13 13:20 config.tgz
-rwxr-xr-x  1 root  root  14358666 Jun 13 13:20 zImage
```

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```
[root@CAS root]#
```

To dismount the PCMCIA adapter go to **Network** tab **PCMCIA Management** submenu and click **Eject** for the adapter.

To reinstall the configuration simply copy the files from the flash card to `/mnt/flash/`. Then reboot.

Password recovery

The factory default username and password are “root” and “tslinux”. If the current password is unknown the following procedure can be used for reset.

Access the terminal server via the console port and reboot the box. During the reboot process, when you see the line:

```
Linux/PPC load: root=/dev/ram ramdisk=0x0000F000
```

You must press the space key once, type “single” and press enter. The ACS will boot and display the root prompt. You can then change the root password with the “passwd” command.

```
[root@(none) /]# passwd root
New password: tslinux
Re-enter new password: tslinux
Password changed
[root@(none) /]# saveconf
[root@(none) /]# reboot
```

NOTE: You MUST perform `saveconf` before rebooting or the new password will not be retained.

Firmware

Units should be upgraded to the latest release of firmware - v3.0.0. A firmware upgrade does not destroy the current configuration settings.

To do this properly the unit must have its MAC address registered with the Fermilab node form and be set to DHCP. The MAC address can be obtained from the web GUI in the **Administration** tab **System Information** submenu. If the unit is not yet configured, connect using the console port from a serial terminal and type “`ifconfig -a`”. Use the “`wiz`” command to configure the network for DHCP. Save the configuration change to RAM, but do not save to flash memory. After the firmware upgrade, the terminal server will reload the original configuration when restarted.

With the serial console connection use the “`ifconfig`” command to obtain the address assigned by DHCP. Connect to that address using a web browser. Log on and use the **Administration** tab **Upgrade Firmware** submenu of the web GUI. Be sure to select **Run Checksum = Yes**.

FTP Site:

`ftp.cyclades.com`

Path and Filename:

`/pub/cyclades/alterpath/acs/released/V_3.0.0/fl0536001.bin`



The screenshot shows a web form for upgrading firmware. It includes a dropdown menu for 'Type' set to 'FTP', a text input for 'FTP Site' with the value 'ftp.cyclades.co', a 'Username' field with 'anonymous' and a 'Password' field with '*****'. Below these are fields for 'Path and Filename' containing '/pub/cyclades/alterp' and a 'Run Checksum' dropdown set to 'Yes'. An 'Upgrade Now' button is at the bottom.

Some useful URLs:

Homepage

<http://www.avocent.com/Products/Default.aspx?id=6846>

http://cyclades.com/common/www/pdf/data_sheets/alterpath_acs.en.pdf

Documentation

<http://cyclades.com/support/downloads.php?prd=Cyclades%20ACS%20Advanced%20Console%20Servers>

Support Information

<http://www.avocent.com/Products/Default.aspx?id=9099>

FAQ

<http://cyclades.com/support/faqs.php?cid=3>

5 Cyclades PMxx IPDU (Intelligent Power Distribution Unit):

Description

Cyclades PM IPDUs provide capability to monitor current, temperature and outlet state. They can remotely turn power on/off or cycle.

The input and output port RJ45 jacks are wired null modem(crossover) and straight through respectively. Appendix A contains the signal pin out.

The PMxx supports daisy-chaining of multiple units via its input and output serial ports. The input port of the first unit is connected to a serial control device which may be a terminal server or PC running a serial communications program. The output port of the first unit is connected to the input port of the next unit. The IPDUs automatically detect additional units attached to the daisy chain. The first unit then reports them as consecutive outlets. Thus if there are two 10 outlet units, the status command will report 20 outlets. They are numbered sequentially starting with the first unit.

Unit 1 = outlets 1-10

Unit 2 = outlets 11-20

The fifth outlet in the second unit is outlet 15.

The Cyclades PM IPDU manual contains a complete list of commands and specifications.

Management via Cyclades terminal server

When connected to a Cyclades terminal server PM IPDU units are automatically detected and configured. The terminal server port must be configured as **Power Management**. See section 4, "Cyclades terminal server setup" of this document for details of the configuration.

The units are normally connected to port 32 of the Cyclades terminal server. There are some exceptions. Please see the `/etc/conserver.cf` file for details of port connections. Standard practice is one daisy chain per rack connected to the terminal server for that rack.

Enstore Console Server System

NOTE: On newer units you must edit the `/etc/daemon.d/pmd.sh` file. Change `DNAME` from `pmd_ng` to `pmd`. Don't forget to run `saveconf` after making the change.

The outlets are managed via the Cyclades terminal server GUI using a web browser. After logging on to the terminal server go to the **Applications** menu and use either the **IPDU Power Mgmt.** or **IPDU Multi-outlet Ctrl.** Menu. Status for each outlet is shown in these screens and there is a button to cycle the power for each outlet.

NOTE: There is only the option to cycle power from these screens. To shut an outlet off or turn one on, the command line interface must be used.

To access the IPDU via its command line interface, connect to the Cyclades terminal server using either the GUI interface or the Conserver program.

Using the terminal server GUI: Under the **Applications** menu select the power controller port – `gccenpwr09-12` for example. Then click **Connect**. You will be automatically connected and logged on to the IPDU. Type `help` for the command menu.

Using Conserver: Type `cons termservername`. Log on to the terminal server as root and type `ts_menu`. You will be presented with a list of ports. Type the number of the port to which the IPDU is connected. You will be connected and automatically logged on to the power controller. Type `help` for the command menu.

To control power for machine consoles listed in the **IPDU Multi-Outlet Ctrl** menu of the Cyclades terminal server you may access the power menu from the console terminal. Connect to the machine using Conserver by typing `cons machinename`. Type `ctrl+p`. The power control menu for that machine will appear.

```
Scientific Linux Fermi LTS release 4.4 (Wilson)
Kernel 2.6.9-55.0.12.ELsmp on an i686

ssasrv4.fnal.gov login:
-----
Cyclades Corporation - Power Management Utility
-----
 1 - Exit      2 - Help      3 - On
 4 - Off       5 - Cycle     6 - Lock
 7 - Unlock   8 - Status    9 - Interval
10 - Other

Please choose an option: █
```

Useful URLs

Homepage

http://www.avocent.com/Cyclades_PM.aspx

Documentation

<http://cyclades.com/support/downloads.php?prd=Cyclades%20PM%20Intelligent%20Power%20Distribution%20Unit>

FAQ

<http://cyclades.com/support/faqs.php?cid=12>

6 Console server setup:

System requirements

The console servers are medium performance Linux systems. `ssasrv4` (GCC) and `ssasrv6` (FCC) are Scientific Linux Fermi 4 installations. Three applications must be installed to manage and communicate with the terminal servers;

1. Firefox (or other up to date browser)
<http://www.mozilla.com/en-US/firefox/>
2. Java JRE 1.4.2 or later
<http://java.com>
3. Conserver program
Available from DAG repositories. To install, use YUM.

```
yum --enablerepo=dag install conserver
```

Firefox and Java are used by the web GUI of the Cyclades for configuration and to make terminal session connections to ports. The Conserver program makes a connection from the console server to the Cyclades terminal server and logs activity on the serial ports.

The default log file location on the console server is `/var/log/consoles`. `/var` must have adequate disk space configured for the anticipated volume of log files.

Because the terminal servers are on a private subnet, the console server `/etc/hosts` file must contain their private subnet IP addresses. The master hosts file is located on `ssasrv1` at `/data/systems/hosts/hosts` and must be copied to the local `/etc/hosts` file. Normally this is done using `cfengine`.

A script (`/usr/local/bin/cons`) simplifies user interaction and invokes the Console client application. The Console client provides a user interface for consoles to the Conserver application which creates and maintains the connection to the console port of the target machines through the terminal servers.

Log files

Conserver logs informational and error messages to `/var/log/conserver`. When the application starts, it opens a connection to all machines listed in the `/etc/conserver.cf` file. Any errors in opening these connections are reported to the log file. The Conserver application does not test for a response from the console. Conserver only reports that a connection is opened to the port of the terminal server.

For each connection that is made, Conserver creates a log file with the machine name in `/var/log/consoles`. Thus for the terminal port connected to the serial console of `stkenmvr140a`, there is a file `/var/log/consoles/stkenmvr140a`. This file contains all activity from the serial port. The file does not receive Conserver messages and menus.

Cons script

Enstore Console Server System

This script takes the name of the requested machine as an input argument. The machine name is passed, with appropriate options, to invoke Console. Console uses Conserver to start the connection. Conserver looks the console server for the target machine up in its internal table. That table is loaded from the `/etc/conserver.cf` file.

If there is a `$DISPLAY` environment variable the script opens an X-term for the console session to that display. If `$DISPLAY` is not set, it creates the console session at the command line.

```
#!/bin/sh
machine="$1"
base=localhost
if [ -z $DISPLAY ]
then
    #/usr/local/bin/console -M $base -A -v $machine
    /usr/bin/console -M $base -A -v $machine
else
    echo "Start xterm for $machine on $base"
    xterm -fg white -bg black -g 80x25 -sb -T "$machine" -n
    $machine -e console -M $base -v -A $machine &
fi
```

Conserver configuration

Conserver has two components. The Conserver application manages the connections to the terminal server and log files. The Console client application manages the interactive user interface.

Conserver is configured using these files:

```
/etc/init.d/conserver
/etc/conserver.cf
/etc/console.cf
/etc/conserver.passwd.
```

The files are identical on both `ssasrv4` and `ssasrv6`. The master copies are stored in CVS and installed by `cfengine`.

conserver: Two options are used in the initialization file for the Enstore configuration of Conserver.

“-d” The default setting. This option starts Conserver as a daemon. Conserver will attempt a connection to consoles listed in `conserver.cf`. All console output will go to log files in `/var/log/consoles/`.

“-F” Conserver will retry failed connections every minute. If a console is down for any length of time this would mean many error messages in the log file. This option disables the automatic retry function.

Enstore Console Server System

conserver.cf: This file contains all the terminal server definitions and provides the look-up table which associates machines consoles with terminal servers and ports. The file also limits access to consoles.

Because the terminal servers are on a private subnet we can give all users full access.

```
### set up global access
default full { rw *; }
```

We then make sure it can only be accessed by a user logged on to ssasrv4 or ssasrv6.

```
### list of clients we allow
access * {
    trusted 127.0.0.1;
    trusted ssasrv4 ssasrv6;
}
```

Some settings are common to all terminal servers. Set them here.

```
### set the defaults for all the consoles
# these get applied before anything else
default * {
    # The '&' character is substituted with the console name
    logfile /var/log/consoles/&;
    logfilemax 500K; # Rollover the log when it reaches 500 KB
    timestamp 1hab; # timestamps every hour with activity and break
                    logging
    include full; # include the 'full' default from above
    master localhost; # Master for all consoles on this machine
    options reinitoncc # If console is down, reconnect
}
```

Define the Cyclades terminal server port base and port increment.

```
#Avocent-Alterpath-Cyclades ACS32 Firmware 3.0.0
default cyclades_acs { type host; portbase 7000; portinc 1; }
```

Example of specific terminal server definition.

```
#### Terminal Server gccents1 ####
#### IP Address 192.168.89.241 - In rack GCC-tr-0502
default gccents1 {
    host gccents1;
    include cyclades_acs;
}
```

Example of console definition block.

```
#### FCC rack FCC-1-1124 Consoles ####
console stkendca2a { include fccents2; port 1; }
console stkenmvr27a { include fccents2; port 2; }
console stkendca9a { include fccents2; port 3; }
console stkendca10a { include fccents2; port 4; }
console stkendca11a { include fccents2; port 5; }
console stkendca12a { include fccents2; port 6; }
# Power strips 05-06, Avocent/Cyclades PM10
console fccenpwr05-06 { include fccents2; port 31; }
```

Enstore Console Server System

Note that the machines are grouped by rack and terminal server in port numeric order. This is not necessary but it organizes the file and makes finding a particular machine or terminal server port easier.

Use lots of comments!

console.cf: This file is not needed in the Enstore implementation.

conserver.passwd: Because the Enstore terminal servers are on a private subnet and only accessible via `ssasrv4` and `ssasrv6`, the `conserver.passwd` file has authentication disabled. The file contains only the following lines:

```
# This line allows anyone access
# bpassing password checking for any user
any:
```

Console commands

The console client has built-in commands that are invoked from the command line. To access the console client command menu while in a session, type “`ctrl+e`” then “`c`” The command prompt will appear “[“. Enter the desired command followed by the return key.

Commonly used commands

- d – End the connection, but not the session.
- o – Reopen the connection and log file
- f – Force attach read/write. Use this to take control when another user is connected.
- . – Disconnect from console and end the session. This does not end logging.
- ? – List all commands

Useful URLs

Conserver web page

<http://www.conserver.com/>

Conserver documentation

<http://www.conserver.com/docs/>

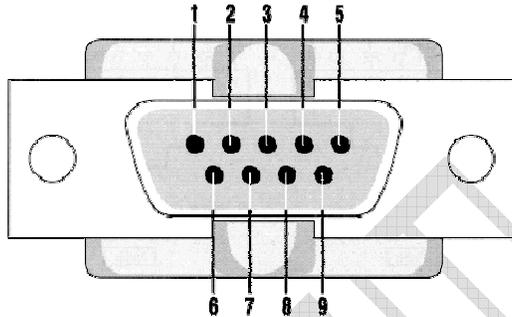
Additional Conserver information

<http://www.conserver.com/consoles/>

7 Appendix A – Serial connector pin outs:

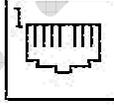
Standard DB9 Serial port

Male – Front view



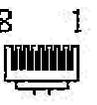
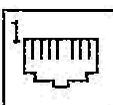
Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

Cyclades serial ports and console port

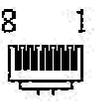
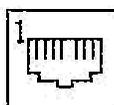
		Male	Ferrale
RJ45			
Pin No.	Signal Description	Abbr.	DTE
1(Blue)	Request To Send	RTS	—>
2(Orange)	Data Terminal Ready	DTR	—>
3(Black)	Transmitted Data	TxD	—>
4(Red)	Signal Ground	SG	
5(Green)	Clear To Send	CTS	<—
6(Yellow)	Received Data	RxD	<—
7(Brown)	Data Carrier Detect	DCD	<—
8(White)	Data Set Ready	DSR	<—

Cyclades PMxx IPDU (Intelligent Power Distribution Unit)

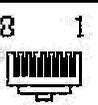
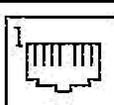
Input connector for IPDU

		Male	Female		
RJ45					
Pin No.	Signal Description	Abbr.	DCE		
1(Blue)	Request To Send	CTS	«—		
2(Orange)	Data Set Ready	DCD	«—		
3(Black)	Data Carrier Detect	RxD	«—		
4(Red)	Received Data	SG			
5(Green)	Transmitted Data	RTS	—»		
6(Yellow)	Signal Ground	TxD	—»		
7(Brown)	Data Terminal Ready	DTR	—»		
8(White)					

Output connector to next IPDU

		Male	Female		
RJ45					
Pin No.	Signal Description	Abbr.	DTE		
1(Blue)	Request To Send	RTS	—»		
2(Orange)	Data Set Ready	DTR	—»		
3(Black)	Data Carrier Detect	TxD	—»		
4(Red)	Received Data	SG			
5(Green)	Transmitted Data	CTS	«—		
6(Yellow)	Signal Ground	RxD	«—		
7(Brown)	Data Terminal Ready	DCD	«—		
8(White)					

Opengear serial ports (console port is standard DB9 pin out)

		Male	Female		
RJ45					
Pin No.	Signal Description	Abbr.	DTE		
1(Blue)	Request To Send	RTS	—»		
2(Orange)	Data Set Ready	DSR	—»		
3(Black)	Data Carrier Detect	DCD	«—		
4(Red)	Received Data	RxD	«—		
5(Green)	Transmitted Data	TxD	—»		
6(Yellow)	Signal Ground	SG			
7(Brown)	Data Terminal Ready	DTR	—»		
8(White)	Clear To Send	CTS	«—		

Cyclades Adapter Chart

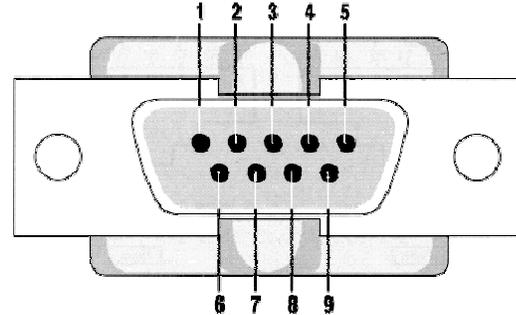
	Cyclades Alterpath Avocent ACS Terminal Ports	Cyclades Black Adapter ADB0200 (no cross)	Cyclades Red Adapter ADP-001A00-8W	Adapter A A4C170-19995	Adapter B No Number	Cyclades Tan Adapter ADB0036
RJ45 Pins						
1(Blue)	RTS	RTS	CTS	CTS	CTS	CTS
2(Orange)	DTR	DTR	DCD-DSR	DCD-DSR	DSR	DCD-DSR
3(Black)	TxD	TxD	RxD	RxD	RxD	RxD
4(Red)	SG	SG	SG	SG	SG	SG
5(Green)	CTS	CTS	RTS	RTS	RTS	RTS
6(Yellow)	RxD	RxD	TxD	TxD	TxD	TxD
7(Brown)	DCD	DCD	DTR	DTR	RTS	DTR
8(White)	DSR	DSR	DTR	DTR	DTR	DTR

NOTE: Signal stated is DB9 pin that RJ45 wire connects to.

Cyclades PMxx IPDU (RJ45 to RJ45)

	Cyclades Avocent PM IPDU (Input)	Cyclades Avocent PM IPDU (Output)
RJ45 Pins		
1(Blue)	CTS	RTS
2(Orange)	DCD	DTR
3(Black)	RxD	TxD
4(Red)	SG	SG
5(Green)	RTS	CTS
6(Yellow)	TxD	RxD
7(Brown)	DTR	DCD
8(White)		

DB9 Connector pins



Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

Opengear Adapter Chart

	Opengear CM4148 Terminal Ports	Grey 319000-00 (no cross)	Opengear ADP-001A11-8w	Grey 319001-00
RJ45 Pins				
1(Blue)	RTS	RTS	CTS	CTS
2(Orange)	DSR	DSR	DTR	DTR
3(Black)	DCD	DCD	DTR	DTR
4(Red)	RxD	RxD	TxD	TxD
5(Green)	TxD	TxD	RxD	RxD
6(Yellow)	SG	SG	SG	SG
7(Brown)	DTR	DTR	DCD-DSR	DCD-DSR
8(White)	CTS	CTS	RTS	RTS

NOTE: Signal stated is DB9 pin that RJ45 wire connects to.