PCS500R Pro:Centric® Server

Installation & Setup Guide
Warranty

SAC35974191
(2112-REV01)

www.lg.com

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ENGLISH

WARNING: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

Warning! Safety instructions

- Please read these safety precautions carefully before using the product.
- In this manual, the illustration may be somewhat different from your product because it is just example to help the instruction.
- Manufacturer and installer cannot provide service related to human safety as the applicable wireless device has possibility of electric wave interference.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION : TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING : TO REDUCE THE RISK OF FIRE AND ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

TO PREVENT THE SPREAD OF FIRE, KEEP CANDLES OR OTHER ITMES WITH OPEN FLAMES AWAY FROM THIS PRODUCT AT ALL TIMES.

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources, such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where it exits from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination in order to avoid injury from tip-over.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Use authorized detergent only when cleaning the product. Do not clean your product with chemicals including glass cleaner, any type of air freshener, insecticide, lubricants, wax (car, industrial), abrasive, thinner, benzene, alcohol etc., which can damage the product and/ or its panel.
  - Product can be deformed.
- Do not install this product on a wall if it could be exposed to oil or oil mist. This may damage the product and cause it to fall.
- If water or another substance enters the product (like a AC adapter, power cord, TV), disconnect the power cord and contact the service centre immediately. Otherwise, this may result in fire or electric shock.
- Only use an authorized AC adapter and power cord approved by LG Electronics. Otherwise, this may result in fire, electric shock, malfunction or product deformation.
- Never Disassemble the AC adapter or power cord. This may result in fire or electric shock.
- Be careful in handling the adapter to prevent any external shocks to it. An external shock may cause damage to the adapter.
- Power Sources
  - This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your INSTALLATION, consult your product dealer or local power company.

- Overloading
  - Do not overload wall power outlets and extension cords as this can result in a risk of fire or electric shock.
- Disconnect Device
  - The AC mains plug is used as the disconnect device. The disconnect device must remain readily operable.
- Object and Liquid Entry
  - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product. Do not use liquid cleaners or aerosol cleaners.
- Outdoor Use
  - To prevent fire or shock hazards, do not expose this product to rain or moisture.
- Wet Location
  - Do not use this product near water or moisture or in an area, such as a basement, that might become flooded. The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
- Test Equipment
  - In some cases, LG has supplied or recommended the use of test equipment and devices for the setup and testing of the equipment. The operation and maintenance of test equipment is described in their associated instruction manuals. Please refer to these manuals for explicit instructions regarding the safe use and handling of the equipment.
- Damage Requiring Service

  Unplug this product from the wall power outlet and refer servicing to qualified service personnel under the following conditions:
  - If the power-supply cord or plug is damaged.
  - If liquid has been spilled, or objects have fallen into the product.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
  - If the product has been dropped or the cabinet has been damaged.
  - If the product exhibits a distinct change in performance.

  Refer all servicing to qualified service personnel.
- Servicing
  - These servicing instructions are for use by qualified service personnel only. To reduce the risk of electrical shock, do not perform any servicing other than that described in the operating instructions unless you are qualified to do so.
- Replacement Parts
  - When replacement parts are required, be sure the service technician uses replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.

- Safety Check
  - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
- Handling Notice
  - Only qualified service personnel should handle and install this unit. A series of screws with lock washers are used to secure the top and bottom covers of the unit. Use caution when handling the unit as the lock washers may have rough edges. Do NOT run your fingers over the top and bottom covers of the unit.
- Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
  - The product can be deformed or fire can break out due to overheating inside the product.
- Do not place the product in a built-in installation such as bookcase or rack.
  - Ventilation required.
- DISCONNECTING DEVICE FROM MAINS
  - Mains plug is the disconnecting device. The plug must remain readily operable.
- Do not place anything containing liquid on top of the product such as flowerpot, cup, cosmetics or candle.
  - This may cause a fire hazard.

PCS500R Rack Installation (See p. 15, 16)

- Wear a properly grounded, antistatic wrist strap to avoid causing electrostatic (ESD) damage to the PCS500R.
- Carefully slide the PCS500R into a standard 19-inch equipment rack.
- When mounting in the rack, make sure to use the appropriate hardware. ALL FOUR MOUNTING SCREWS MUST BE USED.
- This equipment is not designed to support other devices. Do NOT stack other equipment on the top of the PCS500R.
- Rear cabling must be dressed and supported so that the weight of the cabling is not a strain on the PCS500R connectors.
- MOUNTING OF THE EQUIPMENT IN THE RACK SHOULD BE SUCH THAT A HAZARDOUS CONDITION IS NOT ACHIEVED DUE TO UNEVEN MECHANICAL LOADING.

Rack-mount Considerations

- **Elevated Operating Ambient**
  - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer (See specifications information in this document).
- **Reduced Air Flow**
  - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. To ventilate the system normally and avoid overheating, leave at least 2.5 cm on each side (including top and bottom) of the PCS500R. Do NOT stack other equipment on the top of the PCS500R. Also, ensure that the unit's AC power adapter is never stacked or bundled with other AC power adapters. Each adapter should have adequate ventilation and should be isolated from other heat sources.
- **Circuit Overloading**
  - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring.
- **Reliable Earthing**
  - Maintain reliable earthing of rack-mounted equipment. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- **Mains Outlet Earthing**
  - The apparatus with Class I construction must be connected to a mains socket outlet with a protective earthing connection.

PCS500R Product Description

The LG PCS500R Pro:Centric® server is a stand-alone, remotely-controlled processor and controller for the Pro:Centric system. The server enables you to create and remotely manage portal and application content for LG TVs, using either the Pro:Centric Java or Pro:Centric Direct HTML application.

Features

- Supports the Pro:Centric Java or Pro:Centric Direct HTML application
- Two output options: RF or IP
  - RF output: QAM-B (6 MHz), DVB-C (6 MHz, 7 MHz, or 8 MHz), and ISDB-T (6 MHz) modulations are supported. The PCS500R generates one 256-QAM or 64-QAM RF channel for GEM/site data
  - IP output: The PCS500R generates two multicast streams for GEM/site data.
- Customer may work with content provider to create Pro:Idiom® encrypted content for RF or IP video playout channels
  - QAM-B and DVB-C RF output: In addition to the GEM/site data channel, the PCS500R generates up to seven RF channels for video playout. Each of these channels supports either two or three programme streams multiplexed on each channel. This capability provides output of up to 21 programmes of video content.
  - ISDB-T RF output: In addition to the GEM/site data channel, the PCS500R generates up to one (Java application) or two (HTML application) RF channels for video playout. Each of these channels supports either two or three programme streams multiplexed on each channel. This capability provides output of up to three (Java application) or six (HTML application) programmes of video content.
  - IP output: In addition to two multicast streams for GEM/site data, the PCS500R generates 21 multicast data streams for video playout. Each data stream supports one programme. This capability provides output of up to 21 programmes of video content.
- Provides remote management capability over Ethernet
- Small, lightweight chassis
- 19-inch rack-mountable
- 1U height profile to minimize rack space usage

An Internet browser-based Admin Client graphical user interface (GUI), provided for system integrator (SI) partners and lodging/institution administrators, facilitates support and maintenance of the Pro:Centric system. The Admin Client enables users to remotely manage system backups, output configuration, software updates, portal/information section content, TV configuration settings, etc.

Setup Information

Check the following items before you begin the PCS500R installation and setup procedures.
Note: Once the PCS500R hardware and software is installed and the initial setup completed, output parameters are configured in the appropriate Pro:Centric Admin Client. Along with this document, it is recommended that you have readily available a copy of either the ***Pro:Centric Server Admin Client User Guide*** (for the Java application) or the ***Pro:Centric Direct Admin Client User Guide*** (for the HTML application), as applicable.

PCS500R

- Unpack the PCS500R Pro:Centric server unit and all accessories.

PCS500R Accessories: AC Power Cord and Adapter

- Select the location for mounting the PCS500R. Ensure adequate ventilation is available.
- Obtain the necessary attachment hardware to mount the PCS500R chassis in its targeted location.
- Plan and install the necessary cabling and network (Ethernet) and AC power access for the PCS500R. You also will need the following to connect a PC directly to the PCS500R for system setup purposes: FTDI TTL-USB cable (P/N TTL-232R-5V-AJ).

Video Channel Assignments for RF Output (QAM-B)

Each input programme is limited to one-half or one-third of the output channel bitrates (Mbps), which in turn are dependent on the modulation format. 256-QAM modulation supports up to 38.8 Mbps per channel, and 64-QAM modulation supports up to 26.97 Mbps per channel.

- Create a channel assignment plan for the installation site, or modify an existing plan to incorporate the RF output of the PCS500R. Ensure that up to eight contiguous CATV broadcast channels are allocated for the PCS500R RF output. The PCS500R uses a 256-QAM or 64-QAM modulation format, thereby occupying approximately 48 MHz of frequency spectrum.
  The RF start channel is user-assigned during system setup (in the Admin Client), and the remaining channels (up to seven) are then automatically assigned per EIA-542 STD CATV frequency allocation standards or also user-assigned, depending on channel selections in the Admin Client.
  Note for contiguous channel allocation: if the RF start channel assignment is channel 2, the seven remaining channels will be 3, 4, 5, 6, 95, 96, and 97. Refer to EIA-542 STD CATV frequency allocation tables for further information as required.
  The highest available RF channel number for the PCS500R is 135. Thus, to allocate all eight channels available for PCS500R RF output, the RF start channel must be set no higher than 128.
- Find a location on the frequency spectrum that is free of existing noise.

Video Channel Assignments for RF Output (DVB-C)

Each input programme is limited to one-half or one-third of the output channel bitrates (Mbps), which in turn are dependent on the modulation format. 256-QAM modulation supports up to 37.27 Mbps (6 MHz bandwidth), 45.05 Mbps (7 MHz bandwidth) or 50.87 Mbps (8 MHz bandwidth) per channel, and 64-QAM modulation supports up to 27.95 Mbps (6 MHz bandwidth), 33.79 Mbps (7 MHz bandwidth) or 38.15 Mbps (8 MHz bandwidth) per channel.

- Create a channel assignment plan for the installation site, or modify an existing plan to incorporate the RF output of the PCS500R. Ensure that up to eight contiguous CATV channel frequencies are allocated for the PCS500R RF output. The PCS500R uses a 256-QAM or 64-QAM modulation format, thereby occupying approximately 48 MHz, 56 MHz, or 64 MHz (depending on channel bandwidth) of frequency spectrum.
  The RF start channel frequency is user-assigned, in KHz, during system setup (in the Admin Client), and the remaining channel frequencies (up to seven) are then automatically assigned in accordance with the specified bandwidth. For example, if the RF start channel frequency assignment is 57000 KHz with a 7 MHz bandwidth, the seven remaining channel frequencies will be 64000 KHz, 71000 KHz, 78000 KHz, 85000 KHz, 92000 KHz, 99000 KHz, and 106000 KHz.
  The highest available RF channel frequency for the PCS500R is 861000 KHz.
- Find a location on the frequency spectrum that is free of existing noise.

Video Channel Assignments for RF Output (ISDB-T)

Each input programme is limited to one-half or one-third of the output channel bitrates (Mbps). ISDB-T modulation supports up to 23.23 Mbps (6 MHz bandwidth) per channel.

- Create a channel assignment plan for the installation site, or modify an existing plan to incorporate the RF output of the PCS500R. Ensure that up to two (Java application) or three (HTML application) contiguous CATV broadcast channels are allocated for the PCS500R RF output. The PCS500R occupies up to 18 MHz of frequency spectrum.
  The RF start channel is user-assigned during system setup (in the Admin Client), and the remaining channels (up to one for the Java application or two for the HTML application) are then automatically assigned in accordance with the 6 MHz bandwidth. For example, if the RF start channel assignment is channel 7 on a server configured for the HTML application, the two remaining channels will be 8 and 9.
  The data channel number must be between 7 and 69. Thus, for example, to allocate all three channels available for PCS500R RF output with the HTML application, the RF start channel must be set no higher than 67.
  Note: The Pro:Centric server cannot generate channels 13 and 14 simultaneously. If you intend to configure more than one channel, set the data channel number from 7 to 12 (two channels) or 7 to 11 (three channels) or from 14 to 68.
- Find a location on the frequency spectrum that is free of existing noise.

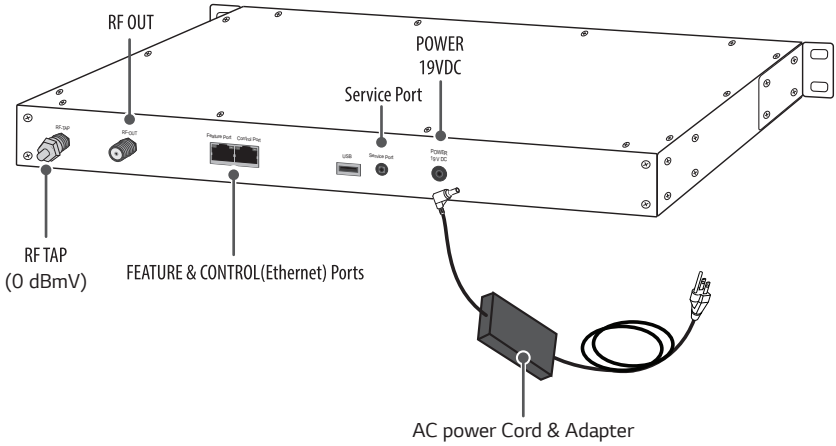
Video Channel Assignments for IP Output

Each IP stream is limited to 19.4 Mbps.

- The PCS500R outputs IPv4 multicast streams. Ensure the institution's IP network and room receivers support IPv4 multicast and that the network is capable of selectively routing multicast traffic. Refer to vendor equipment documentation for further information.
- Create a channel assignment plan for the installation site, or modify an existing plan to incorporate the IP output of the PCS500R. Ensure that up to 23 unused and unreserved IPv4 multicast addresses, within the designated range 224.0.0.0 to 239.255.255.255, are allocated for the PCS500R IP output.
  The IP start channel is user-assigned in the Admin Client, and the remaining channel assignments are then automatically incremented. For example, if the IP start channel assignment is 227.0.0.40, the remaining channels will be 227.0.0.41, 227.0.0.42, etc. Since the first two streams are reserved for site data, the first video content channel in this scenario will be 227.0.0.42.
- Reserve one User Datagram Protocol (UDP) port for the multicast data streams. You can use the system default (1234) or another unassigned port number, for example, 50000, 50001, etc. The port must avoid conflict with other protocols in use.
  Note: Refer to the IANA IPv4 Multicast Address Space Registry and/or the IANA Service Name and Transport Protocol Port Number Registry for further IP address/port information as required.

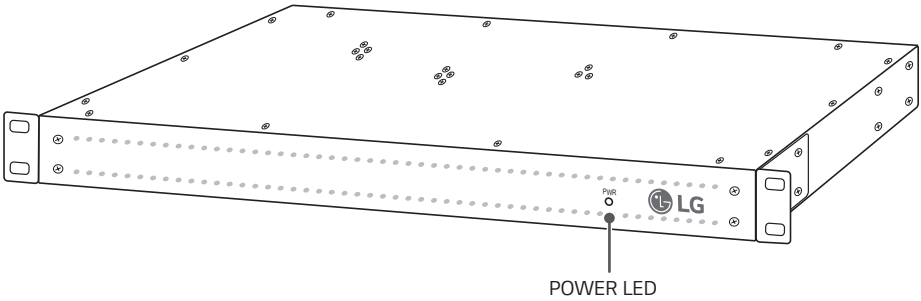
Rear and Front Panel Overviews

PCS500R Rear View



- **Disconnect Device**
  The AC mains plug is used as the disconnect device. The disconnect device must remain readily operable.
- **RF TAP Connector**
  Reserved for service technician use only. When not in use, this connector must remain terminated with attached terminator accessory.

PCS500R Front View



- **Ventilation**
  Air flow must not be obstructed. To ventilate the system normally and avoid overheating, leave at least 2.5 cm on each side (including top and bottom) of the PCS500R. Do NOT stack other equipment on the top of the PCS500R.
- **Screws with Lock Washers**
  Only qualified service personnel should handle and install the PCS500R. A series of screws with lock washers are used to secure the top and bottom covers of the PCS500R. Use caution when handling the unit as the lock washers may have rough edges. Do NOT run your fingers over the top and bottom covers of the unit.

Rack Installation

Typical Rack Installation

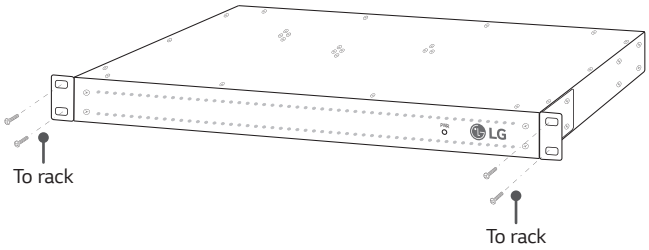
1 To avoid causing electrostatic (ESD) damage to the PCS500R during installation, attach an antistatic wrist strap to a properly grounded rack/object and put it on.

2 (Optional) As shipped, the PCS500R mounting brackets are attached flush with the front of the unit (see diagram a). If desired, the mounting brackets may be detached from the unit and reattached, for example, so that they are flush with the rear of the unit (see diagram b). If you wish to change the location/orientation of the mounting brackets, carefully remove each of the four (M4 x 10 mm) screws and attendant washers (one flat and one lock washer per screw) holding each bracket in place. Then, use the same screws and washers to reattach the mounting brackets in the desired location.

3 Carefully slide the chassis into a standard 48.2 cm equipment rack.

4 Use all four mounting screws to secure the chassis to the rack.

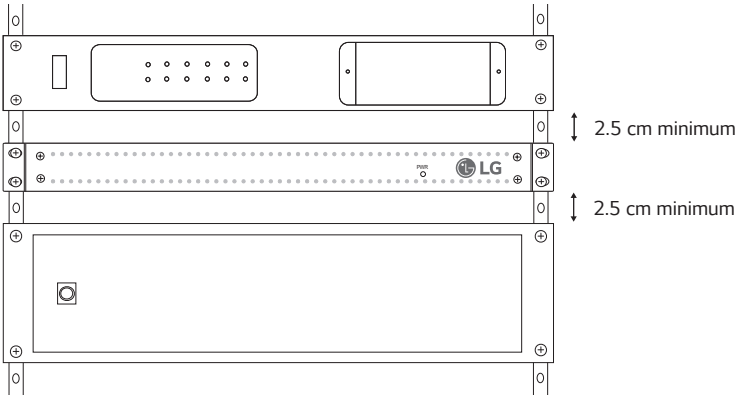
(A)



(B)

Use flat washer and lock washer with each M4 x 10 mm mounting bracket screw.

Front View of Rack Cabinet



Rack-mount Considerations

A. Elevated Operating Ambient

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer (see specifications information in this document).

B. Reduced Air Flow

Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. To ventilate the system normally and avoid overheating, leave at least 2.5 cm on each side (including top and bottom) of the PCS500R. Do NOT stack other equipment on the top of the PCS500R unit. Also, ensure that the unit's AC power adapter is never stacked or bundled with other AC power adapters. Each adapter should have adequate ventilation and should be isolated from other heat sources.

C. Circuit Overloading

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring.

D. Reliable Earthing

Maintain reliable earthing of rack-mounted equipment. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

E. Mains Outlet Earthing

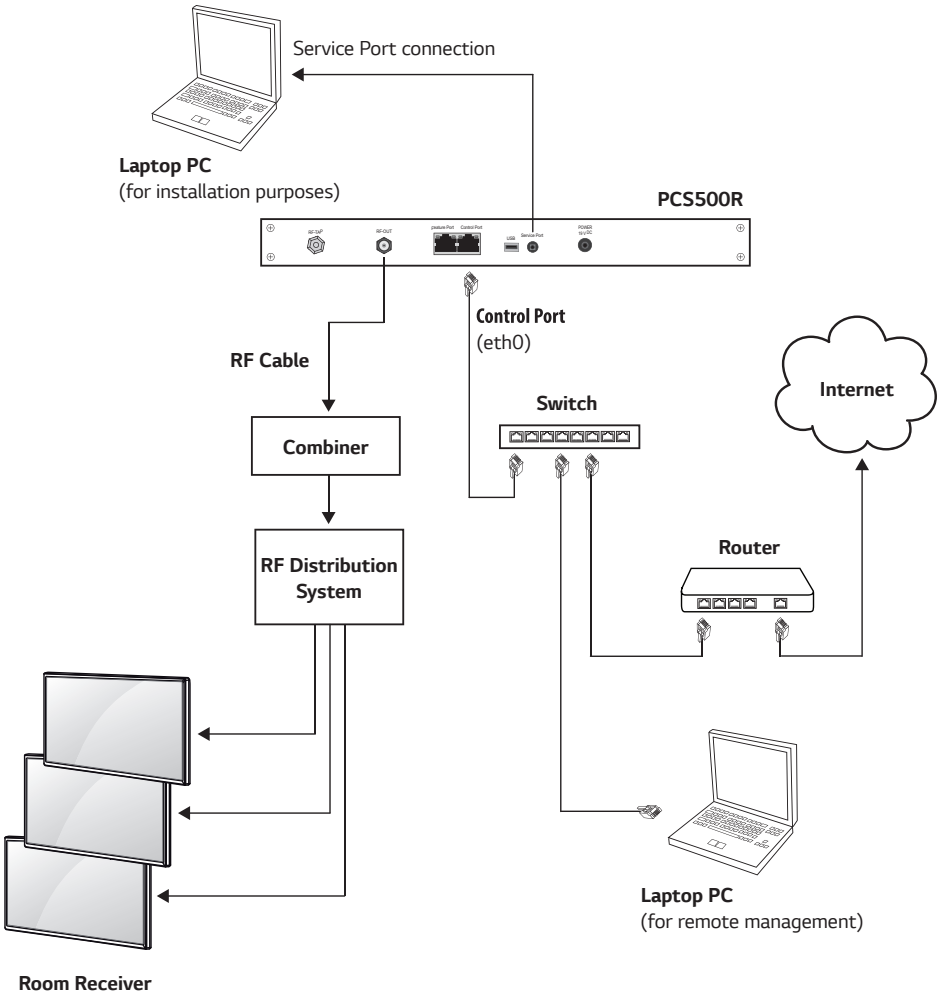
The apparatus with Class I construction must be connected to a mains socket outlet with a protective earthing connection.

System Setup

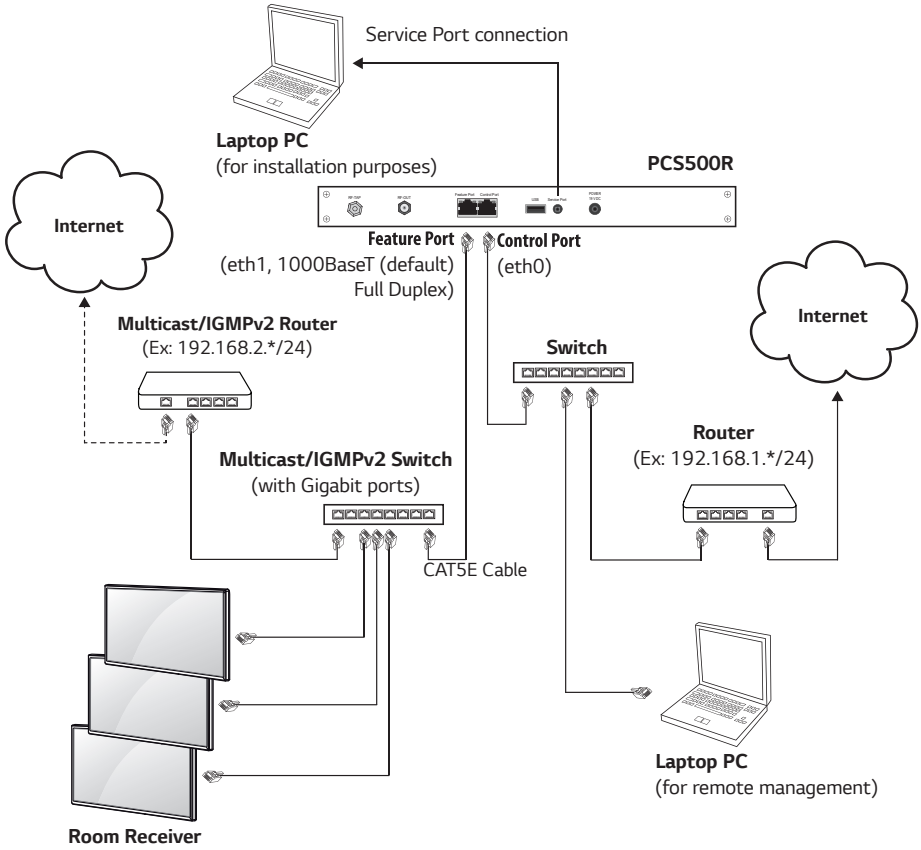
Refer to the following diagrams, and complete the system installation as described on pages 20 to 23.

Caution: Do not make system connections until instructed to do so during the system installation procedure. In some instances, configuration steps must be performed before physical connections are made.

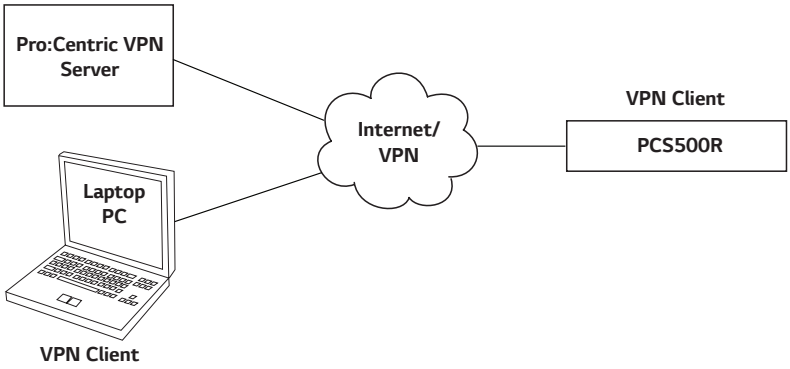
Typical Setup Diagram for PCS500R with RF Output



Typical Setup Diagram for PCS500R with IP Output



VPN Network Connections Overview



Setting Up the Pro:Centric Network

This section describes how to complete the initial network configuration for the PCS500R. See also typical setup and VPN network connections diagrams above.

1 To enable remote management, connect one end of a CAT5 RJ-45 Ethernet cable to the Control Port on the PCS500R rear panel, and connect the other end of the cable to the institution's network.

2 Connect the PCS500R power supply to the POWER connector on the PCS500R rear panel. Then, plug the AC power cord into a powered AC line receptacle. When power is applied, the PWR (Power) LED on the PCS500R front panel will initially flash red and then turn green (blinking during boot-up).
The boot-up process for the PCS500R may take several minutes. When boot-up is complete, the PWR LED on the PCS500R front panel will light continuously green.

3 Once the PWR LED is lit continuously (no longer blinking), use the FTDI TTL-232R-5V-AJ cable to connect a PC to the Service Port on the PCS500R rear panel.

4 Using HyperTerminal or an equivalent terminal emulation programme on the PC, configure the serial port as follows: Bits per second/baud = 115200; Data bits = 8; Parity = None; Stop bits = 1; Flow Control = None
Note: To avoid configuration errors, make sure the keyboard settings on the terminal emulator assign the backspace character to Ctrl + H (ASCII 8).
Once the connection is established, you should see a login prompt. (If the login prompt is not automatically displayed, press **Enter** to refresh the screen.)
At the `login as:` prompt, type **admin** and press **Enter**. Then, at the `password:` prompt, type **Password4Partners** (case-sensitive) and press **Enter**.

Note: After the initial system setup is complete, it is highly recommended that you change the admin user password from its default value. See "Change the Login Password" on page 35 for further information.

5 The system will display a prompt for you to select the Pro:Centric portal application you will be using:

```
You must select a portal application to continue.
Available portal applications are:
  1   pca (Java)
  2   pcd (HTML)
Enter 1 or 2 to select a portal application:
```

6 Either:

- Type **1** and press **Enter** to select the Java application.
- Type **2** and press **Enter** to select the HTML application.

Note: Select the appropriate application based on the purchase order associated with this server. The software license specifies the Java or HTML application, and the application type must be set accordingly in this step. Once you make your selection, the server will display confirmation before initiating a reboot, for example:

```
You selected the pcd (HTML) application
System will now reboot to run the selected application
```

7 When the reboot is complete, you should see a new login prompt. Log back in to the server (see step 5). Once you are logged in, you will see a `Command >` prompt.

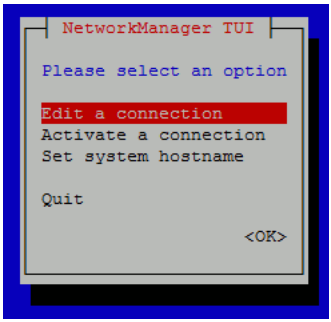
The next step describes how to set static IP addresses for the Control Port and/or Feature Port, if desired/applicable. The Control Port is used for remote management/communication purposes, while the Feature Port is designated for PCS500R IP or hybrid RF/IP output. By default, both ports are configured for DHCP.

- **Note**: You can press **Enter** at any PCS500R command prompt to view current menu, if desired.
- **Note**: To view the server's current configuration settings, type **info** and press **Enter** at the `Command >` prompt. The System Information display will show the IP address that has been assigned to the Control Port (if the network is configured for DHCP) and the output configuration. See "View System Information" on page 26 for further information.
- **Note**: If the Control Port network is configured for DHCP but the Control Port IP address is not displayed in the System Information display (see note above), refer to "Network Setup" troubleshooting information on page 42. If configured, the DHCP server should assign an IP address to the Control Port once the PCS500R successfully connects to the network.

8 (Optional) Set a static IP address for the Control Port and/or Feature Port. It is highly recommended that the Feature Port be configured with a static IP address. See also note below regarding Feature Port.

- **Note**: Static configuration for the Feature Port is recommended, regardless of whether you are configuring the system for Multicast Mode or Unicast Mode, as the Feature Port IP address is embedded in every deployed Pro:Centric application project. After a project has been deployed and any TVs/STBs (to which the project has been deployed) complete a boot cycle, the TVs/STBs automap themselves to the Pro:Centric server using the Feature Port IP address. If the Feature Port IP address is assigned by a DHCP server, and the DHCP server experiences an interruption, the IP address assignment may change, and this will cause a Pro:Centric interruption.
- **Note**: For detailed information on this step and additional screen samples, see "Modify Network Settings" on pages 27 to 30.

a) At the Command > prompt, type **setip** and press **Enter.**
TCP/IP configuration is performed in the CentOS Network Manager TUI (text-based user interface). The system will display the Network Manager menu, for example:



b) Select/highlight **Edit a connection** and press **Enter**.
c) In the next screen, select/highlight the port you wish to configure and press **Enter**.
d) With the Edit Connection screen for the selected port on display:

* Add the appropriate IP address in the format xxx.xxx.xxx.xxx/xx, where the last two digits (after the forward slash) identify the network mask bits for the IP address.

* Add the gateway (if applicable) and DNS IP addresses in the format xxx.xxx.xxx.xxx.

See also notes below.

Note: In order to avoid a service interruption, do not modify any of the other fields in the Edit Connection screen. In particular, do NOT modify the data in the Profile Name and Device fields.
Note: The Feature Port IP address MUST be on a different subnet than the Control Port IP address, but should be on the same network as the TVs. Also, while either IPv4 or IPv6 is supported for the Control Port, the Feature Port must be configured on an IPv4 network.
Note: Do not specify a gateway IP address for the Feature Port.

e) When you are finished with network configuration for the selected port, select/highlight **<OK>** at the bottom right of the Edit Connection screen and press **Enter**.
f) Repeat steps (c) to (e), as required, to complete configuration for the second port.
g) When you are finished with port configuration, select/highlight **<Quit>** at the bottom right of the port selection screen and press **Enter** to return to the Network Manager menu. To exit the Network Manager and return to the Command > prompt, select **Quit** and press **Enter**.

- **Note**: Review the configuration data for each port carefully before you confirm the settings. Ensure each of the addresses was entered correctly.
- **Note**: You may also edit the host name from the Network Manager menu, if desired. See “Modify the Server Host Name” on pages 31 to 32 for further information. Avoid using spaces or special characters, such as ?, -, etc., in the host name.

9 (Optional) Set the time zone and/or the date and time on the PCS500R.
By default, the PCS500R is synchronized with an NTP server and configured for the US Eastern time zone. If the PCS500R is connected to the Internet, the NTP client will periodically update the time setting on the PCS500R. You can set the time zone as required. If the PCS500R is not connected to the Internet, you also have the option to specify date and time data manually.
Use the PCS500R "tz" and/or "time" commands (available from the `Command>` prompt) and follow the system prompts to set the time zone and/or date and time on the PCS500R, as necessary. See "Set the Time Zone" on pages 33 and/or "Set the Date and Time" on pages 34 for further information.
Note: If you changed the time zone, you will be prompted to reset the system. Continue with step 10.

10 If you made any configuration changes in steps 8 or 9, reset the PCS500R: At the `Command>` prompt, type **reset** and press **Enter**.
The reset process may take several minutes, after which the PCS500R resumes normal operation.

11 Make the appropriate connection to the RF distribution system or IP distribution network depending on the PCS500R output option to be used.

- RF output: Connect RF OUT on the PCS500R to the RF distribution centre combiner, and balance the RF signal so that the Pro:Centric signal level at the TV(s) is between 0 to +7 dBmV.
- IP output: Connect a CAT5E or better Ethernet cable between the Feature Port on the PCS500R rear panel and the institution's IP distribution network.

Caution (RF Output only): For proper system performance, the Pro:Centric signal level at the TV input (ANTENNA IN) must be between 0 to +7 dBmV. Note that additional equipment may be required to adjust the signal level.
Caution: When not in use, the RF TAP (0 dBmV) connector must remain terminated with attached terminator accessory.

The remainder of the system setup—configuration of RF or IP output parameters, video playout settings, Pro:Centric Channel Map, etc.—is performed in the Admin Client that is appropriate for your system (based on your selection in step 6 of the procedure above). Refer to either the ***Pro:Centric Server Admin Client User Guide*** (Java application) or the ***Pro:Centric Direct Admin Client User Guide*** (HTML application), as applicable, for further information.
Note: By default, the server output is enabled for 256-QAM-B modulation (RF output), with the data channel set to 75.

PCS500R Configuration Options

Network and Communication Setup

This section describes PCS500R communication options for configuration purposes.

Note: Before you proceed with any additional configuration, the PCS500R software should be installed and configured as described in the setup procedure on pages 20 to 23.

Also note that configuration updates periodically require that you reset the PCS500R. Make sure to reset the unit when directed to do so.

There are two typical options for communicating with the PCS500R:

- Use an SSH client to communicate with the PCS500R via a command line interface. If necessary, consult the network administrator to obtain the IP address that has been assigned to/configured for the PCS500R's Control Port.
- To establish a direct connection to the PCS500R, connect a PC to the PCS500R using the FTDI TTL-USB cable (P/N TTL-232R-5V-AJ). Plug the USB end of the cable into an open USB port on your PC. If necessary, install the device driver. Plug the other end of the cable into the Service Port jack on the PCS500R rear panel. Using HyperTerminal or an equivalent terminal emulation programme on the PC, configure the serial port as follows:

  - Bits per second/baud = 115,200
  - Data bits = 8
  - Parity = None
  - Stop bits = 1
  - Flow Control = None

  Note: To avoid configuration errors, make sure the keyboard settings on the terminal emulator assign the backspace character to Ctrl + H (ASCII 8).

You will need to know the "admin" user password in order to log in to the command line interface. The default admin user password is "Password4Partners" (case-sensitive). If necessary, for example, if the password has been changed from its default value, consult the system administrator to obtain the current admin user password.
Note: If you want to connect a PC directly to the PCS500R Control Port using an Ethernet CAT5E cable, in order for communication to be established, the PCS500R's IP address must be on the same subnet as the PC's IP address.

Log In to the PCS500R and Access the Main Menu

Note: The PCS500R must be connected to an IP network for SSH client access. For direct access to the PCS500R Service Port, use the FTDI TTL-USB cable (P/N TTL-232R-5V-AJ). See also "Network and Communication Setup" above for further information.

1 Establish communication with the PCS500R using an SSH client or via a direct connection to the PCS500R Service Port.
Once communication is established, you should see a login prompt. (If the login prompt is not automatically displayed, press **Enter** to refresh the screen.)

2 At the login as: prompt, type **admin** and press **Enter**.

3 At the Password: prompt, type the admin password and press **Enter**.

4 At the `Command >` prompt, either:

- Press **Enter** to display the PCS500R Main Menu (see example below).
- Type the desired command and press **Enter**.

The following sections describe each of the configuration commands.
Note: You can always press **Enter** at the `Command >` prompt to display the PCS500R Main Menu.

Example: PCS500R Main Menu

```
                    Main Menu

info        System information
setip       TCP/IP Setup Menu
hostname    Set server host name
tz          Timezone setup
time        Time setup
pwd         Change password
portal      Select the portal application
monitor     System monitor
ping        Send ICMP ECHO_REQUEST to network hosts
update      Update
vpn         VPN setup
shut        Shutdown the system
reset       System Reset
reinstall   Return to factory configuration
exit        End the session

Command >
```

View System Information

1 Log in to the PCS500R as described on the previous page.

2 At the `Command >` prompt, type **info** and press **Enter**.

The System Information display identifies important information about the PCS500R, including the unit serial number, hardware ID (firmware version), software versions, MAC addresses, IP addresses, etc., for example:

```
PCS500R Pro:Centric Server vx.x-xxxx/y.y.y.yyyyy
Copyright (c) 2021 LG Electronics U.S.A., Inc.

 SN:              601-12480013
 Hardware ID:     1
 FPGA version:    802
 BIOS version:    116
 BIOS vendor:     PCS500v3
 CPU SN:          000002703544
 OS version:      Linux 3.10.0-327.e17.x86_64
 OS release:      #1 SMP Mon Jul 29 17:46:05 UTC 2019
 Ctrl MAC:        00:13:95:21:a2:7d
 Ctrl IP:         10.1.2.3
 Ctrl IP V6:      n/a
 Feat MAC:        00:0C:63:40:47:db
 Feat IP:         192.168.20.120
 Feat IP V6:      n/a
 VPN IP:          n/a
 RF config:       Mode 3, 256-QAM-B, RF: 6 MHz, 5.36 MSps, ASI: 38.81 Mbps
 RF channel:      75
 Channels:        1
 Docker vers      17.09.0-ce, build afdb6d4
 Portal app:      pcd (HTML)
 Local time:      Tue Feb 15 17:48:23 CDT 2021
```

Where x.x-xxxx is the version and build number of the HTML application and y.y.y.yyyyy is the version and build number of the Java application.

Note: If RF output is configured for DVB-C modulation, the display will identify the RF frequency (in KHz) in place of the RF channel. If IP output is configured, the display will identify the multicast IP address in place of the RF fields.

It is recommended that you record this information for future reference. If you find it necessary to call customer service or engineering support, please have this information available.

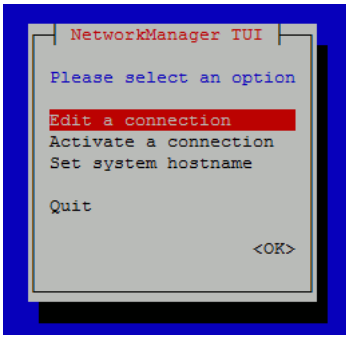
Modify Network Settings

This section describes how to modify the network settings of the PCS500R Ethernet ports. The Control Port is used for remote management/communication purposes, while the Feature Port is designated for PCS500R IP output.

Note: It is highly recommended that the Feature Port (if in use) be configured with a static IP address, regardless of whether you are configuring the system for Multicast Mode or Unicast Mode, as the Feature Port IP address is embedded in every deployed Pro:Centric application project. After a project has been deployed and any TVs/STBs (to which the project has been deployed) complete a boot cycle, the TVs/STBs automap themselves to the Pro:Centric server using the Feature Port IP address. If the Feature Port IP address is assigned by a DHCP server, and the DHCP server experiences an interruption, the IP address assignment may change, and this will cause a Pro:Centric interruption.

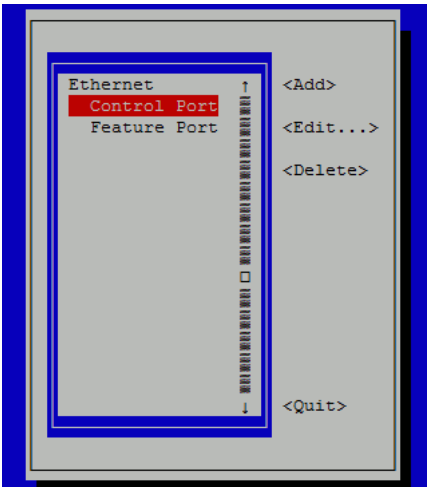
1 Log in to the PCS500R as described on the previous page.

2 At the `Command >` prompt, type **setip** and press **Enter**.
The system will display the Network Manager menu.

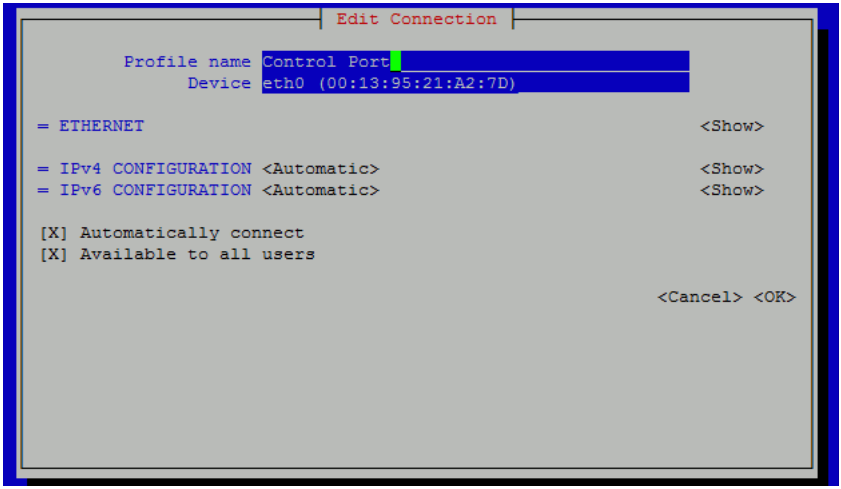


3 Select/highlight **Edit a connection** and press **Enter** to modify the IP configuration of either the Control Port or the Feature Port.
Note: To exit the Network Manager and return to the Main Menu prompt without modifying any settings, select **Quit**. You may also modify the server's host name from the Network Manager. See "Modify the Server Host Name (via TUI)" on pages 31 for further information.

4 In the next screen, select/highlight the port profile to modify, and then press **Enter**.

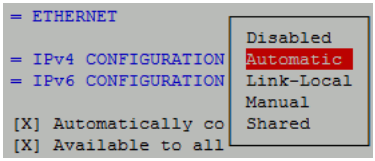


Once you select a port, the Edit Connection screen for that port will be displayed, for example:



Note: Steps 5 to 9 identify all fields that may require modification for the purposes of the Pro:Centric network. In order to avoid a service interruption, do not modify any of the other fields in the Edit Connection screen. In particular, do NOT modify the data in the Profile Name and Device fields.
Note: The Feature Port IP address MUST be on a different subnet than the Control Port IP address, but should be on the same network as the TVs.
Also, while either IPv4 or IPv6 is supported for the Control Port, the Feature Port must be configured on an IPv4 network.
Note: Do not specify a gateway IP address for the Feature Port.

5 To change the port configuration from Automatic to Manual or vice versa, select/highlight the IPv4 Configuration field and press **Enter**. Then, select the appropriate option (**Automatic** or **Manual**) from the drop-down menu.

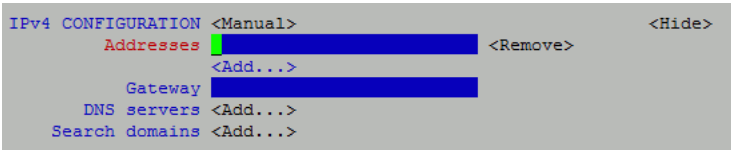


6 The next step depends on your selection in the previous step.

- If you selected **Automatic**, go to step 9.
- If you selected **Manual**, continue with step 7.

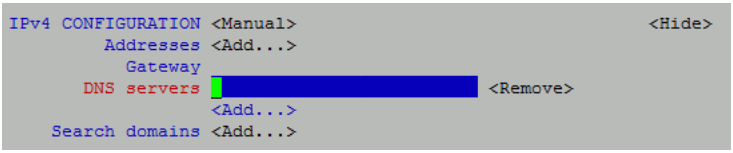
7 If you are configuring static (i.e., manual) settings, select/highlight **<Show>** at the right of the IP Configuration field and press **Enter** to view the expanded configuration fields.

8 Complete the following configuration:
Select/highlight **<Add...>** and press **Enter** in the **Addresses** field. Then, type the appropriate IP address in the format xxx.xxx.xxx.xxx/xx, where the last two digits (after the forward slash) identify the network mask bits for the IP address.
In the Gateway field (Control Port only—see also note above), type the gateway IP address in the format xxx.xxx.xxx.xxx.



Note: If you do not specify the network mask bits in the port's IP address, as indicated above, the system will not create a local route over the network interface (unless the interface is used as the system's default route).

- Select/highlight **<Add...>** and press **Enter** in the DNS Servers field, and type the primary DNS IP address (in the format xxx.xxx.xxx.xxx). As required, select **<Add...>** again and type the secondary DNS IP address.



9 (Recommended) Change the unused port configuration from **Automatic** to **Ignore**. For example, for the Feature Port, select/highlight the IPv6 Configuration field and press **Enter**. Then, select Ignore from the drop-down list of options.

10 When you are finished, select/highlight **<OK>** at the bottom right of the Edit Connection screen and press **Enter**.

11 Repeat steps 4 to 10 for the second port as required. When you are finished with port configuration, select/highlight **<Quit>** at the bottom right of the port selection screen and press **Enter** to return to the Network Manager menu. To exit the Network Manager and return to the Main Menu prompt, select **Quit** and press **Enter**.

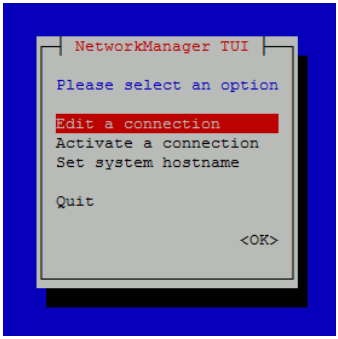
12 If you changed the port configuration, you will need to reset the system. If you are ready to reset the system immediately, at the `Command >` prompt, type **reset** and press **Enter** (see "Reset the System" on page 40 for further information).
Note: If you intend to modify additional configuration settings during the current session, you may wait until all changes are complete before you reset the system.

Modify the Server Host Name (via TUI)

This option enables you modify the PCS500R host name via the Network Manager TUI Menu.
Note: You may also use the "hostname" option in the Pro:Centric Direct Main Menu to modify the server's host name. See "Modify the Server Host Name (via CLI)" on page 32 for further information. The most recent update determines the server's host name, regardless of which command you choose to use.

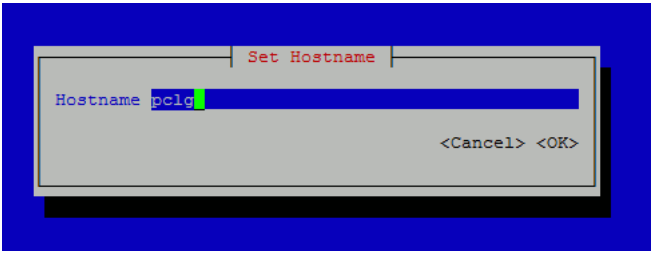
1 Log in to the server as described on page 25.

2 At the `Command >` prompt, type **setip** and press **Enter**.
The system will display the Network Manager menu, for example:

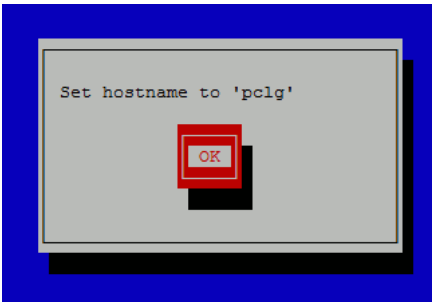


3 Select/highlight **Set system hostname** and press **Enter**.
Note: To exit the Network Manager and return to the Main Menu prompt without modifying any settings, select **Quit**. You may also modify the Control and/or Feature Port configuration from the Network Manager. See "Modify Network Settings" on pages 27 to 30 for further information.

4 The Hostname field in the **Set Hostname** screen shows the current host name. Modify the host name as required (avoid using spaces or special characters, such as ?, -, etc.) and then press **Enter**.



5 At the prompt for confirmation, press **Enter**.



6 If you changed the host name, you will need to reset the system. If you are ready to reset the system immediately, at the `Command >` prompt, type **reset** and press **Enter** (see "Reset the System" on page 40 for further information).

Note: If you intend to modify additional configuration settings during the current session, you may wait until all changes are complete before you reset the system.

Modify the Server Host Name (via CLI)

This option enables you modify the server's host name via the command line interface.

Note: You may also use the "Set system hostname" option in the Network Manager TUI Menu to modify the server's host name. See "Modify the Server Host Name (via TUI)" on pages 31 for further information. The most recent update determines the server's host name, regardless of which command you choose to use.

1 Log in to the server as described on page 25.

2 At the `Command >` prompt, type **hostname** and press **Enter**.
The system will prompt you to type the new host name:
`Enter host name:`

3 Type the new host name, and then press **Enter**. Avoid using spaces or special characters, such as ?, -, etc.
Once you enter the new host name successfully, the system displays confirmation:
`Host name has been set. Please reset the system.`

4 If you are ready to reset the system immediately, at the `Command >` prompt, type **reset** and press **Enter** (see "Reset the System" for further information).

Note: If you intend to modify additional configuration settings during the current session, you may wait until all changes are complete before you reset the system.

Set the Time Zone

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type **tz** and press **Enter**.
The system displays the current time zone information for the PCS500R and prompts you to specify whether or not you wish to change the time zone.

```
Current time zone is: America/New York
Change the time zone? [y/n]:
```

3 Either:

- Type **n** and press **Enter** to return to the Main Menu `Command >` prompt without changing the current time zone.
- Type **y** and press **Enter** to change the time zone. Then, continue with step 4.

4 The system will display the following prompt for a location, followed by a list of options:

```
Please identify a location so that time zone rules can be set correctly.
Please select a continent or ocean.
```

At the `#?` prompt, type the number that corresponds to the appropriate option for your location, and then press **Enter**.

5 The system will display the following prompt for a country, followed by a list of options:

```
Please select a country.
```

At the `#?` prompt, type the number that corresponds to the appropriate option for your country, and then press **Enter**.

6 The system will display the following prompt for a region, followed by a list of options:

```
Please select one of the following time zone regions.
```

At the `#?` prompt, type the number that corresponds to the appropriate option for your region, and then press **Enter**.
After you specify the time zone region, the system displays an overview of your location selections and prompts for confirmation, for example:

```
The following information has been given:
  United States
  Central Time
Therefore TZ='America/Chicago' will be used.
Local time is now:            Tue Feb 15 11:58:48 CDT 2021.
Universal Time is now:        Tue Feb 15 16:58:48 CDT 2021.
Is the above information OK? [y/n]:
```

7 Either:

- Type **y** and press **Enter** if the information in the display is correct. The system will confirm the setting and then prompt you to reset the PCS500R:

```
Timezone has been changed.
Please restart the server.
```

- Continue with step 8.

Type **n** and press **Enter** to return to the initial location prompt and reset the time zone (repeat this procedure from step 4).

8 If you are ready to reset the system immediately, at the `Command >` prompt, type reset and press **Enter** (see "Reset the System" on page 40 for further information).
Note: If you intend to modify additional configuration settings during the current session, you may wait until all changes are complete before you reset the system.

Set the Date and Time

By default, the PCS500R is synchronized with an NTP server and configured for the US Eastern time zone. If the PCS500R is connected to the Internet, the NTP client will periodically update the time setting on the PCS500R. If the PCS500R is not connected to the Internet, you also have the option to specify date and time data manually. Refer to "Set the Time Zone" above for information on setting the time zone.

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type **time** and press **Enter**.
The system will display the current time (for example: Current time: 2021-02-15 15:45:44) and then initiate a series of prompts to enable you to set the time.

3 At each of the following prompts, type the year, month, day, hour, and minute, respectively. Note that each of these fields requires numerical values, and the hour should be entered in 24-hour format. Press **Enter** after each entry.
If applicable, you can also press **Enter** at each prompt to accept the default value in square brackets.

```
Enter new year [2021]>
Enter new month [02]>
Enter new day [15]>
Enter new hour (0-23) [15]>
Enter new minute [45]>
```

Once you enter the minute value, the system will display the new time and then prompt for confirmation, for example:

```
New time: 2021-02-15 15:46:00
Apply? [y/n]:
```

4 Either:

- Type y and press **Enter** to apply the new time configuration. The system will confirm the setting and then prompt you to reset the PCS500R:

```
Time is set. Please reset the system.
```

Continue with step 5.

Type **n** and press **Enter** to return to the `Command >` prompt without changing the time configuration.

5 If you are ready to reset the system immediately, at the `Command >` prompt, type **reset** and press **Enter** (see "Reset the System" on page 40 for further information).

Note: If you intend to modify additional configuration settings during the current session, you may wait until all changes are complete before you reset the system.

Change the Login Password

For security purposes, it is recommended that the admin user login password be unique to the system. Note that the login password is case-sensitive.

1 Log in to the PCS500R as described on page 25.

2 At the `Command>` prompt, type **pwd** and press **Enter**.
The system prompts for the current admin user password:
```
Changing password for admin
Old password:
```

3 Type the current password and press **Enter**. The system will then prompt you to type and retype the new password:
```
New password:
Retype password:
```

4 Type and then retype the new password at the prompts. Press **Enter** after each entry.

Once you complete the Password fields successfully, the system displays confirmation:
```
Password for admin changed by admin.
```

Change the Portal Application

This option enables you to change the portal application (Java or HTML), if necessary.

Caution: This option will create a temporary system interruption and should be used only when necessary. After you complete the procedure below, you must perform a number of additional steps in the appropriate Admin Client (i.e., the Admin Client for the new application) in order for portal functionality to be initiated. Software feature licensing, output configuration, and portal configuration are not ported from one application to the other.

1 Log in to the PCS500R as described on page 25.

2 At the `Command>` prompt, type **portal** and press **Enter**.
The system prompts for confirmation that you wish to make a change, for example:
```
The system is configured to use the pcd (HTML) portal application.
Do you wish to change the portal appliction? [y/n]:
```

3 Either:

- Type **y** and press **Enter** to continue. The system will display the available applications, followed by a prompt for a selection:

```
Available portal applications are:
  1) pca (Java)
  2) pcd (HTML)
Select a new portal application [2]:
```

  Continue with step 4.

- Type **n** and press **Enter** to return to the Main Menu without changing the portal application.

4 At the prompt to select a new portal application, either:

- Type **1** and press **Enter** to select the Java application.
- Type **2** and press **Enter** to select the HTML application.

  Note: Select the appropriate application based on the purchase order associated with this server. The software license specifies the Java or HTML application, and the application type must be set accordingly.

  Once you make your selection, the server will display confirmation and prompt you to reboot the system, for example:

```
Successfully set to pca (Java) portal application
You must reset the system now.
Are you sure you want to reset the system? [y/n]:
```

5 Either:

- Type **y** and press **Enter** to initiate an immediate reset of the PCS500R. The reset process may take several minutes, after which the system resumes normal operation.
- Type **n** and press **Enter** to return to the Main Menu without resetting the system at the current time; however, note that you must eventually reset the system in order to apply the new portal application configuration.
- See "Reset the System" on page 40 when you are ready to reset the system.

  Note: If you intend to modify additional configuration settings during the current session, you may wait until all changes are complete before you reset the system.

The remainder of the new portal application setup—configuration of feature set, output parameters, video playout settings, Pro:Centric Channel Map, customized portal interactive menus, etc.—is performed in the appropriate Admin Client, as indicated at the beginning of this section. Refer to either the ***Pro:Centric Server Admin Client User Guide*** (Java application) or the ***Pro:Centric Direct Admin Client User Guide*** (HTML application), as applicable, for further information.

Caution: When your Admin Client portal configuration activities are complete, you must reset the server to activate the new application configuration.

Monitor the System

This option enables you to view dynamic system streaming data.

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type **monitor** and press **Enter** to display the current system data. See example on following page.

3 The system data will refresh every second. When you are finished monitoring streaming data, press **Enter** to stop the system monitor and return to the `Command >` prompt.

Example: System Monitor Display (QAM-B RF Output, HTML Application)

```
SYSTEM MONITOR

Date:           2021-02-15 16:44:27
SN:             601-12480013
Version:        1.2
Output:         RF_QAM256_6M
Pg/RF:          2

Bitrates (Mbps):
```

Slot	Content	Secs	Mbit	Pct	RF Out	
1	GEM Data	685	8.9	-	75-1	
4	Video1.ts	6	5.1	1	76-1	:)
5	Video2.trp	205	4.6	78	76-2	:)
7	Video3.ts	40	4.2	12	77-1	:)
8	Video4.trp	172	2.7	66	77-2	:)
10	Video5.ts	12	3.5	3	78-1	:)
11		-	0.0	-	78-2	
13	Video6.ts	171	4.7	94	79-1	:)
14		-	0.0	-	79-2	
16		-	0.0	-	80-1	
17		-	0.0	-	80-2	
19		-	0.0	-	81-1	
20		-	0.0	-	81-2	
22		-	0.0	-	82-1	
23		-	0.0	-	82-2	

```
Press <Enter> key to exit the monitor
```

The system monitor display shows streaming data for each of the active video programmes. The first column in the display shows the channel slot numbers for which video playlists can be defined. Slots 1 and 2 are reserved for GEM/site data and Slot 3 is unused (and is not shown in the display). On servers configured with the Pro:Centric Java application, it is possible to add a site video to Slot 2, and so for these systems, Slot 2 will appear in the system monitor display. On the other hand, it is not possible to add a site video to Slot 2 on servers that are configured with the Pro:Centric Direct HTML application, and so for these systems, Slot 2 will not appear in the system monitor display. The system monitor example below shows data for a system that is configured for QAM-B RF output with the Pro:Centric Direct HTML application.

Note: Output parameters are configured in the Admin Client. Refer to either the Pro:Centric Server Admin Client User Guide (Java application) or the Pro:Centric Direct Admin Client User Guide (HTML application), as applicable, for further information.

Send Ping Commands to Network Hosts

This option enables you to ping network hosts for troubleshooting purposes. Multiple data variables (flags) are available, as described below.

1 Log in to the server as described on page 25.

2 At the `Command >` prompt, you can either:

- Type **ping destination**, where destination is the IP address or domain name of the network host, and then press **Enter** to ping the desired network host without any ping option flags.
  The system will continue to send ping messages and display data until you press **Enter**.
- Type a ping command with flags (see examples below) and press **Enter** to collect specific data. Each flag name and input should be preceded and followed by a space, as shown in the Ping Commands With Flags example below.
  If you did not specify the number of messages to send, the system will continue to send ping messages and display data until you press **Enter**.
- Type **ping** and press **Enter** to display information on ping command options. See ping command usage information example below.

3 (Unlimited messages only) When you are finished monitoring ping data, press **Enter** to stop the ping messages and return to the `Command >` prompt.

Once the ping messages are stopped (either manually via **Enter** press or via a Count flag), the system will display a summary of the ping statistics.

Example: Ping Commands With Flags

Note: Ping commands are not case-sensitive; however inputs are limited to letters and/or numbers (Aa, Bb, Cc, 1, 2, 3, etc.) and dot, hyphen, and underscore (., -, and _) characters.

```
ping 1.2.3.4 c 2
ping 1.2.3.4 c 4 i eth0
ping 1.2.3.4 c 2 s 20 t 3
```

Example: Ping Command Usage Information

```
Usage: ping <destination> [ count c ] [ SIZE s ] [ TTL t ] [ INTERAFCE i ]
Send ICMP ECHO_REQUEST messages to the specified address.

Optional flags:
        COUNT c is the number of messages to send, default is unlimited
        SIZE    s       is the number of data bytes, default is 50
        TTL     t       is the IP packet's TTL value
        INTERFACE i     is the interface to send from, such as eth0 or eth1

Flag names may be shortened, e.g. you may type t instead of TTL.

All options are limited to the set of alphanumeric characters and
        dot, hyphen, and underscore: a-z A-Z 0-9 . - _

Command >
```

Update the Pro:Centric Application

This option is only applicable for the Java portal application. It enables you to update the Java Pro:Centric application via the Ethernet. Note that the update replaces the application and clears all user settings, but preserves the application license.

Caution: Do NOT initiate simultaneous menu sessions while a software update is in progress. Doing so may interfere with the active process and may corrupt the system configuration and/or cause the PCS500R to cease normal operation.

The appropriate update file must be provided by LG; the system will not download an improper file.

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type update and press **Enter**.

3 At the **Enter** `update filename:` prompt, type in the software update filename and press **Enter**.
The system will initiate the download and confirm progress, for example:
`Downloading file: pcs400r_app_xxxx.upd`

4 When the update is successfully completed, reset the system (see "Reset the System" on page 40 for further information).

Update the VPN Setup

This option is only applicable for the Java portal application. It enables you to update the VPN client via a serial link to the PCS500R.
The appropriate update file must be provided by LG; the system will not transfer an improper file.

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type vpn and press **Enter**.

3 At the `Send VPN client file using Xmodem ...` prompt, transfer the new VPN client file using Xmodem protocol. For example, in HyperTerminal, select **Transfer** and then **Send File....** In the Send File window, enter or select the appropriate filename in the Filename field, and select **Xmodem** in the Protocol field.
The update process may take several minutes. The system will display progress messages as well as the result of the update process.

4 When the update is successfully completed, reset the system (see "Reset the System" on page 40 for further information).

Shut Down the System

This command allows you to shut down the system in an orderly manner. Use this command to shut down the PCS500R, for example, if you intend to physically move the unit from one location to another. It is also recommended that you run this command from the PCS500R Service Port in order to track detailed shutdown log messages.

Note: Once you use this command, you must remove power from (i.e., unplug) the unit and then plug the AC power cord back into a powered AC line receptacle when you are ready to restart the server. It is not possible to restart the server remotely.

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type shut and press **Enter**.
The system will prompt for confirmation:
`Are you sure you want to shut down the system? [y/n]:`

3 Either:

- Type **y** and press **Enter** to shut down the system immediately. The shutdown typically takes about a minute. When the PCS500R is in its shutdown state, the front panel LED will blink steadily green.
- Type **n** and press **Enter** to return to the Main Menu without shutting down the system.

Reset the System

1 If not already logged in, log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type reset and press **Enter**.
The system will prompt for confirmation:
`Are you sure you want to reset the system? [y/n]:`

3 Either:

- Type **y** and press **Enter** to initiate an immediate reset of the PCS500R. The reset process may take several minutes, after which the system resumes normal operation.
- Type **n** and press **Enter** to return to the Main Menu without resetting the system.

Reinstall the Factory Configuration

This option reinstalls the Pro:Centric carousels to their factory default configuration, which may be useful for recovering from a system interruption.

Caution: This command removes portal content, media files, etc. After you run the command, TVs/STBs will no longer receive application downloads until you rebuild the application/re-add media files.

Note: This command will not affect the server's network configuration and also preserves the feature set, if installed.

1 Log in to the PCS500R as described on page 25.

2 At the `Command >` prompt, type **reinstall** and press **Enter**.
The system will display a warning and then prompt for confirmation:

```
WARNING!
You are about to reinstall the application carousels.
This will reset the Pro:Centric carousels to the
factory default configuration and will delete any
installed software updates or media files.
It will not change configured network settings.
Are you sure you want to reinstall the carousels? [y/n]:
```

3 Either:

- Type **y** and press **Enter** to continue.
- Type **n** and press **Enter** to return to the Main Menu without reinstalling the Pro:Centric carousels.

If you opt to continue, progress messages will be displayed as the carousels are restored to the factory default configuration. When the installation is successfully completed, you will be prompted to reset the system:

```
Successfully reinstalled factory carousel applications
Done
Please reset the system.
```

4 Reset the system (see "Reset the System" on page 40 for further information).

Exit the Current Session

At the `Command >` prompt, type **exit** and press **Enter** to end the current session.

Troubleshooting

PCS500R Setup

The following sections provide basic troubleshooting information for the PCS500R.

Equipment Setup Review

- Make sure all connectors and connections are tight and secure on all entertainment system components.
- Check the PCS500R LED. Under standard operating conditions, i.e., when the PCS500R is booted and operating normally, the PWR (Power) LED on the PCS500R front panel is continuously lit green. If there is a hardware fault, the PWR LED will turn and stay red.

Note: When power is first applied to the PCS500R, the PWR LED initially flashes red and then turns green (blinking during boot-up).

Network Setup

If the network is configured for DHCP but the PCS500R has not been assigned an IP address, i.e., the Ctrl IP field in the PCS500R System Information display is blank:

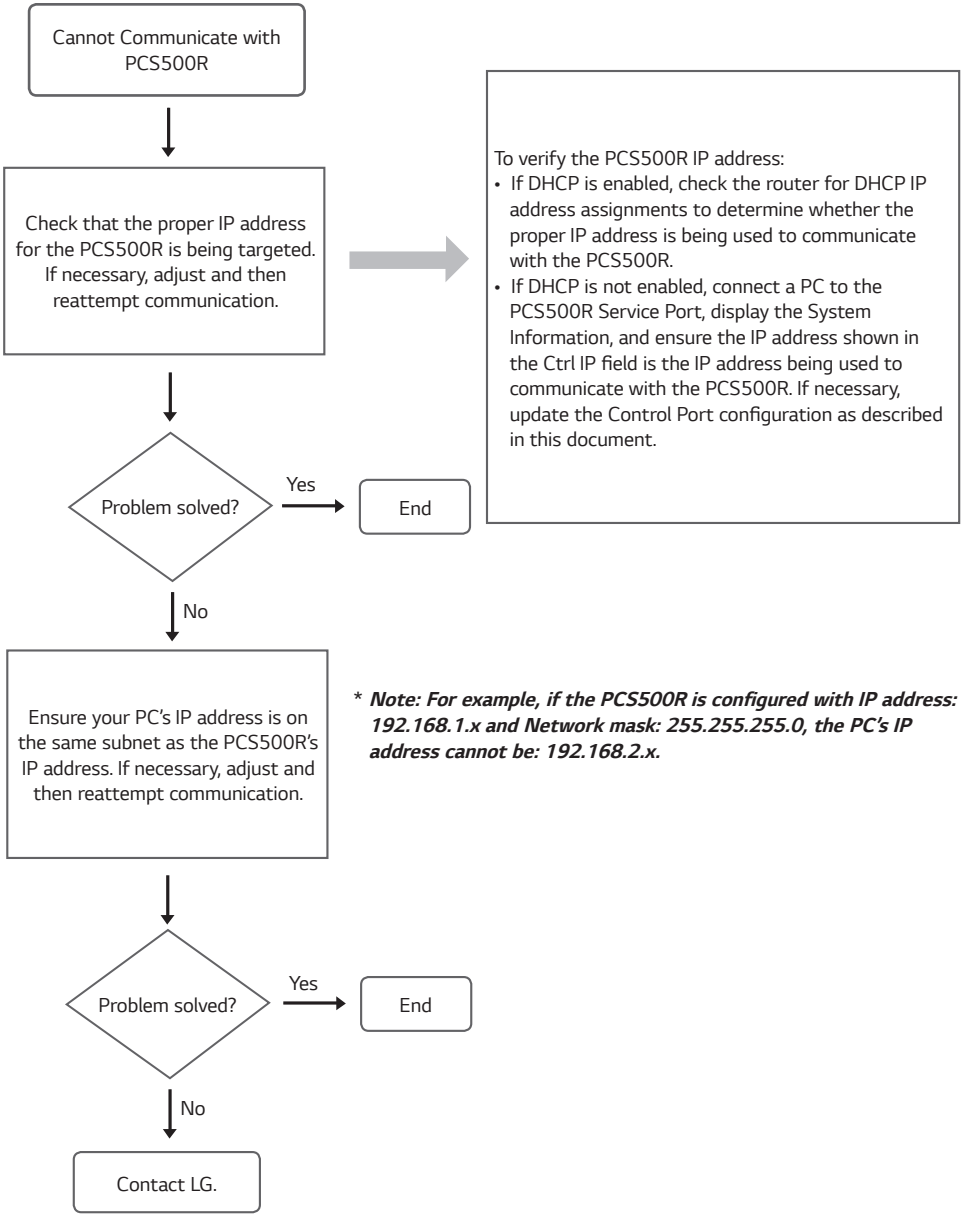
1 Check the Control Port connector on the rear panel of the PCS500R. Make sure the cable connection is tight and secure.

2 Observe the green LED on the Control Port. Once the PCS500R is connected to the network, the LED will be lit continuously.

3 Contact the network administrator to verify the network status and check that the DHCP server is working properly.

PCS500R Communication

If you are unable to establish remote communication with the PCS500R, refer to the following flow chart.



* ***Note: For example, if the PCS500R is configured with IP address: 192.168.1.x and Network mask: 255.255.255.0, the PC's IP address cannot be: 192.168.2.x.***

Specifications

Note: Design and specifications subject to change without prior notice.

Dimensions	
Height	42.977 mm
Width	482.6 mm (for EIA standard 19-inch rack mount)
Depth	215.9 mm
Weight	2.63 kg (rack-only weight)

Environmental Operating Conditions		Environmental Storage Conditions	
Temperature (Tma)	0 ° to 35 ° Celsius	Temperature (Tma)	-20 ° to 70 ° Celsius
Humidity	95 % non-condensing	Humidity	95 % non-condensing

Electrical	
RF Out Connectors (2)*	75 Ohm, Type 'F'
Frequency	VHF/UHF 54 - 865 MHz
RF Output Span	Up to 8 Contiguous Channels (within 120 MHz span)
RF Output Frequency Range	54 MHz to 865 MHz
Active Output Level at RF Out jacks	-1 dBm (+47.75 dBmV) Typical
Test Output Level	-47.75 dBm (+1 dBmV) Typical
Frequency Accuracy	±5 ppm
DC Input	+19 V DC @ 2.2 Amps
Ethernet Connector (Control Port)	10/100/1000BaseT, RJ-45
Ethernet Connector (Feature Port)	1000 BaseT Full Duplex, RJ-45
USB Port	USB 3.0
Solid State Drive	UL Listed, FCC compliant, and/or other applicable agency-recognized/ listed (Maximum current draw = +5V DC @ 2.0 Amps)

* RF TAP connector reserved for service technician use only.

Modulation Specifications	
Standard	ITU-T J.83 Annex B (QAM-B)
Constellations	64-QAM, 256-QAM
Symbol Rate	64-QAM 5.056941 MBaud 256-QAM 5.360537 MBaud
Interleaving	Fixed I = 128, J = 1

Standard	EN 300 429 V1.2.1 (DVB-C)
Constellations	64-QAM, 256-QAM
Symbol Rate	64-QAM / 256-QAM 5.056 MBaud 64-QAM / 256-QAM 6.111 MBaud 64-QAM / 256-QAM 6.9 MBaud

Standard	ABNT NBR 15601:2007 (ISDB-T)
Parameters	64-QAM, 7/8 Convolutional Code, 1/32 Guard Interval Ratio, 2K FFT, 13 Segments
Sample Rate	8.126984Ms/s

AC/DC Adapter	
Manufacturer	APD
Model	DA-65G19
Input	AC 100 - 240 V ~ 50/60 Hz
Output	DC 19 V ⎓ 3.42 A

Open Source Software Notice Information

Product Type	Pro:Centric Server
Model Number / Range	PCS500R

Those products identified by the Product Type and Model Range above from LG Electronics, Inc. ("LGE") contain the open source software detailed below. Please refer to the indicated open source licences for the terms and conditions of their use.

* **Warning: The PCS500R is intended for Commercial use only. It is not a Consumer product and should not be installed in residential dwellings.**

Open Source	License	Copyright
abrt 2.1.11	GPL-2.0	Copyright (c) 2014 ABRT team
abrt-addon-ccpp 2.1.11	GPL-2.0	
abrt-addon-kerneloops 2.1.11	GPL-2.0	
abrt-addon-pstoreoops 2.1.11	GPL-2.0	
abrt-addon-python 2.1.11	GPL-2.0	
abrt-addon-vmcore 2.1.11	GPL-2.0	
abrt-addon-xorg 2.1.11	GPL-2.0	
abrt-cli 2.1.11	GPL-2.0	
abrt-console-notification 2.1.11	GPL-2.0	
abrt-dbus 2.1.11	GPL-2.0	
abrt-libs 2.1.11	GPL-2.0	
abrt-python 2.1.11	GPL-2.0	
abrt-retrace-client 2.1.11	GPL-2.0	
abrt-tui 2.1.11	GPL-2.0	
acl 2.2.51	GPL-2.0 LGPL-2.1	Copyright (c) 2015 Free Software Foundation, Inc.
alsa-firmware 1.0.28	GPL-2.0	
alsa-lib 1.0.28	LGPL-2.1	Copyright (c) 2000 by Abramo Bagnara <abramo@alsa-project.org>, Jaroslav Kysela <perex@perex.cz>
alsa-tools-firmware 1.0.28	GPL-2.0	

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atk 2.14.0	LGPL-2.1	
attr 2.4.46	GPL-2.0	Copyright (c) Andreas Grünbacher <agruen@kernel.org>, October 2015
attr-libattr 2.4.46	LGPL-2.1	Copyright (c) Andreas Grünbacher <agruen@kernel.org>, October 2015
audit 2.4.1	GPL-2.0, LGPL-2.1	Copyright (c) 2004-2015 Red Hat Inc., Durham, North Carolina
augeas 1.4.0	LGPL-2.1	Copyright (c) 2007-2016 David Lutterkort
authconfig 6.2.8	GPL-2.0	Copyright (c) 1999-2014 Red Hat, Inc.
autogen 5.18	LGPL-3.0	
avahi 0.6.31	LGPL-2.1	
bash 4.2.46	GPL-3.0	Copyright (c) 2007, 2009, 2011, 2014 Free Software Foundation, Inc.
bash-completion 2.1	GPL-2.0	
bc 1.06.95	GPL-2.0	Copyright (c) 1998, 2001, 2003, 2014 Free Software Foundation, Inc.
binutils 2.23.52.0.1	GPL-3.0	Copyright (c) 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009 Free Software Foundation, Inc.
biosdevname 0.6.2	GPL-2.0	Copyright (c) 2006 Dell, Inc. by Matt Domsch <Matt_Domsch@dell.com>
blktrace 1.0.5	GPL-2.0	Copyright (c) 2005 Jens Axboe <axboe@suse.de> Copyright (c) 2006 Jens Axboe <axboe@kernel.dk>
bridge-utils 1.5	GPL-2.0	Copyright (c) 2000 Lennert Buytenhek
btrfs-progs 3.19.1	GPL-2.0	Copyright (c) 2007 Oracle
ca-certificates 2015.2.6	GPL-2.0	Copyright (c) 2003 Fumitoshi UKAI <ukai@debian.or.jp> Copyright (c) 2009 Philipp Kern <pkern@debian.org> Copyright (c) 2011 Michael Shuler <michael@pbandjelly.org> Copyright (c) Various Debian Contributors</michael@pbandjelly.org> </pkern@debian.org></ukai@debian.or.jp>
cairo 1.14.2	LGPL-2.1	Copyright (c) 2010 Chris Wilson <chris@chris-wilson.co.uk>
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chkconfig-ntsysv 1.3.61	GPL-2.0	

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cracklib 2.9.0	LGPL-2.1	Copyright (c) 1993 Alec Muffett <alecm@crypto.dircon.co.uk> Original CrackLib author for releases up to v2.7 Copyright (c) Nathan Neulinger <nneul@neulinger.org> version 3.0 modifications and new release
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dyninst 8.2.0	LGPL-2.1	
e2fsprogs 1.42.9	GPL-2.0	Copyright 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010 by Theodore Ts'o
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gconf 3.2.6	LGPL-2.1	Copyright (c) 1999, 2000 Red Hat, Inc.
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gettext 0.18.2.1	GPL-3.0, LGPL-2.1	Copyright (c) 1998, 2010, 2013 Free Software Foundation, Inc.
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GNU nano - an enhanced clone of the Pico text editor 2.3.1	GPL-3.0	
GnuPG 2.0.22	GPL-3.0	
gnutls 3.3.8	LGPL-2.1	
gobject-introspection 1.42.0	LGPL-2.1	Copyright (c) 2005 - 2015 The GNOME Project
gpgme 1.3.2	LGPL-2.1	Copyright (c) 2000 Werner Koch (dd9jn) Copyright (c) 2001, 2002, 2003, 2004, 2005, 2007, 2012, 2014, 2015 g10 Code GmbH
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hostname 3.13	GPL-2.0	Copyright (c) 1994-1997 Peter Tobias <tobias@et-inf.fho-emden.de> 2009- Michael Meskes <meskes@debian.org>
hunspell 1.3.2	LGPL-2.1	
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hwdata 0.252	GPL-2.0	
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irqbalance 1.0.7	GPL-2.0	
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kbd 1.15.5	GPL-2.0	
kexec-tools 2.0.7	GPL-2.0	
keyutils 1.5.8	LGPL-2.1	
kmod 20	GPL-2.0, LGPL-2.1	
kpatch 0.1.10	GPL-2.0	
langtable 0.0.31	GPL-3.0	
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libdaemon 0.14	LGPL-2.1	
libdwarf 2	LGPL-2.1	
libestr 0.1.9	LGPL-2.1	
libfprint 0.5.0	LGPL-2.1	
libgcrypt 1.5.3	LGPL-2.1	Copyright (c) 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012 Free Software Foundation, Inc. Copyright (c) 2012, 2013 g10 Code GmbH
libgpg-error 1.12	LGPL-2.1	Copyright (c) 2003, 2004 g10 Code GmbH Copyright (c) 1995, 1996, 1997, 1999, 2005, 2007, 2008, 2010 Free Software Foundation, Inc.
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libmount 2.23.2	LGPL-2.1	
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libnl 3.2.21	LGPL-2.1	Copyright (c) 2003-2013 Thomas Graf <tgraf@suug.ch> Copyright (c) 2007 Secure Computing Corporation Copyright (c) 2007 Philip Craig <philipc@snapgear.com> Copyright (c) 1992-2013 Free Software Foundation, Inc. Copyright (c) 2013 Sassano Systems LLC <joe@sassanosystems.com> Copyright (c) 2013 Cong Wang <xiyou.wangcong@gmail.com> Copyright (c) 2014 Susant Sahani <susant@redhat.com> Copyright (c) 2012 Rich Fought <rich.fought@watchguard.com> Copyright (c) 2007, 2008 Patrick McHardy <kaber@trash.net>
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librsvg2 2.39.0	LGPL-2.1	
libsemanage 2.1.10	LGPL-2.1	
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xorg-lib-libXt 1.1.4	HPND	Copyright (c) 2001, 2003 Keith Packard Copyright (c) 1987, 1988 by Digital Equipment Corporation, Maynard, Massachusetts
xorg-lib-libXtst 1.2.2	X11	Copyright (c) 1990, 1991 by UniSoft Group Limited Copyright (c) 1992, 1993, 1995, 1998 The Open Group Copyright (c) 1992, 1994, 1995 X Consortium
xorg-lib-libXxf86vm 1.1.3	X11	Copyright (c) 1995 Kaleb S. KEITHLEY
yajl 2.0.4	ISC	Copyright (c) 2007-2009 Lloyd Hilaiel
zip 3.0	Info-ZIP	
zlib 1.2.7	Zlib	Copyright (c) 1995-2013 Jean-loup Gailly and Mark Adler

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This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (*http://www.openssl.org/*).

LG PCS500R Pro:Centric Server Warranty

Broadcast Products	Welcome to the LG family! We believe that you will be pleased with your new PCS500R Pro: Centric Server. Please read this warranty carefully, it is a "LIMITED WARRANTY". This warranty gives you specific legal rights.

LG's RESPONSIBILITY

Warranty Term	**1 year** parts and labour from date of purchase or delivery date.
Parts	New or remanufactured replacements for factory-defective parts may be used. Such replacement parts have a warranty for the remaining portion of the original warranty period.
Warranty Service	Warranty service is provided by LG. Customer pays for shipping charges to LG; LG pays for return shipping Charge's to return PCS500R Pro: Centric Server to customer. Call **0844 248 6655** for further information.

WARRANTY SPECIFICS

Not Covered	This warranty covers manufacturing defects and does not cover installation, adjustment of customer controls, Installation or repair of antenna systems, cable converters or cable company-supplied equipment; it also does not cover damage due to misuse, abuse, negligence, acts of God or other causes beyond the control of LG. Any alteration of the product after manufacture voids this warranty in its entirety. **THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND LG SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, OR INCIDENTAL DAMAGES OF ANY KIND, INCLUDING LOST REVENUES OR PROFITS IN CONNECTION WITH THIS PRODUCT.**

OWNER'S RESPONSIBILITY

Effective Warranty Date	Warranty begins on the date of delivery of the PCS500R Pro: Centric Server. **For your convenience, keep the dealer's dated bill of sale or delivery ticket, as evidence of the purchase date.**
Installation Guide	Read the Installation & Setup Guide carefully so that you will understand the operation of the PCS500R Pro: Centric Server along with how to adjust the settings.
Warranty Service	**For warranty service information**, call **0844 248 6655**. Parts and labour for service work carried out are LG's responsibility (See above) will be provided without charge. Other service is at the owner's expense. If you have any problem in obtaining satisfactory warranty service, call **0844 248 6655**. **You must provide the model number, serial number and date of purchase or date of original installation.**

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