SpectraLink® 6300 MCU

Maintenance and Diagnostics

SpectraLink 6000 System

POLYCOM®

Contact Information

Please contact your Polycom Authorized Reseller for assistance.
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About this Guide

This document describes the procedures for troubleshooting, maintaining, and expanding the SpectraLink 6000 System.

Polycom Model Numbers

This document covers the following registered model numbers:

JPI300, MCS300, RCC400, RCO400, RCU100, RCU200, RCU201

Related Documents

SpectraLink 6300 MCU: Facility Preparation (1725-36121-001)

SpectraLink 6300 MCU: Installation (1725-36122-001)

SpectraLink 6300 MCU: OAI Installation and Configuration (1725-36124-001)

SpectraLink 6300 MCU: Operator's Console (1725-36125-001)

SpectraLink 6300 MCU: T1 Remote Module Installation (1725-36126-001)

Installing the Outdoor Base Station (1725-36127-001)

Available at
http://www.polycom.com/usa/en/support/voice/proprietary_wireless/proprietary_wireless.html

LinkPlus Interface Guide (1725-361xx-001 where xx indicates a number corresponding to the type of PBX)

Available at
http://www.polycom.com/usa/en/support/voice/wi-fi/pbx_integration.html

Contacting Polycom

Polycom wants you to have a successful installation. If you have questions please contact the Customer Support Hotline at 1-888-POLYCOM (1-888-765-9266).

The hotline is open Monday through Friday, 6 a.m. to 6 p.m. Mountain time.

For Technical Support: technicalsupport@polycom.com

For Knowledge Base: http://www.polycom.com/usa/en/support/voice/voice.html

For Return Material Authorization: rmacoordinator@polycom.com

Icons and Conventions

This manual uses the following icons and conventions.

	Caution! Follow these instructions carefully to avoid danger.
	Note these instructions carefully.
Label	This typeface indicates a key, label, or button on SpectraLink hardware.

Contents

1

Troubleshooting Overview

The SpectraLink 6000 System software constantly monitors system components for problems. If a problem is detected, the system will flag the problem with an alarm. Alarms are displayed in two places:

Operator's Console

The Chk3000 program allows the administrator or technician to display details about each system component. If the component is in an alarm state, details about the alarm will display on the appropriate screen. See the *SpectraLink 6300 MCU: Operator's Console* manual for more information.

LEDs

The front panels of all system cards (System Controller, Shelf Controller, and Interface Modules) have six LEDs: one red (labeled **ALARM**), and five green (labeled **1** through **5**) to indicate status, including alarm conditions. LED sequences, descriptions, and recommended procedures are provided in Chapter 7 *LED and Alarm Troubleshooting Tables* covering troubleshooting for each type of card

2

System Maintenance

This section explains some common maintenance procedures.

Replace an Interface Module (Hot Swap)

Interface Modules can be removed and replaced without shutting the system down. Interface Modules must be replaced with the same type of card.

To perform a "hot swap" of an Interface Module:

1. From the Operator's Console, press F2, **Portcard State Display**. Display the **Portcard** to be swapped, so you can monitor its status during the process.

2. On the card to be replaced, move the **Normal/Disable** switch to the **Disable** position. This locks the card and disables the Base Stations to prevent new calls from starting, but does not drop active calls. Existing calls are allowed to complete before the card is locked.

3. When the alarm light stops blinking and turns solid red, the card is idle. Verify this on the Operator's Console, all lines and Base Stations should show no activity. If you unplug the card before it is idle, the system may alarm.

4. At the Operator's Console, press Esc. This stops the Operator's Console from trying to monitor the card you are about to remove.

5. Unplug the 25-pair cable from the card.

6. Unscrew the card from the shelf and slide it out.

7. Slide the replacement Interface Module into the slot, until the card clicks into place. Tighten the screws at the top and bottom of the card to secure it.

8. Connect the 25-pair cable to the card.

9. When the heartbeat LED sequence displays on the Interface Module (LED **1** flashes 1/3 of the time), press F2, **Portcard State Display** on the Operator's Console to verify the status of the new card. It should be **Running**.

Add a Handset

Before adding a new handset, you must have a port location on the demarcation block on the switch and a port location on the SpectraLink 6300 MCU Interface Module. If no ports are available on the SpectraLink 6300 MCU, you must install another Interface Module in the shelf. See *SpectraLink 6300 MCU: Installation*.

1. Connect the host telephone system port to the SpectraLink 6300 MCU Interface Module port assigned to the new handset.

2. On the Operator's Console, press F4, **Portcard Configuration Display and Administration**.

3. Using the arrow keys or mouse, position the cursor on the port location to be configured, and press Enter.

4. When the menu displays, scroll down to **Edit Line**, and press Enter.

5. At the pop-up menu, type the information for the handset.

    Serial Number The factory assigned serial number for this telephone, located inside the battery compartment under the battery. Double-check this number when it is entered. If the serial number is entered incorrectly the telephone will not function and will appear to be defective.

    Note (optional) User name or any other information. Do not enter quotes (") in this field or an error message will display.

    Extension/SPID Extension number or SPID. Must be numeric.

6. When information is correctly entered, select **SAVE** to save it.

7. To program the handset to display the correct extension number, hold down the **FCN** key until **Volume Level** displays. Press the **# >** key until **EXTENSION** displays on the handset. Press **0**, then enter the correct extension number. Press **END** when finished.

8. When the handset is turned on, the extension will be displayed. Test the new handsets by placing a call to each one to verify that the correct telephone rings.

Replace a Handset

Use this procedure to replace a handset with a new handset.

1. On the Operator's Console, press F4, **Portcard Configuration Display and Administration**. Use the **Search** function to locate the handset to be replaced, searching for the extension or the serial number.

2. Highlight the port location of the telephone and select **Edit Line**.

3. When the pop-up screen displays, replace the serial number of the old telephone with the serial number of the new telephone.

4. Select **SAVE** to save the change.

Delete a Handset

Use this procedure to completely remove a handset from the system, without replacing the telephone with another.

1. On the Operator's Console, press F4, **Portcard Configuration Display and Administration**.

2. Using the arrow keys or mouse, position the cursor on the port location of the telephone to be deleted, and press Enter.

3. When the menu displays, scroll down to **Delete Line**, and press Enter.

4. Scroll to **DELETE** and press Enter.

5. If you do not plan to re-use the port on the SpectraLink 6000 System, remove the cabling for this telephone between the host telephone system and the SpectraLink 6000 System's demarc block.

Add a Base Station

Before adding a new Base Station you should have a port location for the new equipment. If no ports are available on the SpectraLink 6300 MCU, you must install another Interface Module in the shelf. See *SpectraLink 6300 MCU: Installation*.

1. Install the new Base Station. See *SpectraLink 6300 MCU: Installation*.

2. On the Operator's Console, press F4, **Portcard Configuration Display and Administration**.

3. Using the arrow keys or mouse, position the cursor on the port location to be configured, and press Enter.

4. When the menu displays, scroll down to **Edit RCU** (Base Station), and press Enter.

5. At the pop-up menu, type the information for each Base Station.

   Offset Offset IDs manage the division of the frequency (spectrum) among the Base Stations. To prevent interference, neighboring Base Stations require different offset values. Each Base Station is assigned a unique two-digit offset. Press the right arrow key to see a menu of choices.

   — For half-hop systems with up to 25 Base Stations, or whole-hop systems with up to 50 Base Stations, number the Base Stations in order 1 through 25 or 1 through 50.

   — If the system has more Base Stations, the offset IDs must be reused. Consult the map that was generated during system installation. Assign unique offsets such that adjacent or nearby Base Stations do not share the same offset. When selecting offset assignments, keep in mind through-floor penetration and the Base Station's proximity to windows.

   — Offset usage is summarized on the **Show RCU Offset Reuse** function from F2 - **Portcard State Display**. This report shows how many times each Offset has been used.

   Isolated? If this Base Station is isolated from all other Base Stations, enter **Y**. An isolated Base Station is one that is located physically apart from other Base Stations, therefore will never be heard during a Listen Verify diagnostic. Designating a Base Station as

Isolated will disable the Listen Verify alarm for that Base Station and avoid generating spurious alarms.

Note (optional) type a short description of where the Base Station was installed (a room or floor number, for example). Up to 30 characters. Do not enter quotes (") in this field or an error message will display.

6. When information is correctly entered, select **SAVE** to save it.

To replace a Base Station, unplug the existing Base Station and plug in the new Base Station.

- The LED will blink red and green as the system software downloads to the Base Station and the Base Station is tested.

- When the LED blinks amber, the system is ready for operation.

- When the LED blinks green, a handset has established a radio link with that Base Station.

- If the LED turns solid red, blinks red, or continues to blink red and green, refer to Chapter 4 *Base Station Problems*.

Delete a Base Station

Use this procedure to completely remove a Base Station without replacing it with a new one.

1. On the Operator's Console, press F4, **Portcard Configuration Display and Administration**.

2. Using the arrow keys or mouse, position the cursor on the port location of the Base Station to be deleted, and press Enter.

3. When the menu displays, scroll down to **Delete RCU**, and press Enter.

4. Scroll to **DELETE** and press Enter.

5. If you do not intend to move the Base Station to a new location, disconnect the cabling for this Base Station from the demarc block.

Add a Shelf

If the existing shelves in the MCU are not large enough to hold the required Interface Modules, you must add a shelf to the system. The system can support 19 Expansion Shelves.

1. Install the shelf. See *SpectraLink 6300 MCU: Installation*.

2. If you moved Interface Modules from one shelf into the new shelf, use the **Move Portcard** function to modify the existing Interface Module configuration to reflect the change.

3. Register the new handsets and/or Base Stations on the new shelf. See Chapter 2, sections *Add a Handset* and *Add A Base Station*.

Delete a Shelf

If you move or reconfigure your system, you may need to completely delete a shelf.

1. On the Operator's Console, press F4, **Portcard Configuration Display and Administration**.

2. If you are completely removing the handsets and Base Stations from this system, delete the Base Stations and handset by deleting each Interface Module on the shelf using the **Delete Portcard** (Interface Module) option.

3. If you are moving the handsets and Base Stations from this shelf to another, use the **Move Portcard** (Interface Module) option to designate the new shelf location of the Interface Module. Note that you cannot move an Interface Module to a slot which already contains configuration information. Also, the Interface Module must be physically moved to the new slot and connected with a cable in order for the module to become operational.

4. When all Interface Modules have been deleted or moved from the shelf, press F1, **Supervisor State Display**. Select the **Delete Cabinet** (shelf) option to delete the shelf.

5. After the shelf is deleted from the system you can physically remove it and its cabling.

3

Handset Problems

Using the Handsets

The SpectraLink 6000 System is an in-building wireless communication system that allows hand-held Wireless Telephones (handsets) to communicate using the existing telephone system. Calls are sent to and received by the handsets via small radio transceivers called Base Stations, located throughout the building or campus. When using and troubleshooting the handsets, consider the following concepts.

Call hand off

- As the user moves through the facility, your conversation will be "handed off" from one Base Station to another.

In range/Out of range

- Service will be disrupted if a user moves outside the transmission area of the SpectraLink 6000 System. Service is restored if the user moves back within range of a Base Station. If a call drops because a user moves out of range, the handset will recover the call if the user moves back into range within a few seconds.

Capacity

- In areas of heavy use, the call capacity of a particular Base Station may be filled. If this happens, the user can wait until another user terminates a call, or move within range of another Base Station and try the call again. If a user is on a call and moves into an area where capacity is full, it is the same as moving out of range of a Base Station.

Transmission obstructions

- Thorough site survey was done prior to installation to determine the best location for Base Stations for optimum transmission coverage. However, small pockets of obstruction may still be present, or obstructions may be introduced into the facility after system installation. This loss of service can be restored by moving out of the obstructed area. Base Stations can also be added to overcome obstructions.

No Extension/Wrong Extension Displayed

1. Hold down the **FCN** key until **Volume Level** displays.

2. Press the **#** key twice until the display reads **Extension.**

3. Press **0**, then enter the correct extension number.

4. Press **END** when finished.

"No Svc" Displayed

The handset is either not registered, out of range, or can't pick up a signal from a Base Station.

1. Visually check to see if the handset is within range of a Base Station where other telephones are working.

2. From the Operator's Console, search for the handset's serial number or extension number to be sure it is properly registered.

3. If other handsets in the area are also not working, see Chapter 3, section *Multiple Handsets Not Working* below.

No Dialtone / No Audio

If the handset has no dialtone, or if the user is unable to hear the other party's voice or heard echo or dead air.

1. Be sure the handset is powered on.

2. Be sure the **No Svc** icon turns off a few seconds after the handset is powered on.

3. Swap the Battery Pack with a Battery Pack from a functional handset. If this corrects the problem, charge the Battery Pack.

4. Turn the handset off then on again, then test again for dial tone and voice quality.

5. Move through several Base Station areas to be sure the handset is within range of an operating Base Station.

6. Check for alarms on the System Controller, Shelf Controller, or Interface Module cards (F1, **Supervisor State Display** or F2, **Portcard State Display**). If the handset is connected through a digital interface, the system will show an alarm. If the state is anything but idle, the handset is in alarm. If there are alarms, see the applicable *Troubleshooting Alarms* section.

7. Check that the system connects when the user goes off-hook. On the Operator's Console, from the **Portcard State Display** screen (F2), view the status of the line when the user goes off-hook.

8. Make sure the handset's Interface Module is connected to a working phone line. Use a telephone test set to check the line at the demarc block.

9. Check the cabling between the Interface Modules and the demarc block, and between the demarc block and the telephone system ports. See *SpectraLink 6300 MCU: Installation* for more information.

10. Isolate the handset line on the PBX from the SpectraLink 6300 MCU. Connect a wired telephone to the port to see if the wired telephone operates properly.

11. Move the handset to a different port location and test again.

No Handoff

If the user walks between Base Station coverage areas, the conversation is not handed off, and the call is dropped.

1. Using another handset, confirm that both Base Stations are operational.

2. Verify that the handset can hand off between other Base Stations.

3. On the Operator's Console, from the **Portcard State Display** screen (F2) check the status of the Base Stations. It is possible that the Base Stations have four calls (the maximum) in progress. If the Base Station is handling three or fewer calls and still drops the call, see Chapter 4 *Base Station Problems*.

Calls Ring on the Wrong Handset

The handset has probably not been registered correctly.

1. From the Operator's Console, use the **Search** function to find the handset's serial number and check its port location.

2. Trace the wires from the back of the Interface Module to the host telephone system to be sure it is actually connected to that port location.

3. If the physical location is different, note the correct port location. From **Portcard Configuration Display and Administration** (F4), use the **Edit Line** function to change the serial number on the correct port. If the port location is already in use by another handset, you will need to delete that handset (using **Delete Line**), then change the serial number on that port location to the serial number of the new handset.

Multiple Handsets Not Working

If several of the handsets are not working there may be a problem with the Interface Module that controls them, or with one or more Base Stations.

1. Check to see that the handsets are correctly registered. See *SpectraLink 6300 MCU: Operator's Console* for instructions.

2. At the Operator's Console, use the **Search** function to display details about the handsets (searching for serial number, extension, or user name). If they are all connected to the same Interface Module, there may be a problem with that Interface Module.

3. Try replacing the Interface Module with a different module of the same type. See Chapter 2, section *Replace an Interface Module (Hot Swap)* for instructions.

4. Check the cabling between the Interface Modules and the demarc block, and between the demarc block and the telephone system ports. See *SpectraLink 6300 MCU: Installation* for more information.

5. If the problem persists, diagnose the Base Stations.

4

Base Station Problems

The first step in diagnosing Base Station problems is to isolate the problem to the Base Station. Be sure the problem is not limited to a single handset. When a problem occurs with a handset, try the same procedure using another telephone, or several telephones (see Chapter 3 *Handset Problems*.)

If all or several handsets are affected, try the following troubleshooting procedures.

If you try the following troubleshooting procedures and the Base Station still does not work, return the unit to Polycom for service.

Multiple Base Stations Not Working

If several of the Base Stations are not working there may be a problem with the Interface Module that controls them.

1. At the Operator's Console, check for alarms on the **Supervisor State Display** (F1) and **Portcard State Display** (F2) screens. Cards or components in alarm will have an exclamation point (**!**). See the applicable *Troubleshooting* section for more information.

2. Check to see that the Base Stations are correctly registered. See *SpectraLink 6300 MCU: Operator's Console* for instructions.

3. If all of the Base Stations are connected to the same Interface Module, there may be a problem with that Interface Module. Try replacing the Interface Module (see Chapter 2, section *Replace an Interface Module*) and re-testing the Base Stations.

4. Use a voltmeter to check for 48V DC on the Base Station wiring.

Base Station LED Not Lit

The Base Station is not receiving power. On the **Portcard Status** screen (F2) the status may show **Reset**.

1. Be sure the RJ-45 connector is plugged into the Base Station.

2. Be sure the MCU is turned on.

3. With a voltmeter, check the 48V DC on the wiring between the MCU and the Base Station.

Base Station LED Flashing Red and Green

The LED on the Base Station is designed to flash in specific colors and patterns to reflect its functioning. At startup the system goes through a "listen" procedure to ensure that the Base Stations do not interfere with each other. During the "listen" process the LED will flash red and green for approximately two minutes.

Certain flashing patterns indicate a problem that needs to be addressed:

- If the System Controller disables a Base Station because it interferes with another Base Station, the disabled Base Station's LED will flash red and green.

- If the Base Station is stuck in "download" the LED will flash red and green. In this case, verify the status of the Base Station at the Operator's Console. Press F2, **Portcard State Display**. If status is **Disabled**, see Chapter 4, section *Base Station Disabled*, below.

- If status is **Download** and the DL Time is longer than one to two minutes, see Chapter 4, section *Base Station Will Not Download*, below.

Also:

- Try disconnecting and reconnecting the power from the Base Station. Unplug the RJ-45 connector on the Base Station then plug it back in again, or remove the bridging clips from the demarc block and replace them. If necessary, reset several Base Stations at once by removing the cable from the Interface Module. Remember, this will also disconnect lines and drop calls!

- Make sure there are no bridge taps ("Y" connections) on the demarc blocks. Remove any you find.

- Use a voltmeter to check the lines for the 48 V dc to be sure there are no power problems.

Base Station Disabled

The System Controller will disable a Base Station if it is too close to another Base Station or if there are communication errors between the Base Station and the System Controller. Once disabled the Base Station does not handle any calls.

1. On the **Portcard State Display** (F2) check that the status of this Base Station is **Disabled**.

2. Before moving Base Stations, check the facility's floorplan and the latest Listen Verify diagnostic (F1, **Check Listen Verify Report** or **Show Listen Report**) for errors and information.

3. To enable this Base Station, disconnect it and relocate it so it is farther from other Base Stations.

4. Disconnecting and reconnecting the Base Station will automatically activate the "listen" procedure. Run the Listen Verify Diagnostic (F1, **Run Listen Verify**) and review results to be sure the problem is corrected without creating any new problems.

Base Station Will Not Download

If a Base Station is stuck in download, the LED may flash red and green or just red; the status on the Operator's Console will show **Reset** or **Download**; and the Base Station will be locked up (not handling calls).

1. At the Operator's Console, check to see that the Base Station is registered, using F2, **Portcard State Display**.

2. Check the status of the Base Station. If the status shows **Download** or **Download Data**, the Base Station has locked up during download.

3. To reset the Base Station: From F2, **Portcard State Display**, highlight the Base Station and press Enter, then select **Reset RCU** from the menu.

4. If the Base Station still does not download, try disconnecting power from the Base Station and then reconnecting it (unplug the RJ-45 connector on the Base Station then plug it back in again, or remove the bridging clips from the demarc block and then replace them.)

5. On the **Portcard State Display** (F2) screen, select the Base Station in question and press Enter to show **Base Station Detail**. This shows continuous update of the Base Station's status. The **DL Errors** field shows the number of Download Errors. Any number greater than 0 indicates a problem. **RCU Link** shows current transmission errors. These errors are generally caused by hardware problems. Contact Polycom Customer Support for assistance.

Base Station LED Flashing Red

This indicates that the Base Station is not communicating with the MCU.

1. Follow the instructions in Base Station LED Flashing Red and Green.

2. Be sure there are no bridge taps ("Y" connections) on the demarc block. Remove any you find.

3. If the problem persists, follow instructions in Chapter 4, section *Base Station LED Solid Red or Yellow*, below.

Base Station LED Solid Red or Yellow

This indicates a short in the Base Station's transmit or receive wire pairs, usually within a pair.

Be sure none of the wires are shorted together. Remove the RJ-45 connector from the Base Station. Remove the cable between the Interface Module and the demarc block. Then use an ohmmeter to be sure there is an open circuit between pins on the RJ-45. If you do not want to remove the cabling from the Interface Module (so you do not interfere with system operation), remove the bridging clips on the demarc block for that Base Station, then test with the ohmmeter.

Base Station LED Flashing Red, Yellow, Green

The Base Station's microprocessor is faulty. Replace the Base Station and contact Polycom customer service.

5

Troubleshooting During Start-Up Phase

This section describes the sequence of the LEDs on all system cards when the system is first powered on (Boot ROM and Download of software).

Boot ROM LEDs

When the system is powered on, the normal sequence is for the green LEDs to 'count' up from 1 to 12 in binary. The following table outlines the sequence.

LEDs	Code	Description
0	0	Entered boot code.
1	1	Done RAM test (check boot code CRC, flash type, factory page CRC, downloaded CRC in that order).
2	2	Sent recognition character at 115200 (if carrier detected).
1, 2	3	Sent recognition character at 57600 (if carrier detected).
3	4	Sent recognition character at 38400 (if carrier detected; send recognition character at 9600 if carrier detected).
1, 3	5	Jumping to downloader code.
2, 3	6	Entered downloader code.
1, 2, 3	7	Copied to RAM, entered C code (check flash type, sense board slot, check board type, CRC functional code, start IPC, in that order).
4	8	Checking for a keepalive message.
1, 4	9	Sent version to supervisor.**
2, 4	10	Awaiting download (sending requests if no other download).**
1, 2, 4	11	Jumping to functional code (functional code then blinks all the LEDs).

** Note: Codes 9 and 10 both blink at one-second intervals while awaiting a response.

Boot ROM Alarms

During system boot, if alarms are encountered the red LED will be on. The alarm code will display on the green status LEDs, consisting of one second of blank lights followed by two LED sequences which each display for one second.

LED 1	LED 2	Description	Recommendation
1	1	RAM test failed.	Replace card.
1	2	Flash type incorrect.	Replace card.
1	1, 2	Boot code CRC incorrect.	Contact Polycom Customer Support.
1	3	Factory page CRC incorrect.	Contact Polycom Customer Support.
1	1, 3	Downloader CRC incorrect.	Contact Polycom Customer Support.
1	2, 3	Bad board type.	Contact Polycom Customer Support.
1	1, 2, 3	Bad board slot.	Contact Polycom Customer Support.
1	4	Bad functional code.	Contact Polycom Customer Support.
1	1, 4	Incompatible functional code version.	Card requires newer version of functional code. Contact Polycom Customer Support.
2	1	Error starting IPC.	Replace card.
2	2	Supervisor communications refusal.	Interface Module card is not configured for PBX type.
2	1, 2	No keepalives detected.	Shelf Controller card is not yet operating.
2	3	Bad shelf number.	Contact Polycom Customer Support.
1, 2	1	Error writing or erasing flash.	Replace card.
1, 2	2	Error downloading FPGA (not used by Interface Module).	Replace card.

Downloads

During downloads, either from the serial port or across the IPC, the green LEDs 'count' up to show progress in the download. Each serial packet or IPC page increments the count and it wraps to zero after getting to 31.

Configuration Changes

When changes are made to the configuration (Base Stations or Lines added or changed), the information is sent from the System Controller to the Shelf Controller and Interface Modules. Status LED **5** blinks on each card during the configuration download.

6

Troubleshooting Card Alarms

This section contains information about how to read the alarm LEDs on the system cards.

For a complete list and description of alarms, see the *Troubleshooting Matrix* tables in Chapter 7 *LED and Alarm Troubleshooting Tables*.

System and Shelf Controller Card Status Indicators

If the red LED is off but one or more green LEDs are on, the green LEDs indicate status, as follows:

LED	Description
Green 1	Normal status when on.
Green 2	Card download in progress.
Green 3	Reserved for future use.
Green 4	Listen Verify in progress.
Green 5	Configuration update in progress.

When the red LED is lit, it indicates an alarm code is currently shown on the 5 green LEDs. When indicating Alarms (from top to bottom):

LED	Description
Red	Alarm is present
Green 1	Low order bit (bit 1) alarm code
Green 2	Bit 2 alarm code
Green 3	Bit 3 alarm code
Green 4	Bit 4 alarm code
Green 5	High order bit (bit 5) alarm code

The following diagram shows the System Controller and Shelf Controller cards.

System Controller Card   Shelf Controller Card
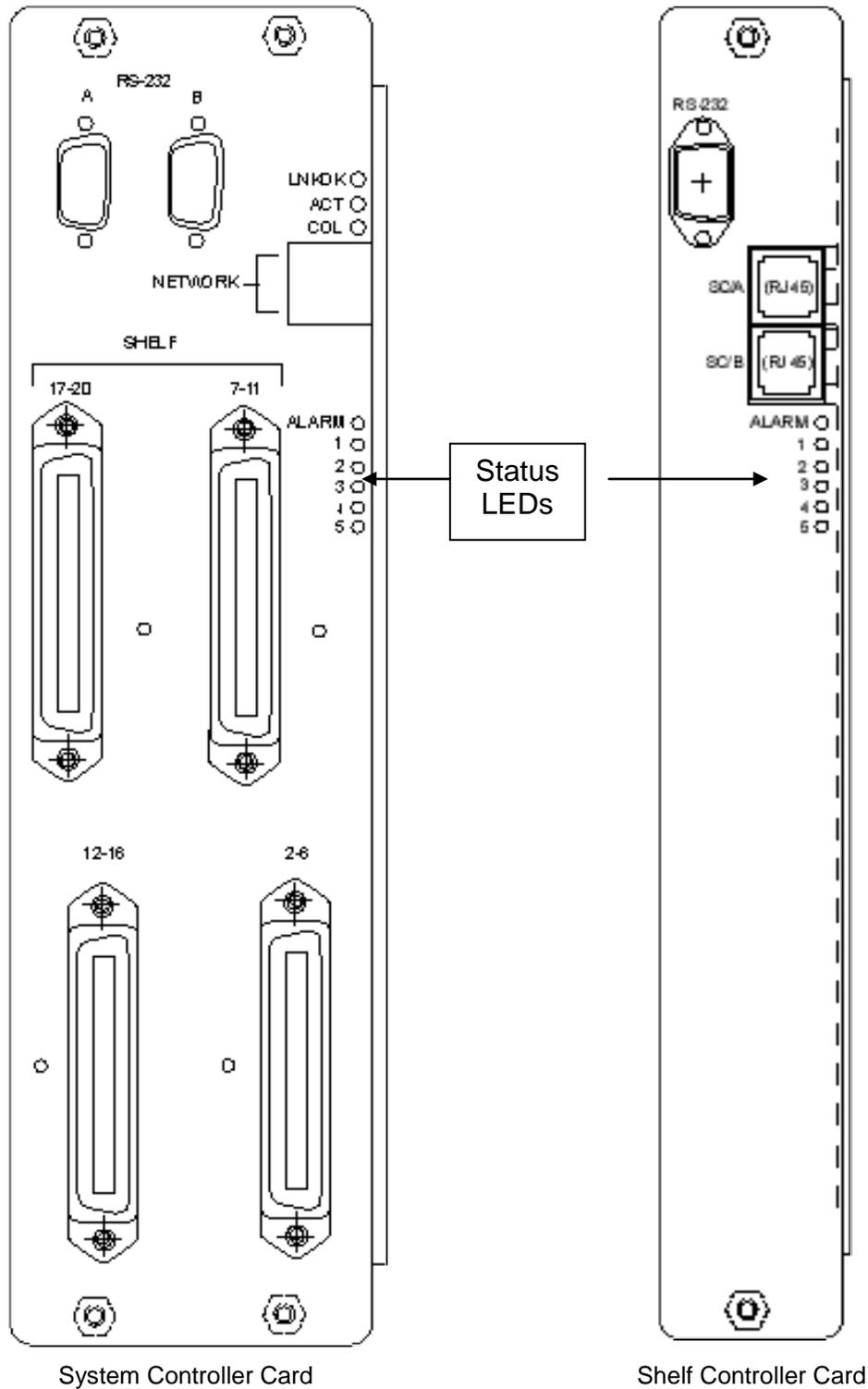
Interface Module Status LEDs
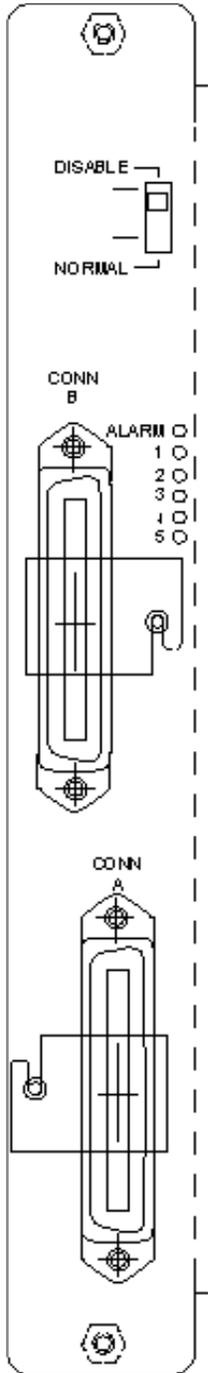
The Status display on the Interface Module consists of:

LED	Description
Red/Alarm	Always off.
Green 1	Card is up and running.
Green 2	One or more lines in use.
Green 3	One or more Base Stations in use.

Reading the Status LEDs

The LEDs cycle in the following sequence:

1. Status

2. Alarm Code (all LEDs off if no alarm exists)

3. Component (all LEDs off if no alarm exists)

The card will iterate through the list of active alarms showing only one of the active alarms at a time. A System Controller with two alarms, for example, would flash the following sequence on the LEDs:

Status - alarm code 1 - alarming component 1 - Status - alarm code 2 - alarming component 2 - Status - alarm code 1 - alarming component 1 etc.

Interface Module

LED and Alarm Troubleshooting Tables

System Controller Card Alarm Matrix

This table summarizes the possible alarm codes which can occur for the System Controller card.

LEDs	Alarm Code	Alarm Components											
		1	2	1, 2	3	1, 3	2, 3	1, 2, 3	4	1, 4	2, 4	1, 2, 4	3, 4
		Router	Funnel	CTLSW	IPC	Flash	SCC Config	PC Config	UART 1	UART 2	Cards	MCU	DL
2, 4	No code	X	X	X			X	X			X		X
1, 2, 4	Test	X		X		X					X	X	
3, 4	Program	X	X	X									
1, 3, 4	Start	X	X		X						X		
2, 3, 4	Keepalive	X									X		
1, 2, 3, 4	Error	X	X		X							X	
5	RX full				X				X	X			
1, 5	TX full				X				X	X		X	
2, 5	Erase					X							
1, 2, 5	Read					X			X	X		X	
3, 5	Write					X							
1, 3, 5	Download	X											
2, 3, 5	HW				X					X	X		
1, 2, 3, 5	PT s/w CRC										X		
4,5	Bad PT Version					X							

System Controller Card Troubleshooting Matrix

On the Operator's Console, System Controller alarms display on the **Show Cabinet Detail** screen for the Primary Shelf (Shelf 1), accessible from **Supervisor State Display** screen (F1). The table is sorted alphabetically by component. LEDs for Component and Alarm are also shown in the table.

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
Cards - 2, 4	Keepalive - 2, 3, 4	Often the result of a missing card or a removed card in the system. Also caused by a breakdown in IPC communications between the Interface Module and the supervisor.	Check to see if a card is present in the system. If no card is present, either insert a card or deconfigure it by deleting the PBX type. Possible incorrect cabling between the System Controller and a Shelf Controller. Check the cabling for the shelf going to the alarming Interface Module.	Any active calls that are on the missing card's Base Stations and have not handed off to other Base Stations by the time the keepalive timeout occurs will be dropped. Avoid removing a card before it is in an idle, locked state as this or other alarms may occur.
Cards - 2, 4	Start - 1, 3, 4	This alarm occurs because a card did not start running functional code. This can happen if a card is unplugged while it is starting.	If the card is missing, reinsert the card or deconfigure it in the Interface Module configuration window. If the card is present, look at its alarm LEDs for clarification of the cause of the problem.	Can be caused by removing a card before it has reached its normal state. Removing a card before it is an idle, locked state should be generally avoided at this or other alarms may occur.
Cards - 2, 4	Unknown hardware - 2, 3, 5	Often the result of inserting a newer card into an older system.	Upgrade the supervisor software to a current revision.	
Cards -2, 4	No code - 2, 4	No valid code found in the flash memory of the System Controller card.	Download the code necessary for the card that is alarming.	Missing card code may be seen in conjunction with another error such as Supervisor DL error Bad Download Image.

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
Cards. 2, 4	Test - 1, 2, 4	Often the result of inserting the wrong card into a previously configured shelf slot.	Insert a card that supports the desired interface (PBX) type.	
Control SW - 1, 2	No code - 2, 4	No valid code to program Control SW-FPGA.	Check supervisor software. If you just did a download, retry the download. If a no download was done lately, the board is probably bad and should be replaced.	The MCU start alarm can be seen as a result of this problem.
Control SW - 1, 2	Program - 3, 4	Control SW FPGA on System Controller will not accept a download.	Replace System Controller card.	The MCU start alarm can be seen as a result of this problem.
Control SW- 1, 2	Test - 1, 2, 4	FPGAs on System Controller will not accept download.	Replace System Controller card.	Indicates a condition that affects all FPGAs on the System Controller. (no FPGA will download). MCU alarm also seen as a result.
Download - 3, 4	No code - 2, 4	Bad code in flash.	If the result of a software download to system, check downloaded code.	Alarm may occur in conjunction with a flash error.
Download - 3, 4	PT s/w CRC - 1, 2, 3, 5	Bad PT code in flash.	If the result of a software download to system, check downloaded code.	Alarm may occur in conjunction with flash error.
Flash - 1, 3	Erase - 2, 5	Bad flash.	Replace System Controller card.	
Flash - 1, 3	Read - 1, 2, 5	Bad flash.	Replace System Controller card.	
Flash - 1, 3	Test - 1, 2, 4	Bad or wrong flash memory.	Replace System Controller card.	
Flash - 1, 3	Write - 3, 5	Bad flash.	Replace System Controller card.	
Flash – 1, 3	Bad PT Version	PT version is 0.0 or 255.255	Load different PT version.	PT versions 0.0 and 255.255 are illegal version numbers.
Funnel - 2	Error - 1, 2, 3, 4	Internal error.	Contact Polycom Customer Support.	As a result of this error, audio may be interrupted on calls where the Base Station and the line are on a different half-shelf.

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
Funnel - 2	Program - 3, 4	Funnel/router FPGA on System Controller will not accept a download.	Replace System Controller card.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
Funnel - 2	Start - 1, 3, 4	Internal error.	Contact Polycom Customer Support.	As a result of this error, audio may be interrupted on calls where the Base Station and the line are on a different half-shelf.
Funnel -2	No code - 2, 4	No valid code to program Funnel FPGA.	Check supervisor software. If you just did a download, retry the download. If a no download was done lately, the board is probably bad.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
IPC - 3	Error - 1, 2, 3, 4	IPC communications can be temporarily disturbed when a card is hot inserted or a shelf is powered on.	If problem persists, contact Polycom Customer Support.	
IPC – 3	RX full - 5	Supervisor encountered a temporary period of heavy traffic.	Contact Polycom Customer Support.	
IPC - 3	TX full - 1, 5	Supervisor encountered a temporary period of heavy traffic.	Contact Polycom Customer Support.	
IPC- 3	Start - 1, 3, 4	HW failed to start in the System Controller card.	If the result of a software download to system, check downloaded code. Replace System Controller card.	Alarm can occur in conjunction with Control Switch alarms.
IPC - 3	HW - 2, 3, 5	Cabling problem between the Shelf Controller and the System Controller.	Check cabling. If problem persists, contact Polycom Customer Support.	
MCU - 1, 2, 4	Error - 1, 2, 3, 4	Internal error.	Contact Polycom Customer Support.	

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
MCU - 1, 2, 4	Test - 1, 2, 4	Code downloaded to the System Controller was not the correct code for the hardware.	Download the correct code.	
MCU - 1, 2, 4	TX full - 1, 5	Internal error.	Contact Polycom Customer Support.	
MCU - 1, 2, 4	Read - 1, 2, 5	Internal error.	Contact Polycom Customer Support.	
PC Cfg - 1, 2, 3	No code - 2, 4	Configuration not present (will occur at 1st start up) or flash memory error	If flash alarm is present, replace System Controller card.	Config not present error will occur at first start up but should not occur in field. Any configuration stored in the flash will be erased. May occur in conjunction with flash errors.
Router - 1	Test - 1, 2, 4	Hardware failure.	Replace System Controller card.	IPC communications will not work in the system. Keepalive card alarms can be seen because of conditions causing this alarm.
Router - 1	Program – 3, 4	Hardware failure.	Replace System Controller card.	
Router - 1	Download - 1, 3, 5	Hardware failure or wrong software.	If software is suspected, check supervisor software, otherwise replace System Controller card.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
Router - 1	Error - 1, 2, 3, 4	Internal error.	Contact Polycom Customer Support.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
Router - 1	Start - 1, 3, 4	Possibly a bad software download or Internal error.	If software is suspected, check supervisor software; otherwise contact Polycom Customer Support.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
Router- 1	Keepalive – 2, 3, 4	Internal error.	Contact Polycom Customer Support.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
Router -1	No code - 2, 4	Bad SW download.	Check supervisor software. If you just did a download, retry the download. If a no download was done lately, the board is probably bad.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
Sys Config - 2, 3	No code - 2, 4	Bad SW download.	Check supervisor software. If you just did a download, retry the download. If a no download was done lately, the board is probably bad.	IPC Communications will not work in system. Keepalive card alarms can be seen because of conditions causing this alarm.
UART1 - 4 UART2 - 1, 3	Read - 1, 2, 5	Bad serial port communications.	Verify serial port works properly on the Operator's Console PC.	
UART1 - 4 UART2 - 1, 3	RX full - 5	Internal error.	Contact Polycom Customer Support.	
UART1 - 4 UART2 - 1, 3	TX full - 1, 5	Internal error.	Contact Polycom Customer Support.	
UART2 - 1, 3	HW - 2, 3, 5	System Controller does not support Open Applications Interface (OAI) but has been configured for OAI.	Unconfigure the OAI support on the System Controller.	

Shelf Controller Card Alarms

This table summarizes the possible alarm codes which can occur for the Shelf Controller card.

LEDs	Alarm Code	Alarm Components			
		1	2	1, 2	3
		CTLSW	MCU	IPC	UART1
2, 4	No code	X	X		
1, 2, 4	Test	X	X		
3, 4	Program	X			
1, 3, 4	Start			X	
2, 3, 4	Keepalive			X	X
1, 2, 3, 4	Error		X	X	
5	RX full			X	
1, 5	TX full		X	X	X
1, 2, 5	Read		X		X
1, 3, 5	HW				X

Shelf Controller Card Troubleshooting Matrix

On the Operator's Console, Shelf Controller alarms display on the **Show Cabinet Detail** screen for Expansion Shelves (Shelf 2-20), accessible from **Supervisor State Display** screen (F1). The table is sorted alphabetically by component. LEDs for Component and Alarm are also shown in the table.

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
Control SW - 1	Program - 3, 4	CTLSW FPGA on Shelf Controller will not accept a download.	Replace Shelf Controller card.	The MCU start alarm can be seen as a result of this problem.
Control SW - 1	Test – 1, 2, 4	FPGAs on Shelf Controller will not accept download.	Replace Shelf Controller card.	Indicates a condition that affects all FPGAs on the Shelf Controller. (no FPGA will download). MCU alarm also seen as a result.
IPC - 1, 2	Error – 1, 2, 3, 4	IPC communications can be temporarily disturbed when a card is hot inserted or a shelf is powered on.	If problem persists, contact Polycom Customer Support.	
IPC - 1, 2	Keepalive - 2, 3, 4	Shelf controller is not receiving keepalive from Shelf Controller.	Check the cabling between the Shelf Controller and the System Controller.	
IPC - 1, 2	RX full - 5	Supervisor encountered a temporary period of heavy traffic.	Contact Polycom Customer Support.	
IPC - 1, 2	Start - 1, 3, 4	HW failed to start in the Shelf Controller card.	If the result of software download to shelf, check downloaded code. Replace Shelf Controller card.	Alarm can occur in conjunction with Control Switch alarms.
IPC - 1, 2	TX Full - 1, 5	Supervisor encountered a temporary period of heavy traffic.	Contact Polycom Customer Support.	

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
MCU - 2	Error – 1, 2, 3, 4	Internal error.	Contact Polycom Customer Support.	
MCU - 2	Test – 1, 2, 4	Code downloaded to the Shelf Controller was not the correct code for the hardware	Download the correct code.	
MCU - 2	TX Full - 1, 5	Internal error.	Contact Polycom Customer Support.	
MCU - 2	Read - 1, 2, 5	Internal error.	Contact Polycom Customer Support.	
UART1 - 3	Keepalive - 2, 3, 4	OAI PC is not properly connected to the MCU.	Check the OAI PC connection to the MCU.	
UART1 - 3	RX Full – 5	Internal error.	Contact Polycom Customer Support.	
UART1 - 3	TX Full - 1, 5	Internal error.	Contact Polycom Customer Support.	
UART1 - 3	HW - 1, 3, 5	System Controller does not support OAI but has been configured for OAI.	Unconfigure the OAI support on the System Controller.	

Interface Module Alarm Matrix

This table summarizes the possible alarm codes which can occur for the Interface Modules.

LEDs	Alarm Code	Alarm Components					See table below:	
		1	2	1, 2	3	1, 3		
		MCU	CT 1	CT 2	DAA 1	DAA 2	Base Stn 1-6	Line 1-16
1, 4	Type	X			X	X	X	
2, 4	Code		X	X	X	X	X	
1, 2, 4	Download		X	X	X	X	X	
3, 4	Keepalive	X	X	X	X	X		
1, 3, 4	Disabled	X					X	X
2, 3, 4	Errors	X					X	
1, 2, 3, 4	Clocks	X						
5	Interrupt	X						
1, 3, 5	Lockout							
1, 2, 3, 5	Bad PT code	X						

LEDs for Base Stations and Lines

LED	Base Stn		LED	LINE		LED	LINE		LED	LINE
2, 3	1		3, 4	1		2, 5	7		4, 5	13
1, 2, 3	2		1, 3, 4	2		1, 2, 5	8		1, 4, 5	14
4	3		2, 3, 4	3		3, 5	9		2, 4, 5	15
1, 4	4		1, 2, 3, 4	4		1, 3, 5	10		1, 2, 4, 5	16
2, 4	5		5	5		2, 3, 5	11			
1, 2, 4	6		1, 5	6		1, 2, 3, 5	12			

Interface Module Troubleshooting Matrix

On the Operator's Console, Interface Module alarms display on the **Portcard State Display** (F2) screen. The table is sorted alphabetically by component. LEDs for Component and Alarm are also shown in the table.

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
CT 1 - 2 or CT 2 - 3	Code - 2, 4	CT processor code not found in bin files.	Download current software.	
CT 1 - 2 or CT 2 - 3	Download - 1, 2, 4	CT processor download failed.	Download current software. If problem persists contact Polycom Customer Support.	
CT 1 - 2 or CT 2 - 3	Keepalive - 3, 4	Too slow/fast keepalive from CT processor.	Contact Polycom Customer Support.	
DAA 1 - 3 or DAA 2 - 1, 3	Code - 2, 4	DAA processor code not found in bin file.	Download current software.	
DAA 1 - 3 or DAA 2 - 1, 3	Download - 1, 2, 4	DAA processor download failed.	Contact Polycom Customer Support.	
DAA 1 - 3 or DAA 2 - 1, 3	Keepalive - 3, 4	Too slow/fast keepalive from DAA processor.	Contact Polycom Customer Support.	
DAA 1 - 3 or DAA 2 - 1, 3	Type – 1, 4	PBX type not found in bin file or incorrect AUX DAA type.	Download current software.	
Line 1 - 3, 4	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 2 - 1, 3, 4	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 3 - 2, 3, 4	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 4 - 1, 2, 3, 4	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 5 – 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 6 - 1, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
Line 7 - 2, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 8 - 1, 2, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 9 - 3, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 10 -1, 3, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 11 - 2, 3, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 12 - 1, 2, 3, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 13 - 4, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 14 - 1, 4, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 15 - 2, 4, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
Line 16 - 1, 2, 4, 5	Disabled - 1, 3, 4	Configured line not in sync.	Check cabling.	
MCU - 1	Clocks - 1, 2, 3, 4	Missing frame interrupts. (Interface Module should reset itself.)	Contact Polycom Customer Support.	
MCU - 1	Interrupt – 5	Unknown interrupt type.	Contact Polycom Customer Support.	
MCU - 1	Errors - 2, 3, 4	IPC CRC errors (or underrun, overrun, queue full).	Contact Polycom Customer Support.	
MCU - 1	Keepalive - 3, 4	No IPC keepalive message for 10 seconds.	Contact Polycom Customer Support.	
MCU - 1	Type - 1, 4	Incorrect HW Board ID (not a 3000 Interface Module).	Replace with a correct Interface Module.	
MCU - 1	Disabled - 1, 3, 4	Card/System locked.	Unlock system via Operator's Console or unlock card using the Disable Switch on the card.	
MCU - 1	Bad PT code - 1, 2, 3, 5	Bad flash on card.	Contact Polycom Customer Support.	
RCU 1 - 6	Code - 2, 4	Base Station (RCU) code not found in bin file.	Download current software.	

Component - Second LED	Alarm - First LED	Probable Cause	Recommendation	Notes
RCU 1 - 6	Disabled - 1, 3, 4	Base Station (RCU) not configured but present, or Base Station (RCU) disabled.	Check if Base Station is configured. If not, configure through the Operator's Console. If Base Station is disabled, see *Base Station Disabled* in Chapter 4 *Base Station Problems*.	
RCU 1 - 6	Download - 1, 2, 4	Base Station (RCU) download failed.	Reset Base Station. See *Base Station Will Not Download* in Chapter 4 *Base Station Problems.* If problem persists, contact Polycom Customer Support.	
RCU 1 - 6	Errors - 2, 3, 4	Base Station (RCU)/MCU link errors too high.	Check cabling, if OK replace Base Station.	
RCU 1 - 6	Lockout - 1, 3, 5	Base Station (RCU) locked out following startup listen.	Reset Base Station. If problem persists, contact Polycom Customer Support.	
RCU 1 - 6	Type - 1, 4	Unsupported Base Station (RCU) type (not Base Station 3.0).	Replace Base Station with supported Base Station type.	

T1 Alarms

The remote card has two LEDs for each T1 connection labeled **LOS** and **LNKOK**. The **LOS** LED is controlled by the hardware (T1 transceiver). The **LOS** is on (red) to indicate Loss Of Signal. The **LNKOK** is controlled by software and is turned on (green) to indicate that IPC data with good CRC is being received.

The six LEDs labeled **Alarm**, **1**, **2**, **3**, **4**, **5**, display status, alarm type, and alarm component. Each of these three values (status, alarm type, alarm component) is displayed for one second. The card continuously cycles through these three displays, completing a cycle every three seconds.

The status display consists of:

ALARM LED	Always off
LED 1	Card is up and running

Alarm type display:

ALARM	1	2	3	4	5	Alarm Type
OFF	OFF	OFF	OFF	OFF	OFF	No active alarms
ON	ON	OFF	OFF	ON	OFF	Type
ON	OFF	ON	OFF	ON	OFF	Code
ON	ON	ON	OFF	ON	OFF	Download
ON	OFF	OFF	ON	ON	OFF	Keepalive
ON	ON	OFF	ON	ON	OFF	Disabled
ON	OFF	ON	ON	ON	OFF	Errors
ON	ON	ON	ON	ON	OFF	Clocks
ON	OFF	OFF	OFF	OFF	ON	Interrupt
ON	ON	OFF	OFF	OFF	ON	SW error

Alarm component display:

ALARM	1	2	3	4	5	Alarm Component
OFF	OFF	OFF	OFF	OFF	OFF	No active alarms
ON	ON	OFF	OFF	OFF	OFF	FPGA
ON	OFF	ON	OFF	OFF	OFF	IPC LOCAL
ON	ON	ON	OFF	OFF	OFF	IPC T1 A
ON	OFF	OFF	ON	OFF	OFF	IPC T1 B

List of possible Portcard alarm conditions and the probable causes:

Component	Alarm	Probable Cause
MCU	Disabled	Card/System locked.
MCU	Keepalive	No IPC keepalive message for 10 seconds.
MCU	Type incorrect	HW board ID (not a 3000 remote card).
MCU	Interrupt	Unknown interrupt type.
MCU	Clocks	Missing frame interrupts (remote card should reset).
MCU	Clocks near/far	GPS pulses out of sync (remote card does not reset).
MCU	SW error	Queue overflow (IPC, main, or time).
FPGA	Code	FPGA code not found in bin file.
FPGA	Download	FPGA download failed.
FPGA	Clocks	External sync pulse too fast/slow or missing.
IPC LOCAL	Clocks	Frequency lock loop (FLL) adjustment failed.
IPC LOCAL	Errors	IPC errors (CRC, overrun, underrun).
IPC T1A/T1B	Errors	IPC errors (CRC, overrun, underrun).
IPC T1A/T1B	Disabled	T1 not in sync (missing).

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Terms and Acronyms

These terms are used in alarms or alarm resolution on the SpectraLink 6000 System.

CRC Cyclical Redundancy Check. Used to check for communication errors between MCU and Base Stations.

CT Internal abbreviation for communication algorithm used in SpectraLink telephone.

CTLSW Control Switch. One of the FPGAs which provides fault tolerance within a shelf.

DAA Hardware on the Interface Module. A DAA alarm concerns lines.

DL Downloader. Downloads software to Interface Modules and Shelf Controllers from the System Controller.

DSP Digital Signal Processor.

Flash Flash Memory.

FPGA Field Programmable Gate Array.

Funnel Component of the System Controller card which transfers audio between half-shelves. The funnel connects time slots on the highways between shelves.

HW Hardware

IPC InterProcessor Communications. Manages the control data packets that run through the router.

Keepalive A heartbeat signal that indicates good communication between 2 components.

Router Component of the System Controller card which transfers audio between shelves.

RX Full Receive overflow error.

Shelf Controller Card in the expansion shelf which contains configuration and software.

System Controller The card in the primary shelf which contains system configuration and software. The controller has three main components: supervisor, router, and funnel.

Supervisor Component of the System Controller which contains the system configuration.

SW Error Software error.

TX Full Transmit overflow error.

UART Universal Asynchronous Receive/Transfer. Protocol used on the COM ports of the system and Shelf Controllers.

Safety Notices

WARNING: Changes or modifications to this equipment not approved by Polycom may cause this equipment to not comply with part 15 of the FCC rules and void the user's authority to operate this equipment.

WARNING: Polycom products contain no user-serviceable parts inside. Refer servicing to qualified service personnel.

IMPORTANT SAFETY INFORMATION
Follow these general precautions while installing telephone equipment:

- Never install telephone wiring during a lightning storm.

- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

- Use caution when installing or modifying telephone lines

- If wiring for a Base Station exits a building—whether to reach an outdoor Base Station location or to reach a Base Station in another building—consult the telephone system manual, the National Electric Code (NEC), and local codes for instructions on providing lightning and other over-current protection.

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