iPower™ Control Protocol

Version 4.0.2

Programmer's Guide

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iPower™ Control Protocol Programmer's Guide

The iPower Control Protocol (iCP) Application Program Interface (API) allows users to develop custom applications on iPower systems. This Active-X control interface supports all the controls provided in the iPower Control Protocol command set. With these controls, you can integrate software that has control over, and works with, the videoconferencing application.

What's New in the This Release

The following features are new in iPower Control Protocol Version 4.0.2:

- iPower 600 system compatibility and the ability to select the COM port in the registry for the iPower 600 system is now supported
- The following queries have been added:
  - Query Near-end Mute Status (QNEM)
  - Query Far-end Mute Status (QFEM)
  - Query Dual Images Call Capability (QSC)
- The following properties have been added:
  - DualImagesCapable
  - NearEndMuteStatus
  - FarEndMuteStatus
- Responses for connected and disconnected calls have been improved
- New call states for the Call Query facility, including Dialing, Ringing, and Connecting, have been added
- Call IDs during the ConnectProgress, Connected, and Disconnected events are now supported
- Serial Port Client commands now function for iCP third-party applications
- WinTOT is now supported
- Voice over IP (VoIP) calls are now supported
- Fixes have been made to known anomalies in order to make the system more robust

Previous Enhancements in Version 4.0.0

The following enhancements were included in the Version 4.0.0 release (they are also included in the Version 4.0.2 upgrade):

- iCP now comes bundled with the iPower software. You do not need to install it separately.
- iCP now supports gateway calls, gatekeeper calls (using video alias and E.164 numbers), and IP calls using the DNS name.
- A new read-only property, GetMainUIStatus(), has been added to allow users to query the UI state.
- Many video responses have been added to iCP including:
  - VDS (Video Display Source)
  - VDP (Video Display Playing)
  - VES (Video Encoder Source)
- Four new commands have been added to iCP:
  - mbwe (enable PIP)
  - mbwd (disable PIP)
  - mavbm (mute)
  - mavbu (unmute)
- The iCP command Query Encoder Source (QES) now functions properly.
- The iCP command Video On Hook (ldd), used to hang up a call, now functions properly.
- Switching between video sources when using iCP has been improved.
- Calls placed with iCP are now made at the selected rate.

Restrictions

Note the following restrictions when using iPower Control Protocol Version 4.0.2:

- You must configure AdminTools to answer incoming calls automatically. This version of iCP cannot answer calls manually or remotely.
- You must set the Call Type before dialing or hanging up a call.
- The third-party applications that use the iDKCP Active Control cannot query the Call ID or Call Information for calls placed or received before the third-party application was started.
- The CallType for an Incoming Audio over IP call is Audio/Video/Data (avd) during the IncomingCall and ConnectProgress events. The CallType will change to Audio (a) when the call connects.
- When a clicker emulation command is sent, iPower sets focus to the Main UI. The third-party application is responsible for setting focus back to its application.

Before You Start

In order to use the iPower Control Protocol, you need the following:

- iPower Version 4.0.2 software
- iPower collaboration system
- External control panel with 9-pin RS-232 serial cable (iPower 900 system) or USB serial port adapter (iPower 600 system)

Setting Up the Hardware and Software

Before you can use the iPower Control Protocol, you must:

- Connect the control system to the iPower system
- Install the iPower software
- Configure the control system to send and receive the iPower Control Protocol commands

The following sections describe how to perform these procedures.

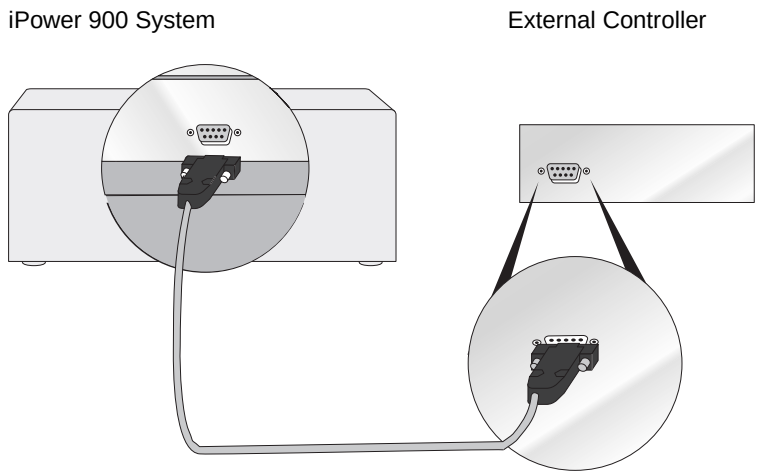
Note: This document assumes a fundamental understanding of the features and behavior of the iPower collaboration system. For more information, visit the Polycom Web site at www.polycom.com.

Connecting the Control System

This section contains information about connecting the Control System to the iPower 900 system and the iPower 600 system.

iPower 900 System

Connect the RS-232 serial cable from the COM1 port on the back of the iPower collaboration system to the COM port on the external control system, as shown in the following illustration.



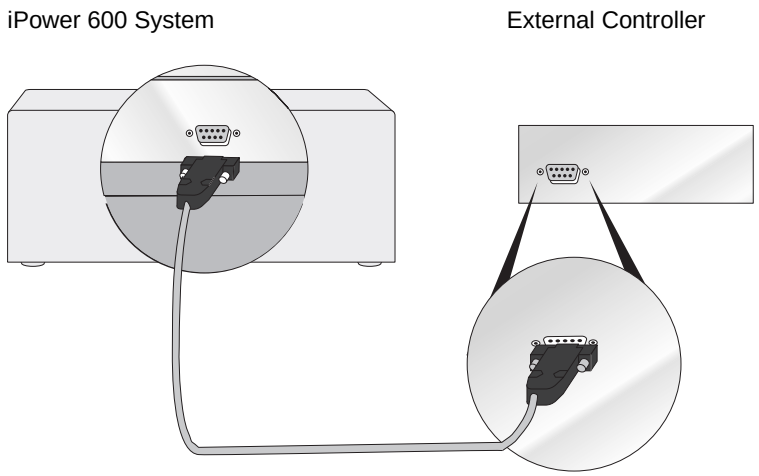
Only the COM1 port is supported for use by the control system.

The following table shows which pins are required to connect an external controller to an iPower 900 system COM1 port.

iPower 900 System	Communication	Control System
Pin 3	←	Control System Transmit
Pin 2	→	Control System Receive
Pin 5	↔	Signal Ground

iPower 600 System

Connect the RS-232 serial cable from the USB serial port adapter (which connects to the back of the iPower 600 system) to the COM port on the external control system, as shown in the following illustration.



The iPower 600 system supports two USB ports. The iPower Control Protocol uses COM Port 3 by default.

The following table shows which pins are required to connect an external controller to an iPower 600 system COM3 port.

iPower 600 System	Communication	Control System
Pin 3	←	Control System Transmit
Pin 2	→	Control System Receive
Pin 5	↔	Signal Ground

Note: If COM3 is not the actual COM port assigned to the USB Serial Port adapter, you can go to the Registry and select the proper COM port in My Computer\HKEY_LOCAL_MACHINE_SOFTWARE\PictureTel\VCS\Admin Settings\Utilities\COMPortSelection.
The value should be identical to the COM Port number for the USB Serial Port adapter.

You must shut down the Main UI before making any changes to this value, and restart the system once you have made the change.

Installing the Software

The iPower Control Protocol is available after you install and configure the iPower software.

To install the iPower Control Protocol

1. ***Install the iPower 4.0.2 software on the iPower system.***
2. ***Start AdminTools and click***  **Utilities*.***
3. ***Click the*** **Custom Control** ***tab.***
4. ***Click the box that says "*****This system can be controlled by a custom control panel that uses the iPower Control Protocol. The control panel connects through the serial port."**
5. ***Click*** **OK.**

Configuring the COM Port on the Control System

The COM port on the external control system must be configured as follows so that the control panel can communicate correctly with the iPower system through the iPower Control Protocol:

- 9600 baud
- 8 bits plus 1 Odd parity bit, 1 Start bit, 1 Stop bit

Using Control Protocol Information Packets

The commands that the control system sends to the iPower system and the responses that the iPower system sends back are packets of ASCII information. Each packet consists of two parts, the Link Layer and the Application Layer.

- The Link Layer surrounds the Application Layer and includes the Start and End-of-Text characters.
- The Application Layer contains the command and any arguments sent from the control system to the iPower system or the response sent back to the control system.

The following table describes the structure of an iPower Control Protocol information packet:

Link Layer	Application Layer	Link Layer
Start <stx> (<stx> = hex 02)	Command (with optional arguments) or Response	End <eot> (<eot> = hex 04)

Note: Some examples in this document contain text enclosed in brackets []. These brackets indicate the location of an argument within the syntax of a command.

Control Protocol Active-X Control

The iPower System uses an Active-X Control (iDKCP) to allow users to deploy customized third-party applications to control the iPower system. iDKCP supports Microsoft Foundation Class (MFC), Visual Basic (VB) and ATL applications. Users can embed Control Protocol capabilities in an application running on an iPower system. The hosting application will have access to several properties, methods, and events through standard COM interfaces.

OCX Filename

iDKCP.OCX

Functionality of the iDKCP Control

The iDKCP control provides a method for sending any currently supported Control Protocol command string. A detailed description of the supported commands and syntax are explained in the section "Control Protocol Command Reference." The current iDKCP version is limited to a single command method. The iDKCP control provides convenient properties for querying status, error information, product version, and system-level statistics.

The iDKCP Event interface allows the host application to receive the same System Responses as Control Protocol users through a single System Response event.

How to Use the Control

The iDKCP control can be deployed into Visual Basic or Visual C++ (MFC and ATL) application and can use the following properties and methods for the specified syntax.

Properties

Accept Call Property

Description

Allows the user to specify if the incoming call will be answered.

Syntax

Visual Basic

```
Integer idkCP.AcceptCalls()
idkCP.AcceptCalls=50
```

Visual C++

```
long idkCP.AcceptCalls()
idkCP.AcceptCalls(long newVal)
```

Remarks

This property is read/write.

Note: The current version of this component does not support this functionality.

CallInfo Property

Description

Returns current call information for the corresponding Call ID.

Syntax

Visual Basic

```
Variant idkCP.CallInfo(long)
```

Visual C++

```
idkCP.CallInfo(long, &Variant)
```

Remarks

This property returns call information for the corresponding Call ID, such as call type and connection type.

The CallInfo property currently sends the following information to the iDKCP client as BSTR in the SafeArray portion of the VARIANT record in the following order:

```
CallType
ConnectionType
```

These values can include any of the following enum constants, based on the Call IDs:

enum cpCallType Constants

0=cpAVD (audio/video/data)
1=cpAV (audio/video)
2=cpA (audio only)
3=cpAD (audio/data)
4=cpD (data only)

enum cpConnectionType Constants

0=cpISDN
1=cpTCPIP
2=cpISDNVOICE
3=cpVOIP

The Call IDs are updated in all CallConnected events. These IDs are valid only when querying the Call Properties. If the iPower Control Protocol receives an invalid Call ID, it returns S FALSE.

This property is read-only.

DualImagesCapable Property

Description

Returns the call Dual Images capability of the call (single image only or Dual Images).

Syntax

Visual Basic

```
Short idkCP.DualImagesCapable()
```

Visual C++

```
cpCallcapabilityConstants idkCP.GetDualImagesCapable()
```

Remarks

This property returns Call Capability enum Constant that indicates either DualImagesCapable or SingleImageCapable.

The enum Constant is:

```
enum cpCallCapabiltyConstants
{
      SingleImageCapable
      DualImagesCapable
}cpCallCapabilityConstants
```

This property is read-only.

ErrorInfo Property

Description

A string containing the last error that occurred.

Syntax

Visual Basic

```
String idkCP.ErrorInfo
```

Visual C++

```
CString idkCP.GetErrorInfo()
```

Remarks

This property is read-only.

ErrorNum Property

Description

The error value for the last error that occurred.

Syntax

Visual Basic

```
Integer idkCP.ErrorNum
```

Visual C++

```
long idkCP.GetErrorNum()
```

Remarks

This property is read-only.

FEMuteStatus Property

Description

Returns the mute status of the far-end system.

Syntax

Visual Basic

```
Boolean idkCP.FEMuteStatus
```

Visual C++

```
Variant BOOL idkCP.GetFEMuteStatus()
```

Remarks

This property returns VARIANT TRUE (-1) if the far-end system is muted; otherwise, this property returns VARIANT FALSE (0).

This property is read-only.

Main UI Status Property

Description

Returns the status of the Main UI (running or not running).

Syntax

Visual Basic

```
Boolean idkCP.MainUIStatus
```

Visual C++

```
Variant BOOL idkCP.GetMainUIStatus()
```

Remarks

This property returns VARIANT TRUE (-1) if the Main UI of the iPower system is running; otherwise, this property returns VARIANT FALSE (0).

This property is read-only.

NEMuteStatus Property

Description

Returns the mute status of the near-end system.

Syntax

Visual Basic

```
Boolean idkCP.NEMuteStatus
```

Visual C++

```
Variant BOOL idkCP.GetNEMuteStatus()
```

Remarks

This property returns VARIANT TRUE (-1) if the near-end system is muted; otherwise, this property returns VARIANT FALSE (0).

This property is read-only.

SpeakerVolume Property

Description

Allows the user to read and change the current speaker volume setting.

Syntax

Visual Basic

```
Integer idkCP.SpeakerVolume
idkCP.SpeakerVolume = 50
```

Visual C++

```
long idkCP.GetSpeakerVolume()
idkCP.SetSpeakerVolume(long newVal)
```

Remarks

This property is read/write.

Status Property

Description

Current state of the control.

0=Unavailable
1=Ready

Syntax

Visual Basic

```
Integer idkCP.Status
```

Visual C++

```
long idkCP.GetStatus()
```

Remarks

This property is read-only.

VerMajor Property

Description

Returns the major version number of the iDKCP control.

Syntax

Visual Basic

```
Integer idkCP.VerMajor
```

Visual C++

```
short idkCP.GetVerMajor()
```

Remarks

This property is read-only.

VerMinor Property

Description

Returns the minor version number of the iDKCP control.

Syntax

Visual Basic

```
Integer idkCP.VerMinor
```

Visual C++

```
short idkCP.GetVerMinor()
```

Remarks

This property is read-only.

Methods

Command Method

Description

This method is used to send a command to the system.

Note: The Initialize method must be called before you invoke this method.

Syntax

Visual Basic

```
idkCP.Command String
```

Visual C++

```
idkCP.Command(CString)
```

Remarks

`Command` is any command listed in this guide.

Initialize Method

Description

This method must be called to initialize the subsystem. If the initialization is successful, the Initialize method will return a Ready event.

Note: You must call this method before exercising any other portion of the API.

Syntax

Visual Basic

```
idkCP.Initialize Integer
```

Visual C++

```
idkCP.Initialize(long lVal)
```

Input parameters include the following:

1=PROTOCOL_RS232
2=PROTOCOL_COM

Remarks

The control initialized with the option PROTOCOL_COM operates as the Local server.

SetAudioMute Method

Description

This method is used to mute the system.

Syntax

Visual Basic

```
idkCP.SetAudioMute = BOOL
```

Visual C++

```
idkCP.SetAudioMute(BOOL bVal)
```

Note: The Input Parameter can be True or False.

Uninitialize Method

Description

This method is used to release the component.

Syntax

Visual Basic

```
idkCP.Uninitialize
```

Visual C++

```
idkCP.Unintialize()
```

Wakeup Method

Description

This method is used to wake up the system and camera or put the system and camera to sleep.

Syntax

Visual Basic

```
idkCP.WakeUp = BOOL
```

Visual C++

```
idkCP.WakeUp(BOOL bVal)
```

Remarks

Input parameters include the following:

True=Wake up the systems and camera
False=Put the system and camera to sleep

Events

Connected Event

Description

This event is sent when a call connects successfully.

Syntax

Visual Basic

```
ControlProtocol_Connected(CallID as Short)
```

Visual C++

```
void OnConnectedControlProtocol(long CallID)
```

Remarks

This event is sent with a parameter that includes the Call ID. The client application uses this ID to query the CallInfo in order to obtain the properties of the call, such as CallType or ConnectionType. The ID becomes invalid when the corresponding call is disconnected.

ConnectFailed Event

Note: In the previous release, this event was named Disconnected Event.

Description

This event is sent in response to any failed call connection.

Syntax

Visual Basic

```
ControlProtocol_ConnectFailed(CallID as Short)
```

Visual C++

```
void OnConnectFailedControlProtocol(long CallID)
```

Remarks

This event is sent with a parameter that indicates the call ID.

ConnectProgress Event

Description

This event is sent in response to making or receiving a call.

Syntax

Visual Basic

```
ConnectProgress(ProgressIndicator as short, CallID as
short)
```

Visual C++

```
void OnConnectProgress (long ProgressIndicator, long
CallID)
```

Valid `ProgressIndicator` states are:

0=Dialing
1=Ringing
2=Connecting

Remarks

Once the call starts (incoming or outgoing), this event is sent for all of the above states. When the call is actually connected, the Connected event is followed by the corresponding Call ID. This ID is identical to the Call IDs that are updated in the Connected and DisConnected events.

DisConnected Event

Note: In the previous release, this event was named CallTerminated Event.

Description

This event is sent in response to the successful hangup of a call.

Syntax

Visual Basic

```
ControlProtocol_DisConnected(CallID as Short)
```

Visual C++

```
void OnDisConnectedControlProtocol(long CallID)
```

Remarks

This event is sent with a parameter that indicates the Call ID. This ID is identical to the ID returned in the OnConnected()/OnConnectProgress event. Once the call is disconnected successfully, the client application must update the Call ID to avoid querying an invalid call ID.

EncoderActiveChange Event

Description

This event is sent when the Encoder is activated or deactivated.

Syntax

Visual Basic

```
ControlProtocol_EncoderActiveChange(EncoderType as long,
lIsActive as long)
```

Visual C++

```
void OnEncoderActiveChangeControlProtocol(long EncoderType,
long nIsActive)
```

Valid `EncoderType` values are:

0=PeopleEncoder
1=ContentEncoder

Valid `nIsActive` and `lIsActive` values are:

0=Inactive
1=Active

Feedback Event

Description

This event is sent in response to any command. It informs the application that a command has been received and processed. It is not an indication that a command was successfully executed by the iPower system.

Syntax

Visual Basic

```
ControlProtocol_Feedback(Command as String, Result as
String)
```

Visual C++

```
void OnFeedbackControlProtocol(CString Command, CString
Result)
```

Remarks

The avr response indicates a successful result string.

The air response indicates an unsuccessful result string.

HangupFailed Event

Description

This event is sent in response to a hangup failure.

Syntax

Visual Basic

```
ControlProtocol_HangupFailed(CallID as long)
```

Visual C++

```
void OnHangupFailedControlProtocol(long CallID)
```

Remarks

The `CallID` parameter specifies the call that the system will hang up.

IncomingCall Event

Description

This event is sent in response to an incoming call.

Syntax

Visual Basic

```
ControlProtocol_IncomingCall(CallType as Short)
```

Visual C++

```
void OnIncomingCallControlProtocol(long CallType)
```

Valid `CallType` values are:

0=AVD, where AVD is an Audio, Video, and Data call
1=AV, where AV is an Audio and Video call
2=A, where A is an Audio call
3=AD, where AD is an Audio and Data call
4=D, where D is a Data call

LocalAudioMuted Event

Description

This event is sent when the local system is muted.

Syntax

Visual Basic

```
ControlProtocol_LocalAudioMuted()
```

Visual C++

```
void OnLocalAudioMutedControlProtocol()
```

LocalAudioUnmuted Event

Description

This event is sent when the local system is unmuted.

Syntax

Visual Basic

```
ControlProtocol_LocalAudioUnMuted()
```

Visual C++

```
void OnLocalAudioUnMutedControlProtocol()
```

Ready Event

Description

This event is sent when the control is initialized and ready to process events and commands.

Syntax

Visual Basic

```
ControlProtocol_Ready()
```

Visual C++

```
void OnReadyControlProtocol()
```

Remarks

This event is sent following successful initialization. See the section "Initialize Method" for more information.

RemoteAudioMuted Event

Description

This event is sent when the remote system is muted.

Syntax

Visual Basic

```
ControlProtocol_RemoteAudioMuted()
```

Visual C++

```
void OnRemoteAudioMutedControlProtocol()
```

RemoteAudioUnmuted Event

Description

This event is sent when the Remote System is unmuted.

Syntax

Visual Basic

```
ControlProtocol_RemoteAudioUnMuted()
```

Visual C++

```
void OnRemoteAudioUnMutedControlProtocol()
```

SourceSelected Event

Description

This event is sent when any source is selected.

Syntax

Visual Basic

```
ControlProtocol_SourceSelected(SourceType as long,
lIsActive as long)
```

Visual C++

```
void OnSourceSelectedControlProtocol(long SourceType, long
nIsActive)
```

Valid `SourceType` values are:

1=MainCamera
2=Aux Camera
3=Doc Camera
4=Aux Doc Camera
5=VCR
6=ImageShare
7=WinTOT

Valid `nIsActive` and `lIsActive` values are:

0=Inactive
1=Active

SystemResponse Event

Description

This event is sent whenever the control has information to report to the host application.

Syntax

Visual Basic

```
ControlProtocol_SystemResponse()
```

Visual C++

```
void OnSystemResponseControlProtocol()
```

Remarks

This event reports the same information as the System Response messages. See the section “System Responses” for more information.

UIStateChanged Event

Description

This event is sent in response to any changes in the UI State.

Syntax

Visual Basic

```
ControlProtocol_UIStateChanged(UIState as long, nIsActive
as long)
```

Visual C++

```
void OnUIStateChangedControlProtocol(long UIState, long
nIsActive)
```

Valid `UIState` values are:

1=Standby
2=Ready to Dial
3=PIP Window
4=Swap PIP
5=FullScreen Mode

Valid `nIsActive` and `lIsActive` values are:

0=Inactive
1=Active

VolumeChanged Event

Description

This event is sent when the volume is changed.

Syntax

Visual Basic

```
ControlProtocol_VolumeChanged(Result as String)
```

Visual C++

```
void OnVolumeChangedControlProtocol(CString Result)
```

Control Protocol Command Reference

The iPower Control Protocol is designed to support the iPower system when used with advanced external control systems.

The following sections describe eight groups of Control Protocol commands and the system responses to these commands:

- Video Call Control Commands
- System Control Commands
- Audio Call Control Commands
- Screen Commands
- Special Commands
- Query Commands
- System Responses
- Remote Control Key Function Commands

Tips for Using the Commands

- Double-byte command arguments should not be used in single-byte commands. For example, when issuing the Store near-end preset 5 command, enter the command as SCsN5. Do not use "05."
- All commands must begin with <stx> and end with <eot>.
- Follow each Remote Control Key Function command (lka) with a stop action/key up command (%). Failure to do so can cause unexpected results or improper system operation.

Note: If you are migrating to an iPower system, in order to reduce the amount of reprogramming, the iPower Control Protocol software supports a subset of legacy commands that are used with the Concorde•4500 system. For more information, see Appendix A, "Legacy System Commands."

Video Call Control Commands

Call Control Overview

You can initiate a call using one of the following methods:

- Use the Manual Dial (ldm) command to initiate simple calls in the most efficient way. This command allows you to send one or more ISDN numbers or an IP address directly to the iPower system. You can also use this command to make advanced gateway and gatekeeper calls.
- Use the Remote Control Key Function commands when you want to use the advanced features in the Make a Call dialog box. (When you send a Call/Answer (lkac) command, the Make a Call dialog box appears.) Use the up, down, left, and right buttons for menu navigation when using this method. See the section "Remote Control Key Function Commands" for more information.

Manual Dial

Sends the ISDN number(s) or IP address to the collaboration system. When you use an IP address, you must include the periods.

This command is also used to make audio-only IP and Voice over IP (VoIP) calls. If the Call Type is set to a (audio), you must change it to avd (audio/video/data) in order to place a video call. It is recommended that you always set the Call Type prior to making an IP call. For more information, see the Set Call Type command (SCT) in the section "IP Audio Calls."

Note: The Make a Call dialog box does not appear when this command is used.

Manual Dial	
Command	ldm
Arguments	Dialing string 1 Separator: s (used to separate numbers in a two-number call) Dialing string 2 (optional) **Note:** The combined length of both dialing strings must be between 1-130 bytes. If a single dialing string is used, its length must also be between 1-130 bytes. Bandwidth (optional): 56, 64, 112, 128, 168, 192, 224, 256, 280, 320, 336, 384, 448, 512, 672, 768, or 1920 kbps Delimiter: , (you must use a delimiter to specify any default entries or unused arguments) Connection type (optional): 0=ISDN (default) 1=Gateway 2=TCPIP Delimiter: , Gateway extension (optional): The far-end system E.164 number that is used to make inbound gateway calls. Null is the default. Delimiter: , Gateway call direction (optional): If the connection type =1 (gateway), this field specifies the direction of the call. 0=outbound (IP to ISDN/default) 1=inbound (ISDN to IP) Terminator: e
Syntax	ldm[Dialing string 1]s[Dialing string 2],[Bandwidth],[Connection type],[Gateway extension],[Gateway call direction]e
Examples	**ISDN point-to-point** One number, 128 kbps bandwidth, no gateway: ldm2924441,128,0e

Manual Dial	
Examples (cont.)	**IP calls** One number, 384 kbps bandwidth, IP call using the far-end IP address: ldm140.242.115.56e One number, 384 kbps bandwidth, IP call using the far-end DNS name: ldmk2beta036,384,2e **Gateway calls** Two numbers, 128 kbps bandwidth, gateway: ldm2924441s2924442,128,1e Two numbers, default bandwidth, gateway=IP to ISDN (outbound): ldm2924441s2924442,,1e **Notes:** You should configure the prefixes and suffixes in AdminTools before attempting the call. Refer to the AdminTools online help for information. The address string should contain the far-end ISDN number without the prefix or suffix. **Gateway calls - ISDN to IP (inbound)** One number (gateway system), 128 kbps bandwidth, gateway, far-end E.164 number (gateway extension), gateway call direction=1: ldm94371330,128,1,567,1e One number (gateway system), default bandwidth, gateway, gateway call direction=1: ldm94371330,,1,,1e After the above call connects, the user has the option to enter the far-end extension (E.164 number) with the remote control using the tonepad in the iPower Options menu. **Gatekeeper calls** Far-end video alias, 128 kbps bandwidth, IP call: ldmst155video,128,2e Far-end E.164 number, 128kbps bandwidth, IPcall: ldm5678,128, 2e

Note: The bandwidth, call type, gateway extension, and gateway call direction arguments are optional. If you do not specify these arguments, system defaults are used.

If you select the optional command arguments for bandwidth, gateway, gateway extension, or gateway call direction, you must use the comma argument separators.

Video Off Hook

Instructs the collaboration system to answer an incoming video call.

Video Off Hook	
Command	ldo
Arguments	none
Syntax	ldo

Video On Hook

Instructs the collaboration system to hang up the current video call.

Video On Hook	
Command	ldd
Arguments	none
Syntax	ldd

System Control Commands

Camera Start Action

Instructs the active camera to start one of the camera actions.

Note: All elements and arguments must be included in this command. The ? is a reserved character. You must include each reserved character where indicated.

Camera Start Action		
Command	SCr	
Destination	N (near end) F (far end)	
Reserved	?	
Action and Direction	t (tilt)	u (up) d (down)
	p (pan)	r (right) l (left)
	z (zoom)	i (zoom in) o (zoom out)
Syntax	SCr[Destination][?][Action][Direction]	
Example	Start tilting near-end camera up: SCrN?tu	

Camera Stop Action

Instructs the active camera to stop one of the camera actions.

Note: All elements and arguments must be included in this command. The ? is a reserved character. You must include each reserved character where indicated.

Camera Stop Action		
Command	SCp	
Destination	N (near end) F (far end)	
Reserved	?	
Action and Direction	t (tilt)	u (up) d (down)
	p (pan)	r (right) l (left)
	z (zoom)	i (zoom in) o (zoom out)
Syntax	SCp[Destination][?][Action][Direction]	
Example	Stop tilting near-end camera up: SCpN?tu	

Camera Store Preset

Sets a camera preset for the specified camera.

Camera Store Preset	
Command	SCs
Terminal	N (near end) F (far end)
Preset number	0-9
Syntax	SCs[Terminal][Preset Number]
Example	Store near-end preset 5: SCsN5

Camera Goto Preset

Selects the camera with the specified preset and moves it to the preset position.

Camera Goto Preset	
Command	SCg
Terminal	N (near end) F (far end)
Preset number	0-9
Syntax	SCg[Terminal][Preset number]
Example	Move the camera to near end preset 5: SCgN5

Audio Call Control Commands

Audio Off Hook

Answers an incoming audio call.

Audio Off Hook	
Command	lao
Arguments	none
Syntax	lao

Audio On Hook

Hangs up the audio call.

Audio On Hook	
Command	lad
Arguments	none
Syntax	lad

ISDN Audio Manual Dial

Instructs the iPower system to make an ISDN audio call. Use this command to initiate an ISDN audio call.

Note: The ISDN Audio Manual Dial command must be followed by the loa<cr> command, which starts the dialing process.

ISDN Audio Manual Dial	
Command	lam
Arguments	1-40 digits
Syntax	lam[Number]
Example	Call 977-9500: lam9779500 loa<cr>

IP Audio Calls

There are two commands that are required to establish IP audio calls. The first command, Set Call Type (SCT), is used to set the call type to Audio. The second command, IP Manual Dial (ldm), is used to dial the call.

Set Call Type

Changes the default call type used in LAN (TCP/IP) calls.

Set Call Type	
Command	SCT
Arguments	avd=audio/video/data a=audio only
Syntax	SCT[Argument]
Examples	SCTavd SCTa ldm (dials the call)

Note: The iPower Control Protocol default call type is avd (audio/video/data). If your application changes the default to a (audio only), then you must set it back to avd before making a video IP call.

IP Manual Dial

Sends the IP address for the audio call.

IP Manual Dial	
Command	ldm
Syntax	ldm[Dialing string 1]s[Dialing string 2], [Bandwidth],[Connection type],[Gateway extension],[Gateway call direction]e

This command uses the same data as the Manual Dial command. For additional information and examples, see “Manual Dial” in the section “Video Call Control Commands.”

Because the bandwidth, call type, gateway extension, and gateway call direction arguments are optional, the format for the Call Command for Audio over IP calls is as follows:

ldm140.242.113.23e

Voice Over IP (VoIP) Calls

In order to make a VoIP call, both systems must be registered with the gatekeeper. Additionally, you must first set the Call Type to a (audio only). (By default, the Call Type is set to avd [audio/video/data]. To place a video call, you must set the Call Type back to avd.)

The format for a VoIP call is the same as for an IP call using the gateway video alias or the video E.164 number. For additional information, see "Manual Dial" in the section "Video Call Control Commands."

Notes: The voice alias and voice E.164 numbers should not be the same as their corresponding video values.

All voice calls are connected at 64 kbps. (There is no need to change the rate.)

For VoIP calls, select option 2 (TCPIP) as the Connection Type.

IP Manual Dial (VoIP Calls)	
Command	ldm
Syntax	ldm[Dialing string 1]s[Dialing string 2], [Bandwidth],[Connection type],[Gateway extension],[Gateway call direction]e
Examples	ldmat146voice,,2 (voice alias) ldm3345,,2 (E.164 number)

Note: In this release, the iPower system will simultaneously accept one video call (IP/ISDN), once VoIP call, and one ISDN voice call. You can add or hang up these calls in any order. Use the Video On Hook (ldd) command to hang up a call.

Audio Volume Control

Use the Remote Control Key Function commands lkau (volume up) and lkad (volume down) to control volume. Use the command lkat to mute and unmute. See the section "Remote Control Key Function Commands" for more information.

Screen Commands

Picture-in-Picture (PIP) Commands

Instruct the system to toggle, enable, or disable the PIP window on the main monitor for single-monitor systems (Full-Screen mode only). These commands have no effect on any other system configuration.

PIP	
Command	mbw
Arguments	t=toggle e=enable d=disable
Syntax	mbwt mbwe mbwd

Cancel

Simulates the CANCEL key on the system's remote control.

Cancel	
Command	llk
Argument	<cr>
Syntax	llk<cr>

Special Commands

ACP On/Off

Turns Automatic Camera Pointing (ACP) on or off.

Note: This command controls ACP for the site selected. It does not select near-end or far-end. To select near-end or far-end, use the Remote Control Key Function command lkam and select the appropriate source using the arrow keys lka^, lka>, lka<, or lkaq.

ACP On/Off	
Command	lGc
Arguments	o=ACP on f=ACP off
Syntax	lGc[ACP on/off]
Example	Turn ACP on: lGco

People Source

Selects a People source.

People Source	
Command	SDP
Arguments	m=main camera a=auxiliary camera **Note:** The auxiliary camera can be set to either People or Content using AdminTools. If the auxiliary camera is set as a Content source, then you should use the SDM command to select it.
Syntax	SDP[Main camera/Auxiliary camera]
Example	Select the main camera as the People source: SDPm

Content Source

Selects a Content source in Dual Images and Legacy modes. When you are in a Dual Images call, this command acts as a toggle to select and deselect a Content source.

Content Source	
Command	SDM
Arguments	d=document camera a=auxiliary camera v=video playback source i=ImageShare w=WinTOT **Note:** The auxiliary camera can be set to either People or Content using AdminTools. If the auxiliary camera is set as a People source, then you should use the SDP command to select it.
Syntax	SDM[Content source]
Example	Select video playback as the Content source: SDMv

A new command, SDMw, has been added in this release. This command enables WinTOT support, which allows the system to send the iPower Windows desktop to the far-end during a videoconference. The command functions in the same manner regardless of call mode (single image or Dual Images) or connection (IP or ISDN). However, command behavior does vary depending on the system state.

- In the Ready-to-Dial state, selecting WinTOT minimizes the Main UI. You must issue the lkap command to the iPower Control Protocol to return to the Main UI.
- In a conference, selecting WinTOT minimizes the Main UI and sends the Windows desktop to the far end. WinTOT is treated as a non-collaborated shared application. When you switch to another source, WinTOT behaves as any other Content source in that you can select WinTOT even if another Content source is being sent to the far end.

To stop sending WinTOT, switch the system to another People or Content source.

Toggle Information Window

Toggles the Information window on or off.

Toggle Information Window	
Command	SDI
Arguments	t=toggle
Syntax	SDIt

Toggle Full Screen

Toggles Full-Screen mode on and off.

Toggle Full Screen	
Command	SDS
Arguments	t=toggle
Syntax	SDSt

Update Permanent Selectable

The UPS command allows you to select a source in the People and Content list, regardless of whether or not a video signal is present. (Normally, sources displayed in the People and Content list are not selectable unless they are active.)

You need to issue this command only once, and you must restart the system in order for it to take effect. On subsequent system restarts, this command is activated automatically.

Update Permanent Selectable	
Command	UPS
Arguments	0=Disable UPS for this device 1=Enable UPS for this device
Syntax	UPS[Main Camera][Document Camera] [Auxiliary Camera][VCR] [ImageShare]
Example	To make all sources permanently selectable, enter the following command: UPS11111 To make the Main camera and ImageShare permanently selectable, enter the following command: UPS10001

Mute/Unmute Audio on System

Mutes and unmutes system audio.

Note: If an iPower system is configured in AdminTools to mute audio for incoming calls, the Control Protocol will ignore any unmute commands while a call is connecting. Once the call connects, the unmute commands will be processed.

Mute/Unmute System	
Command	mavb
Arguments	m=mute u=unmute
Syntax	mavbm mavbu

Query Commands

Queries are used to request status from the iPower system about a particular state.

Query Call State

Determines if the system is in a call (either audio or video).

Query Call State	
Command	lqh
Arguments	None
Syntax	lqh
Example	Response:lqh:*n* *n*=0 (not in a call) *n*=1 (in a call)

Query Control Protocol Version

Determines the version number of the operating iPower Control Protocol.

Query Control Protocol Version	
Command	lqb
Arguments	None
Syntax	lqb
Example	Response:lqb:3.0 The returned two-digit number (3.0 in the example above) is the version number of the iPower Control Protocol that is currently in operation.

Query UI State

Use this command to establish the current system screen configuration and readiness state. Note the following:

- The Ready-to-Dial query returns a value of 1 whenever the system status window displays the "Ready to dial" text.
- The Full-Screen query tells you whether or not the Primary Display is in Full-Screen mode.
- The Standby query returns a value of 1 if the system's screen saver is running.

The UI State (UIS) system response (explained in the section "System Responses") is related to this query, in that the UIS response tells you when the Ready-to-Dial or Full-Screen mode changes. However, the UIS system response does not currently provide Standby notifications.

Query UI state	
Command	QUI
Arguments	Category values: S=Standby mode R=Ready State F=Full-Screen mode State values returned: 0=Off/Not ready (possibly in a call) 1=On/Ready (not in a call)
Syntax	QUI[Category]
Example	Use the following query command to determine the Ready state of the system: QUIR If the system is in the Ready-to-Dial state, it responds with the following notification: QUI:R1

Query Display Source

Use this command to determine which near-end video source or far-end video type is mapped to a particular video display. Up to four video displays are possible, depending on whether the system is set up as a single- or dual-monitor system.

Do not use this command to determine if a video display has an active or playing source. Use the Query Display Playing (QDP) command instead.

Query Display Source	
Command	QDS
Arguments	Video Display values: 0=Primary Display 1=PIP1 2=AuxDisplay 3=AuxPIP Video Source values returned: 0=None 1=MainCamera 2=DocCamera 3=AuxCamera 4=VCR 5=ImageShare 6=(reserved for future use) 7=Far-end People 8=Far-end Content
Syntax	QDS[Video Display value]
Example	Use the following query to determine the video source that is being viewed in the Primary Display: QDS0 During a call with a dual-monitor configuration, if far-end Content is presented in the Primary Display, the system responds with the following: QDS:08

Query Display Playing

Used to establish the playing state of each video display.

Query Display Playing	
Command	QDP
Arguments	Video Display values: 0=Primary Display 1=PIP1 2=AuxDisplay 3=AuxPIP Playing State values returned: 0=Not Playing 1=Playing
Syntax	QDP[Video Display value]
Example	Use the following query to determine the playing state of PIP1: QDP1 If PIP1 is playing, you will receive the following response in the format QDP:[VideoDisplay][PlayingState] QDP:11

Query Video Encoder Source

Used to establish the current source of each video display.

Query Video Encoder Source	
Command	QES
Arguments	Encoder Type values: 0=People 1=Content Video Source values: 1=MainCamera 2=DocCamera 3=AuxCamera 4=VCR 5=ImageShare
Syntax	QES[Encoder Type value]
Example	Use the following query to determine the People Video Encoder source: QES0 If the People Video Encoder source is the Main Camera, you will receive the following response in the format QES:[EncoderType][VideoSource] QES:01

Query Encoder Active

Used to establish whether or not an encoder is active. This command is also useful for determining if the system is sending Dual Images or if a video source is inactive. Video sources are inactive when they are unplugged or turned off.

Query Encoder Active	
Command	QEA
Arguments	Encoder Type values: 0=People 1=Content Video Source values: 0=Not Playing 1=Playing
Syntax	QEA[Encoder Type value]
Example	Use the following query to establish the playing state of the Content video: QEA1 If the Content video is not playing, you will receive the following response in the format QEA:[EncoderType][ActiveState]: QEA:10

Query Decoder Active

Used to establish whether a decoder type is active or not. This command is also useful in determining if the far-end is sending Dual Images.

Query Decoder Active	
Command	QDA
Arguments	Decoder Type values: 0=People 1=Content Video Source values: 0=Not Playing 1=Playing
Syntax	QDA[Decoder Type value]
Example	Use the following query to establish the playing state of the People video: QDA0 If the People video is playing, you will receive the following response in the format QDA:[DecoderType][ActiveState]: QDA:01

Query Dual Images

Used to determine if the system is sending or receiving Dual Images.

Query Dual Images	
Command	QDI
Arguments	N=Near end F=Far end 0=Disabled 1=Enabled
Syntax	QDI[N/F]
Example	Use the following query to establish the state of Dual Images on the far end: QDIF If People and Content is being received at the far end, you will receive the following response: QDIF:1

Query Near-End Mute Status

Used to determine the mute status on the near-end system.

Query Near-End Mute Status	
Command	QNEM
Arguments	0=Not muted 1=Muted
Syntax	QNEM
Example	If the near-end system is muted, you will receive the following response: QNEM:1

Query Far-End Mute Status

Used to determine the mute status on the far-end system.

Query Far-End Mute Status	
Command	QFEM
Arguments	0=Not muted 1=Muted
Syntax	QFEM
Example	If the far-end system is not muted, you will receive the following response: QFEM:0

Query Dual Images Call Capability

Used to determine whether the current call supports Dual Images.

Query Dual Images Call Capability	
Command	QSC
Arguments	S=Single image D=Dual Images
Syntax	QSC
Example	If the current call supports Dual Images, you will receive the following response: QSC:D

System Responses

System responses are messages that are sent to the control system from the iPower collaboration system. This information enables you to monitor the collaboration system.

Note: UI State responses are enhanced in Version 4.0.2, and their format has changed. The old format is no longer available for iPower 4.0 systems.

For example, when the system state changes to Ready to Dial:

Old format: `UIS R1`

New format: `UIS 21`

The following system responses begin with <stx> and end with <eot>. For simplicity, these characters are not shown in the following table.

Response	Meaning	When It Occurs
avr	Valid command received	Sent in response to a valid command received from the control system. Once you receive this response, it is safe to send another command.

Response	Meaning	When It Occurs
A limited set of commands do not receive a Valid Command Received response (avr). These commands include: ❑ Query Call State (lqh) ❑ Query Control Protocol Version (lqb) ❑ Query UI State (QUI) ❑ Query Display Source (QDS) ❑ Query Display Playing (QDP) ❑ Query Video Encoder Source (QES) ❑ Query Encoder Active (QEA) ❑ Query Decoder Active (QDA) ❑ Query Dual Images (QDI) ❑ Query Near-End Mute Status (QNEM) ❑ Query Far-End Mute Status (QFEM) ❑ Query Dual Images Call Capability (QSC) The following Off Hook commands return an avr only when used to answer incoming calls. When used to establish outgoing calls, the Dial Tone Detected response (awt) is issued without an avr. ❑ Video Off Hook (ldo) ❑ Audio Off Hook (lao) ❑ Dial Audio Call (lam) returns an avr only if the call attempt succeeded. Otherwise, a Call Connection Attempt Failed response (awf) is returned. ❑ Auto point on/off (lGco/lGcf) will return an avr only if the command succeeded. Otherwise, an Invalid Command Received response (air) is returned. The Auto Point commands fail if they are sent to a source that does not support auto-pointing, such as a PowerCam 70.		
air	Invalid command received	Sent in response to an invalid command received from the control system. Resend the command in the proper format before sending a subsequent command.
awt	Dial tone detected	Sent in response to an off-hook command (either audio or video).
awf	Call connection attempt failed	Sent when the system fails to connect.
SKr	iPower system is available	Sent whenever the user interface returns to “Ready to Dial” state, such as before and after a call.

Response	Meaning	When It Occurs
SKu	iPower system is not available	Sent whenever the user interface is not ready to dial, such as when the system is in a call.
awa	Audio call has been connected	Sent after an audio call has been successfully connected.
awh	Audio call has been disconnected	Sent after an audio call has been disconnected from the far-end system.
awj	Incoming audio call has been detected	Sent when an incoming audio call is attempting to connect.
awd	Video call has been disconnected	Sent when a video call has been disconnected.
awc	Video call has been connected	Sent when a video call has been connected.
awi	Incoming video call is detected	Sent when an incoming video call is attempting to connect.
SANm	Near end has been muted	Sent when the near-end audio is set to Mute.
SANu	Near end has been unmuted	Sent when the near-end audio is set to Unmute.
SAFm	Far end has been muted	Sent when the far-end audio is set to Mute.
SAFu	Far end has been unmuted	Sent when the far-end audio is set to Unmute.
SANv*nnn*	Audio volume level has changed to value *nnn* (*nnn* = 0-100)	Sent in response to an audio volume change.
UIS:R0	System is not ready to dial	Sent whenever the system leaves or returns to the Ready-to-Dial state
UIS:R1	System is ready to dial	
UIS:F0	System is not in Full-Screen mode	Sent whenever the system toggles into and out of Full-Screen mode
UIS:F1	System is in Full-Screen mode	
UIS:10	iPower system is not in Standby mode	The iPower system exits Standby mode

Response	Meaning	When It Occurs
UIS:11	iPower system is in Standby mode	The iPower system is put into Standby mode
UIS:20	iPower system is not in Ready-to-Dial state	A call is made when the system is in Ready-to-Dial state
UIS:21	iPower system is in Ready-to-Dial state	❑ You start the iPower Main UI ❑ You hang up a call
UIS:30	PIP is disabled	PIP is off
UIS:31	PIP is enabled	PIP is on
UIS:40	Main video and PIP are in their original positions	You swap the Main video and PIP back to their original orientation
UIS:41	Main video and PIP are swapped	You swap the Main video and PIP
UIS:50	Change Main UI full-screen mode to "L-view"	The Main UI switches from full-screen mode to an "L-view" when a call is hung up, Content is no longer sent, etc.
UIS:51	Change Main UI from "L-view" to full-screen mode	The Main UI switches from an "L-view" to full-screen mode when a call connects, you start sending Content, etc.
VEA:00	People video is not playing	These responses are sent when a call connects or disconnects, or when a Content source is added or removed from a conference. The system has two encoders that can be used to simultaneously transmit People and Content video to the far end. (This capability is referred to as Dual Images.) The encoders become active during the call-connection sequence, and return to the inactive state while the call is terminating. The People encoder is always active during a call; the Content encoder is active only when a Content source is selected during a call. These responses provide information to monitor or manage the system's Dual Images state.
VEA:01	People video is playing	
VEA:10	Content video is not playing	
VEA:11	Content video is playing	

Response	Meaning	When It Occurs
VDA:00	People decoder is inactive	Similar to Video Encoder Active (VEA), these responses are sent when a call connects or disconnects, or when the far end begins or stops transmitting a Content source. The iPower system has two decoders that can be used to simultaneously receive People and Content from the far end. (This capability is referred to as Dual Images.) The decoders become active during the call connection sequence, and return to the inactive state while the call is terminating. The People decoder is only active during a call when People video is being received; the Content decoder is only active during a call when the far end is transmitting a Content source. These responses provide information to monitor or manage the far-end Dual Images state.
VDA:01	People decoder is active	
VDA:10	Content decoder is inactive	
VDA:11	Content decoder is active	
VDS:01	Primary display has People encoder video	The iPower system supports four Display types (Primary display, PIP1, Aux(iliary) display, and Aux(iliary) PIP) and four Display sources (People encoder, Content encoder, People decoder, Content decoder). Whenever any of the Display sources changes, the system sends an updated VDS response to the Control Protocol user. You receive the VDS:01 response when: ❑ You hang up a call (single-monitor mode) ❑ You stop sending Content in a Dual Images call (single-monitor mode) ❑ You stop sending Content to the near end or far end in a Dual Images call (dual-monitor mode) ❑ You send the People source to the near end or far end in a single-image call (all modes)

Response	Meaning	When It Occurs
VDS:02	Primary display has Content encoder video	❑ You send Content in a call (single-monitor mode) ❑ You send Content to the near end (dual-monitor mode)
VDS:03	Primary display has People decoder video	❑ You stop sending Content to the near end or far end in a Dual Images call (single-monitor mode) ❑ You send the People source to the near end or far end in a single-image call (single-monitor mode)
VDS:04	Primary display has Content decoder video	You send Content in a call from the far end
VDS:11	PIP1 has People encoder video	❑ You stop sending Content from the near end or far end in a Dual Images call ❑ You send the People source to the near end or far end in a single-image call
VDS:12	PIP1 has Content encoder video	❑ You stop sending People from the near end or far end in a Dual Images call ❑ You send the Content source to the near end or far end in a single-image call
VDS:13	PIP1 has People decoder video	You send Content from the near end (all calls) or far end (Dual Images calls only)
VDS:14	PIP1 has Content decoder video	You send People from the near end (all calls) or far end (Dual Images calls only)
VDS:21	Aux display has People encoder video	You send Content from the far end in a single-image call
VDS:22	Aux display has Content encoder video	You send People from the far end in a single-image call
VDS:23	Aux display has People decoder video	
VDS:24	Aux display has Content decoder video	
VDS:31	Aux PIP has People encoder video	You send near-end People to the auxiliary PIP on the second monitor

Response	Meaning	When It Occurs
VDS:33	Aux PIP has People decoder video	You send far-end People to the auxiliary PIP on the second monitor
VDP:00	Primary display is not playing	The iPower system supports four Display types (Primary display, PIP1, Aux(iliary) display, and Aux(iliary) PIP) and four Display sources (People encoder, Content encoder, People decoder, Content decoder). Whenever the Display status changes, the system sends an updated VDP response to the Control Protocol user.
VDP:01	Primary display is playing	If the iPower collaboration application is minimized, the system sends the response UIS:11 (Standby mode is on). Once you maximize the collaboration application, the system sends the response UIS:10 (Standby mode is off). While the application is being maximized, the system sends the VDP:01 response if the Primary display is playing.
VDP:10	PIP1 is not playing	❑ PIP is disabled (single-monitor mode only) ❑ You hang up a call (single-monitor mode only)
VDP:11	PIP1 is playing	❑ You make a call (single-monitor mode only) ❑ You start or stop sending Content (single-monitor mode only)
VDP:20	Aux display is not playing	You hang up a call (dual-monitor mode only)
VDP:21	Aux display is playing	❑ A call connects (dual monitor mode only) ❑ You send People from the far end in a single-image call (dual-monitor mode only)
VDP:30	Aux PIP is not playing	PIP is not displayed on the second monitor (dual-monitor mode only)
VDP:31	Aux PIP is playing	PIP is displayed on the second monitor (dual-monitor mode only)

Response	Meaning	When It Occurs
VES:01	People encoder source has changed to Main camera	The iPower system supports two Video encoders (People and Content). Additionally, the iPower system can use any of the Main or Auxiliary sources on the People encoder, and any of the Content sources on the Content encoder. Sources include: ❑ Main camera ❑ Document camera ❑ Auxiliary camera ❑ VCR ❑ ImageShare The VES response you receive depends on the previous encoder source and the selected encoder source. For example, the first time you start the Main user interface, the People encoder default is the Main camera; the Content encoder default is the Document camera. If you select the Auxiliary camera as the People encoder source, the Control Protocol system sends the response VES:03. If you switch back to the Main camera, the system sends the response VES:01. In a Dual Images call, if you select the Document camera as the Content encoder source, the system does not send a response, since this is the default. However, if you select ImageShare as the Content encoder source, the system sends the response VES:15.
VES:03	People encoder source has changed to Auxiliary camera	
VES:12	Content encoder source has changed to Document camera	
VES:13	Content encoder source has changed to Auxiliary camera	
VES:14	Content encoder source has changed to VCR	
VES:15	Content encoder source has changed to ImageShare	

Remote Control Key Function Commands

Allow the control system to emulate remote control button functions. Each command represents a key press available through the remote control. For information on remote control functionality, refer to the *iPower Collaboration System Getting Started Guide* or the *iPower Collaboration System Quick Tips Sheet*.

Note: Follow each Remote Control Key Function command with a stop action/key up command. Failure to do so can cause unexpected results or improper system operation.

Remote Control Key Function Commands		
Command	lka	
Arguments	i (Information) p (POWER) m (MENU) c (CALL/ANSWER) h (HANG UP) 1 (1) 2 (2 ABC) 3 (3 DEF) 4 (4 GHI) 5 (5 JKL) 6 (6 MNO) 7 (7 PQRS) 8 (8 TUV) 9 (9 WXYZ) * (* <) 0 (0) # (# +) s (SET)	x (CANCEL) g (PRESET) ^ (Up) < (Left) e (Enter) > (Right) q (Down) l (PEOPLE) M (CONTENT) u (Volume up) d (Volume down) P (PIP) z (Zoom in) o (Zoom out) t (MUTE) G (AUTO) % (Stop action/Key up)
Example	Send the 9 digit: lka9 lka%	

Note: Up, left, down, and right commands should normally be used for menu navigation. For camera control, use the System Control commands.

Command Quick Reference

This section provides a quick reference for the commands used with the iPower Control Protocol. For more information, see the section on the specific command.

Note: Double-byte command arguments should not be used in single-byte commands. For example, when issuing the Store near-end preset 5 command, enter the command as SCsN5. Do not use "05."

Video Call Control Commands

Command Name	Command	Argument(s)
Manual Dial	ldm	Dialing string 1 Separator: s Dialing string 2 (optional) **Note:** The combined length of both dialing strings must be between 1-130 bytes. If a single dialing string is used, its length must also be between 1-130 bytes. Bandwidth (optional): 56, 64, 112, 128, 168, 192, 224, 256, 280, 320, 336, 384, 448, 512, 672, 768, or 1920 kbps Delimiter: , Connection type (optional): 0=ISDN (default) 1=Gateway 2=TCPIP Delimiter: , Gateway extension (optional): Null (default) Delimiter: , Gateway call direction (optional): 0=outbound (IP to ISDN/default) 1=inbound (ISDN to IP) Terminator: e
Video Off Hook	ldo	none
Video On Hook	ldd	none

System Control Commands

Command Name	Command	Argument(s)
Camera Start Action	SCr	Destination: N (near end), F (far end) Reserved: ? Action/ Direction: t (tilt) u(up), d (down) p (pan) r (right), l (left) z (zoom) i (zoom in), o (zoom out)
Camera Stop Action	SCp	Destination: N (near end), F (far end) Reserved: ? Action/ Direction: t (tilt) u(up), d (down) p (pan) r (right), l (left) z (zoom) i (zoom in), o (zoom out)
Camera Store Preset	SCs	Terminal: N (near end), F (far end) Preset: 0-9
Camera Goto Preset	SCg	Terminal: N (near end), F (far end) Preset: 0-9

Audio Call Control Commands

Command Name	Command	Argument(s)
Audio Off Hook	lao	none
Audio On Hook	lad	none
ISDN Audio Manual Dial	lam	1 - 40 digits The ISDN Audio Manual Dial command must be followed by the loa<cr> command, which starts the dialing process.
Set Call Type	SCT	avd (audio/video/data) a (audio only)

Command Name	Command	Argument(s)
IP Manual Dial Voice Over IP (VoIP) Calls	ldm	Dialing string 1 Separator: s Dialing string 2 (optional) **Note:** The combined length of both dialing strings must be between 1-130 bytes. If a single dialing string is used, its length must also be between 1-130 bytes. Bandwidth (optional): 56, 64, 112, 128, 168, 192, 224, 256, 280, 320, 336, 384, 448, 512, 672, 768, or 1920 kbps Delimiter: , Connection type (optional): 0=ISDN (default) 1=Gateway 2=TCPIP (use this connection type for VoIP calls) Delimiter: , Gateway extension (optional): Null (default) Delimiter: , Gateway call direction (optional): 0=outbound (IP to ISDN/default) 1=inbound (ISDN to IP) Terminator: e

Screen Commands

Command Name	Command	Argument(s)	Keystrokes
Picture-in-Picture (PIP) Commands	mbw	t (toggle) e (enable) d (disable)	N/A
Cancel	lIk	<cr>	N/A
Keystroke Action	loa	<cr> (enter) <cn> (move cursor up) (move cursor down) <sb> (move cursor right) <ec> (move cursor left) <stx> (start of text) <eot> (end of transmission)	h0D h5E, ascii ^ h71, ascii q h3E, ascii > h3C, ascii < h02 h04

Special Commands

Command Name	Command	Argument(s)
ACP On/Off	lGc	o (ACP on), f (ACP off)
People Source	SDP	m (main camera), a (auxiliary camera)
Content Source	SDM	d (document camera), a (auxiliary camera), v (video playback source), i (ImageShare), w (WinTOT))
Toggle Information Window	SDI	t (toggle)
Toggle Full Screen	SDS	t (toggle)
Update Permanent Selectable	UPS	0=Disable 1=Enable
Mute/Unmute Audio on System	mavb	m (mute), u (unmute)

Query Commands

Command Name	Command	Argument(s)
Query Call State	lqh	none
Query Control Protocol Version	lqb	none
Query UI State	QUI	Category values: S=Standby mode R=Ready State F=Full-Screen mode State values returned: 0=Off/Not ready 1=On/Ready

Command Name	Command	Argument(s)
Query Display Source	QDS	Video Display values: 0=Primary Display 1=PIP1 2=AuxDisplay 3=AuxPIP Video Source values returned: 0=None 1=MainCamera 2=DocCamera 3=AuxCamera 4=VCR 5=ImageShare 6=(reserved for future use) 7=Far-end People 8=Far-end Content
Query Display Playing	QDP	Video Display values: 0=Primary Display 1=PIP1 2=AuxDisplay 3=AuxPIP Playing State values returned: 0=Not Playing 1=Playing
Query Video Encoder Source	QES	Encoder Type values: 0=People 1=Content Video Source values returned: 1=MainCamera 2=DocCamera 3=AuxCamera 4=VCR 5=ImageShare
Query Encoder Active	QEA	Encoder Type values: 0=People 1=Content Video Source values returned: 0=Not Playing 1=Playing

Command Name	Command	Argument(s)
Query Decoder Active	QDA	Decoder Type values returned: 0=People 1=Content Video Source values returned: 0=Not Playing 1=Playing
Query Dual Images	QDI	Near end/Far end values: N=Near end F=Far end Dual Images state values returned: 0=Disabled 1=Enabled
Query Near-End Mute Status	QNEM	0=Not muted 1=Muted
Query Far-End Mute Status	QFEM	0=Not muted 1=Muted
Query Dual Images Call Capability	QSC	S=Single image D=Dual Images

System Responses

Response	Meaning
avr	Valid command received from control system
A limited set of commands do not receive a Valid Command Received response (avr). These commands include: ❑ Query Call State (lqh) ❑ Query Control Protocol Version (lqb) ❑ Query UI State (QUI) ❑ Query Display Source (QDS) ❑ Query Display Playing (QDP) ❑ Query Video Encoder Source (QES) ❑ Query Encoder Active (QEA) ❑ Query Decoder Active (QDA) ❑ Query Dual Images (QDI) ❑ Query Near-End Mute Status (QNEM) ❑ Query Far-End Mute Status (QFEM) ❑ Query Dual Images Call Capability (QSC) The following Off Hook commands return an avr only when used to answer incoming calls. When used to establish outgoing calls, the Dial Tone Detected response (awt) is issued without an avr. ❑ Video Off Hook (ldo) ❑ Audio Off Hook (lao) ❑ Dial Audio Call (lam) returns an avr only if the call attempt succeeded. Otherwise, a Call Connection Attempt Failed response (awf) is returned. ❑ Auto point on/off (lGco/lGcf) will return an avr only if the command succeeded. Otherwise, an Invalid Command Received response (air) is returned. The Auto Point commands fail if they are sent to a source that does not support auto-pointing, such as a PowerCam 70.	
air	Invalid command received from control system
awt	Dial tone detected
awf	Call connection attempt failed
SKr	iPower system is available
SKu	iPower system is not available
awa	Audio call has been connected
awh	Audio call has been disconnected
awj	Incoming audio call has been detected

Response	Meaning
awd	Video call has been disconnected
awc	Video call has been connected
awi	Incoming video call is detected
SANm	Near end has been muted
SANu	Near end has been unmuted
SAFm	Far end has been muted
SAFu	Far end has been unmuted
SANv*nnn*	Audio volume level has changed to value *nnn* (*nnn* = 0-100)
UIS:R0	System is not ready to dial
UIS:R1	System is ready to dial
UIS:F0	System is not in Full-Screen mode
UIS:F1	System is in Full-Screen mode
UIS:10	System is not in Standby mode
UIS:11	System is in Standby mode
UIS:20	System is not in Ready-to-Dial state (system is in a call)
UIS:21	System is in Ready-to-Dial state
UIS:30	PIP is disabled
UIS:31	PIP is enabled
UIS:40	Main video and PIP are in original positions
UIS:41	Main video and PIP are swapped
UIS:50	Main UI is switched from full screen to “L-view”
UIS:51	Main UI is switched from “L-view” to full screen
VEA:00	People video is not playing
VEA:01	People video is playing
VEA:10	Content video is not playing
VEA:11	Content video is playing
VDA:00	People decoder is inactive
VDA:01	People decoder is active

Response	Meaning
VDA:10	Content decoder is inactive
VDA:11	Content decoder is active
VDS:01	Primary display has People encoder video
VDS:02	Primary display has Content encoder video
VDS:03	Primary display has People decoder video
VDS:04	Primary display has Content decoder video
VDS:11	PIP1 has People encoder video
VDS:12	PIP1 has Content encoder video
VDS:13	PIP1 has People decoder video
VDS:14	PIP1 has Content decoder video
VDS:21	Aux display has People encoder video
VDS:22	Aux display has Content encoder video
VDS:23	Aux display has People decoder video
VDS:24	Aux display has Content decoder video
VDS:31	Aux PIP has People encoder video
VDS:33	Aux PIP has People decoder video
VDP:00	Primary display is not playing
VDP:01	Primary display is playing
VDP:10	PIP1 is not playing
VDP:11	PIP1 is playing
VDP:20	Aux display is not playing
VDP:21	Aux display is playing
VDP:30	Aux PIP is not playing
VDP:31	Aux PIP is playing
VES:01	People encoder source has changed to Main camera
VES:03	People encoder source has changed to Auxiliary camera
VES:12	Content encoder source has changed to Document camera
VES:13	Content encoder source has changed to Auxiliary camera
VES:14	Content encoder source has changed to VCR

Response	Meaning
VES:15	Content encoder source has changed to ImageShare

Remote Control Key Function Commands

Command Name	Command	Argument(s)			
Remote Control Keys	lka	i	(Information)	x	(Cancel)
		p	(Power)	g	(Preset)
		m	(Menu)	^	(Up)
		c	(Call/Answer)	<	(Left)
		h	(Hang Up)	e	(Enter)
		1	(1)	>	(Right)
		2	(2 ABC)	q	(Down)
		3	(3 DEF)	l	(People)
		4	(4 GHI)	M	(Content)
		5	(5 JKL)	u	(Volume up)
		6	(6 MNO)	d	(Volume down)
		7	(7 PQRS)	P	(PIP)
		8	(8 TUV)	z	(Zoom in)
		9	(9 WXYZ)	o	(Zoom out)
		*	(* <)	t	(Mute)
		0	(0)	G	(Auto)
		#	(# +)	%	(Stop action/Key up)
		s	(Set)		

Note: Up, left, down, and right commands should normally be used for menu navigation. For camera control, use the System Control Commands.

A

Legacy System Commands

Introduction

This appendix contains information about legacy system commands. Although legacy commands are supported in the iPower system, it is recommended that you use the non-legacy commands for increased efficiency.

Note: If your control panel is already configured to use a legacy command, you should not need to reprogram it to the standard version of that command. However, if you are configuring your control panel for the first time, you should use the standard version of the command.

To initiate a call, the control panel must first issue an Off Hook (non-legacy) command to the iPower system and receive a Dial Tone response from the iPower system. Next, the control panel sends the dial string using the Enhanced Manual Dial (legacy) command or a Manual Dial (non-legacy) command.

To terminate the call, the control panel issues an On Hook (non-legacy) command.

For more information on non-legacy commands, see the section "Control Protocol Command Reference" in the previous chapter.

Command Reference

This following sections describe the four groups of commands used with legacy systems:

- Video Call Control Commands
- System Control Commands
- Audio Call Control Commands
- Screen Commands

Note: All commands must begin with <stx> and end with <eot>. <stx> = h02 and <eot> = h04.

Video Call Control Commands

Video Off Hook

Instructs the collaboration system to start a call.

Note: This command is not a legacy command, but is listed here because it is used in a legacy dialing sequence.

Video Off Hook (Legacy Systems)	
Command	ldo
Arguments	none
Syntax	ldo

Enhanced Manual Dial

Sends the phone number(s) to the collaboration system.

Enhanced Manual Dial (Legacy Systems)		
Command	lde	
Arguments	Dialing string(s): Separator: Terminator:	1-130 bytes for each string <0xFE> <0xFF>
Syntax	lde[Dialing string 1][0xFE][Dialing string 2][0xFF]	
Examples	One number: lde2924441<0xFF> Two numbers: lde2924441<0xFE>2924442<0xFF>	

System Control Commands

Camera Start Action

Instructs the selected camera to start one of the camera actions.

Note: All elements and arguments must be included in this command. The ? is a reserved character. You must include each reserved character where indicated.

Camera Start Action (Legacy Systems)		
Command	ckr	
Reserved:	?	
Reserved:	?	
Action and Direction:	t (tilt)	u (up) d (down)
	p (pan)	r (right) l (left)
	z (zoom)	i (zoom in) o (zoom out)
Syntax	ckr[?][?]{Action][Direction]	
Example	Start tilting the selected camera up: ckr??tu	

Camera Stop Action

Instructs the selected camera to stop one of the camera actions.

Note: All elements and arguments must be included in this command. The ? is a reserved character. You must include each reserved character where indicated.

Camera Stop Action (Legacy Systems)		
Command	ckp	
Reserved:	?	
Reserved:	?	
Action and Direction:	t (tilt)	u (up) d (down)
	p (pan)	r (right) l (left)
	z (zoom)	i (zoom in) o (zoom out)
Syntax	ckp[?][?][Action][Direction]	
Example	Stop tilting the selected camera up: ckp??tu	

Camera Store Preset

Sets a camera preset for the selected camera.

When you use the legacy Camera Store Preset command with an iPower system, note that the iPower system preset 1 is equivalent to the legacy preset 00.

Note: All elements and arguments must be included in this command. The ? is a reserved character. You must include each reserved character where indicated.

Camera Store Preset (Legacy Systems)	
Command	cks
Reserved	?
Preset number	00 (preset 1) 01 (preset 2) 02 (preset 3) 03 (preset 4) 04 (preset 5) 05 (preset 6) 06 (preset 7) 07 (preset 8) 08 (preset 9) 09 (preset 10)
Syntax	cks[?][Preset number]
Example	Store preset 5: cks?04

Camera Goto Preset

Selects the camera with the specified preset and moves it to the preset position.

When you use the legacy Camera Goto Preset command with an iPower system, note that the iPower system preset `1` is equivalent to the legacy preset `00`.

Note: All elements and arguments must be included in this command.

Camera Goto Preset (Legacy Systems)	
Command	ckg
Preset number	00 (preset 1) 01 (preset 2) 02 (preset 3) 03 (preset 4) 04 (preset 5) 05 (preset 6) 06 (preset 7) 07 (preset 8) 08 (preset 9) 09 (preset 10)
Reserved	?
Syntax	ckg[Preset number][?]
Example	Move the main camera to near-end preset 5: ckg04?

Audio Call Control Commands

Audio Off Hook

Used to start a call using legacy commands.

Note: This command is not a legacy command, but is listed here because it is used in a legacy dialing sequence.

Audio Off Hook (Legacy Systems)	
Command	lao
Arguments	none
Syntax	lao

Screen Commands

Keystroke Action

Passes keystrokes to the user interface. These keystrokes include cursor movements and special keys such as ENTER.

Keystroke Action	
Command	loa
Argument	<cr> (enter) <cn> (move cursor up) (move cursor down) <sb> (move cursor right) <ec> (move cursor left) <stx> start of text <eot> end of transmission
Keystrokes	<cr> h0D <cn> h5E, ascii ^ h71, ascii q <sb> h3E, ascii > <ec> h3C, ascii < <stx> h02 <eot> h04
Syntax	loa[Argument][Keystrokes]
Example	Emulate pressing ENTER on the remote control: <stx>loa<cr><eot>

Legacy Command Quick Reference

This section provides a quick reference for legacy commands. For more information, see the section on the specific command.

Command Name	Command	Argument(s)	Keystrokes
Video Off Hook	ldo	none	N/A
Enhanced Manual Dial	lde	Dialing strings: 1-130 bytes/string Separator: <0xFE) Terminator: <0xFF>	N/A

Command Name	Command	Argument(s)	Keystrokes
Camera Start Action	ckr	Reserved: ? Reserved: ? Action: t (tilt) u(up), d (down) p (pan) r (right), l (left) z (zoom) i (zoom in), o (zoom out)	N/A
Camera Stop Action	ckp	Reserved: ? Reserved: ? Action: t (tilt) u(up), d (down) p (pan) r (right), l (left) z (zoom) i (zoom in), o (zoom out)	N/A
Camera Store Preset	cks	Reserved: ? Preset: 00 (preset 1) 01 (preset 2) 02 (preset 3) 03 (preset 4) 04 (preset 5) 05 (preset 6) 06 (preset 7) 07 (preset 8) 08 (preset 9) 09 (preset 10)	N/A
Camera Goto Preset	ckg	Preset: 00 (preset 1) 01 (preset 2) 02 (preset 3) 03 (preset 4) 04 (preset 5) 05 (preset 6) 06 (preset 7) 07 (preset 8) 08 (preset 9) 09 (preset 10) Reserved: ?	N/A
Audio Off Hook	lao	none	N/A
Keystroke Action	loa	<cr> (enter) <cn> (move cursor up) (move cursor down) <sb> (move cursor right) <ec> (move cursor left) <stx> (start of text) <eot> (end of transmission)	h0D h5E, ascii ^ h71, ascii q h3E, ascii > h3C, ascii < h02 h04