# Appendix 5 IR Interfaces

This appendix describes HCA support for two supported IR Interfaces: the Global Caché GC-100 and the Bitwise BC4. These network devices – they are located by an IP address – contain IR output ports. Some units also contain digital sensor ports, relays, and serial ports.

HCA supports the IR output ports and using them can send IR sequences to control TVs, Audio, These sequences come from the stored database inside the Bitwise BC4, and when using the GC100, from sequences captured by the Global Caché IR Learner.

When using the GC-100, digital inputs are supported and can be polled for status or, if they are set up as notify ports, used to start HCA programs. The GC-100 relays are also supported.

This appendix describes

- GC-100
  - GC-100 Setup
  - GC-100 IR outputs
    - IR Learner
    - IR Keypad builder
    - Creating an HCA device for an IR Output Port
    - IR sequences in programs
    - IR sequences in schedules
  - GC-100 Digital sensor ports
    - Creating a HCA device for a sensor port
    - Using a GC-100 sensor port for program triggers
  - GC-100 Relays
    - Creating a HCA device for a relay
    - Using a GC-100 relay
  - Design Inspector for the GC-100
- Bitwise BC4
  - Bitwise BC4 Setup
  - Bitwise BC4 device type selection
  - IR Keypad builder
  - Creating an HCA device for an IR Output Port
  - IR sequences in programs
  - IR sequences in schedules

### GC100-Setup

Global Cache Setup Properties		×
GC-100 Unit 1 GC-100 Unit 2 GC-100 Unit 3 GC-100 Unit 4 Keypads		
☑ Enable GC-100		
Name: Office		
IP Address: 169 . 254 . 180 . 101 Connect		
Module Unit Type Setup Current State		
	Close	Cancel

To set up the GC-100, press the *GC-Setup* button in the ribbon *Interfaces* menu and select *Configure* from the menu.

HCA can utilize up to four GC-100s. The first 4 tabs of this dialog are for configuration of them. Each tab contains:

- Checkbox to enable or disable use of this GC 100
- Name of the GC-100. In other areas of HCA, you refer to the different GC-100s that you have configured by this name
- The IP address of the unit. The GC-100 has many different mechanisms for determining an IP address. HCA supports only a static IP address. This IP address is set using the software available from Global Caché or the internal web server configuration pages in the GC-100.
- A display of how the various ports are configured.

After entering the name and IP address, press the connect button. The configuration of the GC-100 displays:

Glo	bal Cache Se	etup Prop	perties				×
0	GC-100 Unit 1	GC-100	Jnit 2   GC-100	Unit 3 GC-100 Unit	4 Keypads		
	🔽 Enable	GC-100					
	Name:	Living R	oom IR				
				100	1		
	IP Address:	1 169 .	254 . 180 .	100 Connec	t Version: 3.0-12		
	Module	Unit	Туре	Setup	Current State		
	0	1	Network Serial				
	2	1	Serial Relay		0		
	3	2	Relay		0		
	3 4	3 1	Relay IR	IR Output	0		
	4	2 3 1	IR IR	IR Output IR Output			
	5		IR IB	Sensor Sensor Notify	1 1		
	5	2 3	IR	IR Output	•		
						Close Ca	ancel

Configuration of the ports is done using the software from Global Caché or the internal web pages of the GC-100. While HCA can read out the setup it does not provide facilities to configure the ports.

# IR Keypad builder

The next step in getting ready to use an IR Output Port is to create an IR keypad. The keypad is used to enter the sequences you want to send from programs and schedules.

Press the *GC-100 setup* button in the ribbon *Interfaces* category and select *Configure* from the menu. Then choose the *Global Cache keypads* tab.

Global Cache Setup Properties	X
GC-100 Unit 1 GC-100 Unit 2 GC-100 Unit 3 GC-100 Unit 4 Keypads	
The Global Cache IR interface contains a number of IR ports. Each port can be configured as an IR output or sensor input. For IR output ports HCA must know the commands you want to send and how to send these commands.	
The first step is to use the Global Cache IR Learner to build a file of commands and the IR sequences to send those commands. The Global Cache IR Learner software does that.	
Next you use this HCA tool to create a virtual keypad. This keypad is attached to the IR sequence definition file and has a button for each command you want to send. This keypad is used to construct sequences in program elements, schedule entries, and in the UI.	
To begin the process of creating a new keypad press the New button.	
Name Definition File	
New Delete Modify	
Close Cancel	

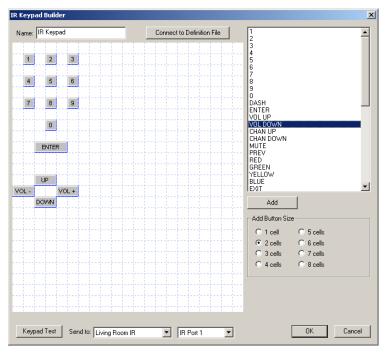
ame: IR Keypad	Connect to Definition File		
		-	
HCA		-	×
	 pad definition file loaded for this k ition File button and then browse		
	Tunderstand		
		C 1 cell C 2 cells G 3 cells C 4 cells	C 5 cells C 6 cells C 7 cells C 8 cells

From the dialog you can create, delete, or edit IR keypads. To create a new Keypad press the New button.

As the popup message points out, the first action you need perform is to connect this keypad to a definition file. Pressing the *Connect to Definition File* button displays this dialog. Press the *Browse* button to locate the IR definition file you created with the IR Learner.

)efinition File: C:\Progra	m Files\home control assistant\HCA Designs\Directv IR remote.csv	Browse for Definition File
Name	Definition	
TV INPUT	38000,1,1,230,45,46,46,23,23,23,45,23,45,46,23,23,45,23,23,46,46,23,768	
FORMAT	38000,1,1,230,45,46,45,23,22,23,46,46,45,23,22,46,45,46,23,23,46,23,768	
RECORD	39000,1,1,230,45,46,45,23,22,23,22,46,45,23,45,23,45,23,22,46,45,23,772	
STOP	38000,1,1,115,45,46,44,23,23,23,23,46,44,23,23,23,45,23,23,23,23,23,765	
SKIP BACK	38000,1,1,230,45,46,45,23,22,23,22,46,45,23,45,46,22,23,45,23,22,23,768	
30 S SKIP AHEAD	38000,1,1,115,45,46,46,23,23,23,23,46,46,23,46,46,23,46,23,46,23,46,23,768	
AST FORWARD	38000,1,1,230,44,46,45,23,22,23,22,46,45,23,45,23,22,23,22,46,22,23,767	
REWIND	38000.1.1.230.45.46.45.23.22.23.22.46.45.23.22.46.45.23.22.46.23.23.768	
POWER	38000.1.1.230.45.46.45.23.23.23.23.23.45.23.23.23.23.23.23.45.23.45.23.45.23.768	
PLAY	38000.1.1.230.46.46.46.23.22.23.22.46.46.23.22.23.22.46.46.46.46.23.768	
PAUSE	38000.1.1.230.46.46.46.23.22.23.22.46.46.23.22.46.22.23.22.23.46.23.768	
NEO	39000.1.1.230.46.46.45.23.22.23.22.46.23.46.45.46.23.23.46.23.46.23.772	
<b>MENIL</b>	39000.1.1.230.45.46.45.23.22.23.22.46.22.23.22.23.22.46.22.46.22.23.772	
BACK	39000.1.1.230.46.46.45.23.22.23.22.46.23.23.46.46.45.23.22.23.22.23.772	
101 10000 I		
•		

After the file is loaded, the key sequences display. Closing this dialog places you back in the Keypad Builder.



This dialog looks a bit like the Visual Programmer. On the canvas are placed the keypad buttons. In the upper right of the dialog is a list of all the IR keys from the definition file.

First, select a key that performs some action that you want. Then select the button size and press Add, or like the Visual Programmer, select the code in the list and drag it on to the canvas.

Once on the canvas you can then drag the buttons to whatever location you want. To change the label on the button or the button size, double click the button to open its properties.

Button Properties	×
For VOL UP key	
Text: VOL +	
Button Size	_
C 1 cell O 5 cells	
O 2 cells	
O 3 cells O 7 cells	
O 4 cells O 8 cells	
OK Cancel	

In the above example, several buttons have different names than listed in the keypad button list (Vol+ instead of Vol Up). This is because the name has been modified by opening the button properties and entering a new name.

When you have placed all the buttons you want on the keypad, you can test it using the *Keypad Test* button at the bottom of the keypad builder dialog. Before starting the test, select the GC-100 and port you want to use.



From the test keypad, pressing a button causes the IR sequence to be transmitted by the selected GC-100 out the selected port.

On HCA IR Keypads, any key sequence from the definition file that you didn't create a button for can still be sent using the dropdown and *Send* button at the bottom.

## Creating a HCA device for an IR Output Port

Now that the IR definition file has been created and associated with a keypad, you can create the HCA device to represent the IR output port. In step 3 of the New Device Wizard, select as the manufacturer *Global Caché* and type *GC-100 IR Output*.

New Device Wizard - St	tep 3 (Master Bedroom - Desk TV)	×
	What type of device are you creating? If the device is not listed select eith device or generic device. You can always change the properties of the de later if necessary.	
		•
	, Kind	
	All	•
	Model number and description	
	GC-100 IR Output	•
< Back > N	ext Finish	Cancel

New Device Wizard -	- Step 4 of 7 (Master Bedroom - Desk TV)	×
	What Global Cache unit and port is used for this IR output ?	
8	Global Cache Unit: Main Setup IR port used when sending commands: 1 Use this keypad for sequence construction: Master Bedroom	
	,	
< <u>B</u> ack >	> <u>N</u> ext Finish	Cancel

On step 4 the specifics of this port are configured.

You select:

- Which GC-100 unit and port this device represents. The GC-100 is selected by the name you entered when it was identified to HCA in the *IR Global Caché GC-100 Setup* dialog.
- Which IR keypad to associate with this device. Keypads are selected by the name you used when you created it in the keypad builder.

The remainder of the New Device Wizard is the same as for all other devices.

- **Hint**: Remember that the ports on the back of the GC-100 can be configured as IR Outputs or sensor inputs. HCA doesn't have the ability to change their use you must use the GC-100 software for this.
- **Hint**: The GC-100 ports are labeled on the back of the GC-100 starting at 1. HCA uses the same numbering.
- Hint: Rather than name the device with the GC-100 name and port number you may want to name the device with what it controls. For example, you may want to use Desk TV, Home DirecTV tuner, etc.

### IR sequences in programs

IR Properties	×
*	IR Keypad
This element sends a series of IR commands to a device. The appropriate IR port is selected before any keycodes are sent.	4 5 6
IR Devices	7 8 9
Desk - Desk TV	
	ENTER
	VOL - VOL + DOVVN
Clear All Delete Selected	
0 milliseconds delay between each cmd	
OK Cancel	Send 30 S SKIP AHEAD

Now that all the setup steps are complete you can finally use the IR port in a program. The IR element is used for this:

Use the keypad to enter the sequence you want to transmit.

IR Properties	×
*	IR Keypad
This element sends a series of IR commands to a device. The appropriate IR port is selected before any keycodes are sent.	4 5 6
IR Devices	7 8 9
Desk - Desk TV	0
IR Sequence P0WER 2 5	ENTER
ENTER VOL UP VOL UP VOL UP	VOL - VOL +
Clear All Delete Selected	
0 milliseconds delay between each cmd	
OK Cancel	Send POWER

If you want to delete some keys in the sequence, select and use the *Delete Selected* Button. New entries are always inserted after the selected item so it is easy to enter missed keys in the middle of a sequence.

#### IR sequences in schedules

Creating a schedule entry that sends an IR sequence is very similar to the IR Visual Programmer element. The schedule entry wizard has a step for IR sequences if you select an IR device. Also the Visual Schedules has properties for IR time bar markers.

Schedule Entry Properties	×
On Date On Time IR Keys Name In plain English	
Using the keypad enter the sequence of keys to be sent IR Sequence POWER 5 5 5 ENTER ENTER ENTER	DOWN
	OK Cancel

Enter the sequence you want to transmit in the same manner as the Visual Programmer. The final tab (or wizard step) of the schedule entry shows in text the sequence to be transmitted.

Schedule Entry Properties	×
On Date On Time IR Keys Name In plain English	
You have created this schedule entry:	
Device "Desk - Desk TV" every day at 10:44 AM send keys "POWER 2.5 ENTER VOL DOWN VOL DOWN".]	
OK Cancel	

### GC-100 Digital sensor ports

The GC\_100 has a number of ports that can be used as IR Output ports and as digital inputs. Available from Global Caché video, voltage, and contact closure sensors that can be plugged in to these ports for sensing when things are on and off. Regardless of the sensor used, all the ports report in the same manner – a simple ON (or one) of OFF (or zero).

These can be set up using the Global Caché software in one of two ways:

- Sensor the port can be polled for its current state and returns one or zero
- Sensor Notify The GC-100 sends a message to HCA each time the port changes from zero to one or one to zero. In addition, the port can be polled like the Sensor port to get its current value.

#### Creating a HCA device for a sensor port

GC-100 sensor ports are added using the New Device Wizard. The first steps of the wizard are as usual. On step 3, choose the type as *GC-100 Digital Input* 

New Device Wizard -	Step 3 (Master Bedroom - TV Sensor)	x
	What type of device are you creating? If the device is not listed select either a similar device or generic device. You can always change the properties of the device later if necessary.	
	Manufacturer	
	Global Caché 🗨	
	Kind	
	All	
	Model number and description	
	GC-100 Digital Input	
< <u>B</u> ack	Next Finish Cancel	

New Device Wizard - Ste	ep 4 of 5 (Master Bedroom - TV Sensor)	×
	What Global Cache unit and port is used for this sensor input?	
	Global Cache Unit: Main Setup	
	Sensor attached to port number: 5	
< <u>B</u> ack > <u>N</u> e	ext Finish Cano	;el

#### On step 4 select the GC-100 and the port:

# Using a G-100 sensor port for program triggers

Once you have added a digital input it can be used in one of two ways. You can use the Test element with the *Is Device On* and *Is Device Off* test conditions. When that element is executed, the GC-100 port is polled to determine the outcome of the test.

If the port was configured as Sensor Notify then you can create program triggers. When the messages about port state changes come from the GC-100, programs can be started.

On the Program properties dialog choose the *Triggers* tab. As the type of trigger choose *Global Caché Sensor*.

gger					
Start the program	on this triager:				
	edroom - TV Senso	r sends ON			 
, ⊢Sensor Port—					
				_	
Master Bedro	oom - TV Sensor		-	<b>-</b>	
Command					
C Off					
• On					
					Cancel

Select the GC-100 sensor and if the program should be triggered when the sensor sends an ON or an OFF.

## **GC-100 Relays**

In addition to the GC-100 IR output ports and Digital Input ports, some GC-100 models have relays. These can be used with HCA after a device is created for them. When the relay is *closed* HCA says it is *On*. When the relay is *open*, HCA says it is *Off*.

#### Creating a HCA device for a relay

To create a GC-100 relay, start the New Device Wizard. On step 3 select as the type *GC-100 relay*:

New Device Wizard -	Step 3 (Master Bedroom - Shade Relay)	
	What type of device are you creating? If the device is not listed select either a similar device or generic device. You can always change the properties of the device later if necessary. Manufacturer Global Caché  Kind All  Model number and description GC-100 Relay	
< <u>B</u> ack	Next Cancel	

On the next step of the wizard enter the GC-100 unit and relay number.

New Device Wizard - Step 4 of 7 (Master Bedroom - Shade Relay)	×
What Global Cache unit and port is used for this relay ?	
Global Cache Unit: Main Setup	
O Relay Port 1	
© Relay Port 2	
C Relay Port 3	
< <u>B</u> ack → <u>N</u> ext Finish	Cancel

**Hint**: The GC-100 relays are numbered on the back of the GC-100. HCA uses the same numbering.

Using a GC-100 Relay

The GC-100 relay can be used as any other non-dimmable device in HCA. You can control it from the UI, schedules, and programs. The relay also responds to starts requests so it can be used in the Visual Programmer Test element and HCA asks the GC-100 for it's current state – On (closed) or Off (open).

#### **Design Inspector**

With all the relays, IR output ports, digital input ports – both Sensor and Sensor Notify – it can be easy to become confused. HCA helps in two areas. First you can always open the GC-100 setup dialog and press the connect button. HCA shows the current setup of the GC-100, how the ports are set up, and their current values.

Global Cache 5	etup Pro	perties				×
GC-100 Unit 1	GC-100	Unit 2   GC-100	) Unit 3   GC-100 Ur	nit 4   Keypads		1
	GC-100 : Living F : 169	Room IR . 254 . 180 .	100 Conn	ect Version: 3.0-12		
Module	Unit	Туре	Setup	Current State		
0 1 3 3 4 4 4 5 5 5 5	1 1 1 2 3 1 2 3 1 2 3 1 2 3	Network Serial Relay Relay IR IR IR IR IR IR IR IR	IR Output IR Output IR Output Sensor Sensor Notify IR Output	1 0 0 1		
					Close	Cancel

Also, the design inspector (part of the troubleshooter) looks at all your usages of the GC-100 and tries to detect problems. For example, creating a program trigger using a port not programmed as Sensor Notify; or using the IR Visual Programmer element with a port that isn't set up as an IR Output.

ICA Troubleshooter	×
	-
Inspector Inspector Setup Alert Manager Log Viewer Log Setup X10 Reception X10 Housecodes Technical Support	
The following numbered items are possible problems found by the inspector. In the box provided check off anything that the inspector	
should ignore. Use the HCA menu and dialogs to correct the remaining items.	
1. Controller "Desk - TV Sensor" is for an IR Sensor Port that isn't configured as a sensor input on the Global Cache unit "Living Room IR".	
Show complete inspection checklist     Show only what's not checked off	
OK Cancel	

## **BC4 Setup**

To utilize IR devices in HCA programs and schedule sit first is necessary to perform several actions first. These are:

- 1. Program the BC4 for the kinds of devices you have. A device kind is specified by what it is TV, DVD, etc the model and codeset.
- 2. Create a keypad for a device kind to enable specification of IR sequences.
- 3. Create a device in HCA using the New Device Wizard that can then be used for scheduling and programming.

To set up the BC4, press the *Bitwise setup* from the ribbon *Interfaces* category then select the *Configure* from the menu.

Bitwise IR Setup Properties				×
Bitwise BC4 Unit 1 Bitwise B	C4 Unit 2   Bitwise BC4 Unit 3   Bit	wise BC4 Unit 4 BitW	lise Keypads	
In order to use the BitWise B accomplished using the BitW	C4 it is necessary to configure it for lise configuration program.	a static IP and address	and select a port number. Th	is is
Enable this BC4 unit				
Name:				
IP Address: 0 . 0	. 0 . 0 Port: 5000	Test Conne	ection	
IR Devices				
	nd codeset for the devices you want vice. Port 1 on the BC4 is used for t			
Туре	Model	Codeset Test Con	nmand	
Unused 💌	-	-	-	Test
Unused	•	•	-	Test
Unused 💌	<b>•</b>	<b>·</b>	<b>•</b>	Test
Unused 💌	•	<b>•</b>	•	Test
Unused 💌	•	<b>•</b>	<b>•</b>	Test
Unused 💌	<b>•</b>	<b>•</b>	<b>•</b>	Test
Unused 💌	•	<b>•</b>	•	Test
Unused	<b>•</b>	<b>•</b>	•	Test
			Close	Cancel

HCA can utilize up to four BC4s. The first 4 tabs of this dialog are for configuration of them. Each tab contains:

- Checkbox to enable or disable use of this BC4
- Name of the BC4. In other areas of HCA, you refer to the different BC4s that you have configured by this name
- The IP address of the unit. The BC4 has many different mechanisms for determining an IP address. HCA supports only a static IP address. This IP address is set using the software available from BC4 or the internal web server configuration pages in theBC4.
- A display of the kinds of IR devices you will control with this BC4.

After entering the name and IP address, press the connect button. If the connection is successful "Connected ok" displays.

Bitwise IR Setup Properties			×
Bitwise BC4 Unit 1 Bitwise	BC4 Unit 2 Bitwise BC4 Unit 3 B	twise BC4 Unit 4 BitWise Keypa	l at
	BC4 it is necessary to configure it for tWise configuration program.	a static IP and address and select	t a port number. This is
Enable this BC4 unit	t		
Name: Bedroom I	R		
IP Address: 192 . 1	168 . 2 . 2 Port: 5000	Test Connection	Connected ok
- IR Devices			
	and codeset for the devices you war device. Port 1 on the BC4 is used for		
	Model	Codeset Test Command	
Type Unused		Codeset Test Command	▼ Test
Unused			Test
Unused			▼ Test
Unused		<b>_</b>	Test
Unused	•	<b>•</b>	▼ Test
Unused	-	•	▼ Test
Unused	•	<b>•</b>	▼ Test
Unused		-	▼ Test
			Close Cancel

Once the connection is made the next step is to program the BC4 to enable it to control the kinds of devices you have.

### Bitwise BC4 device type selection

You can think of the BC4 like a universal remote control. You first have to tell it what kind of device you have: Is it a TV, DVD, Audio, etc? Then you select the model of that device type you have: Is it a Sony TV, Toshiba TV, Sylvania TV, etc? Lastly you have to select the codeset the device uses. This one is harder and the only way you can know what codeset to use is by testing.

Bitwise IR Setup Properties	x
Bitwise BC4 Unit 1   Bitwise BC4 Unit 2   Bitwise BC4 Unit 3   Bitwise BC4 Unit 4   BitWise Keypads   In order to use the BitWise BC4 it is necessary to configure it for a static IP and address and select a port number. This is	
accomplished using the BitWise configuration program.	
Enable this BC4 unit	
Name: Bedroom IR	
IP Address: 192 . 168 . 2 . 2 Port: 5000 - Test Connection Connected ok	
☐ IR Devices	11
Select the type, model, and codeset for the devices you want to control. Test the codeset selection by sending a command to see if it effects your device. Port 1 on the BC4 is used for the test command. These selections are used later when creating HCA devices.	
Type Model Codeset Test Command	
TV V Sylvania V 1394 Power On/Off Test	
Unused V V V Test	
Unused V V V Test	
Unused V Test	
Unused V Test	
Unused 🗸 🔽 Test	
Unused 💌 💌 💌 Test	
Unused V Test	
Close Cancel	

In this example, the kind of device is a TV, its model is Sylvania, and the chosen codeset is 1394.

How do you know the codeset is correct? Select one of the codeset choices – there may be one or there may be quite a few – then chose a command and press the *Test* button.

That command is then sent out of IR Port number 1 - they are labeled on the back of the BC4. Watch the device and see if it responds. If it does you have selected the correct codeset. If it doesn't responds as expected then select a different codeset and try again.

HCA limits you to programming the BC4 for up to 8 device kinds.

# IR Keypad builder

As outlines above, the next step in getting ready to use an IR device is to create an IR keypad. The keypad is used to enter the sequences you want to send from programs and schedules.

Press the *Bitwise setup* button in the ribbon *Interfaces* category and select *Configure* from the menu. Then choose the *Bitwise Keypads* tab.

Bitwise IR Setup Properties	×
Bitwise BC4 Unit 1 Bitwise BC4 Unit 2 Bitwise BC4 Unit 3 Bitwise BC4 Unit 4 BitWise Keypads	
The BitWise IR interface contains a universal IR controller capable of sending IR sequences to many different devices. Before HCA can use the BitWise IR interface you must first select the device types and the codesets they use. This is done on the others tab of this dialog.	
Next you use this tool to create a virtual keypad. This keypad is for a specific IR device type has a button for each command you want to send. This keypad is used to construct sequences in program elements, schedule entries, and in the UI.	
To begin the process of creating a new keypad, press the New button.	
Name         Use           IR Keypad         TV:Sylvania:1394	
n najpau n. synana. 1999	
New Delete Modify	
Close	Cancel

From the dialog you can create, delete, or edit IR keypads. To create a new Keypad press the New button.

Name:       IF Keypad       Use:       TV:Sylvania:1334       Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Ohr Power On/Dff       Ohr Power On/Dff       Ohr Power On/Dff         Optig 1       Digit 2       Digit 3       Digit 4         Digit 3       Digit 3       Digit 3       Digit 3         Digit 3       Digit 3       Digit 3       Digit 3         Digit 3       Digit 3       Digit 3       Digit 3         Digit 4       Ohr Power Ohr	IR Keypad Builder				x
Off: Forward Up         Channel Up         Channel Down         Volume Down         Mute         Digi 1         Digi 2         Digi 3         Digi 4         Digi 5         Digi 6         Digi 7         Digi 8         Digi 9         Digi 10         Last Channel         TV/Viceo         Menu (Picture)         Menu (Picture)         Menu (Audio)	Name: IR Keypad	Use:	TV:Sylvania:1394		•
Channel Down Volume Up Volume Down Mute Digi 1 Digi 2 Digi 2 Digi 3 Digi 4 Digi 5 Digi 6 Digi 7 Digi 8 Digi 7 Digi 8 Digi 9 Digi 0 100 Last Channel TVV/ideo Meru (Picture) Meru (Picture) Buton widh: 2 cells v Buton height: 2 cells v				Off- Power On/Off	
Volume Down Mute Digi 1 Digi 2 Digi 3 Digi 4 Digi 5 Digi 6 Digi 7 Digi 7 Digi 8 Digi 9 Digi 0 Digi 10 10 Last Channel TV/Viceo Menu (Picture) Menu (Picture) Buton widh: 2 cells v Buton height: 2 cells v					
Mute Digi 1 Digi 2 Digi 3 Digi 4 Digi 4 Digi 5 Digi 7 Digi 6 Digi 7 Digi 8 Digi 9 Digi 9 Digi 9 Digi 0 100 Last Channel TV/Viceo Menu (Picture) Menu (Picture) Menu (Picture) Menu (Picture) Menu (Add)				Volume Up	
Digit 2 Digit 2 Digit 3 Digit 4 Digit 6 Digit 6 Digit 7 Digit 8 Digit 9 Digit 9 Digit 9 Digit 9 Digit 9 Digit 0 Digit 0 Toto Last Channel TVV/ideo Meru [Picture] Meru [Pi		88		Mute	=
Digi 4 Digi 5 Digi 5 Digi 7 Digi 7 Digi 7 Digi 9 Digi 9 Digi 0 Lest Channel TV//ideo Menu (Picture) Menu (Picture) Menu (Picture) Menu (Audio)				Digit 1 Digit 2	
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	Bedroom IR				

This dialog looks a bit like the Visual Programmer. On the canvas are placed the keypad buttons. In the upper right of the dialog is a list of all the IR keys from the definition file.

The major areas of this dialog are:

- The name of the keypad. You should choose a unique name for each keypad you create as you will use these names when you \*create HCA devices.
- One of the different device kinds you programmed the BC4 for. Select the one to use with this keypad.
- All the possible IR keys that you can use on this keypad. This list comes from the selection you made for the device kind, model, and codeset.
- The size of the buttons that you will create.
- A test area where you can select the BC4 unit and IR port. Pressing the *Keypad Test* button opens a test of the keypad.

IR Keypad Builder					×
Name: IR Keypad	Use:	TV:Sylvania:1394	•	Power On/Off On- Power On/Off	<u> </u>
				Off- Power On/Off Channel Up Channel Down Volume Up	
Power On/Of				Volume Down Mute Digit 1	E
Channel Up	Vol +			Digit 2 Digit 3 Digit 4	
Channel Down	Vol -			Digit 5 Digit 6 Digit 7	
				Digit 8 Digit 9 Digit 0 100	
				Last Channel TV/Video Menu (Picture)	
				Menu (Audio) Add	
				Size for new buttons Button width: 8 cells	
				Button height: 3 cells	
				,	
Kunned Test					Connect
Keypad Test Send to: Bed	room IR	▼ IR Port 1	•	OK	Cancel

To add a new button to a keypad, select a key in the list of keys that performs the action that you want. Then select the button size and press Add, or like the Visual Programmer, select the key in the list and drag it on to the canvas.

Once on the canvas you can then drag buttons to whatever location you want. To change the label on the button or the button size, double click the button to open its properties.

Button Properties
For Volume Up key
Text: Vol +
Button width: 8 cells 💌
Button height: 3 cells
OK Cancel

In the above example, several buttons have different names than listed in the list of possible keypad buttons (Vol+ instead of Volume Up). This is because the name has been modified by opening the button properties and entering a new name.

When you have placed all the buttons you want on the keypad, you can test it using the *Keypad Test* button at the bottom of the keypad builder dialog. Before starting the test, select the BC4 and port you want to use.

IR Keypad		x
	Power On/O	Off
Channel U	lp	Vol +
Channel Do	wn	Vol -
		Close

From the test keypad, pressing a button causes the IR sequence to be transmitted by the selected BC4 out the selected port.

**Hint**: You can create more than one keypad for a device kind. You may want to do that to have a "full" keypad when you work with the device in the HCA UI and a simpler one when used in a client like *HCA for Android*.

#### Creating a HCA device for an IR Output Port

Now that you have selected the device kind in the BC4 setup, and have created keypads to use with each device kind, you can finally create the HCA device to represent the IR output port. In step 3 of the New Device Wizard, select as the manufacturer *Bitwise* and type *BC4 IR Output*.

New Device Wizard	- Step 3 (Bedroom - Desk TV)
	What type of device are you creating? If the device is not listed select either a similar device or generic device. You can always change the properties of the device later if necessary.
	Manufacturer
	BitWise 🔽
	Kind
	IR 🗨
	Model number and description
	BC4 IR Output
-	
<back td="" ∥:<=""><td>&gt; Next Cancel</td></back>	> Next Cancel

On step 4 the specifics of this port are configured.

New Device Wizard - Step 4 of 5 (Bedroom - Desk TV)	<u>}</u>
New Device Wizard - Step 4 of 5 (Bedroom - Desk IV)         What IR Interface, port, and keypad are used for this device?         IR Interface:         Bedroom IR         IR Configured type:         TV: Sylvania: 1394         IR port used when sending commands:         2         Keypad for IR sequence construction:         IR Keypad	
< <u>B</u> ack > <u>N</u> ext Finish Cancel	]

You select:

- Which BC4unit and port this device represents. The BC4 is selected by the name you entered when it was identified to HCA in the *IR Bitwise Controls IR Setup* dialog.
- Which kind of device. This is one of the eight you programmed the BC4 for.
- Which IR keypad to associate with this device. Keypads are selected by the name you used when you created it in the keypad builder.

The remainder of the New Device Wizard is the same as for all other devices.

- Hint: The ports are labeled on the back of the BC4 starting at 1. HCA uses the same numbering.
- Hint: Rather than name the device with the BC4 name and port number you may want to name the device with what it controls. For example, you may want to use Desk TV, Home DirecTV tuner, etc.

### IR sequences in programs

Now that all the setup steps are complete you can finally use the IR port in a program. The IR element is used for this:

IR Properties	×
*	IR Keypad
This element sends a series of IR commands to a device. The appropriate IR port is selected before any keycodes are sent.	4 5 6
IR Devices	7 8 9
Desk - Desk TV	0
IR Sequence	ENTER
	UP VOL - VOL +
	DOWN
Clear All Delete Selected	
0 👘 milliseconds delay between each cmd	
OK Cancel	Send 30 S SKIP AHEAD

Use the keypad to enter the sequence you want to transmit.

IR Properties	×
*	IR Keypad
This element sends a series of IR commands to a device. The appropriate IR port is selected before any keycodes are sent.	4 5 6
IR Devices	7 8 9
Desk - Desk TV	0
IR Sequence POWER 2 5	ENTER
ENTER VOL UP VOL UP VOL UP	VOL - VOL +
Clear All Delete Selected	
0 📑 milliseconds delay between each cmd	
OK Cancel	Sendi POWER

If you want to delete some keys in the sequence, select and use the *Delete Selected* Button. New entries are always inserted after the selected item so it is easy to enter missed keys in the middle of a sequence.

#### IR sequences in schedules

Creating a schedule entry that sends an IR sequence is very similar to the IR Visual Programmer element. The schedule entry wizard has a step for IR sequences if you select an IR device. Also the Visual Schedules has properties for IR time bar markers.

Schedule Entry Properties	×
On Date On Time IR Keys Name In plain English	
Using the keypad enter the sequence of keys to be sent	
	OK Cancel

Enter the sequence you want to transmit in the same manner as the Visual Programmer. The final tab (or wizard step) of the schedule entry shows in text the sequence to be transmitted.

Schedule Entry Properties	×
Dn Date   Dn Time   IR Keys   Name   In plain English	
You have created this schedule entry:	
Device "Desk - Desk TV" every day at 10:44 AM send keys "POWER 2.5 ENTER VOL DOWN VOL DOWN".	
OK Cancel	

Appendix – IR Interfaces