

Using RTI and other Universal Remotes to Control DigiLinX

In DigiLinX Dealer Setup 2.3, NetStreams has introduced a new method of controlling DigiLinX from a 3rd party control system called Serial2Command (S2C). S2C allows external control systems to communicate with and control DigiLinX, enabling dealers to offer a more flexible solution for control to end users.

The S2C driver runs on a ControLinX, or on a MediaLinX Pro slot configured as a ControLinX. S2C changes the ControLinX from a device that controls other 3rd party sub-systems, to one that listens for commands from other systems and directs DigiLinX to perform various actions such as selecting a zone, selecting a source, adjusting audio volume, or triggering a macro. This capability also allows dealers to use external clocks, such as the RTI XP-8 processor, to fire time and event based macros inside DigiLinX. This topic will be discussed in-depth in a different application note.

For the purpose of this application note, we have designed a simple DigiLinX and RTI network to illustrate the examples. This network diagram shows the key equipment:



In this example, the DigiLinX system consists of 2 SpeakerLinX, 2 MediaLinX, and 1 ControLinX connected to a SwitchLinX. The ControLinX is connected via RS-232 to the RTI XP-8, and the XP-8 is connected to a RM-433 RF. You will need o use a Null Modem adapter or cable for RTI Processors. In this application, you can use any RF-capable RTI remote, such as a T4.

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To enable control of DigiLinX from the RTI remote, first load the Serial2Command driver onto the ControLinX. Open DigiLinX Dealer Setup project file and select your matched ControLinX. Click the IR/RS-232 tab, then select the driver dropdown and select SerialToCommand.lua.

DigiLinX System Setup version 02.21.00AV - NewPr	oject			
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Project - New Project Seatures Get Intercom	Info IR/RS232 Settings	Labels Me	au]	Input Sensor
Skins Skins Groups	*Service Name:	Control		
Macros	Driver:	General Purp	ose D	river 🔹
E Favorites	Driver File:	SerialToCom	nand.I	lua 🔹
Static Menus	Control Type:	Serial	•	Enable Service
Control CL (0.0.0)	Baud Rate:	9600 Baud	•	
V 🗁 Other Devices	Data Bits:	8		
	Parity:	None	1	
	Stop Bits:	1		
	* "Service Name" is wha	tt appears or	the	Button in the GUI.
NETSTREAMS		Clear List	e	Find Devices

Send configurations to all devices, and DigiLinX will be ready to receive commands through the ControLinX.

On the RTI side, the XP-8 must be trained to send commands that DigiLinX understands, and the remote must contain a GUI that the user can use to control DigiLinX. To configure the RTI processor and remote, open RTI Integration Designer.

DigiLinX uses commands called ASCII to communicate. ASCII commands are text-based and can be written by hand, or copied and pasted from DigiLinX Dealer Setup (recommended method). For a full list of DigiLinX ASCII commands, please refer to the manual "Programming for 3rd Party Control."

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After you have added the remote and processor in Integration Designer, click on the remote, and a window will open showing the current GUI.

•	Control System [TestCont	rol] 🔤 🖸 🔀 Add Event - 😨 Driete Event.	ADA Multi Room Controller
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,	1 Play All S	ongs on Test P32	Output: [[C] Port 1 [TestControl]
no	Pages:	emo] *	Loudness Off. ZONE 01 Loudness Off. ZONE 02 Loudness Off. ZONE 03
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			Loudness On: ZONE 01
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			Loudness On: ZONE 04
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	A STATE	All of the screens in this sample are LOCK (COKRENTDATE) M/ d/ 99%5	Mute Off: ZONE 02
	200 C	available from the ragewizard command in TheaterTouch Designer	Mute Off. ZONE 03 Mute Off. ZONE 04
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			Mute Off: ZONE 09
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			Mute Off: ZONE 12
			Mute Off: ZONE 13
			Mute Off. ZONE 14 Mute Off. ZONE 15
			Mute Off: ZONE 16
			Select New Device

In this example, we have created a 2-zone system with control of a Living Room and an Office, and 2 sources: XM Satellite Radio, and an MP3 server, as well as control of the RTI T4's physical buttons to create actions in DigiLinX. Open the project file XXXXXXXX if you would like to follow along.

Since the T4 is a wireless RF remote, and can be located anywhere, the user must tell the remote which zone they would like to control. The user will first press the zone they want to control, then select the source they want to listen to in that zone. For example, they might select the Office zone, then choose the XM Radio source. RTI will handle routing the commands and variables we are about to set so that the correct DigiLinX commands are routed to the correct zones, based on what RTI calls "flags."

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To see and change the commands for any button, right click on the button and choose "Edit Macro."

Macro Editor (System Mode - TestControl) - [Living Room]	? 🔀
 ✓ Clear Flag: [002] Unnamed ✓ Set Flag: [001] Unnamed ▽ Serial Port [CM-232] 2 (9600 8N1): #@Living Player#Active On\r ▽ Serial Port [CM-232] 2 (9600 8N1): #@Living Player#Mute Off\r 	Command Type: Explain Command Type: Explain Command from Library B&K Receiver Z2_AVR_507 52_(006)
	All Ports 💌
	BK006 AM BK006 BALANCE LEFT BK006 DALANCE RIGHT BK006 DOWN BK006 DOWN BK006 EVITER BK006 EVIT BK006 EVIT BK006 MUTER BK006 MUTE BK006 MUTBER 1 BK006 NUMBER 1 BK006 NUMBER 2 BK006 NUMBER 3 BK006 NUMBER 4 BK006 NUMBER 4 BK006 NUMBER 5 BK006 NUMBER 5 BK006 NUMBER 5 BK006 NUMBER 7
OK Cancel Report Drag steps to the trash to delete them.	Select New Remote

A new window will pop up for that button that details the different macro commands associated to that button in the RTI GUI. Choose "RS-232 Command" from the drop down list.

Clear Flao: [002] Unnamed	Command Type: Explain
Set Flag: [001] Unnamed	RS-232 Command
Serial Port [CM-232] 2 (9600 8N1): #@Living Player#Active On\r	Command from Library
Serial Port [CM-232] 2 (9600 8N1): #@Living Player#Mute Off\r	Command from Page
	RS-232 from Library
	RS-232 Command
	🕒 Time Delay
	III Button Pause
	🐨 Stop Macro
	C Repeat Steps
	Status Test
	Relay/Trigger Control
	System Macro
	Time Range Test
	🗳 Event Control
	∕ € Flag
	Comment
	a×b Toggle IR Code
	Drag this icon to add a new step

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Application Note: 030062 NetStreams , DigiLinX, ControLinX, MediaLinX, SpeakerLinX and SwitchLinX are Trademarks of NetStreams LLC. All rights reserved. Copyright © 2008 NetStreams.

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This is the screen that will allow you to enter DigiLinX RS-232 control codes into RTI.

Macro Editor (System Mode - TestControl) - [Living Room]	? 🔀
✓ Clear Flag: [002] Unnamed	Command <u>Type</u> : Explain ▼ RS-232 Command ▼ Baud Rate: 9600 ♥ Parity: None ♥ Bits: Data: 8 ♥ Stop: 1 ♥ Port: [CM-232] Port 2 ♥ String Hex Edit Mode ▶
OK Cancel Report Drag steps to the trash to delete them.	Drag this icon to add a new step to the macro.

You should always set Baud Rate to 9600, Parity to None, Data Bits to 8 and Stop Bits to 1. The port will depend on the output port from your RTI processor; just make sure to match the output port selection in Integration Designer to the physical output port that your RS-232 cable is plugged into.

In our example, we are using RTI's "flag" feature to set variables representing each zone. If Flag 001 is set, RTI knows that commands to follow are destined for the Living room zone. If Flag 002 is set, RTI knows that commands to follow are destined for the Office zone. If you add additional zones, assign them their own flags, and be sure to clear all flags before you set the flag for this zone. You'll see that the first step is to clear Flag 002 and set flag 001.

Once the flags are set, you can send the RS-232 command. To enter the command, change the baud rate, parity, and bits settings as seen above. Then enter the command in the "string" text field at the bottom.

DigiLinX ASCII commands start with a "#" then use an "@" to designate the zone or service being addressed. In this case, we are addressing the Player in the Living zone. "#" and the specific command addressed to this service, in this case "Active On" turns on the zone. Finally, the command must be finished with a carriage return, or "\r".

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ASCII commands can be hand written if you know the syntax. However, the easiest way to generate ASCII commands is to use the macro tool in DigiLinX Dealer Setup! To open the macro tool, click "Macros" at the top left corner in DigiLinX Dealer Setup.



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Next, name the macro and click the "Edit Macro" button:

DigiLinX System Setup version	02.21.00AV - NewProject	
<u>Elle Edit Devices Tools Help Abou</u>	ıt	
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MACRO LIB	RARY	×
Macro	Description (optional)	
Test Macro		(Move Up
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Add Delete	Clone Edit Mac	ro
Apply		Cancel
NETSTREAMS	Clear List	Find Devices

Next, you will build a macro to do something in DigiLinX. In this case, we will build a simple macro that turns on the Living room zone.

First, choose "Audio/Video Player Services" from the Category drop down list. Next, pick "Living Player" from the Service list. Finally, select "Set Active On" in the Action list. Last, click "Add Step."

DigiLinX System Setup v	ersion (2.21.00	AV - New	Project						[
	<u>A</u> bout		<u>)</u>			?				
MACRO B	UIL	DE	R							x
Macro Name: Test Ma	cro			_			Macro Vie	ew: E	Basic	•
Step 1 - Send Command Category (service type):	Го:	Set Ac	ctive On of L	Living Player	r				Test Ma	cro
Audio/Video Player Services	•	?								
Service: Living Player	•	,								
Sub-service:						 				
	•	?								
Step 2 - Action:	_					 				
Set Active On	•	?								
Step 3 - Delay After Comr	nand:					 				
No Delay	•	?				 				
Add Ste	>									
			Nove Up) (Move	Down V)		Delete I	tem	Clear	AII
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Next, change the Macro View at the top right hand corner from Basic to Advanced.

DigiLinX System Setup ve	rsion 0	2.21.00AV - NewProject	
e Edit Devices Tools Help	About		
MACRO B	UIL	DER	x
Macro Name: Test Mac	ro		Macro View: Advanced •
Step 1 - Send Command T	o:		Test Macro
Category (service type):		#@Living Player#ACTIVE ON	
Audio/Video Player Services	- 1		
Service:			
Living Player	- 1		
Sub-service:			
	- 1		
Step 2 - Action:			
Set Active On	• 1		
Step 3 - Delay After Comm	and.		
No Delay	+ 1		
Add Step	•>)		
		(A Move Up) (Move DownV)	Delete Item Clear All
Save & Return to Libra	ary		Cancel
			End Davies
etStreams		Clear Li	st Find Devices

Highlight the text, and copy it using CTRL+C. Return to RTI Integration Designer and paste the RS-232 string into the HEX edit field:

Clear Flag: [002] Unnamed	Command Type:Explain
Set Flag: [001] Unnamed	RS-232 Command
Serial Port [CM-232] 2 (9600 BN1): #@Test P32 Player#Active On\r Serial Port [CM-232] 2 (9600 BN1): #@Test P32 Player#Mute Off\r	Baud Rate: 2400 Parity: None Bits: Data: 8 Stop: 1 Port: [CM-232] Port 1 String Hex Edit Mode g Player#ACTIVE ONV
Dran steps to the	Drag this icon to add a new step to the macro.

Then click and drag the icon at the bottom right into the window to add the step. Don't forget to add "\r" at the end of the string.

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Note that when you turn a SpeakerLinX on (using Active On), by default it turns on muted. Use the Muto Off command to un-mute the zone.

To view the flags configuration, right click the XM Satellite Radio button in the RTI project, and choose "Edit Macro."

Macro Editor (System Mode - TestControl) - [XM Satellite Radio]	? 🛛
	Command Type: Explain
	Parity: None
	Port: [CM-232] Port 1
	#@Living Player #ACTI\
OK Cancel Beport Drag steps to the trash to delete them.	Drag this icon to add a new step to the macro.

On this screen you will see that if Flag 002 is set, then the RTI processor sends the ASCII command to DigiLinX for the Office to select the XM source. If Flag 001 is set, it sends the ASCII command for the Living zone.

Finally, the physical buttons on the RTI remotes can also be mapped to DigiLinX commands.

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Right click the button you would like to map and choose Edit Macro.

acro Editor (System Mode - TestControl) - [Volume Up]	2
If flag [002] Unnamed is set then	Command Type: Explain Command Type: Explain Res-232 Command Baud Rate: 2400
Else If flag [001] Unnamed is set then C Repeat until button is released	Bits: Data: 8 Stop: 1 Port: [CM-232] Port:
←	String Hex Edit Mode #@Living Player #ACTI\
Over Concel Drag steps to the	Drag this icon to add a new step to the macro.

You will see commands that change the volume up and down, and in RTI the command is specified to repeat until the button is released – perfect for ramping volume up and down.

The SerialToCommand driver is a powerful tool that allows Custom Integrators to control DigiLinX from any RS-232 capable device. Another tool that *NetStreams* has built into DigiLinX is the ability for ASCII messages to be embedded into other drivers' control streams. This means that if you are using a Lutron driver to control a Lutron system from DigiLinX, DigiLinX will also listen to Lutron for control, so you can now use Lutron touch panels to control DigiLinX.

We hope that this tutorial was informative and helpful. Please email us at marketing@netstreams.com if you have feedback.