



Manufacturer: Linn Product Ltd.  
Model: DS/DSM  
Device Type: Media Streamer

#### CONTACT SUPPORT:

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NOTES:	

#### GENERAL INFORMATION

SIMPLWINDOWS NAME:	LinnLite_Demo_CP3
CATEGORY:	Miscellaneous
VERSION:	1.0.6
SUMMARY:	This driver offers an interface for basic network control over several Linn DS/DSM devices including the Linn Kustom DSM. Rather than communicating directly with a single device it communicates with Linn gateway API software. Within the driver, a device can be selected from a list of Linn DS/DSM devices on the local network and then control over basic functionalities is available. Up to 20 Linn devices can be controlled using this driver (note that a Kustom DSM acts like several devices).
GENERAL NOTES:	<p>The package includes a demonstration project in .smw format to aid with integration into a Crestron project. Additionally, touch panel designs have been created in Crestron VT Pro-e that work alongside the demonstration project; these are used for demonstration purposes although elements can be incorporated into your project.</p> <p>For more detailed installation instructions see the setup guide document on Linn docs: <a href="https://docs.linn.co.uk/wiki/index.php/Crestron_Linn-Lite_FAQ%27s">https://docs.linn.co.uk/wiki/index.php/Crestron_Linn-Lite_FAQ%27s</a></p>
CRESTRON HARDWARE REQUIRED:	Crestron Processor (Minimum Series 3)
SETUP OF CRESTRON HARDWARE:	Crestron Processor on the same local network as the Linn equipment
VENDOR FIRMWARE:	Requires Linn DS/DSM with firmware 4.99.491+



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#### VENDOR SETUP:

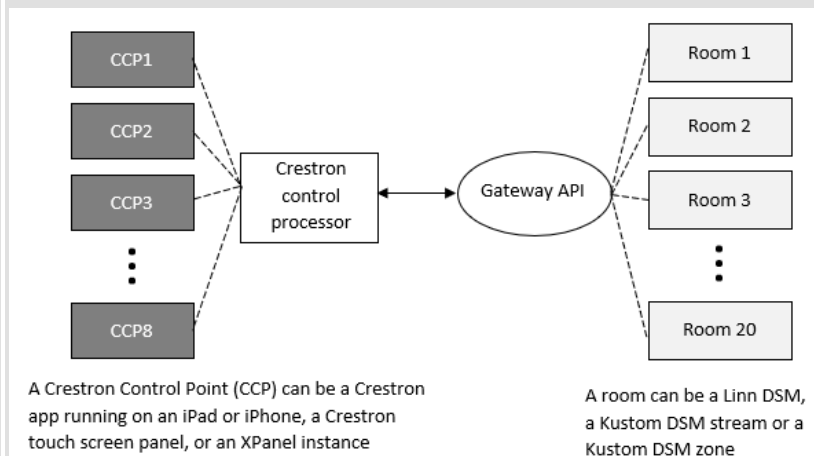
The Linn system should be installed and configured by a suitably qualified engineer, according to Linn documentation, prior to integration with this driver. Any subsequent changes to the configuration of the Linn system may require additional re-configuration of the Crestron modules.

This driver also requires the Linn gateway API server. This should be enabled through the system configuration of a Linn device that supports this feature. The current supporting products are Klimax DSM (2020 Variant), Kustom DSM, Majik DSM (2020 Variant), Selekt DSM, Selekt DSM Classic, Selekt DSM Edition, Series 3. The product running the gateway should be updated to at least firmware 4.99.491.

Alternatively, an instance of Kazoo Server running on the network will also provide the gateway API server. A minimum requirement for Kazoo Server is 4.11.27. Only one instance of the gateway API server is required.

#### CABLE DIAGRAM:

Communicates via TCP-IP



The driver itself has two core constituent SIMPL modules/symbols (and one optional) that need to be incorporated in a SIMPL Windows project:

#### LinnLiteDriver.umc

This module is the 'brain' of the driver that is responsible for establishing communication with the Gateway API and managing information received from it to update Crestron Control Points (CCP) accordingly.

#### CONTROL:

ProgramActive\_Toggle

D

Toggle the driver between being in a disabled or active state. Defaults to be in an active state on loading onto the Crestron processor. Once active will start searching for a gateway API connection.



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<b>ProgramRefresh</b>	D	If program is active, this will refresh the program. All known data about Linn devices and their states will be reset and the current Gateway API session will be closed and re-established.
<b>MacroCommands</b>	S	Used for sending LPEC commands directly to rooms within the house. For more information see setup guide document linked in general notes.

#### Signal Group: Control Point Communications

This group handles gateway communications with up to 8 CCP modules.

<b>CP[1-8]_Comms_Rx</b>	S	Connects to the corresponding CP_DriverComms_Tx output on the LinnLiteControlPoint symbol. Used to communicate input changes on the CCP. Optional, only required for the CCPs slots that are in use for the setup.
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#### Signal Group: Rooms

This group provides information about the rooms within the house that is universal across all CCPs. These signals will be used in the room selection menu of every CCP.

<b>Room[1-20]_Standby_Toggle</b>	D	Directly toggle the standby state of a room.
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### FEEDBACK:

<b>ProgramActive_Status</b>	D	Indicates the current active status of the driver. If active this will be high in value, else it will be low.
<b>GatewayConnection_Status</b>	D	Indicates the current state of the connection with the gateway API. If a connection is open this will be high in value, else it will be low.
<b>NumberOfRooms</b>	A	Once a connection to the gateway API is established this signal will output the number of rooms (more specifically, the number of lines required in the room selection list).

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<b>CP[1-8]_Comms_Tx</b>	S	Connects to the corresponding CP_DriverComms_Rx input on the LinnLiteControlPoint symbol. Used to communicate output changes to the CCP. Optional, only required for the CCPs slots that are in use for the setup.
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Room[1-20]_Standby_Status	S	Gives feedback for the standby status of the rooms within the house. Note: Digital signal high for standby off (i.e., room turned on), low for standby on.
Room[1-20]_Standby_Visible	D	Must be used to set the visibility of the room standby buttons. In some cases, with the Kustom DSM, a standby button will be hidden.
Room[1-20]_Text	S	The names of the rooms in the current house setup.

## PARAMETERS:

GATEWAY_IP	S	Optional: By entering a valid IPv4 address into this field, the automatic discovery mechanism will be overridden, and this address will be used instead.
GATEWAY_PORT	S	Optional: By entering a valid port number (integer 1025-65536) into this field, the default gateway port number of 4100 will be overridden.
PROCESSOR_IP	S	Enter the IPv4 address of the Crestron control processor used in the project that is also hosting source images files.
DEFAULT_SOURCE_IMAGE_PATH	S	Enter the local path for the image that will be used for source that don't conform to any of the following types.
ANALOG_SOURCE_IMAGE_PATH	S	Enter the local path for the image that will be used for external sources of the analog type.
SPDIF_SOURCE_IMAGE_PATH	S	Enter the local path for the image that will be used for external sources of the SPDIF type.
TOSLINK_SOURCE_IMAGE_PATH	S	Enter the local path for the image that will be used for external sources of the TOSLINK type.
HDMI_SOURCE_IMAGE_PATH	S	Enter the local path for the image that will be used for external sources of the HDMI type.
SPOTIFY_SOURCE_IMAGE_PATH	S	Enter the local path for the image that will be used for the Spotify source.
CCP[1-8]_DEVICE_LOCK	S	Optional: By entering a UDN or name of a room that appears in the house topology, the associated CCP will lock to that room and room selection will become unavailable.



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### LinnLiteControlPoint.umc

This module provides all the unique input and output signals required per CCP. One of these modules must be added for each CCP used in the house setup. The top line contains the input and output string signals which are to be connected to the corresponding input and output signals on the main driver module. The signals following this cover all the remaining functionality of the driver.

<b>CONTROL:</b>		
<b>CP_DriverCommsRx</b>	S	Connects to the corresponding CP_Comms_Tx input on the LinnLiteDriver symbol, filling one of the CCP slots. Receives output changes for the CCP from the driver symbol.
<b>CP_Room_Selected</b>	A	Takes an integer number between 1 and the number of rooms within the house. When changed will invoke an update to the CCP to display the information of the corresponding room.
<b>CP_Source_Selected</b>	A	Takes an integer number between 1 and the number of sources available for the currently selected room. When changed will invoke a change in source for the selected rooms DS device.
<b>CP_Standby_Toggle</b>	D	Toggle the standby state of the room currently selected by the CCP.
<b><u>Signal Group: Volume &amp; Transport Control</u></b>		
This group contains signal relating to volume, mute, and transport control of the active room.		
<b>CP_Mute_Toggle</b>	D	Toggle the mute state of the room currently selected by the CCP.
<b>CP_VolumeAbs</b>	A	Sets the volume using the absolute value of the analog input. Any time a change is made to this input the room's volume will be set to that value.
<b>CP_VolumeInc</b>	D	Increase the volume of the room currently selected by the CCP by a defined step size (default 1).
<b>CP_VolumeDec</b>	D	Decrease the volume of the room currently selected by the CCP by a defined step size (default 1).
<b>CP_Shuffle_Toggle</b>	D	Toggle the shuffle state of the room currently selected by the CCP.
<b>CP_Repeat_Toggle</b>	D	Toggle the repeat state of the room currently selected by the CCP.
<b>CP_Play</b>	D	Set the transport state of the room currently selected by the CCP to play.



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CP_Pause	D	Set the transport state of the room currently selected by the CCP to pause.
CP_PlayPause_Toggle	D	Toggle the transport state of the room currently selected by the CCP between play and pause. Alternative to individual play and pause buttons.
CP_Next	D	Skip forward to the next item in the active playlist.
CP_Prev	D	Skip backward to the previous item in the active playlist.
<b>Signal Group: Pins &amp; Metadata</b>		
This group contains signals relating to the physical pin buttons on Linn devices and the metadata of the currently playing audio.		
CP_Pin[1-6]	D	Select the corresponding pin for playback for the room currently selected by the CCP. Pins are the physical buttons on a Linn device that are configured to change source or play a media item such as radio station or playlist.

## FEEDBACK:

CP_DriverCommsTx	S	Connects to the corresponding CP_Comms_Rx input on the LinnLiteDriver symbol, filling one of the CCP slots. Send input changes from the CCP to the driver symbol.
CP_Header_Status	S	This text output will give primary information about the current state of the CCP. It will display text when searching for the gateway connection or loading and give information about which room within the house topology is currently selected by the CCP
CP_Subheader_Status	S	This text output is used for secondary information about the current state of the CCP. Used when a listening room is selected, the listening room name will be output through this signal.
CP_RoomSelection_Available	D	Defines the availability of the room selection button. The room selection page can't be used when there is not gateway connection or device locking is in use for the CCP.
CP_Source_Status	S	This text output shows the current source selected by the active room of the CCP.
CP_Number_Of_Sources	A	Updated with the number of sources for the room currently selected by the CCP. Used by the source selection menu subpage to determine the number of items in a list.
CP_Standby_Status	D	Gives feedback for the standby state of the room currently selected by the CCP. Note: Digital signal high for standby off (i.e., room turned on), low for standby on.



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<b>CP_Standby_Available</b>	D	Must be used to define the availability of the standby control button. For cases where no room is actively selected the standby button in the CCP should become unavailable.
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#### **Signal Group: Volume & Transport Control**

This group contains signal relating to volume, mute, and transport control of the active room.

<b>CP_Mute_Status</b>	D	Gives feedback for the mute state of the room currently selected by the CCP. Note: Digital signal high for mute on, low for mute off.
<b>CP_Volume_Status</b>	S	This string output displays the current volume level of the active room of the CCP.
<b>CP_Shuffle_Status</b>	D	Gives feedback for the shuffle state of the room currently selected by the CCP.
<b>CP_Repeat_Status</b>	D	Gives feedback for the repeat state of the room currently selected by the CCP.
<b>CP_ShuffleRepeat_Available</b>	D	Must be used to define the availability of the shuffle and repeat toggle buttons. For cases where these buttons are irrelevant for the actively selected room's source these will become unavailable in the CCP.
<b>CP_Play_Status</b>	D	Gives feedback for the play state of the room currently selected by the CCP.
<b>CP_Pause_Status</b>	D	Gives feedback for the pause state of the room currently selected by the CCP.
<b>CP_TransportControl_Available</b>	D	Must be used to define the availability of the transport control buttons. For cases where these buttons are irrelevant for the actively selected room's source these will become unavailable in the CCP.

#### **Signal Group: Pins & Metadata**

This group contains signals relating to the physical pin buttons on Linn devices and the metadata of the currently playing audio.

<b>CP_Pin[1-6]_Available</b>	D	Must be used to define the availability of the corresponding pin buttons. For cases when a pin is empty, loading or no room is currently selected.
<b>CP_Pin[1-6]_Name</b>	S	This text output contains the name of the item the pin contains for the active room of the CCP.
<b>CP_Pin[1-6]_ArtworkUri</b>	S	This text output contains the artwork URI of the item the pin contains for the active room of the CCP.
<b>CP_Metadata_Line1</b>	S	This text output contains the first line of metadata for the active room of the CCP. Usually, a track title, radio station name, or external source name.



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CP_Metadata_Line2	S	This text output contains the second line of metadata for the active room of the CCP. Usually, an artist name or radio metatext.
CP_Metadata_Line3	S	This text output contains the third line of metadata for the active room of the CCP. Usually, an album name or the audio bitrate.
CP_Metadata_ArtworkUri	S	This text output contains the artwork URI metadata for the active room of the CCP.
CP_Metadata_Visible	D	Must be used to define the visibility of the metadata. Used to hide metadata during standby and loading.

#### Signal Group: Room & Source Selection Menu

This group contains signals relating to the room and source selection menus of the CCP.

CP_RoomSelected_Any	D	Used to indicate if any room is actively selected on the CCP. Digital high if so, low if not.
CP_RoomSelected_[1-20]	D	Whichever room in the topology is currently active on the CCP will be shown in this set of digital outputs. Gives feedback for the room selection menu by allowing it to highlight the active room.
CP_SourceSelected_[1-20]	D	Whichever source is currently selected for the active room of the CCP will be shown in this set of digital outputs. Gives feedback for the source selection menu by allowing it to highlight the active source.
CP_Source[1-20]_Text	S	A set of serial signals which are populated with the names of the sources for the currently active room on the CCP. Used by the source selection menu.

#### RoomSelectionTool.ush

This small SIMPL+ symbol is an optional utility used in the demo project. Depending on implementation this may not be required. This symbol takes in the range of digital inputs from the room selection GUI menu list and outputs an analog number indicating the room number selected and simultaneously pulses a digital output to toggle the room selection viewability (close the room selection menu).

#### **CONTROL:**

diRoomSelectionViewStatus	D	Connect to the output of a toggle symbol for the room selection menu visibility.
diSourceSelectionViewStatus	D	Connect to the output of a toggle symbol for the source selection menu visibility.
diGatewayConnectionStatus	D	Connect to the corresponding output on the LinnLiteDriver module





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diRoomSelection[1-20]	D	A range of digital signals for selecting rooms rather than a signal analog input signal.
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## FEEDBACK:

doRoomSelectViewToggle	D	Connects back to the input of the toggle symbol for the room selection menu visibility. Will toggle the visibility when a room selection change is made.
doSourceSelectViewToggle	D	Connects back to the input of the toggle symbol for the source selection menu visibility. Will toggle the visibility when a source selection change is made.
aoRoomSelected	A	Turns the range of digital inputs into an analog signal into a analog signal that can be received by the LinnLiteControlPoint module.

## TESTING:

OPS USED FOR TESTING:	2.7000.00052
SIMPL WINDOWS USED FOR TESTING:	SIMPL Windows: 4.2500.04.00 SIMPL+: 4.06
DEVICE DB USED FOR TESTING:	200.295.001.00
CRES DB USED FOR TESTING:	221.00.002.00
SYMBOL LIBRARY USED FOR TESTING:	SymLib.Tio 1186
SAMPLE PROGRAM:	CP3: LinnLite_Demo_CP3.smw
REVISION HISTORY:	1.0.6 - Updated to use either on-device - Driver automatically enables on startup