MIDICLUB

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JUNO CTRL

Operation Manual

Table of Contents

Overview

The JunoCTRL is a full-featured controller for the Roland Alpha Juno 1, Alpha Juno 2, HS-10, HS-80 and MKS-50 Polyphonic Synthesizers.

The JunoCTRL has all of the same features of the Roland PG-300 and more, allowing more complete integration of your synthesizer and DAW/Sequencer.

The JunoCTRL can also function as a generic MIDI controller, capable of controlling many hardware and software devices. It is especially well-suited for controlling software synthesizers that are based on the Alpha Juno series, such as ReDominator or DIVA (configured using the Alpha Juno template), but will also work well with software versions of single-oscillator synthesizers such as the SH-101, SH-2, Juno-6/60, etc.

Features

- Three modes of operation:
    - **CTRL Mode**: Conventional synthesizer control as well as built-in CC conversion allowing synthesizer parameters to be controlled by almost any DAW/sequencer through CC messages
    - **CC Mode**: JunoCTRL functions as a generic MIDI controller, sending out CC messages over MIDI to control any hardware/software device or any DAW/Sequencer
    - **DUAL Mode**: Conventional synthesizer control coupled with CC output and conversion, allowing DAW/sequencer to receive, record and playback physical knob manipulation in real time
- Virtual MIDI Thru (All MIDI messages sent to the JunoCTRL are passed to the MIDI Out port)
- For all modes, CC messages and channels are fully assignable
- Internal Chord Memory allows for faster chord memory setup and playback
- Snapshot and Snapshot Trigger functions allows for all parameters or a specific set of parameters to be updated simultaneously

Getting To Know The JunoCTRL

Power Adapter

Getting Started

Plug the power adapter into a wall socket, and connect it to the JunoCTRL via the **DC In** port. The power adapter is rated for voltages ranging from 100-240v and frequencies of 50-60hz, making it safe to use worldwide. A simple plug adapter may be needed outside of North America

The JunoCTRL will control the Roland Alpha Juno-1, Alpha Juno-2, MKS-50, HS-10 and HS-80 Synthesizers. The synthesizer *must* be configured to the following settings:

- MIDI CH = **1** *(Default - Must be the same as the JunoCTRL's CTRL Channel - See **Assigning Channels** below)*
- MIDI EXCL = **ON**
- MIDI PORTAMENTO = **ON**
- MIDI OMNI = **ON** (Only required for **Dual** mode)

To quickly get started programming your synthesizer with the JunoCTRL simply plug a MIDI cable going from the **MIDI Out** port of the JunoCTRL to the **MIDI In** port of the synthesizer. Make sure the **Mode Switch** is set the **CTRL Mode**. Turn on the JunoCTRL and the synthesizer and you're ready to start sculpting your own sounds. Moving any of the knobs or switches' positions will update that parameter's value on the synthesizer instantly.

If you want to connect external gear or your DAW/Sequencer to the JunoCTRL, or take advantage of some of the advanced features, the following sections explain all of the JunoCTRL's modes of operation and advanced functions.

Modes of Operation

The JunoCTRL has three modes of operation that can be selected by using the **Mode Switch** on the back of the unit. Each mode is distinct in its function and application.

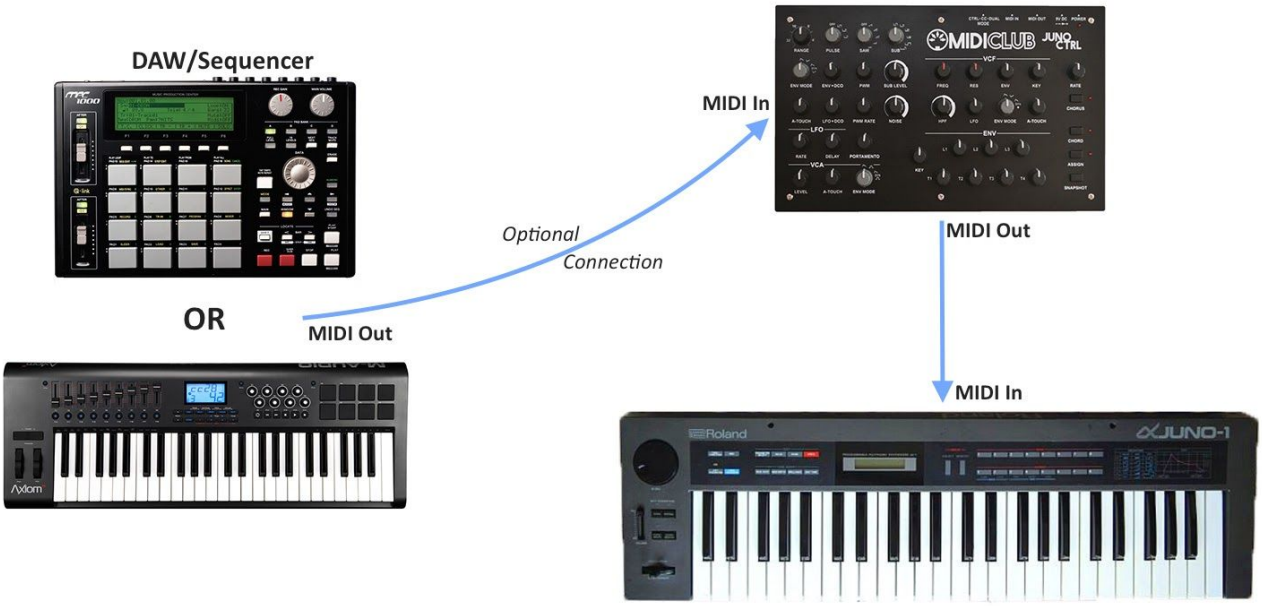
CTRL Mode

CTRL Mode allows you to control the synthesizer's parameters directly with the JunoCTRL. It's the mode you use when you want just a standard controller for your synth. Also featured in **CTRL** mode is a MIDI to SysEx converter. A range of MIDI CC messages sent to the JunoCTRL input will be converted to SysEx messages to control the tone parameters on the Alpha Juno (For more info, see **CC Conversion** below).

To begin using **CTRL** mode, connect the **MIDI Out** of the JunoCTRL to the **MIDI In** of the synthesizer. If you wish to play the synthesizer using a MIDI Keyboard or a DAW/Sequencer, connect the **MIDI Out** of the keyboard/DAW/Sequencer to the **MIDI In** of the JunoCTRL.

Remember that the Alpha Juno synthesizer *must* be configured to the following settings in order for the JunoCTRL to be able to control your Alpha Juno:

- MIDI CH = **1** *(Default - Must be the same as the JunoCTRL's CTRL Channel - See **Assigning Channels** below)*
- MIDI EXCL = **ON**
- MIDI PORTAMENTO = **ON**



*CTRL Mode Diagram - In the example above, the JunoCTRL is controlling the Roland Alpha Juno-1 while in **CTRL** Mode. The MIDI keyboard or DAW/Sequencer can be used to play/sequence the Alpha Juno-1 as the JunoCTRL passes all MIDI messages from the **MIDI In** to the **MIDI Out**.*

CC Conversion

While in **CTRL** Mode, it is possible to send MIDI CC values to the JunoCTRL from a DAW/Sequencer or MIDI Controller. The JunoCTRL will take these values and convert them into the SysEx messages that the synthesizer can understand. **This allows for real-time control of synthesizer parameters using a MIDI Controller or DAW/Sequencer.**

To utilize the CC Conversion, ensure the **MIDI Out** of your DAW/Sequencer or MIDI Controller is connected to the **MIDI In** of the JunoCTRL. By default, the JunoCTRL will respond to MIDI CC messages 11-46 on the **CTRL Channel** (Default: Channel 1). See **Appendix - Default CC Implementation** for a chart containing CC messages and the parameters they control.

The CC messages and channel can also be re-assigned, see **Assigning CC Messages** or **Assigning Channels** below.

CC Mode

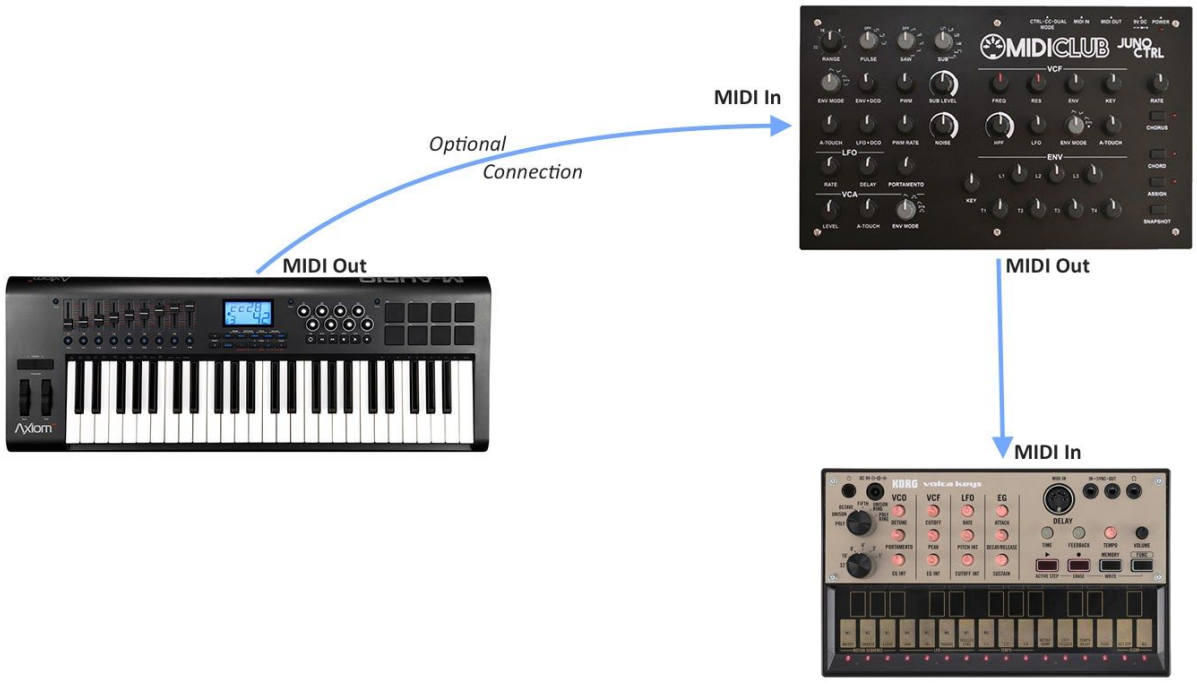
In **CC Mode**, the JunoCTRL acts as a generic MIDI controller and will output CC messages whenever any of the controls are manipulated. This allows the JunoCTRL to control a DAW/Sequencer, a synthesizer, a sampler, or any other device that responds to CC messages.

The JunoCTRL will easily function as a dedicated MIDI controller for the *AudioRealism ReDominator* Alpha Juno software synthesizer. The controls are identical to the Roland Alpha Juno. The JunoCTRL will also function well with U-he's DIVA, by selecting the "Alpha" template from the presets. Most of the controls will match the JunoCTRL, except for the less complicated ADSR envelope and the lack of special envelope modes. The JunoCTRL will function fairly well as a dedicated MIDI controller for any single oscillator software synthesizer, or any software synthesizer that emulates hardware classics such as the SH-101, SH-2, Juno-6/60 also works great.

To begin using **CC Mode**, connect the **MIDI Out** of the JunoCTRL to the **MIDI In** of the device you wish to control. If you wish to pass any messages from another device to the one you are controlling, connect its **MIDI Out** to the **MIDI In** of the JunoCTRL.

By default, the JunoCTRL outputs CC messages 11-46 on the **CC Channel** (Default: Channel 1). See **Appendix - Default CC Implementation** for a chart containing CC messages and the parameters they control.

The CC messages and channel can also be re-assigned, see **Assigning CC Messages** or **Assigning Channels** below.



***CC Mode** Diagram - In the example above, the JunoCTRL is controlling the Korg Volca Keys while in **CC Mode** by*

*outputting CC messages that can be understood by the Volca. The MIDI keyboard can be used to play the Volca as the JunoCTRL passes all MIDI messages from the **MIDI In** to the **MIDI Out**.*

Dual Mode

Dual Mode is a unique mode that allows you to record and playback parameter changes in real-time with the JunoCTRL and a DAW/Sequencer. With some setup, it is possible to automate parameter changes as easily as you may be used to automating parameter changes in your DAW/Sequencer from your favorite MIDI Controller.

Dual Mode functions like this: Changing any parameter on the JunoCTRL will send a CC message out to your DAW/Sequencer (through the synthesizer's **MIDI Thru**). The DAW/Sequencer must be setup to record incoming CC messages and pass them through to its **MIDI Out** port. The CC messages are received by the JunoCTRL's **MIDI In** port and are converted into SysEx messages that the synthesizer can understand, and sent to the synthesizer. Confused? It may be a bit hard to wrap your head around at first, but it's less complicated than it sounds once put into practice.

*Note: To use **Dual Mode**, the DAW/Sequencer must have both a **MIDI In** and **MIDI Out** port, and must be capable of passing all information from its **MIDI In** port to its **MIDI Out** port.*

To begin using **Dual** Mode, connect the **MIDI Out** of the JunoCTRL to the **MIDI In** of the Alpha Juno Synthesizer. Connect the **MIDI Thru** of the Synthesizer to the **MIDI In** of the DAW/Sequencer. Connect the **MIDI Out** of the DAW/Sequencer to the **MIDI In** of the JunoCTRL, completing a full loop.

Please note that as of March 30th, 2019 the JunoCTRL firmware now uses a slightly different approach which is better for Alpha Juno users as opposed to MKS-50 users.

Dual Mode Diagram

<u>For JunoCTRLs released ***before*** March 30th, 2019:</u>

Create a MIDI track in your DAW/Sequencer. Set the track to **only receive MIDI data from channel 1** and to **only output on MIDI channel 1** (note, if you have changed the **CTRL Channel** from the default channel 1, you will have to set your DAW/Sequencer to instead use that channel for both input and output).

Enable your track to pass all the data from the MIDI input to the MIDI output. This is usually achieved by arming the track or enabling monitoring. Ensure that **MIDI OMNI** is set to **ON** on the synthesizer.

If everything has been setup correctly, altering parameters on the JunoCTRL should now directly change parameters on the synth. It should also be possible to record any parameter changes on the JunoCTRL in your DAW/Sequencer, and to play back these parameter changes to that the synthesizer responds to them.

By default, the JunoCTRL outputs and converts CC messages 11-46 on Channel 1. See **Appendix A - Default CC Implementation** for a chart containing CC messages and the parameters they control.

The CC messages and both the **CTRL Channel** and **Dual Channel** can also be re-assigned, see **Assigning CC Messages** or **Assigning Channels** below.

For JunoCTRLs released ***after*** March 30th, 2019:

Follow the same instructions as the previously explained, however instead of setting the MKS-50 or Alpha Juno to MIDI OMNI ON, you must keep MIDI OMNI set to OFF. You must also set the MIDI CHANNEL of the MKS-50 or Alpha Juno to Channel 2. And finally if you are using any keyboard variant of the Alpha Juno series then you will want to also set LOCAL CONTROL to OFF.

How Does it Work?

While at first glance it may appear that this setup creates a feedback loop, setting the JunoCTRL in **Dual Mode** will eliminate the feedback as it will convert *any messages that it receives to a different channel*. The loop operates as follows:

1. A parameter is changed on the JunoCTRL - The JunoCTRL outputs a CC message on the **CTRL Channel** (default: Channel 1).
2. The CC message passes through the Synthesizer (The Alpha Juno and MKS-50 Synthesizers ignore CC messages in all but a few circumstances).
3. The DAW/Sequencer receives the CC message and can record it for future playback. The CC message is passed through the DAW/Sequencer. At this time, the DAW/Sequencer may also playback sequenced notes or previously recorded CC messages.
4. The JunoCTRL receives the CC messages that were either sent by the JunoCTRL at the beginning of the loop, or played back from previously recorded CC messages on the DAW/Sequencer. These messages are converted by the JunoCTRL to the SysEx messages that the Synthesizer is able to understand, and they are sent to the Synthesizer.

   The JunoCTRL takes all other MIDI messages and converts them to the **Dual Channel** (default: Channel 2). This still allows the Synthesizer to receive note data from the DAW/Sequencer, albeit on a different channel, *necessitating the use of OMNI mode on the synthesizer*. This also ensures that MIDI messages do not cycle through the loop endlessly, causing MIDI feedback. The JunoCTRL is set-up to ignore all System Messages such as SySex, MIDI Start, Stop and Timing Clock messages while in **Dual Mode**.

Advanced Functions

Chord Memory

If the Synthesizer is being played via a MIDI Keyboard or DAW/Sequencer connected to the **MIDI In** port of the JunoCTRL, the JunoCTRL's chord memory may be used. While the Synthesizers all have built-in chord memory, this mode is designed to be easier to use and has 8 fully assignable chords.

To use the chord memory, press the **Chord** button. The **Chord** light will turn on to indicate that the chord memory is currently active. The JunoCTRL will play a chord for every note that it receives.

To switch between the 8 chords, hold the **Chord** button and move one of the 8 knobs in the **ENV** section (**Key**, **T1**, **L1**, **T2**, **L2**, **T3**, **L3**, or **T4**). Each knob corresponds to one chord memory location. The default chord for all of them is a minor triad.

Changing the Chord

To change the chord, hold the **Chord** button and press the **Assign** button. Let go of the buttons and the **Chord** and **Assign** lights will blink to indicate that a new chord can be entered.

Move the knob in the **ENV** section corresponding to the chord you'd like to change (if none is selected, the last chord used will be changed). On the MIDI Keyboard or DAW/Sequencer, play any notes to create a chord. If you'd like to change another chord, select it by moving one of the knobs in the **ENV** section and then play the notes on the MIDI Keyboard or DAW/Sequencer to change the chord.

Once you are done changing the chord(s), press the **Chord** or **Assign** button to exit Chord assign. The **Chord** and **Assign** lights will stop flashing.

Chord Memory Mode

There are two chord memory modes each useful for different scenarios of playing. The default is **Mono** chord memory, and the alternate is **Poly** chord memory.

In **Mono** chord memory, only one chord will be played at a time. If a note is pressed, the chord for that note will play. If another note is pressed, the first chord is silenced and the chord for the second note is played. This is especially useful for bashing out big chords such as minor 7ths, since you don't have to let go of the keyboard fully before the next note is pressed (great for techno and house chord progressions).

In **Poly** chord memory, the JunoCTRL allows you to play as many chords as you like simultaneously *(as long as the total number of notes is less than 6!)*. For example, if a 2-note chord is used, it is possible to play up to 3 chords at the same time.

To change the chord memory mode, hold **Chord** and press **Snapshot**. All 3 lights on the side of the JunoCTRL will turn solid to indicate that the change has been made. Your choice of **Chord Memory Mode** will be saved even if the unit is turned off.

Snapshot

Pressing the snapshot button at any time will send out a message from the JunoCTRL indicating the state of its current controls.

In **CTRL** mode, this will update the synthesizer with the state of the current controls via a single sysex message. In **CC** mode, this will update the receiving device with the state of the current controls via a string of MIDI CC messages. In **Dual** mode, this will update both the synthesizer and the DAW/Sequencer by both means previously mentioned.

Snapshot Trigger

This function allows you to temporarily mute the output of the controller so that you can make changes to a few knobs. The parameter changes will then be sent out simultaneously.

Press and hold the **Assign Button**. While holding the **Assign Button** move any controls and then let go of the assign button. Any controls you changed will all update simultaneously upon letting go of the **Assign Button** and return to regular functionality.

If the **Assign Button** is held but no parameters were updated, the JunoCTRL will enter **Assign Mode**.

Assigning CC Messages

CC Messages are used by the JunoCTRL in 2 different ways

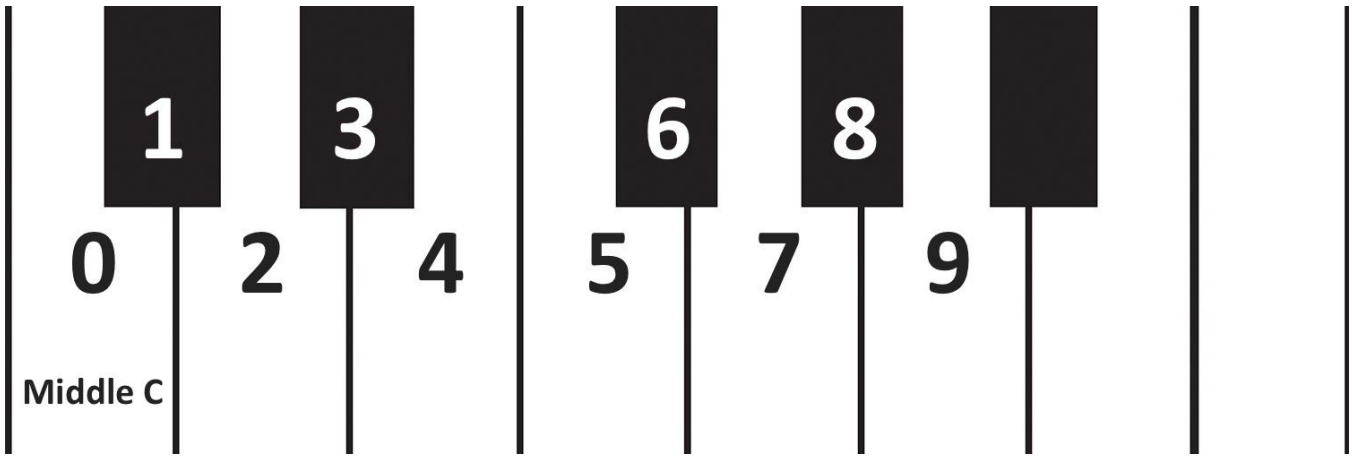
- In **CTRL** mode, CC messages are sent into the JunoCTRL are converted into the SysEx messages that the synthesizer can understand. In **Dual** mode, the JunoCTRL outputs CC messages *and* converts them in the same way to SysEx messages as in **CTRL** mode.
- In **CC** mode, the JunoCTRL outputs CC messages.

Because CC messages are used in similar ways in **CTRL** and **Dual** modes, changing them in one mode will affect the other. *Ie. If CC 20 is assigned to control the filter in **CTRL Mode**, moving the filter knob in **Dual mode** will output CC 20.* However, CC messages are assigned independently in **CC Mode**.

To change the CC messages assigned to a parameter, a MIDI keyboard or other MIDI device that is able to send note data should be connected to the **MIDI In** port of the JunoCTRL.

Press the **Assign** button; The **Assign** light will turn solid to indicate that it is waiting for middle C. Press the middle C key on your MIDI keyboard or other MIDI device *(Note: middle C can either be C2 or C3 depending on the standard chosen by the manufacturer)*. Once the JunoCTRL receives a middle C note, the **Assign** light will begin to flash slowly.

It is now possible to re-assign CC messages for each parameter on the JunoCTRL. First, manipulate the control (move the knob / switch it in the case of a rotary switch / press the **Chorus Button**). Then, enter a new CC message to use for that parameter by using the MIDI Keyboard or other MIDI device. The keys correspond to numbers as shown in the diagram below.



Ie. If you wish to assign CC 24 to the filter knob, move the filter knob and press 24 on the keyboard as shown above. And that's it. If you want to assign another number to it move the knob again and enter the new number. Once you enter 3 digits you can no longer input numbers to that knob until you move it again.

The CC message entered must range from 0-119. Note that many common parameters use CC messages 0-10, some of which are utilized by the synthesizer itself, so it's not a good idea to use these messages. The JunoCTRL does not allow you to assign multiple knobs to the same CC number. If you assign a parameter a CC number that is already assigned elsewhere, the assignment will be removed from the previous parameter.

When finished assigning one or more CC messages to parameters, press the **Assign** button again; The **Assign** light will begin flashing quickly. At this step, a new channel can be selected (for more information, see **Assigning Channels** below). Press the **Assign** button again to exit assign mode; The **Assign** light should turn off.

Assigning Channels

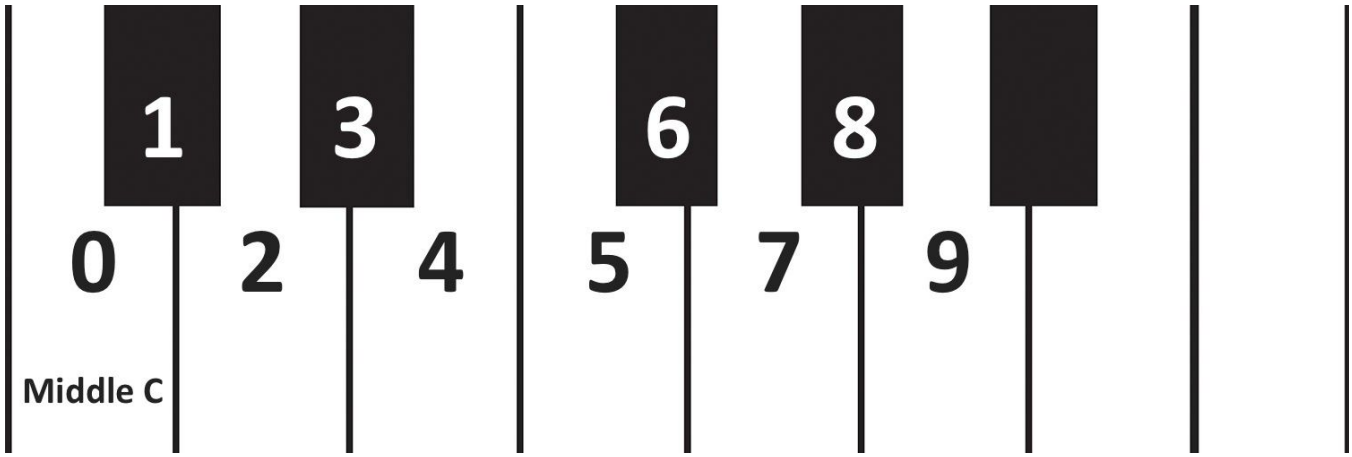
The JunoCTRL uses three different channels that may be assigned independently:

- **CTRL Channel** - **Assigned in CTRL Mode** (*Default Channel 1*)
    - SysEx messages that the synthesizer can understand are sent out on this channel in **CTRL** and **Dual Mode**
    - CC messages to be converted to SysEx messages that the synthesizer can understand are expected on this channel in **CTRL Mode**.
    - CC messages are sent out on this channel in **Dual Mode**; CC messages to be converted to SysEx messages that the synthesizer can understand are expected on this channel in **Dual Mode**.
- **CC Channel** - **Assigned in CC Mode** (*Default Channel 1*)
    - CC messages are sent out on this channel in **CC Mode**
- **Dual Channel** - **Assigned in Dual Mode** (*Default Channel 2*)
    - All messages that the JunoCTRL receives, with the exception of CC messages used by the JunoCTRL's MIDI to SysEx converter, are passed to the **MIDI Out** of the JunoCTRL on this channel. (For more information, see **Dual Mode** in the **Modes of Operation** section above.)

To reassign a channel, a MIDI keyboard or other MIDI device that is able to send note data should be connected to the **MIDI In** port of the JunoCTRL.

To reassign a channel, choose the channel you wish to modify using the **Mode switch**. Press the **Assign** button; The **Assign** light will turn solid to indicate that it is waiting for middle C. Press the middle C key on your MIDI keyboard or other MIDI device *(Note: middle C can either be C2 or C3 depending on the standard chosen by the manufacturer)*. Once the JunoCTRL receives a middle C note, the **Assign** light will begin to flash slowly. At this point you can reassign the CC messages associated with each parameter (see **Assigning CC Messages** above). Press the **Assign** button again; The **Assign** light will begin to flash quickly, indicating it is ready to receive the new channel.

It is now possible to re-assign the channel by using the MIDI Keyboard or other MIDI device. The keys on your MIDI device correspond to numbers as shown in the diagram below. Use keys to enter a new channel, ranging from 1-16. *Note: The **CTRL Channel** and **Dual Channel** cannot be the same. If you try and assign one to the same channel as the other, nothing will happen.*



Ie. *If you want to change the **CTRL Channel** to Channel 10, make sure the **Mode Switch** is set to **CTRL mode**. Press the **Assign button**, press Middle C on your keyboard, and then press the **Assign Button** again so the **Assign light** is flashing quickly. Using the keyboard on your MIDI device as shown above, press 1 and then press 0.*

If you make a mistake and wish to re-enter the channel, the JunoCTRL will listen for a new channel again after 2 digits have been entered. Ie. *If you press 1, the channel is now set to 1. If you press 1 again, the channel is now set to 11. If you press 1 a third time, the channel is set to 1 again.*

Once you are done assigning the channel, press the **Assign Button** to exit **Assign Mode**. The light will turn off indicating you have done so.

Setting the CC Output Type

You may notice that the **SUB LEVEL**, **NOISE**, **RANGE** and **HPF** parameters on the JunoCTRL are full range potentiometers. Usually they only send out 4 values, acting just like the rotary switches for the waveform selection. If you wish to use the Juno CTRL as a midi controller in **CC Mode** for a software or hardware synthesizer that *is not* a full emulation of the Alpha Juno, you may find it more useful to use the entire range of these knobs. For example, a synth emulation of the SH-101 will have a noise parameter that you can fade from 0-127, as opposed to just 4 steps like the Alpha Juno.

If you wish to change the **CC Output Type** to take advantage of the full range of these knobs, make sure you are in **CC Mode**, hold the **Assign Button**, and then press the **Chord Button**. All lights will light up, indicated you have switched the mode. Doing this again will change the **CC Output Type** back to default. The mode you have selected will be saved on the JunoCTRL even if the unit is powered off.

Setting to Factory Default

If you wish to revert all the settings back to factory default then you can do so following these steps: Press and hold the **Assign Button** and then press the **Snapshot Button**. All lights will light up indicating you have executed

the factory default command. See the **Appendix - Default CC Implementation** for reference regarding the factory default settings.

Troubleshooting

Here are some issues you may run into while using the JunoCTRL:

Chord Memory doesn't work in some or all modes.

Chord Memory will only work for notes sent through the JunoCTRL on the appropriate channel respective to the mode it is in. This is designed so that the chord memory does not impact other hardware or software that is daisy-chained with the JunoCTRL. Ie. If you are in **CTRL Mode** and the **CTRL Channel** is set to 1 (default), then only notes sent on channel 1 will play as chords.

Assigning a new chord to chord memory doesn't seem to work in all or some modes.

Once again, if you are assigning notes to the chord memory then they *must* be sent on the correct channel respective to what mode you are in on the JunoCTRL. See the previous explanation for more detail.

Dual Mode isn't working, my DAW/Sequencer is sending and receiving MIDI data to and from the JunoCTRL, but the Alpha Juno is not responding.

The Alpha Juno's channel must be set to the same channel as the **CTRL Mode Channel**, even if you have it set it to OMNI on. The OMNI setting on the Alpha Juno applies for note and control message data, but not SysEx data, which is how the JunoCTRL talks to the synthesizer.

Your DAW/Sequencer **must** be set-up to pass through all incoming MIDI data on the **CTRL Channel** (default: Channel 1) out to the same channel.

When I use Dual Mode to record and playback automation data values seem to jump a little or are somewhat erratic.

If you are sending a lot of automation data at the same time to the JunoCTRL from your DAW, or even tweaking too many knobs at the same time very quickly while the JunoCTRL is converting CC messages to SysEx, you may see some slowing down or erratic behavior of all the values. Unfortunately, this is an inherent limitation of CC messages to SysEx messages. A MIDI CC message is typically 3 bytes long, where as Roland's SysEx messages to control individual parameters is 10 bytes long. The answer is kind of technical, but in short, you just can't have too many values being controlled by your DAW at the same time or else the unit can't convert them fast enough and it backs up.

This can be aggravated by DAWs such as Ableton Live which send a continuous stream of CC messages for automated parameters, even if the CC value has not changed.

When I use Dual Mode there is a noticeable delay between when I move a knob and the parameter is affected on the synth.

Firstly, if you have a low or zero-latency MIDI interface for your computer there won't be a noticeable delay. If you do have a low latency audio interface turn the input and output buffer size down as low as possible.

The SUB LEVEL, NOISE, RANGE, and HPF knobs behave oddly when assigned to my software synthesizer.

You may have the **CC Mode Type** selection wrong. See the **CC Mode Type** section for an explanation about these knobs and how you can change their output to be more desirable in certain situations.

How do I connect the JunoCTRL to my computer if it doesn't have a USB output?

You will need to have a dedicated MIDI interface, an Audio interface with MIDI input/output, or some other USB device that may have MIDI Input/Output (ie. a USB MIDI Keyboard).

Appendix - Default CC Implementation of the JunoCTRL

CTRL Mode and Dual Mode

The default CC messages for all 3 modes are listed below. **CTRL mode** uses these CC messages for CC conversion, **CC Mode** outputs these CC messages, and **Dual Mode** both outputs these CC messages and uses them for CC conversion.

*Note: the CC messages used for CC conversion in **CTRL Mode** are the same as the ones used for CC output and conversion in **Dual Mode**. Therefore making changes to CC messages in **CTRL Mode** will change the CC messages for **Dual Mode** and vice-versa. **CC Mode** is independent, and making changes to it will not impact the other modes or vice-versa.*

CC Message	Parameter	Parameter Type	Output
11	DCO ENV MODE	Switch	0 | 43 | 85 | 127
12	VCF ENV MODE	Switch	0 | 43 | 85 | 127
13	VCA ENV MODE	Switch	0 | 43 | 85 | 127
14	PULSE	Switch	0 | 43 | 85 | 127
15	SAW	Switch	0 | 26 | 51 | 77 | 102 | 127
16	SUB	Switch	0 | 26 | 51 | 77 | 102 | 127

17	RANGE	Rotary Knob (Virtual Switch)	0 | 43 | 85 | 127 **OR** 0-127 (Switchable)
18	SUB LEVEL	Rotary Knob (Virtual Switch)	0 | 43 | 85 | 127 **OR** 0-127 (Switchable)
19	NOISE	Rotary Knob (Virtual Switch)	0 | 43 | 85 | 127 **OR** 0-127 (Switchable)
20	HPF	Rotary Knob (Virtual Switch)	0 | 43 | 85 | 127 **OR** 0-127 (Switchable)
21	CHORUS ON/OFF	Button	0 | 127
22	LFO > DCO	Rotary Knob	0-127
23	DCO ENV	Rotary Knob	0-127
24	DCO AFTERTOUCH	Rotary Knob	0-127
25	PWM	Rotary Knob	0-127
26	PWM RATE	Rotary Knob	0-127
27	CUTOFF	Rotary Knob	0-127
28	RESONANCE	Rotary Knob	0-127
29	VCF LFO	Rotary Knob	0-127
30	VCF ENV	Rotary Knob	0-127
31	VCF KEY	Rotary Knob	0-127
32	VCF AFTERTOUCH	Rotary Knob	0-127
33	VCA LEVEL	Rotary Knob	0-127
34	VCA AFTERTOUCH	Rotary Knob	0-127
35	LFO RATE	Rotary Knob	0-127
36	LFO DELAY	Rotary Knob	0-127
37	ENV T1 (Attack)	Rotary Knob	0-127
38	ENV L1 (Level)	Rotary Knob	0-127
39	ENV T2 (Decay 1)	Rotary Knob	0-127
40	ENV L2 (Sustain 1)	Rotary Knob	0-127
41	ENV T3 (Decay 2)	Rotary Knob	0-127

42	ENV L3 (Sustain 2)	Rotary Knob	0-127
43	ENV T4 (Release)	Rotary Knob	0-127
44	ENV KEY	Rotary Knob	0-127
45	CHORUS RATE	Rotary Knob	0-127
46	PORTAMENTO	Rotary Knob	0-127 (*Note: Always outputs as CC message, even in **CTRL mode***)

Specifications

Ports

- **DC In Jack** (9V DC, Center Positive, 2.1mm barrel, 300MA Minimum)
- **MIDI Input** (DIN-5 Jack)
- **MIDI Output** - acts as virtual **MIDI Thru** (DIN-5 Jack)

Power Supply

- **Input:** AC 100-240v, 50-60hz, 100mA
- **Output:** DC 9V, 305 mA

Knobs

6mm D-Shaft, flat end towards marker

Size

26.5 cm x 16.5 cm x 6 cm

Weight

1.2 kg

Made In Canada

MIDI Club is

Dylan Morrison / Silviu Toderita

Vancouver, BC

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Manual Rev 1.3