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Introduction

CLOCKstep is a MIDI controller that specializes in the timing of MIDI commands and BPM Clock rate.

It's a MIDI Master Clock that can synchronize multiple devices together, such as loopers, DAWs and time-based effects.

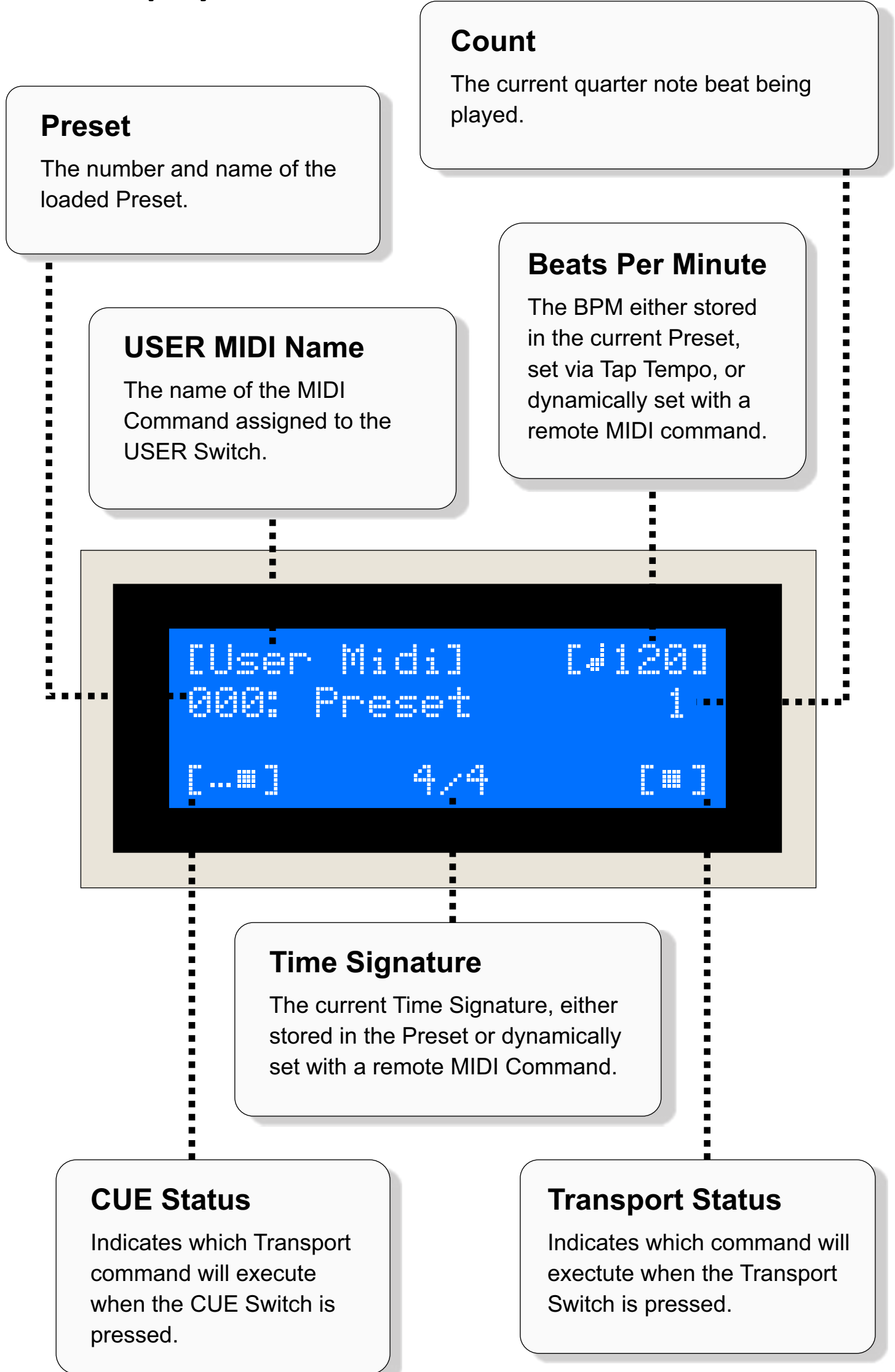It has a Transport footswitch to centralize the start and stop of multiple devices, plus the ability to time commands according to Beats, Bars, Time Signatures and BPM.

A Metronome feature generates MIDI Notes that can be sent to a synth or sampler to produce an audible click track.

Custom MIDI events can be created for advanced scenarios.

All of these features can be organized and stored into 300 Presets.

Main Display

Count

The current quarter note beat being played.

Preset

The number and name of the loaded Preset.

USER MIDI Name

The name of the MIDI Command assigned to the USER Switch.

Beats Per Minute

The BPM either stored in the current Preset, set via Tap Tempo, or dynamically set with a remote MIDI command.

```
[User Midi]      [♩120]
000: Preset          1

[..▪]        4/4        [▪]
```

Time Signature

The current Time Signature, either stored in the Preset or dynamically set with a remote MIDI Command.

CUE Status

Indicates which Transport command will execute when the CUE Switch is pressed.

Transport Status

Indicates which command will exectute when the Transport Switch is pressed.

Running the Clock

CLOCKstep is capable of generating MIDI Clock pulses from 10 to 250 Beats Per Minute (BPM), including fractions of BPM.

Clock pulses are sent as MIDI System Real-time messages and they can be sent independent from the Transport if desired.
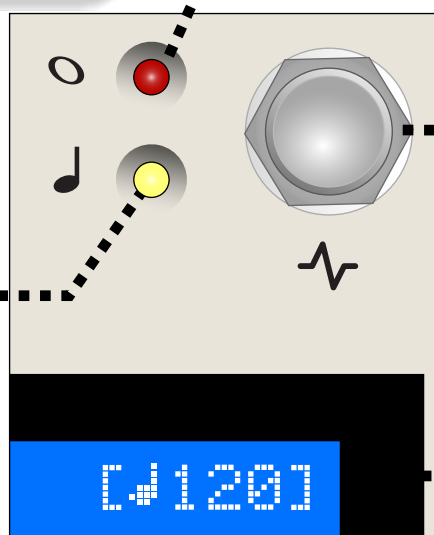
Bar LED

The red LED flashes once to indicate the first beat of a bar according to the current Time Signature.

In some cases, it will flash rapidly when CLOCKstep is responding to external messages.

Pulse Switch

Starts and Stops the MIDI Clock pulses.

Hold while the clock is inactive for Tap Tempo Mode.

Beat LED

The yellow LED illuminates on each Quarter Note and dims on each Eighth Note in between.
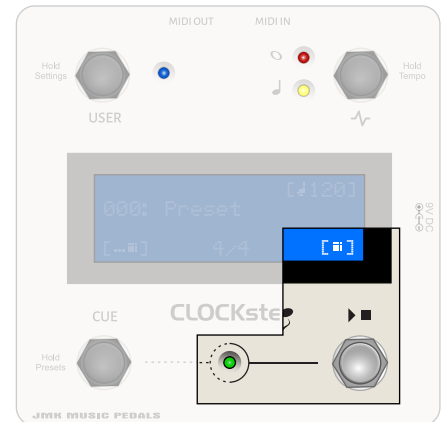
Beats Per Minute

The current BPM is displayed in the LCD screen below the pulse switch.

Transport Start/Stop

CLOCKstep sends MIDI System Real-time messages for Start and Stop.

All devices in the MIDI signal path that have a function that reacts to MIDI Real Time Start and Stop can be controlled by a single button press.
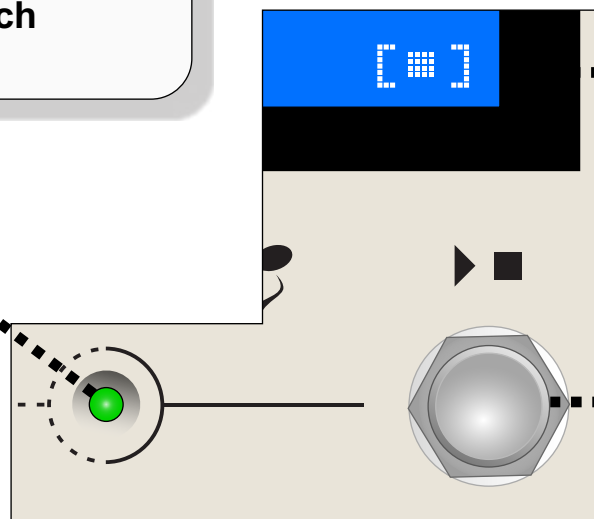
Transport Display

The LCD just above the Transport Switch indicates what command will execute next when the Transport Switch is pressed.

Transport LED

Illuminates to a steady green when the Transport is started and turns off when the Transport is stopped.

See also: **CUE Switch**

Transport Switch

Toggles between sending Start and Stop MIDI Commands

Starting the Transport will also start the MIDI Clock if it's not already running.

Cue Start/Stop

CLOCKstep is able to send Start and Stop commands on the first beat of a bar, freeing the performer from having to stand ready to press the Transport Switch at the precise instant.

This results in a perfectly timed action every time.
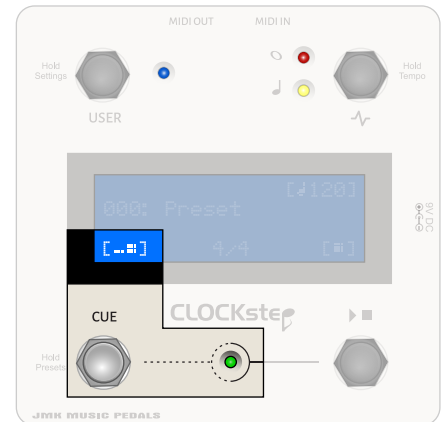
CUE Display

The LCD just above the CUE Switch indicates what Transport command will execute next when the CUE Switch is pressed.

When a cued action is in progress, the display changes to a countdown of the number of bars remaining before the action takes place.

Transport LED

When an action is cued, the Transport LED will flash rapidly until the action is carried out.

CUE
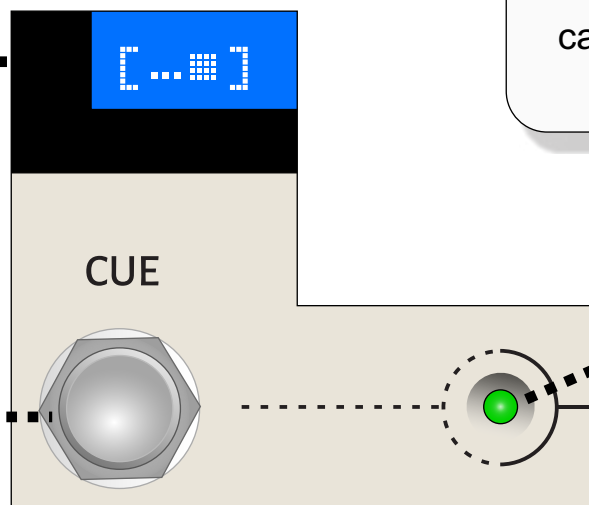
CUE Switch

Begins the cued action to either Start or Stop the Transport.

Press a second time before the countdown is finished to cancel the action.

HOLD while the clock is inactive for Preset Navigation.

Executing Custom MIDI

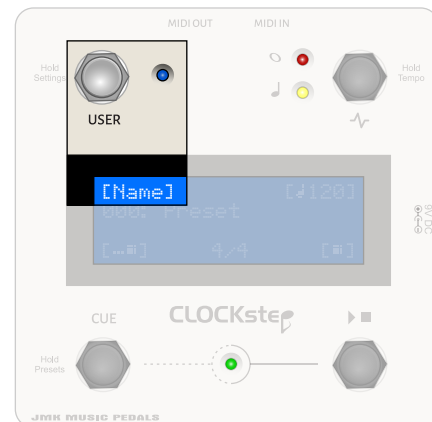You can have CLOCKstep send custom MIDI commands in several ways. The first is by programming and pressing the USER Switch.

The full details of custom MIDI is covered in the User MIDI chapter.

USER Switch

The function of the USER Switch depends on what actions you've programmed into the loaded Preset.

Up to 8 commands can be executed at a time, and can use a mix of Press, Toggle and Cue behaviors.

HOLD while the clock is inactive for Settings Mode.

USER LED

If a toggling behavior is assigned to the USER Switch, the blue LED will light to indicate when the switch is in the On state.

If a cued behavior is assigned to the USER Switch, the LED will flash rapidly to indicate that the cued action is pending.

USER Display

When a command has been programmed onto the USER Switch, the name of the command will be shown here.

The name will alternate based on toggling behavior.

If a cued behavior is used, the name will be prefixed with '...'

Global Settings

Global Settings are accessed by holding down the USER Switch while the pedal is inactive and scrolling to the Global Settings menu choice.

Global Parameters

MIDI In Enabled

Enable this setting if you want CLOCKstep to receive MIDI commands that can be used to control it remotely.

MIDI In Channel

Set the MIDI Channel address used by CLOCKstep to receive MIDI commands.

MIDI Thru Enabled

Enable this setting if you want CLOCKstep to pass all messages received by the MIDI IN through to the MIDI OUT.

Clock Source

Choose whether CLOCKstep will use it's own timing reference or follow external MIDI Clock pulses. (see the chapter on [Clock Source](#) for more details)

Internal

The default operation for CLOCKstep. Use when CLOCKstep is the Master Clock in your setup.

External

CLOCKstep will monitor for any incoming clock pulses and sync to them, causing the tempo lights to flash and beat counting to begin.

External + Start

Same as External above, plus CLOCKstep will also listen for incoming MIDI Real-time Start commands, which will start CLOCKStep's Transport automatically.

External + Align

Same as External + Start, plus CLOCKstep will align its beat to the initial incoming MIDI Real-time Start command.

continued ...

Global Parameters (continued)

Fine Tune +/-

Sets very minor adjustments to the calculation that marks time in CLOCKstep.

Every device that keeps time, even each CLOCKstep, runs at a slightly different rate according to an internal reference. It's the reason why specifications like MIDI Clock exist in the first place.

This setting allows you to adjust the timing calculations if you have a very specific need to make your CLOCKstep conform to some external measurement. It will be set during assembly according to an external reference that we use in house.

This setting has nothing to do with a devices ability to stay in sync with CLOCKstep and you should ignore changing it unless there is a well-defined need to.

Clock LED Enabled

Disable this setting if you do not wish to have the red and yellow LEDs that show clock pulses to illuminate.

Send Bar Marker

Enable this setting to have CLOCKstep send out a MIDI Bar Marker message at the start of each new bar.

The message that it sends is defined in the MIDI 1.0 Spec as a Universal System Exclusive Real-Time message:

```
F0 7F 7F 03 01 7F 3F F7
```

This can be useful to some devices as an extra layer of synchronization or as a way for them to implement Cued commands similar to those available within CLOCKstep.

Global Parameters (continued)

Send Time Signature

Enable this setting to have CLOCKstep send out a MIDI Time Signature message when a Preset is loaded or the Time Signature is changed.

The message that it sends is defined in the MIDI 1.0 Spec as a Universal System Exclusive Real-time message as an *Immediate Time Signature.*

For example, 4/4 is:

        70 7F 7F 03 02 04 04 02 18 8

and 7/8 is:

        70 7F 7F 03 02 04 07 03 18 8

Show Save Screens

Disable this setting to accelerate using CLOCKstep when you save a new Preset or Setting.

Show Load Screens

Disable this setting to accelerate using CLOCKstep when you load a Preset.

Show Info Screens

Disable this setting to accelerate using CLOCKstep while navigating through menus.

Factory Reset?

Returns CLOCKstep to the default factory settings. This will erase all Presets and Settings. You must follow through with multiple prompts to confirm. When finished, the pedal will restart.

Presets

CLOCKstep can store and recall 300 Presets. Presets can be named with up to 20 characters for easier reference.

Loading Presets

While the pedal is inactive, hold down the CUE Switch to access the Preset Navigation screen. From this screen you can scroll UP or DOWN through the Preset list and choose to Load or Edit a Preset.

You can also load a Preset using a remote MIDI command. Please see the chapter on the MIDI IN Specification for all the commands that CLOCKstep will recognize.

Preset Parameters

BPM

The Beats Per Minute that the clock will run at. Values range from 10 to 250. You have the ability to set a fraction for the BPM as well. **NOTE:** Fractions will not appear in the Main Screen when the clock is active.

Time Signature

Time Signatures can have either a 4 or 8 beat value (denominator) and the number of beats (numerator) can range from 1 to 16.

Cue In Bars

The number of bars that will be counted before the CUE Start action will occur. Values are 1 - 4.

Cue Out Bars

The number of bars that will be counted before the CUE Stop action will occur. Values are 1 - 4.

Auto Stop Clock

Disable this setting if you want the Clock to continue running even after stopping the Transport. This means that, although other devices may stop their own transports in response, CLOCKstep will continue to count beats, send Metronome data and stand ready to perform CUE, Transport and Custom MIDI actions.

Preset Parameters (continued)

Use Metronome

Determines the conditions under which the Metronome Note data is being sent.

Never

Metronome Data is disabled for this Preset.

Always

Metronome Data is sent anytime the Clock is running.

Clock Only

Metronome Data is only sent when the Clock is running, but the Transport is stopped.

Cue In Only

Metronome Data is only sent during the CUE In phase for a Transport Start action (ie: Only for a count in).

Metronome Beat

Sets the rhythmic pattern played for the primary metronome pulse. Values are in ascending order by length of interval:

None	Dotted Eighth
Dotted Whole	Eighth Note
Whole Note	Eighth Triplet
Whole Triplet	Eighth Shuffle
Dotted Half	Eighth Skipping
Half Note	Dotted Sixteenth
Half Triplet	Sixteenth Note
Dotted Quarter	Sixteenth Triplet
Quarter Note	Sixteenth Gallop
Quarter Triplet	Sixteenth Skipping
Quarter Shuffle	Thirty-second Note

Metronome Accent

Sets the rhythmic pattern played for the accented metronome pulse. Values are identical to Metronome Beat above.

Preset Parameters (continued)

Metronome FirstBeat

Determines if the special Metronome Note will be played on the first beat of every bar.

Midi Assign (1 - 8)

Select a stored User MIDI command for use in this Preset. Selections are performed using both User MIDI number and name. (see chapter on MIDI Assign Considerations for more details)

Midi When (1 - 8)

The action that triggers the User MIDI command selected by Midi Assign (1 - 8). Read it as "Execute Midi assigned to (*x*) when (*this*) occurs".

USER Press

Immediately when USER Switch is pressed.

USER On

Immediately when USER Switch is set ON (toggle state).

USER Off

Immediately when USER Switch is set OFF (toggle state).

Cue USER Press

On the next interval when the USER Switch is pressed, as determined by the **MIDI Cue Interval** parameter.

Cue USER On

On the next interval when USER Switch is set ON (toggle state), as determined by the **MIDI Cue Interval** parameter.

Cue USER Off

On the next interval when USER Switch is set OFF (toggle state), as determined by the **MIDI Cue Interval** parameter.

Transport Start

Immediately when the Transport Start command is sent.

Transport Stop

Immediately when the Transport Stop command is sent.

Clock Start

Immediately when the Clock starts.

Clock Stop

Immediately when the Clock stops.

Preset Parameters (continued)

Preset Load

Immediately when the Preset is loaded.

Cue CC:36 Value:[1-8]

On the next interval when a MIDI CC command is received by CLOCKstep, determined by the **MIDI Cue Interval** parameter.

Every *n* Bar(s)

Automatically while the Transport is running as determined by the **MIDI Auto Bars** parameter.

MIDI Cue Interval

Determines the timing of execution for all cued User MIDI commands. The default setting of "1 Bar" will execute triggered commands on the first beat of the next Bar. Other options are: "Zero", "Eighth", "Quarter", "2 Bars", "4 Bars" and "1/2 Bar". Setting "Zero" will cause CUE commands to execute immediately.

MIDI Cue Offset +/-

Slides the execution of all cued "Bar" User MIDI commands forward or backward in time relative the first beat of the next bar. Each value is 1 MIDI Clock pulse.

This parameter only matters if the **MIDI Cue Interval** is "1 Bar", "2 Bars" or "4 Bars"

This can be used to dial in a more accurate timed execution of a MIDI command based on your observation of external factors. Such factors could be the time it takes for the receiving device to execute a command once received. If the response from the device is happening too late, then set a negative Cue Offset until it is timed correctly.

This can also be used artistically since it is implicitly tied to BPM. 24 Clock pulses is the equivalent of a Quarter Note. So, an Eighth Note would be 12 Clock pulses, Sixteenth would be 6 Clock pulses, etc. This value will be ignored if it exceeds the number of Clock pulses present in 1 bar. (ie: 96 pulses equal 1 bar of 4/4)

See the chapter on [Quantize & MIDI Cue Offset](#) for more details.

MIDI Auto Bars

The number of bars between automatic executing a User MIDI command that has the **When** "Every n Bar(s)" parameter value. The range spans 1 to 127 bars, and 0 can be set to disable any automatic execution.

Preset Parameters (continued)

Send MIDI Start

Set to "No" if you want to suppress the MIDI Real-time Start command from being sent when the CLOCKstep Transport is started.

By turning this off, you can use the Transport Start action to only send custom MIDI commands that you assign.

Send MIDI Stop

Set to "No" if you want to suppress the MIDI Real-time Stop command from being sent when the CLOCKstep Transport is stopped.

By turning this off, you can use the Transport Stop action to only send custom MIDI commands that you assign.

Tap Tempo Enabled

Changes the Clock Pulse START/STOP switch (upper Right) into a real-time Tap Tempo switch.

Preset Name

A Preset can be named with up to 20 alpha-numeric and special characters. TIP: Hold down the Right or Left switch to jump to the next menu option and bypass any remaining character spaces.

Metronome

CLOCKstep sends standard MIDI Note data to drive an external sampler or synthesizer, which in turn provides click audio for monitoring beats.

> **NOTE: CLOCKstep does not send click audio. The audio must come from a connected sampler or synth.**

Metronome Settings

Metronome Settings are accessed by holding down the USER Switch while the pedal is inactive and scrolling to the Metronome Settings menu choice.

Metronome Parameters

Metronome Enabled

Enable the Metronome globally (you can still disable the Metronome within a Preset if you wish).

Metronome Tx Channel

The MIDI Channel that CLOCKstep will send MIDI Notes to that are generated by the Metronome feature. Set this to the same channel that you set your receiving device.

Beat Note

The MIDI Note Number used to play the primary Metronome pulse. The Note Number will be sent by CLOCKstep to the receiving device on the MIDI Channel set by **Metronome Tx Channel**.

Beat Velocity

The MIDI Velocity associated with the **Beat Note**. The best results are achieved when this velocity is lower than **Accented Velocity**, allowing Accented Notes to stand out.

Accented Note

The MIDI Note Number used to play the accented Metronome pulse. The Note Number will be sent by CLOCKstep to the receiving device on the MIDI Channel set by **Metronome Tx Channel**.

Accented Velocity

The MIDI Velocity associated with the **Accented Note**. The best results are achieved when this velocity is higher than the **Beat Velocity**.

Metronome Parameters (continued)

First Beat Note

The MIDI Note Number used to play a note indicating the first beat of a new bar. You can think of this as a special version of the Accented Note to really bring added emphasis the start of a new bar. The Note Number will be sent by CLOCKstep to the receiving device on the MIDI Channel set by **Metronome Tx Channel.**

First Beat Velocity

The MIDI Velocity associated with the First Beat Note. The best results are achieved when this velocity is higher than the Accented Velocity.

User MIDI

"User MIDI" is what we call custom commands programmed into CLOCKstep by you.

The implementation for creating custom MIDI is a little different than what you may by used to. Think of a User MIDI command as a "MIDI Entity", kind of like its own Preset. CLOCKstep can hold up to 250 User MIDI commands, each with its own name up to 12 characters.

Each User MIDI command that you create only needs to be entered once. It can then be reused in any Preset (see **Preset Parameters -> MIDI Assign (1-8)**).

You can also edit a User MIDI command and have that edit propagate instantly to any Preset where it has been assigned. This greatly reduced the maintenance burden if you frequently change how a command operates, or if you swap out gear and continue to use similar commands for each device.

For example, you may be using one particular looper that has a Record command which you create in the system as a USER MIDI entity and then assign it to the USER Switch in many Presets. If you decide to change loopers, but want the same behavior from CLOCKstep, you can edit the USER MIDI command to work with the new looper, and that edit will instantly take effect in every one of your Presets where it has been assigned.

User MIDI Settings

User MIDI Settings are accessed by holding down the USER Switch while the pedal is inactive, scrolling to the User MIDI menu choice and pressing [enter].

From this screen you can scroll UP or DOWN through the User MIDI list and choose which one to edit.

User MIDI Parameters

Command Type

One of the standard MIDI Command types to send with this User MIDI setting.

Program Change	Start CS (*)
Control Change	Stop CS (*)
Note On	Continue
Note Off	BPM CS (*)
Note Aftertouch	Time Signature CS (*)
Channel Aftertouch	Metronome On CS (*)
Pitch Bend	Metronome Off CS (*)
Song Position	Metronome Toggle CS (*)
Song Select	Tap Tempo CS (*)
Start	Resync
Stop	

(*) denotes a special command that will effect functions of CLOCKstep instead of sending a command out to another device.

Program Number

The Program Number value to send when the Command Type is Program Change.

Control Number

The Control Number to send when the Command Type is Control Change.

Control Value

The Control Vale to send when the Command Type is Control Change.

Note Number

The Note Number value to send when the Command Type is Note On, Note Off or Note Aftertouch.

Velocity

The Velcoty value to send when the Command Type is Note On or Note Off

Pressure

The Pressure value to send when the Command Type is Note Aftertouch or Channel Aftertouch.

User MIDI Parameters (continued)

Pitch +/-

The Pitch value to send when the Command Type is Pitch Bend.

Song Position

The Song Position value to send when the Command Type is Song Position.

Song Number

The Song Number value to send when the Command Type is Song Select.

BPM

The BPM value to set when the Command Type is BPM CS (*).

Time Signature

The Time Signature value to set when the Command Type is Time Signature CS (*).

Channel

For channelized commands, the MIDI Channel (1-16) to send the command on.

Name

A User MIDI command an be named with up to 12 alpha-numeric and special characters. TIP: Hold down the Right or Left switch to jump to the next menu option and bypass any remaining character spaces.

Special Mention: Resync Command Type

There is no official or standard MIDI Command known as "Resync". Instead, this special Command Type sends out a series of commands that cause CLOCKStep and other Loopers or Sequencers to all instantly stop and restart, aligning them all to the same beat. Useful if you have a device that somehow drifts away from the MIDI Clock timing (or isn't following MIDI Clock in the first place).

Resync will only execute if the CLOCKStep **Clock Source** Global Parameter is set to "Internal" and the CLOCKStep Transport is currently running.

The commands that it sends, in order, are:

> **Real-time Stop**
> (1 ms delay)
> **Song Position 0**
> (1 ms delay)
> **Real-time Start**

MIDI Assign Considerations

When assigning User MIDI to a Preset's **MIDI Assign** and **MIDI When** parameters, there are a few considerations to keep in mind.

Execution Order

When an action causes multiple User MIDI commands to be executed at once, they will be executed in their assignment order in the Preset.

Toggle USER Switch Actions

Setting up a Toggle on the USER switch is accomplished by using **When** values that have "On" and "Off" in their names. Assign a command to execute "when USER On" and another command to execute "when USER Off".

Toggling requires that for each "On" action there is at least one related "Off" action (or vice-versa). Commands can be assigned in any order, but without a pair of related "On" or "Off" actions somewhere in the assignments, the commands will just be ignored and no toggling will occur.

USER Switch Name in the Main Display

You cannot directly control the name that will appear in the Main Display for the USER Switch command. Instead, prioritization rules are used that automatically decide which name to place on the screen. The rules, listed in order of priority, are:

- Cue USER On/Off
- Cue USER Press
- USER On/Off
- USER Press

You can think of it as Cue actions being given the highest priority, then Toggle actions. With all things being equal, the lowest MIDI Assign value will be shown.

Cue Actions while the Clock is Stopped

Cue commands assigned to the USER switch will execute immediately if pressed while the Clock is stopped.

External Execution of User MIDI

The MIDI API has two ways that allow you to execute User MIDI stored in CLOCKstep from an external controller. The first simulates pressing the USER Switch and the second can target each of the 8 stored commands individually for discrete, cued execution. See "External Execution of User MIDI 1-8" for further details.

MIDI Assign Considerations (continued)

Repurposing the Transport Switch as a second USER Switch

If having an additional switch to send custom MIDI is more important to you than sending Start and Stop commands, then set the **Send MIDI Start** and **Send MIDI Stop** parameters to "No" within the preset. Your commands assigned with the "Transport Start" and "Transport Stop" MIDI *When* parameters will execute alone when the Transport Switch or CUE Switch are pressed.

External Execution of User MIDI 1-8

User MIDI assignments in a Preset can be executed discretely by sending in a MIDI message on Controller #36 with a value of 1 through 8.

If the Transport is stopped, the execution of the User MIDI command located in that assignment slot will be immediate. If the Transport is running, then execution will be cued according to the **MIDI Cue Interval** value set within the Preset.

Changing MIDI Cue Interval in Real-time

Each command is capable of maintaining its cue independently based on how the **MIDI Cue Interval** is set at the time of execution. That value can be changed by sending in a MIDI message on Controller #37. Changing the **MIDI Cue Interval** will not effect any commands that are already pending.

Sharing External Execution with Other "When" Actions

No matter what **When** action is chosen for an assigned User MIDI command, the command can still be executed discretely by sending in the MIDI Controller #36 message. This makes it possible for the same command to be used in more than 1 context. If you want the User MIDI command to react only to an incoming MIDI Controller message, the **When** parameter should be set to "Cue CC:36 Value:n".

Going Beyond 8 Commands

With this kind of functionality, you might find 8 commands are not enough to do everything you want, but with the inclusion of being able to receive MIDI messages on Controller #41-48, #51-58, #61-68, #71-78 and #81-88, you can instantly change the values of a User MIDI command before CLOCKstep sends it, as well as changing the assigned **When** parameter (see MIDI In Specification).

This level of functionality probably isn't going to be for the user just getting started with MIDI or CLOCKstep, but if a user reaches the limit of stored commands, this flexibility will prove valuable.

In planning your dynamic changes, keep in mind that a cued User MIDI command will use the values set once it reaches execution. Changing the values any time before it reaches execution will change how it executes.

Automatic Execution of User MIDI 1-8

User MIDI assignments in a Preset can be executed automatically by CLOCKstep based on a number of bars that have elapsed. Commands will continue to repeat at that interval while the Transport is running without the performer having to do anything.

Typical Use Case

The main reason a feature like this exists is to stop and restart loopers and sequencers that are not following MIDI Clock. It's probably clear to anyone at this point that the only way for devices to stay in sync with one another is if they follow a shared clock. You can be very precise in all your actions, or even use CLOCKstep CUE features to be ultra-precise, but the longer a loop or sequence runs without following the same clock, the more the drift will compound into something you will notice.

With automatic execution of a User MIDI command, you can send a message that restarts the device at the top of its sequence at a given bar, snapping it back onto the downbeat before any drift becomes noticeable.

Setting the Interval

The Preset's **MIDI Auto Bars** parameter us used to determine what interval is used. The concept is simple, if you have recorded a looping sequence of 4 bars, then setting this interval to "4" will realign the track as it reaches its loop point. You can also do any multiple of 4 since it may take a while for drift to even become noticeable, so there may be no harm in letting loop a few times.

There's no auto execution when the Transport in first started. It takes until the first time that the specified number of bars have elapsed for the first execution to happen.

MIDI Auto Bars can also be set in real-time by sending in a message on Controller #38. If the Transport is already running, then this change will extend the countdown if that number of bars have yet to elapse, or it will cause the count to restart at the beginning of the next bar if less.

The interval can be 0-127, where 0 will disable any automatic execution.

Quantize & Cue Offset

Some Looping devices have the ability to perform Quantize loop recording. This is where the Looper manages how to end the recording so that the size of the loop is exactly aligned to the beat and will not drift when the loop is repeated.

Nothing can beat the ability of a Looper to internally know when to end the recording of a quantize loop. If the Looper is using internal quantize, then generally a command to end the recording can be received at anytime and doesn't need to CUE in CLOCKstep. The Looper still manages when to exactly end the recording based on clock pulses or file size.

> **NOTE: it's always recommended that if a Looper has a quantize feature, and quantize looping is your goal, then enable that feature.**

Though CLOCKstep was built upon the idea of sending commands precisely in time, the MIDI protocol doesn't allow for 2 messages to arrive at the exact same time. Commands sent by CLOCKstep are always sent between 2 clock pulses. (the default for any Cued command is to be sent just before the related pulse).

The actual timing of execution is up to the device that receives it. Typically, this takes milliseconds, if not microseconds, and is good enough for nearly every command during a performance.

Midi Cue Offset

That being said, CLOCKstep does provide the **MIDI Cue Offset +/-** setting in each Preset that can be used if you want to try to more accurately time the event when the Looper doesn't have a quantize feature.

For example, you can create a User MIDI command to end a recording (see your Looper's MIDI documentation for the specific message needed) and assign it to a User MIDI command using one of the "Cue" actions for the **When** parameter.

Test the recording of a new loop using the CUE features of CLOCKstep to start the recording and ending it. Listen to the loop on repeat against the timing of the clock, and if the loop seems to pick up speed (ie: begins playing before the beat), then adjust the **Midi Cue Offset** parameter towards the positive range and try recording it again. Use the negative range if the loop seems to begin playing after the beat. The values in **MIDI Cue Offset** represent 1 MIDI Clock pulse.

Clock Source

CLOCKstep has the ability to keep time for itself and other devices using an internal timing reference, effectively making it a Master Clock. Or, it can sync to another Master Clock while still providing the benefit of all its other features.

Clock Source configuration can be changed in the Global Settings or by sending a remote MIDI command (see chapters on Global Settings and MIDI IN Specification).

Internal

This is the default Clock Source configuration. When running, CLOCKstep will send MIDI Clock pulses out at the rate of 24 pulses per Quarter Note and serve as a Master MIDI Clock to other devices. It will also send MIDI System Real-Time Start and Stop commands in response to its own Transport actions.

External

When set to External Mode, CLOCKstep will remain idle and wait for incoming MIDI Clock Pulses. CLOCKstep will never generate or send its own clock pulses in this configuration.


Once pulses are received, CLOCKstep will respond as if its own Pulse Footswitch has been pressed. The Clock LEDs will flash in sync with the incoming clock rate and beats will begin counting.
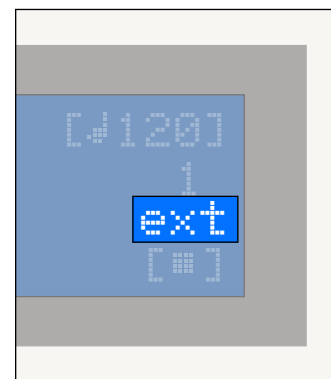
The BPM display will also update after calculating the rate of the incoming pulses, and may take a couple beats to settle in. This only has an effect on the display however; The actual timing of CLOCKstep will be in tight synchronization with the incoming clock pulses regardless.

Prior to clock pulses being received, you can press the Transport switch to ready the Start command.

The green LED will flash rapidly to show that it is waiting for the first clock pulse to be received, and then will start automatically once that happens. You can cancel out of this state by pressing the Transport switch a second time.
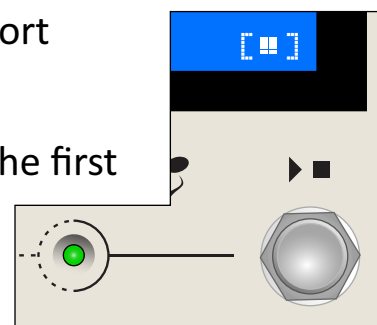
The Clock and Transport in CLOCKstep will Stop when incoming clock pulses are no longer detected.

The Transport alone will Stop in response to a MIDI System Real-time Stop command.

continued ...

Clock Source (continued)

External + Start

This setting is exactly like the External mode with regard to how incoming pulses interact with CLOCKstep, but now CLOCKstep will also listen for MIDI System Real-time Start and Continue commands and automatically start the Transport in response.
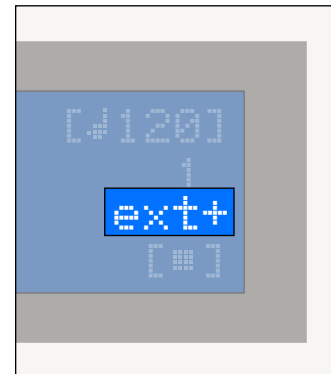
According to the MIDI 1.0 Specification, a device that receives a MIDI System Real-time Start command should wait until the next clock pulse to execute the start action. CLOCKstep follows this spec, and the green LED will flash rapidly if it is waiting for a clock pulse to be received.

When receiving an external System Real-time Start command, CLOCKstep will suppress sending it's own System Real-time Start command to avoid duplication, however any custom MIDI commands you have assigned to the Transport Start action in CLOCKstep will still execute.

External + Align

This setting is practically identical to External + Start, but when receiving an external MIDI Real-time Start command, CLOCKstep forcibly aligns the first beat of a new measure to the start action.

The reason for this is because some devices that can act as Master MIDI Clock will always send clock pulses. They have no means to turn the pulses off, meaning that CLOCKstep is perpetually running in sync. When these types of devices send the MIDI Real-time Start command, they also reset their internal clock and counters. Having this mode enabled allows CLOCKstep's own counters to align with the master device.

Pulse Switch Operation

When configured for any External Mode, the Pulse switch operation changes from being a control for Clock Start and Stop to becoming an "Ignore Clock" switch. Some devices constantly send out Clock pulses, and this switch becomes a way to place CLOCKstep into an idle state, which is necessary if you want to change any Settings or Presets.

NOTE: The Tap Tempo Screen is not accessible when CLOCKstep is configured for any External modes.

MIDI IN Specification

Program Change

You can select one of the 300 Presets stored in CLOCKstep by sending just a MIDI Program Change command (0-127) or a combination of Bank Change command (Controller 0) and the Program Change command to reach Presets higher than 127.

Control Change

Parameter	CC#	Range	Notes
Bank	0	0-2	
TRANSPORT Press	3	0, 64, 127	0=Stop, 64=Toggle, 127=Start
CUE Press	9	0, 64, 127	0=Stop, 64=Toggle, 127=Start
PULSE Press	14	0, 64, 127	0=Stop, 64=Toggle, 127=Start
Tap Tempo	15	Any	
BPM	16	1, 2, 0-127	Send 1 first to add 100 Send 2 first to add 200 Send 10-127 first for BPM rate, or 0-127 second to add to 100 or 200
Time Signature	17	1-16, 21-36	1-16=Quarter Note bar (1=1/4) 21-36=Eighth Note bar (21=1/8)
USER Press	18	Any	
Auto Stop Clock	19	0, 127	0=No, 1=Yes
CUE In Count	20	1-4	
CUE Out Count	21	1-4	
Metronome Enabled	22	0, 64, 127	0=No, 64=Toggle, 127=Yes

MIDI IN Specification (continued)

Parameter	CC#	Range	Notes
Metronome Beat	23	0-21	0=None 1=Dotted Whole 2=Whole Note 3=Whole Triplet 4=Dotted Half 5=Half Note 6=Half Triplet 7=Dotted Quarter 8=Quarter Note 9=Quarter Triplet 10=Quarter Shuffle 11=Dotted Eighth 12=Eighth Note 13-Eighth Triplet 14=Eighth Shuffle 15=Eighth Skipping 16=Dotted Sixteenth 17=Sixteenth Note 18=Sixteenth Triplet 19=Sixteenth Gallop 20=Sixteenth Skipping 21=Thirty-second Note
Metronome Accent	24	0-21	See Metronome Beat for values
Metronome First Beat	25	0, 64, 127	0=No, 64=Toggle, 127=Yes
Metronome Use	26	0-3	0=Never 1=Always 2=Clock Only 3=Cue In Only
Clock Source	27	0-3	0=Internal 1=External 2=External + Start 3=External + Align
Send Bar Marker	28	0, 64, 127	0=No, 64=Toggle, 127=Yes

MIDI IN Specification (continued)

Parameter	CC#	Range	Notes
Send Time Signature	29	0, 64, 127	0=No, 64=Toggle, 127=Yes
Clock LED Enabled	30	0, 64, 127	0=No, 64=Toggle, 127=Yes
MIDI Thru Enabled	31	0, 64, 127	0=No, 64=Toggle, 127=Yes
Send MIDI Start	32	0, 62, 127	0=No, 64=Toggle, 127=Yes
Send MIDI Stop	33	0, 62, 127	0=No, 64=Toggle, 127=Yes
BPM INC/DEC	34	0-127	Increment or Decrement BPM by 1 based on current Value. Useful with Expression Controllers.
Tap Tempo Enabled	35	0, 64, 127	0=No, 64=Toggle, 127=Yes
Execute User MIDI	36	1-8	Execute any of the 8 User MIDI assignments stored in a Preset.
MIDI Cue Interval	37	0-5	0=Zero 1=Eighth 2=Quarter 3=1 Bar 4=2 Bars 5=4 Bars 6=1/2 Bar
MIDI Auto Bars	38	0-127	Sets the number of Bars for auto User MIDI execution.

MIDI IN Specification (continued)

Parameter	CC#	Range	Notes
User MIDI Data 1	41-48	0-127	41-48 targets assigned User MIDI 1-8 respectively. 0-127 sets the value of the first data byte. (ie: if the stored MIDI type is a Continuous Controller, this sets the Controller Number. If the MIDI type is Program Change, then it sets the Program Number.)
User MIDI Data 2	51-58	0-127	51-58 targets assigned User MIDI 1-8 respectively. 0-127 sets the value of the second data byte. (ie: if the stored MIDI type is a Continuous Controller, this sets the Controller Value. If the MIDI type is Program Change, then there's nothing to set.)
User MIDI When	61-68	0-12	61-68 targets assigned User MIDI 1-8 respectively. 0=USER Press 1=USER On 2=USER Off 3=Cue USER Press 4=Cue USER On 5=Cue USER Off 6=Transport Start 7=Transport Stop 8=Clock Start 9=Clock Stop 10=Preset Load 11=Cue CC:36 12=Every n Bar(s)

continued ...

MIDI IN Specification (continued)

Parameter	CC#	Range	Notes
User MIDI Command Type	71-78	0-20	71-78 targets assigned User MIDI 1-8 respectively. 0=Program Change 1=Control Change 2=Note On 3=Note Off 4=Note Aftertouch 5=Channel Aftertouch 6=Pitch Bend 7=Song Position 8=Song Select 9=Start 10=Stop 11=N/A 12=N/A 13=Continue 14=N/A 15=N/A 16=N/A 17=N/A 18=N/A 19=N/A 20=Resync
User MIDI Channel	81-88	1-16	81-88 targets assigned User MIDI 1-8 respectively. The MIDI Channel that the USER MIDI Command will send on.

continued …

MIDI IN Specification (continued)

System Real-time Start

In "External + Start" and "External + Align" Clock Source mode, CLOCKStep will respond to Real-time Start commands by starting the Transport. (see MIDI Continuous Controller #3 for an alternate way to start the Transport via MIDI).

System Real-time Continue

In "External + Start" and "External + Align" Clock Source mode, CLOCKStep will respond to Real-time Continue commands by starting the Transport and resuming count at the same place where it was previously stopped.

System Real-time Song Position Pointer

The only value CLOCKstep will respond to is Zero (0). CLOCKStep will immediately reset all counters as if the device was stopped and restarted instantly.

System Real-time Stop

CLOCKstep will respond by stopping the Transport. (See Continuous Controller #3 for an alternate way to stop the Transport via MIDI).

System Real-time Clock

In one of the "External" Clock Source modes, CLOCKstep will respond by starting the Clock functions when incoming pulses are detected, and then stopping the Clock function when incoming pulses are absent.

Additionally, CLOCKstep synchronizes itself to the incoming clock pulses.

LCD Contrast

The LCD Contrast is set during assembly, but if you need to adjust it, open the casing and carefully use a small screw-driver to make the adjustment.
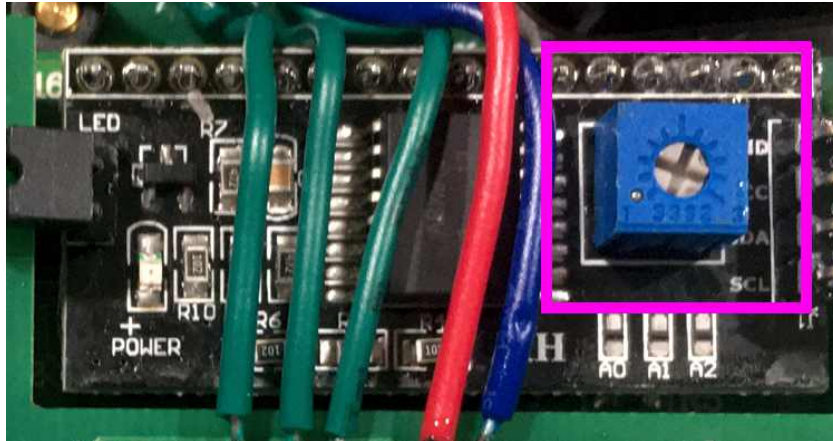
USB & Firmware Updates

The Micro USB connection is internal and is only used for Firmware updates. Enough space was provided around the USB port to accommodate attaching the cable. Exercise care when making the connection and while CLOCKstep is connected to the computer with the casing open. CLOCKstep will be powered through the USB port, so you don't need to have a 9V adapter connected while performing the update.

Further instructions will be provided with the Firmware download.
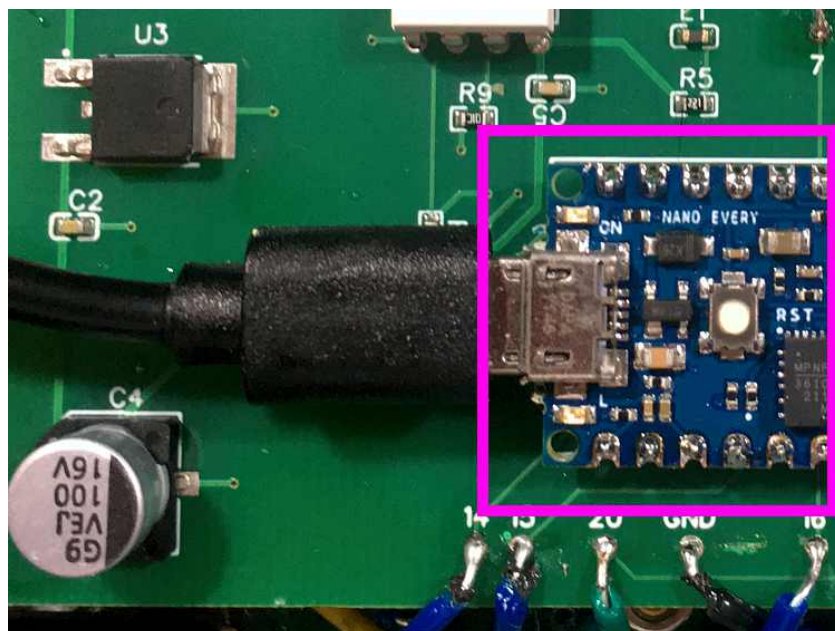
Products Specifications

Power Requirements   9 volts DC max, 65 mA min (power adapter is not included)

Power Connection   2.1 mm barrel, center negative

I/O   MIDI IN, MIDI OUT, internal Micro USB (for updates)

Dimensions   4.72" x 4.72" x 1.34" (1.95" to the top of a footswitch)

Assembed in the USA

Limited Warranty

CLOCKstep comes with a 1-year limited warranty on parts and workmanship when purchased new from JMK Music Pedals or an authorized dealer. During the warranty period, and at the sole discretion of JMK Music Pedals, we will either repair or replace your CLOCKstep free of charge.

Warranty service does not include damage through misuse, mistreatment or modification of the pedal.

Contact us at support@jmkmusicpedals.com for assistance with a warranty claim.