ADDAC System
Instruments for Sonic Expression
Est.2009

INTRODUCING
ADDAC403
VC TIME SIGNATURE CLOCK SOURCES

USER'S GUIDE . REV02

April.2021

ADDAC System

From Portugal with Love!

Welcome to:
ADDAC403 VC TIME SIGNATURE CLOCK SOURCES USER'S GUIDE

Revision.02April.2021

DESCRIPTION

This is our long due Eurorack Clock module, featuring multiple sections for a combined total of 8 independent trigger outputs. Introducing standard time signature musical notation along with the possibility to generate syncopation, irregular tempo ratios and phasing all at once in a single straight forward unit.

We started by programming an extremelly stable digital clock with over time drift compensation and adjustable to any Beat per Minute [BPM] up to 1 decimal case (from 0.1 to 250.0 BPM).
Also implemented a Tap Tempo button and Pingable input for syncing to external clocks using either Soft or Hard [SYNC] modes.

The Time Signature X/Y section defined as [Beats Per Bar] / [Beat Unit] and generating 4 outputs triggering at every: Beat, Bar, Odd Beat (1,3,5...) and Even Beat (2,4,6...).

A [PAUSE] button sets the Pause/Resume state of the clock also allowing different sync methods on Resume.

A [RESET] button resets either each or both the Main and Phasing Clocks

A Divider section can be set to any beat division in Linear (3,4,5,6,7,8,9,10) or Exponential mode (1,2,4,8,16,32,64,128)

The Phasing section features a totally independent clock that can run in two modes: [TEMPO] running at a slower/faster bpm phasing in and out of tempo against the main clock. [OFFSET] running at the same bpm but offsetted/delayed against the main clock generating a steady syncopated beat.

A Tuplet section allows the generation of Triplets, Quintuplets, Septuplets and Ninelets with adjustable [LENGTH] or Span of the tuplet to any number of Beats from 1 to 16.
4 Modes allow different [TRIGGER] and [MUTE] functionalities: they can run in a loop or one shot mode, [TRIGGER] always triggers/resets the Tuplet and [MUTE] can be set to Gate On or Gate Off. Tuplets always output irregular divisions of the Beat and allow Polybeat generation.

A Swing Delay section allow to delay 1 Beat at [Every X Beats]. The [Delay] knob sets the delay in a fraction of 1 Beat, this section also allows the generation of syncopated beats.

More specific settings can be changed in the [SHOW/MENU], menu functions are labeled in gold.

DESCRIPTION

All sections feature they're own monitor LEDs.

By default Display shows the current Time Signature status. Pressing the [SHOW/MENU] button sequentially will display each sections settings. After 3 seconds it automatically returns to default Time Signature status.

All settings can be saved to a single memory slot, upon startup the memory state will be automatically loaded.

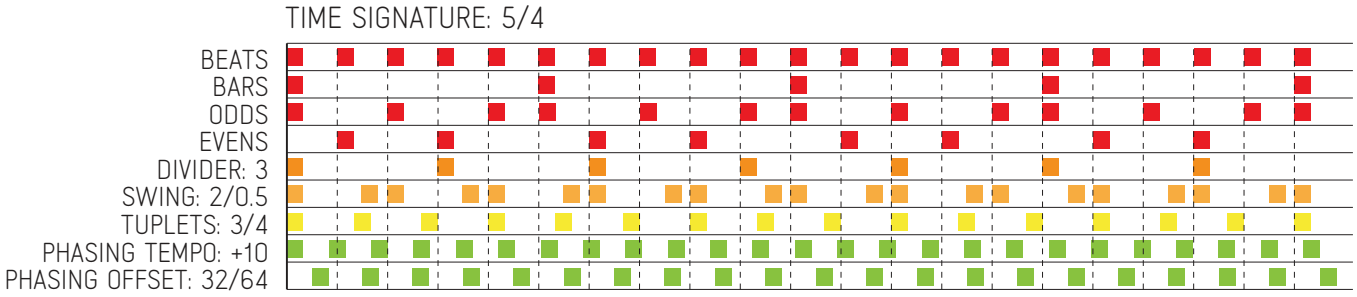
All Knobs and Push-Buttons have their own CV/Trigger inputs except the [BPM] encoder and [SHOW/MENU] button.

Tech Specs:
16HP
4cm deep
140mA +12V
40mA -12V

CV and TRIGGER Inputs locations

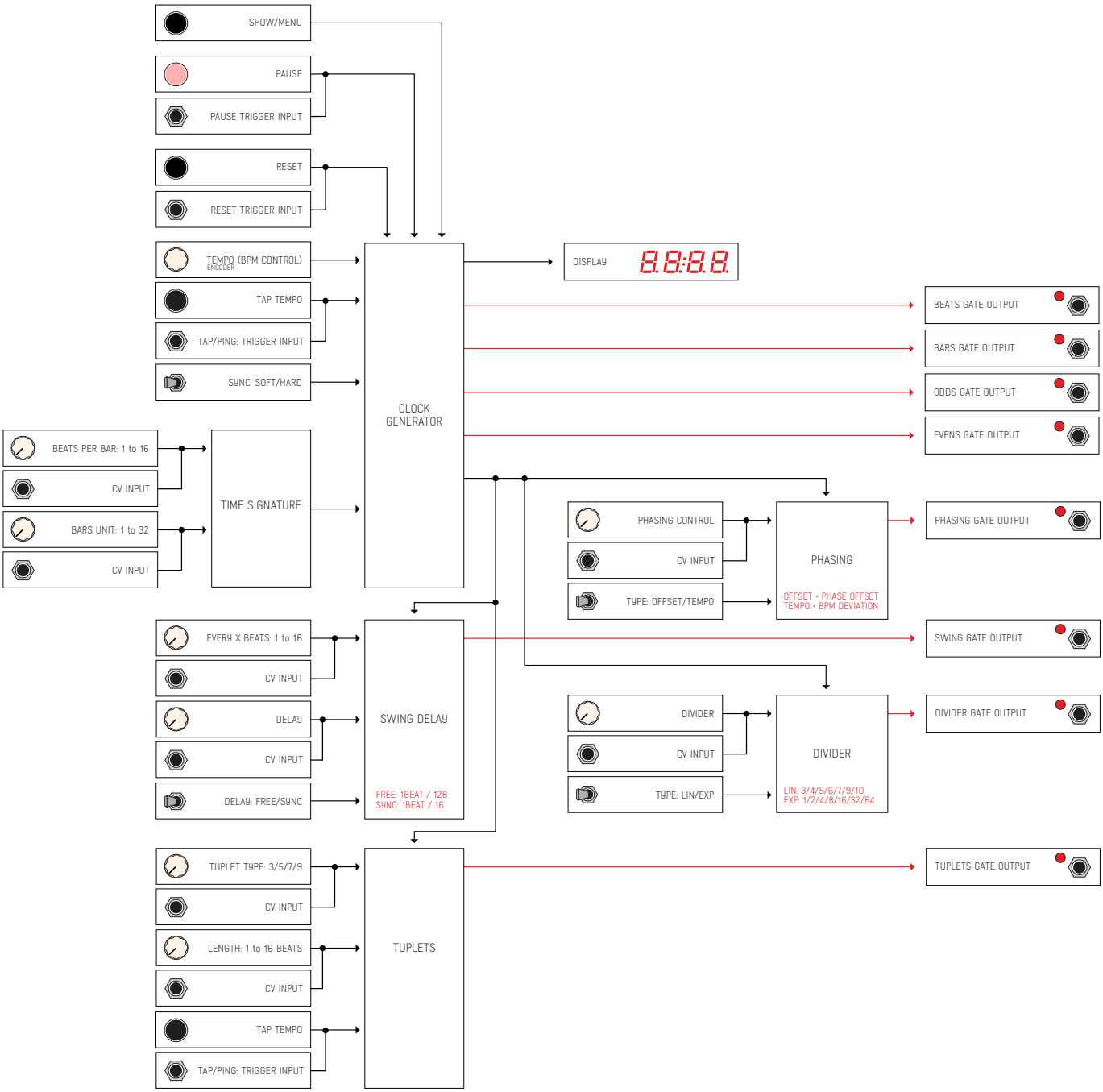
CLOCK LOGIC TABLE

All Outputs Trigger/Gate length can be set globally from 1 to 4000 milliseconds.



TRIGGER LENGTHS DEPENDS ON TRIGGER LENGTH SETTING

SIGNAL FLOW DIAGRAM



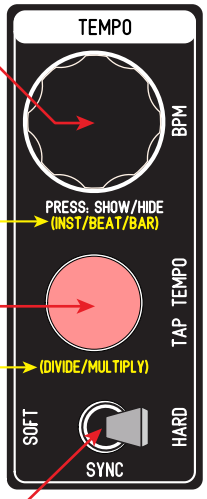
CLOCK SECTIONS

TEMPO (BPM):
BPM can be set with the [BPM] Encoder from 0.1 to 250.0 BPM
BPM can also be set by [TAP TEMPO], push button 4 times to set tempo, likewise for CV Input.
Button LED will blink at every button push or trigger input.

MENU SETTINGS: There's 3 Modes for when the Tempo changes to have effect:
INST INSTANT: Changes have an immediate effect
BARS BEAT: Changes will have effect on the next Beat
BEAT BAR: Changes will have effect on the next Bar

MENU SETTINGS: There's 13 states for dividing/multiplying the incoming Tap /Ping:
1:1 1:8 DIVISION: 1/1 to 1/8
1.5 4.0 MULTIPLICATION: 1.5 to 4.0

SYNC:
Both the push-button and cv input will be synced using two methods:
SOFT: Sets new BPM but does NOT sync to the input clock.
HARD: Sets new BPM and syncs to the input clock.

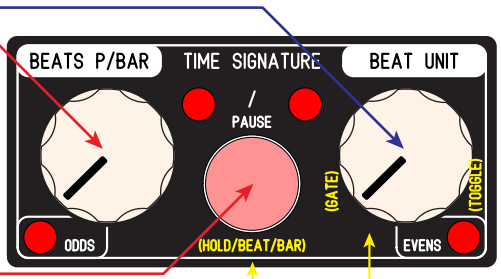


TIME SIGNATURE:
[BEATS P/BAR] sets how many Beats per BAR: 1 to 32
[BEAT UNIT] sets the unit that represents 1 Beat:
1:whole-note, 2:half-note, 4:quarter-note,
8:eight-note, 16:sixteenth-note, 32:thirty-second note

PAUSE:
[PAUSE] will pause the clock while LED is ON

MENU SETTINGS: There's 3 Modes for when Pause is disengaged:
HOLD HOLD: Resumes Clock where it was paused.
BEAT BEAT: Resumes Clock and advances to the next Beat
BAR BAR: Resumes Clock and Resets to the Beat 1

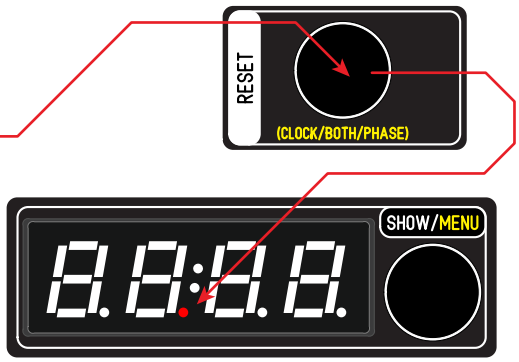
MENU SETTINGS: There's 2 Modes for how Pause behaves:
GATE GATE: Pauses while Button is pressed or Gate In is On:
TOGL TOGL: Toggles Pause State



CLOCK SECTIONS

RESET:
[RESET] Button and Trigger In immediatelly resets clock

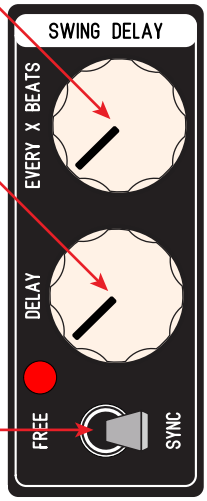
MENU SETTINGS: There's 3 Reset Modes:
CLOC CLOCK: Resets Clock.
BOTH BOTH: Resets Clock & Phasing Clock
PHAS PHASE: Resets Phasing Clock



Incoming gates will be displayed in the small dot on the screen

SWING DELAY:
Swing [DELAY] delays one Beat [EVERY X BEATS]

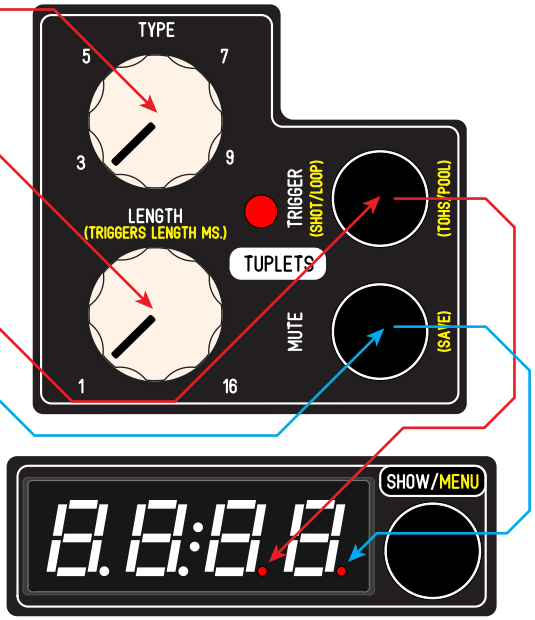
[SYNC] The delay can be set to 2 Modes:
FREE (0-63): Divides 1 Beat by 64.
SYNC (0-15): Divides 1 Beat by 16.



TUPLETS:
[TYPE] Triplets, Quintuplets, Septuplets, Ninelets
[LENGTH] Lasting how many Beats (1 to 16)

[TRIGGER] Will Start/Reset the Tuplet
[MUTE] Mutes the Tuplet Output

MENU SETTINGS: How [TRIGGER] and [MUTE] behaves
SHOT SHOT: Plays 1 Tuplet then Stops
[TRIGGER] Starts/Reset the Tuplet
[MUTE] Gate ON Mutes Tuplet Output
LOOP LOOP: Plays Tuplets in a Loop
[TRIGGER] Reset the Tuplet
[MUTE] Gate ON Mutes Tuplet Output
TOHS TOHS: Plays 1 Tuplet then Stops
[TRIGGER] Starts/Reset the Tuplet
[MUTE] Gate OFF Mutes Tuplet Output
POOL POOL: Plays Tuplets in a Loop
[TRIGGER] Reset the Tuplet
[MUTE] Gate OFF Mutes Tuplet Output

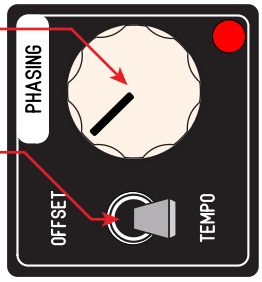


Incoming gates will be displayed in the small dots on the screen

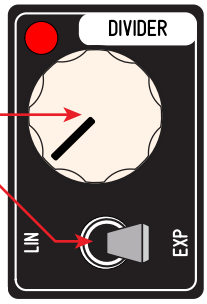
CLOCK SECTIONS

PHASING:
PHASING generates a secondary clock.
[PHASING] sets the OFFSET/TEMPO deviation

[OFFSET/TEMPO] Sets the Clock Mode:
OFFSET: Offset to the main clock (0/16 to 15/16) - same BPM
TEMPO: BPM decrease/increase from main clock = -16 to +16 BPM



DIVIDER:
[DIVIDER] Sets the Clock Division
[LIN/EXP] Sets the Mode:
LIN: 3, 4, 5, 6, 7, 8, 9, 10
EXP: 1, 2, 4, 8, 16, 32, 64, 128



SHOW/MENU:
Pressing [SHOW] button sequentially shows the current settings

BPM	0.1	250.0	BPM: 0.1 to 250.0
TIME	01:01	16:32	TIME: 01:01 to 16:32
SWING	00:00	16:63	SWING: 00:00 to 16:63
TUPL	03:01	09:16	TUPLETS: 03:01 to 09:16
PHAS	-016	016	PHASING: -016 to 16
DIVI	001	128	DIVISION: 001 to 128

SHOW/HIDE BEHAVIOUR:
Whenever any change happens to any knob/cv input the display will show the respective section parameters for 3 seconds.
As this can get confusing when using multiple external CV sources, each section can be automatic display can be hidden. To hide a section simply press the [BPM] encoder while a section is showing and the display will show HIDE HIDE informing the user that the respective section is now hidden and will not be shown when changes to the controls are made.
To Show parameters again simply press [SHOW] button until the desired section is shown and press the [BPM] encoder, at each press the display will toggle between SHOW and HIDE
SHOW HIDE

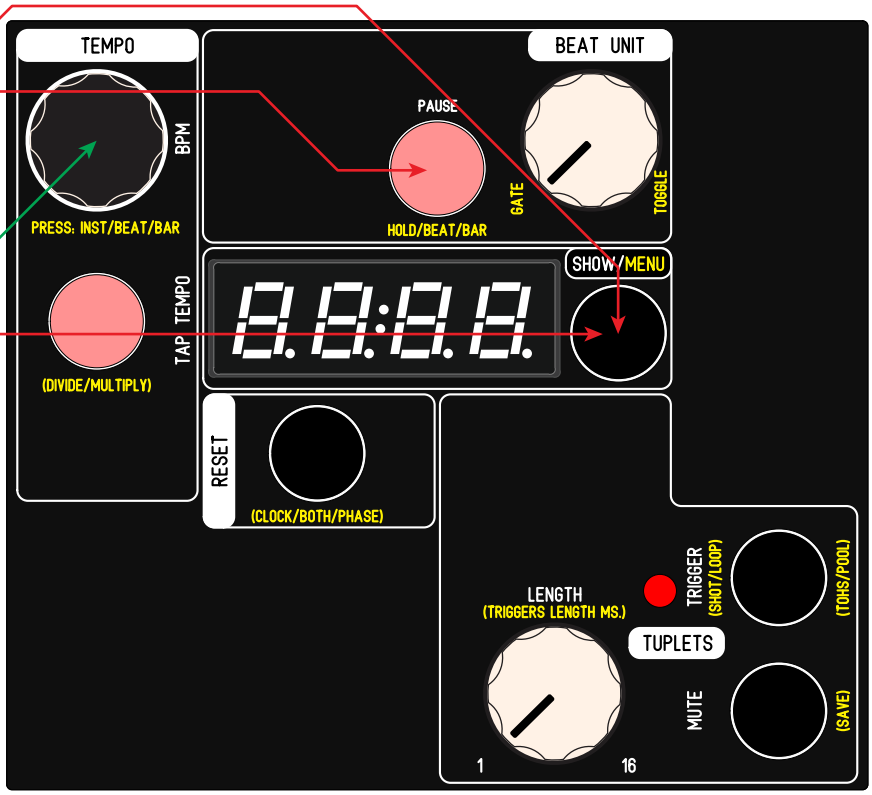
MENU

SHOW/MENU:
To Enter Menu press [MENU] button for 3 seconds

While in MENU STATE [PAUSE] button LED will Blink

To Exit Menu press [MENU] Button one time

Holding [BPM] encoder while in MENU STATE for 5 seconds Resets the module to "Factory Settings"



While in MENU STATE all gold labelling will be active.
All other parameters are disabled.

While in MENU STATE any time a parameter changes it will be shown in the display.
It is advised to unconnect any CV/TRIGGER while inside the Menu, the incoming CV will override the knobs and buttons pushes and possibly make undesired changes.

MENU CHEAT SHEAT:

BPM SETTINGS: [BPM] encoder PRESS: INSTANT / BEAT / BARS	INST BEAT BARS
EXTERNAL SYNC SETTINGS: [TAP TEMPO] button: DIVIDE / MULTIPLY	4 1:1 1:8 1:16
PAUSE/PLAY SETTINGS: [PAUSE] button: HOLD / BEAT / BAR [BEAT UNIT] knob: GATE / TOGGLE	HOLD BEAT BARS GATE TOGL
TUPLETS SETTINGS: [TRIGGER] button; SHOT / LOOP / TOHS / POOL	POOL SHOT LOOP TOHS
ALL TRIGGERS LENGTH: [LENGTH] knob: Length in Milliseconds	0001 4000
RESET SETTINGS: [RESET] button: CLOCK / BOTH / PHASE	CLOC BOTH PHAS

SAVE

SAVE:
There's a single save state that will be recovered at startup.
To save the current state get inside the Menu State and press [SAVE] button once.

The display will then show:
"SAVE" SAVE

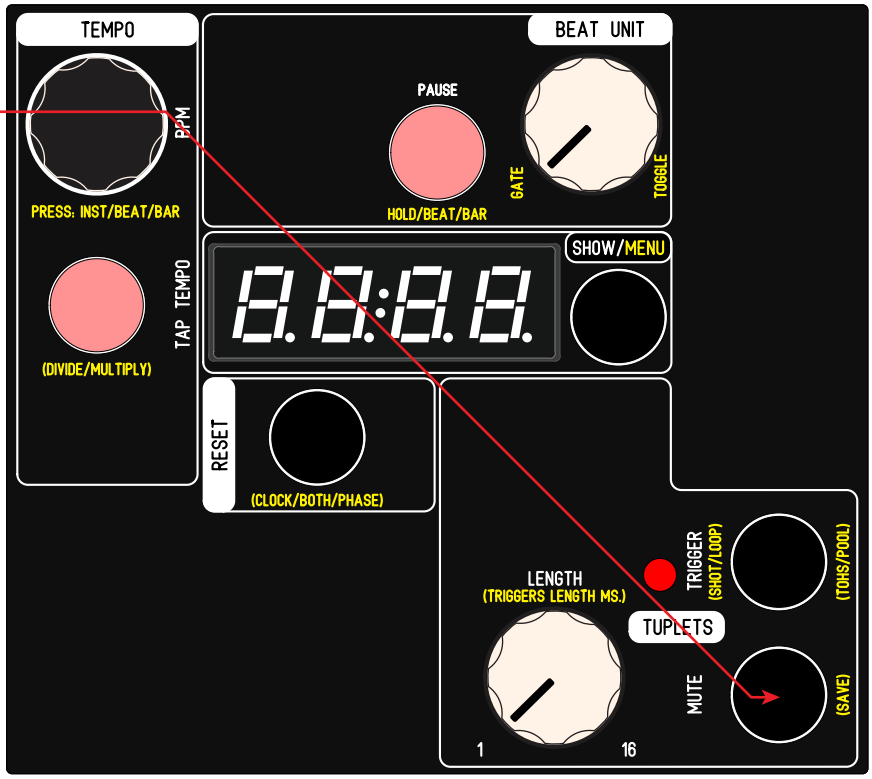
Press [SAVE] button once more.

The display will then show:
"SURE" SURE

Confirm you wish to overwrite the memory state by pressing the [SAVE] button once again.

The display will then show:
"DONE" DONE

Your new settings are now saved!



CONTROLS OVERALL DESCRIPTION

FIRMWARE UPDATE

While powering up the module will show: HELLO
followed by the firmware version installed, in this case C9:

If no version is shown then the firmware is below C8 and an update is advised.

Micro USB on the bottom

Update Process;

1. Download this App:
https://www.pjrc.com/teensy/loader.html

2. Next download and unpack the Firmware file:
http://media.addacsystem.com/firmwares/ADDAC403_Firmware.zip

3. Open the App, go to: File>Open HEX File and choose the .hex file downloaded.

4. Remove your module from the frame but keep it connected to your busboard and keep power ON.

5. Find the micro usb connector located at the bottom of the module and plug a usb cable to your computer.

6. Then look for a small white push button on the small board where the USB is connected to, use some plastic tool (metal may short some pins when reaching in) to reach in and press the button once.

7. On your computer hit upload on the teensy loader app, wait for it to complete and you're all done.

For feedback, comments or problems please contact us at:
addac@addacsystem.com

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