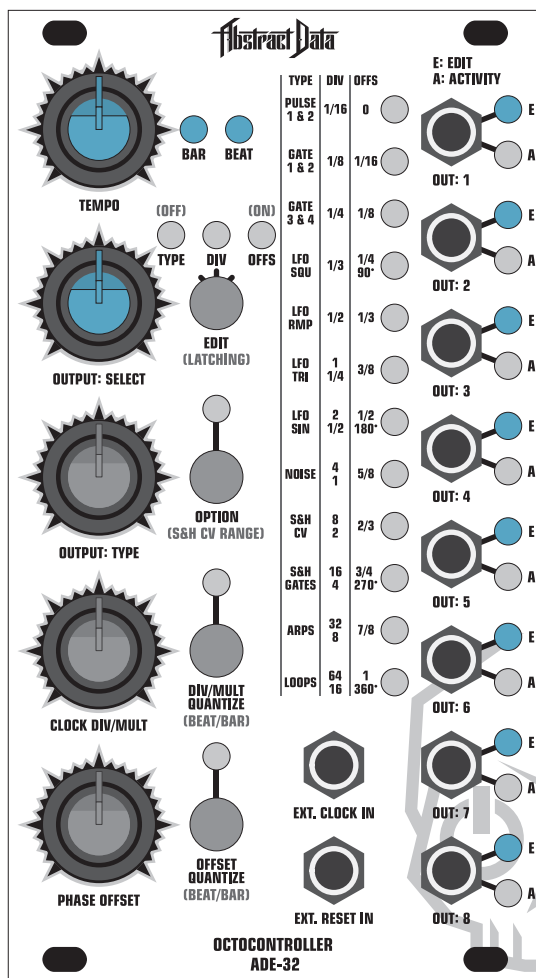


## ADE-32 OCTOCONTROLLER

*Control, Modulation, Triggering and Pattern module with 12 Output Types individually assignable to 8 simultaneous Outputs.*



## USER GUIDE

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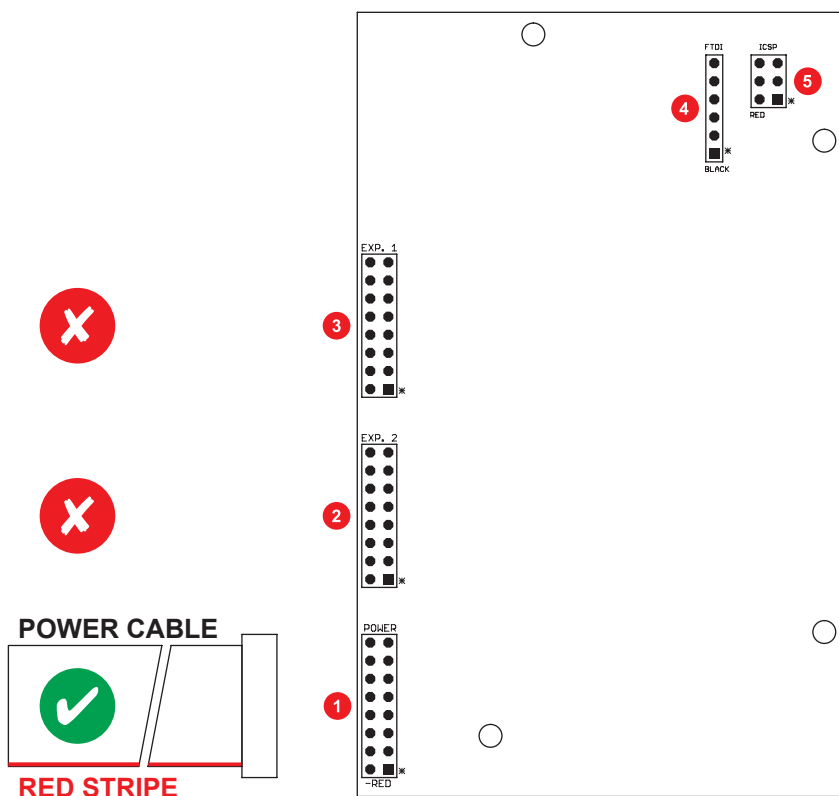
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# 1: Module Overview

- The ADE-32 is an 8 output module capable of running multiple, synced trigger, rhythm, modulation and control signals.
- The ADE-32 has built-in non-volatile memory and will retain all settings for all outputs on power down.
- There are 12 different output types including gates, LFOs and S&H. Each output type also has an 'option' giving a total of over 40 potential output types.
- Any of the output types can be assigned to any of the 8 outputs in any order.
- Each output can be edited individually with settings for clock division/multiple and phase offset. These settings can be quantized or free-running.
- All output types can be synced to the on-board clock – or to a clock supplied to the external input – and will output a 64 beat / 16 bar cycle at tempos between 20 and 270 BPM.
- The module can be configured to suit the user's preference through a choice of 'latching' or 'non-latching' knob behaviour and 'start of next beat' or 'start of next bar' behaviour for clock division/multiple and phase offset changes.
- The front panel is laid out in a simple 3-part grid that allows easy access to all the relevant performance information for all outputs – there is no menu-diving.
- The module's firmware can be upgraded by the user through a simple installation process.

# 2: Rear Connections



- 1 POWER CONNECTION:** 16 pin Eurorack power connection
- 2 EXPANDER PORT:** Port for future ADE-32 expanders
- 3 EXPANDER PORT:** Port for future ADE-32 expanders
- 4 FTDI PORT:** Firmware upgrade port
- 5 ICSP PORT:** Factory programming port

**PRECAUTIONS:** Only connect the power cable to the power connection as shown.

***DO NOT CONNECT THE POWER CABLE TO ANY OTHER PORT!***

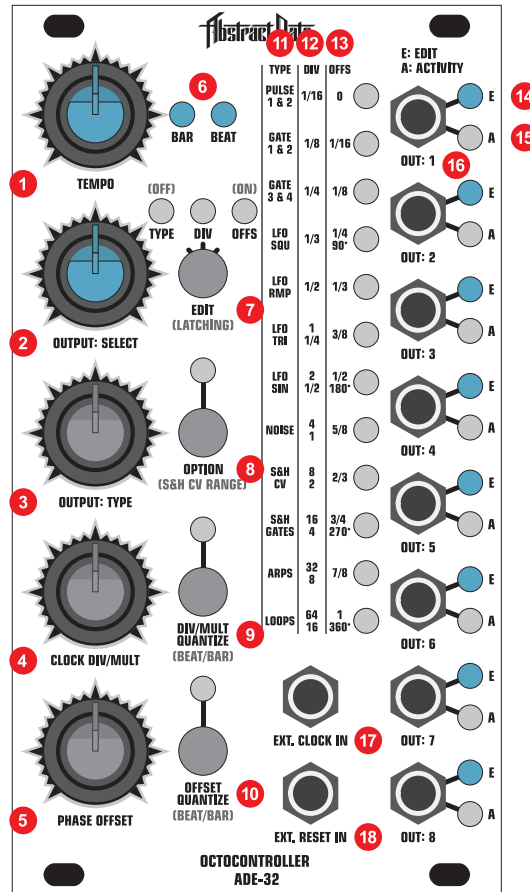
The ADE-32 uses the Doepfer standard for power connection and cable orientation.

The RED stripe on the supplied power cable connects to the NEGATIVE (-12V) rail on the ADE-32 with the RED stripe facing DOWN. This is marked on the back of the ADE-32 PCB as “- RED”.

The ADE-32 has diode and polyfuse protection built in but an incorrectly connected cable may still cause permanent damage to the module or the power supply.

The rear panel of the ADE-32 has exposed parts and connections. Please ensure when handling the ADE-32 that the unit is held by the sides of the front panel or the sides of the PCB.

# 3: Front Panel



- 1 TEMPO:** Sets the global/master tempo of the on-board clock
- 2 OUTPUT SELECT:** Selects outputs 1-8 for editing
- 3 OUTPUT TYPE:** Assigns an output type to the selected output
- 4 CLOCK DIV/MULT:** Sets the clock division/multiple for the selected output
- 5 PHASE OFFSET:** Sets the offset for the selected output
- 6 BAR/BEAT:** Blue LEDs indicate bar and beat timing
- 7 EDIT:** Shows the output type, clock division/multiple and offset settings
- 8 OPTION:** Sets the option for each output type
- 9 DIV/MULT QUANTIZE:** Sets the clock division/multiple quantizing for the selected output
- 10 OFFSET QUANTIZE:** Sets the offset quantizing for the selected output
- 11 OUTPUT TYPE:** White LED shows the output type for the selected output
- 12 OUTPUT DIVISION/MULTIPLE:** White LED shows the clock division/multiple for the selected output
- 13 OUTPUT OFFSET:** White LED shows the offset for the selected output
- 14 EDIT LED 1-8:** Blue LED shows the selected output
- 15 ACTIVITY LED 1-8:** White LED shows the activity at each output
- 16 OUTPUTS 1-8:** Individual outputs
- 17 EXT. CLOCK INPUT:** Syncs/slaves the module to an external clock
- 18 EXT. RESET INPUT:** Resets all outputs to bar 1, beat 1 of the global 16 bar loop

## 1) SET THE TEMPO

Set the tempo to the desired speed using the TEMPO knob.

The tempo is indicated by the two blue LEDs immediately to the right of the TEMPO knob.

## 2) SELECT AN OUTPUT TO EDIT

Select an output to edit using the OUTPUT: SELECT knob.

As you move the knob back and forth, the blue LEDs on the right hand side of the front panel will update to indicate the selected output.

Set the OUTPUT: SELECT knob so that the blue LED at OUT: 1 is illuminated.

## 3) ASSIGN AN OUTPUT TYPE TO THE SELECTED OUTPUT

Select an output type to assign to the selected output using the OUTPUT: TYPE knob.

As you move the knob back and forth, the vertical row of 12 white LEDs to the left of the outputs will update and illuminate to indicate the output type that has been selected.

Set the OUTPUT: TYPE knob so that LED 5 is illuminated.

Read across to the left column of text labelled TYPE – this indicates that LFO RMP has been assigned to the selected output.

## 4) SET THE CLOCK DIVISION

Set the clock division/multiple for the selected output type at the selected output using the CLOCK DIV/MULT knob.

As you move the knob back and forth, the vertical row of 12 white LEDs to the left of the outputs will update and illuminate to indicate the selected clock division/multiple.

Set the CLOCK DIV/MULT knob so that LED 8 is illuminated.

Read across to the middle column of text labelled DIV – this indicates that the output type now has a length of 4 Beats / 1 Bar at the current tempo.

## 5) SET THE PHASE OFFSET

Set the phase offset for the selected output type at the selected output using the PHASE OFFSET knob.

As you move the knob back and forth, the vertical row of 12 white LEDs to the left of the outputs will update and illuminate to indicate the phase offset that has been selected.

Set the PHASE OFFSET knob so that LED 7 is illuminated.

Read across to the right column of text labelled OFFS – this indicates that the output type now has a phase offset of 90 degrees.

## 6) REVIEW THE PATCH SETTINGS

Single-click the EDIT button to cycle through the TYPE (output type), DIV (clock division/multiple) and OFFS (phase offset) settings for the selected output.

The vertical row of 12 white LEDs to the left of the outputs will update to show the current settings for each of the 3 parameters for the selected output.

## 7) ASSIGN THE NEXT OUTPUT

Return to step 2 to select a new output to edit and then repeat steps 3-6 for each output.

## 1) OUT: 1-8

The ADE-32 has 8 outputs aligned vertically down the right-hand side of the front panel.

Any of the 12 output types can be assigned to any of the 8 outputs.

To the right of each output are 2 indicator LEDs – a blue LED marked 'E' (Edit) to show which of the 8 outputs is currently selected for editing according to the position of the OUTPUT: SELECT knob and a white LED marked 'A' (Activity) to show what is happening at that output.

## 2) EXT. CLOCK IN

The ADE-32 can be operated using its on-board clock or can be synced/slaved to an external clock.

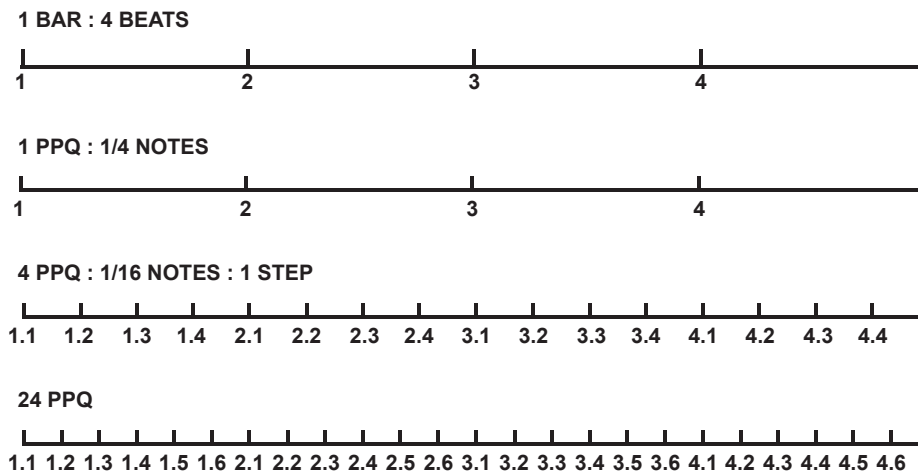
Under the latest firmware revision it is possible to select whether the ADE-32 is controlled by the internal or an external clock.

When controlled by an external clock – the ADE-32 will not run until it receives a clock signal.

When running under the internal clock – the ADE-32 can be started and stopped manually via the front panel.

The ADE-32 will sync to the rising edge of an incoming signal between 20 and 270 BPM as long as the incoming clock is set to the correct resolution and within the module's tempo range.

Under the latest firmware revision the ADE-32 will sync to external clock resolutions of 1, 4 or 24 PPQN.



## 3) EXT. RESET IN

The ADE-32 can be reset using the rising edge of an external input signal.

This will reset the cycle of all 8 outputs back to bar 1, beat 1 of the overall 16 bar, 64 beat cycle.

## 1) TEMPO

The TEMPO knob sets the master tempo for the entire module. It is active when the module is running under the internal clock and disabled when the module is running under external clock.

The clock divisions/multiples for all outputs are set from this tempo.

The tempo can be changed from 20 to 270 BPM. The 2 blue LEDs to the right of this knob indicate BAR and BEAT respectively with a slightly longer flash at the first beat of each 64 beat/16 bar cycle.

## 2) OUTPUT: SELECT

The OUTPUT: SELECT knob selects an output to edit.

Each of the 8 outputs has a blue LED marked 'E' (Edit) to the upper right that will illuminate to indicate the output that is being edited as you turn this knob.

## 3) OUTPUT: TYPE

The OUTPUT: TYPE knob assigns an output type to the selected output.

The 12 output types are listed on the front panel in the left-hand vertical column titled TYPE.

The vertical row of 12 white LEDs to the right of that column will update and illuminate to indicate the output type that has been selected.

## 4) CLOCK DIV/MULT

The CLOCK DIV/MULT knob sets the timing of the output type assigned to the selected output.

This timing is a division or a multiple of the master tempo.

The 12 timing divisions are listed on the front panel in the middle vertical column titled DIV.

The vertical row of 12 white LEDs to the right of that column will update and illuminate to indicate the clock division/multiple that has been selected.

## 5) PHASE OFFSET

The PHASE OFFSET knob sets a phase offset for the output you are editing. Phase offset is expressed in degrees or as a fraction of the total time of the clock division.

The 12 offset options are listed on the front panel in the right-hand vertical column titled OFFS.

The vertical row of 12 white LEDs to the right of that column will update and illuminate to indicate the phase offset that has been selected.



## 1) EDIT

Clicking the EDIT button will scroll through to display the current status for each of the 3 parameters for the selected output: TYPE (output type), DIV (clock division/multiple) and OFFS (phase offset).

The white LED above the panel title will illuminate to show which of the 3 parameters has been selected and is ready to edit.

The vertical row of 12 white LEDs will also update and illuminate to show which option has been selected for the selected parameter.

These 3 LEDs will also update when the OUTPUT: TYPE, CLOCK DIV/MULT or PHASE OFFSET KNOBS are moved.

## 2) OPTION

Each output type has an option. Clicking the OPTION button will turn the option on or off (output types 1-8), activate looping (output types 9-10) or scroll through (output types 11-12).

For output types with only one option – the white LED above the OPTION button will illuminate to show whether the option is selected (LED on) or not (LED off).

For output types with a looping option – the white LED above the OPTION button will illuminate to show whether looping is on (LED on) or off (LED off).

For output types with multiple options the white LED above the OPTION button will illuminate momentarily with each press.

## 3) DIV/MULT QUANTIZE

The DIV/MULT QUANTIZE button will turn quantizing of clock division/multiple settings on or off for the selected output.

When quantizing is on, the white LED above the DIV/MULT QUANTIZE button will illuminate and the clock divisions/multiples for the selected output will lock to one of the 12 clock divisions listed in the vertical column on the front panel labeled DIV.

When quantizing is off, the white LED above the DIV/MULT QUANTIZE button will be off and the clock division at the selected output will move incrementally.

When quantizing is off, the vertical row of 12 white LEDs will flash at different speeds to show how far from (slow flash) or close to (fast flash) a particular clock division you are.

## 4) OFFSET QUANTIZE

The OFFSET QUANTIZE button turns quantizing of phase offset positions on or off for the selected output.

When quantizing is on, the white LED above the OFFSET QUANTIZE button will illuminate.

When turning the PHASE OFFSET – the phase offset for the selected output will lock to one of the 12 phase offset positions listed in the vertical column on the front panel labeled OFFS.

When quantizing is off, the white LED above the OFFSET QUANTIZE button will be off and the phase offset at the selected output will move incrementally.

When quantizing is off, the vertical row of 12 white LEDs will flash at different speeds to show how far from (slow flash) or close to (fast flash) a particular phase offset you are.

## 5) MUTE SELECTED OUTPUT

Simultaneously clicking both the EDIT and OFFSET QUANTIZE buttons will mute or unmute the currently selected output.

The blue Edit LED of the currently selected output will flash to show that output has been muted.

## 1) EDIT [LATCHING]

A click & hold on the EDIT button will change the behavior for the OUTPUT: TYPE, DIV/MULT QUANTIZE and OFFSET QUANTIZE knobs between 'non-latching' and 'latching'.

Non-latching means that when a knob is turned the setting for that output will instantly update to reflect the current knob position.

Latching means that no update will take place until the knob has been turned to the position that matches the setting for that knob.

The change is indicated by a series of 3 quick flashes on the TYPE LED to show LATCHING OFF and on the OFFS LED to show LATCHING ON.

## 2) OPTION [S&H CV RANGE]

A click & hold on the OPTION button will alternate the behaviour of the S&H CV output type between bipolar (+/- 5V) and unipolar (0-1V).

The unipolar values are quantized to whole notes across a 1 octave range.

The change is indicated by a series of 3 quick flashes on the TYPE LED to show QUANTIZING OFF and on the OFFS LED to show QUANTIZING ON.

## 3) DIV/MULT QUANTIZE [BEAT/BAR]

A click & hold on the DIV/MULT QUANTIZE button will change the behaviour of the CLOCK DIV/MULT knob between BEAT i.e. – the clock division/multiple will update as soon as the knob is turned and BAR – i.e. the clock division/multiple will update at the first beat of the next bar.

The change is indicated by a series of 3 quick flashes on the TYPE LED to show QUANTIZING OFF and on the OFFS LED to show QUANTIZING ON.

## 4) OFFSET QUANTIZE [BEAT/BAR]

A click & hold on the OFFSET QUANTIZE button will change the behaviour of the OFFSET QUANTIZE knob between BEAT i.e. – the phase offset will update as soon as the knob is turned and BAR – i.e. the phase offset will update at the first beat of the next bar.

The change is indicated by a series of 3 quick flashes on the TYPE LED to show QUANTIZING OFF and on the OFFS LED to show QUANTIZING ON.

## 5) SET EXTERNAL CLOCK RESOLUTION

Simultaneously clicking both the EDIT and OPTION buttons will cycle through the 3 available external clock resolutions of 1, 4 or 24 PPQN.

The change is indicated by a series of 3 quick flashes on the TYPE LED to show 1 PPQN, on the DIV LED to show 4 PPQN and on the OFFS LED to show 24 PPQN.

## 6) CLOCK MODE

Simultaneously clicking both the EDIT and DIV/MULT QUANTIZE buttons will cycle through the 2 available clock modes.

When the ADE-32 is in internal clock mode – the module will run using the built-in clock to set tempo.

When the ADE-32 is in external clock mode – the module will only run when it is receiving a clock signal at EXT. CLOCK IN.

# 9: Output Types & Options

#	Name	Description	CV Range	Option (Off)	Option (On)	Clock Div. (Min)	Clock Div. (Max)
1	Pulse 1 & 2	Fixed-width	0-5V	5 Msec duration	10 Msec duration	1/16 Beat	2 Beats   1/2 Bar
			0-5V	50 Msec duration	100 Msec duration	4 Beats   1 Bar	16 Beats   4 Bars
			0-5V	1/2 Sec duration	1 Sec duration	32 Beats   8 Bars	64 Beats   16 Bars
2	Gate 1 & 2	Variable-width	0-5V	1/16 of clock division	4/16 of clock division	1/16 Beat	64 Beats   16 Bars
3	Gate 3 & 4	Variable-width	0-5V	8/16 of clock division	12/16 of clock division	1/16 Beat	64 Beats   16 Bars
4	LFO SQU	Square wave	+/-5V	In phase	Inverted phase	1/16 Beat	64 Beats   16 Bars
5	LFO RMP	Ramp/Sawtooth	+/-5V	In phase	Inverted phase	1/16 Beat	64 Beats   16 Bars
6	LFO TRI	Triangle wave	+/-5V	In phase	Inverted phase	1/16 Beat	64 Beats   16 Bars
7	LFO SIN	Sine wave	+/-5V	In phase	Inverted phase	1/16 Beat	64 Beats   16 Bars
8	Noise	Digital noise	+/-5V	Digital noise 1	Digital noise 2	1/16 Beat	64 Beats   16 Bars
9	S&H CV	Random CV	+/-5V    0-1V	Looping: Off	Looping: On	1/16 Beat	64 Beats   16 Bars
10	S&H Gates	Random gates	0-5V	Looping: Off	Looping: On	1/16 Beat	64 Beats   16 Bars
11	Arps	10 Arpeggio types	0-1V	Scroll: Arps 1-10	-	1/16 Beat	16 Beats   4 Bars
12	Loops	10 Rhythmic gates	0-5V	Scroll: Loops 1-10	-	1/16 Beat	16 Beats   4 Bars

# 10: Arpeggios

Arp. #	Artist	Track	Note 1	Note 2	Note 3	Note 4
1	Orbital	Remind	C	C#	G	G#
2	Energy 52	Café Del Mar	C	D	G	F
3	Leftfield	Song Of Life	C	D#	D	D#
4	Aphex Twin	Polynomial Arpeggios	C	D#	G	G#
5	Pink Floyd	On The Run	C	D#	G#	F
6	Boards of Canada	Collapse	C	D#	A#	G
7	Tangerine Dream	White Eagle	C	G	C*	G
8	Underworld	Rez	C*	G#	D#	C
9	Donna Summer	I Feel Love	F	F	C	D#
10	New Order	Blue Monday	G	F	D	C

**NOTES:** The ADE-32 includes 10 pre-set arpeggios of 4 notes each 'in the style of' various classic pieces of electronic music. Use them as is or as building blocks for further experimentation and manipulation.  
C\* is an octave up from C

# 11: Loops

	STEP #1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LOOP #1		█		█			█	█		█			█	█	█	
2		█			█		█		█	█		█			█	█
3	█	█		█		█			█	█		█		█	█	
4	█			█	█		█			█	█			█	█	
5	█		█				█	█			█	█			█	
6	█			█		█	█			█		█		█	█	
7		█		█	█		█		█			█		█	█	
8		█	█		█		█	█		█		█			█	█
9		█		█				█	█		█		█	█		█
10	█		█			█		█	█		█		█	█		█

**NOTES:** The ADE-32 includes 10 pre-set loops of 16 steps each formed by a series of rhythmic gates. Use them as is or as building blocks for further experimentation and manipulation.

## 1) SYSTEM REQUIREMENTS

- Apple Mac computer running OS 10.9 or later with 1 free USB port.
- USB to FTDI cable (TTL-232R-5V): A suitable cable can be purchased directly from the Abstract Data website or from any of the suppliers listed on the Abstract Data website.  
Please note: This needs to be the 5V cable – \*not\* the 3.3V version.  
Please note: Abstract Data cannot provide support for cables or programmers that do not fit this spec.

## 2) DOWNLOADS: <http://www.abstractdata.biz/products/eurorack/3x/ade32/?tab=firmware>

- FTDI Cable Driver: This is the driver for the USB to FTDI cable – this only needs to be installed once.
- Easy Uploader: This is the firmware installer – this only needs to be installed once.
- Firmware files: These are the latest EEPROM and firmware versions that are unique to each upgrade.

## 3) UPGRADE PROCEDURE

- Please note that this procedure will restore your ADE-32 to factory settings. Please consider making a written record of any important settings you might currently have on the ADE-32 before upgrading.
- Install the FTDI driver on the computer that you'll be using for the upgrade.
- Install the Easy Uploader on the computer that you'll be using for the upgrade.
- The ADE-32 needs to be plugged in via a standard Doepfer power cable – but \*not\* powered up. You will also need access to the FTDI port (6x vertical pins) on the rear PCB of the ADE-32.
- Carefully plug the FTDI cable in to the FTDI port (6x vertical pins) on the rear of the ADE-32. The black wire on the FTDI cable faces down.
- Ensuring the ADE-32 is in a secure position where none of the exposed components are likely to touch other conductive surfaces – power up the ADE-32.
- Plug the USB end of the USB to FTDI cable into the computer you will be doing the install on. The ADE-32 might appear to stall a little as it is mounted – this is normal.
- Open the application 'Easy Uploader'. If you get an 'unidentified developer message' – click 'OK' and then open the application using a Control/Right Click – this will bring up a dialogue box – click 'Open'. Check the correct USB port is selected – it will generally be the one on the bottom of the list and will look something like: `/dev/cu/usbserial-XXXXXXXX`
- EEPROM must be updated first. Click the 'Upload...' button, then navigate to and select the ADE-32 EEPROM file you downloaded.  
You will see the status message "Programming. Please wait..." followed by the status message "Completed!". The unit will now be in a coma. This is normal.
- Now update the firmware. Click the 'Upload...' button again, then navigate to and select the ADE-32 firmware file you downloaded.  
This part will take a bit longer – but you will see the status message "Programming. Please wait..." followed by the status message "Completed!".
- Quit the 'Easy Uploader', unplug the USB end of the cable from the computer, power-down the ADE-32 and then carefully unplug the FTDI end of the cable from the ADE-32.  
You have now completed the Firmware upgrade.

## 1) SYSTEM REQUIREMENTS

- Windows computer running Win XP or later with 1 free USB port.
- USB to FTDI cable (TTL-232R-5V): A suitable cable can be purchased directly from the Abstract Data website or from any of the suppliers listed on the Abstract Data website.  
Please note: This needs to be the 5V cable – \*not\* the 3.3V version.  
Please note: Abstract Data cannot provide support for cables or programmers that do not fit this spec.

## 2) DOWNLOADS: <http://www.abstractdata.biz/products/eurorack/3x/ade32/?tab=firmware>

- FTDI Cable Driver: This is the driver for the USB to FTDI cable – this only needs to be installed once.
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## 3) UPGRADE PROCEDURE

- Please note that this procedure will restore your ADE-32 to factory settings. Please consider making a written record of any important settings you might currently have on the ADE-32 before upgrading.
- Install the FTDI driver on the computer that you'll be using for the upgrade.
- Install the Easy Uploader on the computer that you'll be using for the upgrade.  
The installer is 32bit but will also work on 64bit systems.
- The ADE-32 needs to be plugged in via a standard Doepfer power cable – but \*not\* powered up.  
You will also need access to the FTDI port (6x vertical pins) on the rear PCB of the ADE-32.
- Carefully plug the FTDI cable in to the FTDI port (6x vertical pins) on the rear of the ADE-32.  
The black wire on the FTDI cable faces down.
- Ensuring the ADE-32 is in a secure position where none of the exposed components are likely to touch other conductive surfaces – power up the ADE-32.
- Plug the USB end of the USB to FTDI cable into the computer you will be doing the install on.  
The ADE-32 might appear to stall a little as it is mounted – this is normal.
- Open the application 'Easy Uploader' – there should be a short-cut on your desktop.  
Check the correct USB port is selected – it will generally be the one on the bottom of the list and will look something like: \\.\COM3
- EEPROM must be updated first. Click the 'Upload...' button, then navigate to and select the ADE-32 EEPROM file you downloaded.  
You will see the status message "Programming. Please wait..." followed by the status message "Completed!". The unit will now be in a coma. This is normal.
- Now update the firmware. Click the 'Upload...' button again, then navigate to and select the ADE-32 firmware file you downloaded.  
This part will take a bit longer – but you will see the status message "Programming. Please wait..." followed by the status message "Completed!".
- Quit the 'Easy Uploader', unplug the USB end of the cable from the computer, power-down the ADE-32 and then carefully unplug the FTDI end of the cable from the ADE-32.  
You have now completed the Firmware upgrade.

## 1) NEW FEATURES

- External clock resolution can now be selected from 1, 4 or 24 PPQN.
- The ADE-32 now has two clock modes. Choose between internal clock mode where the ADE-32 runs from its own internal clock or external clock mode where the ADE-32 will not run unless a clock source is present at the external clock input.
- Switching clock modes when no external clock is present can be used for manual stop/start control.
- The 2 blue bar/beat LEDs reverse out to show when the ADE-32 is running under external clock.
- Each output can now be muted individually. The blue edit LED flashes to indicate a muted state on the currently selected output.

## 2) CHANGES

- Quantized (0-1V) or unquantized (+/-5V) S&H CV types can now be set locally, per output.
- Pulses, gates and loops are now unipolar 0-5V.
- Gate 1 and 2 lengths are now 1/16, 4/16, 8/16 and 12/16 respectively.
- LED indicator behaviour standardised to 3 flashes for all option and global settings.

## 3) BUG FIXES

- Fixed a bug where pulses would not trigger at clock divisions greater than 16 || 4.
- Fixed a bug where output types 9-10 might act eratically when allocated to output 8.



# 15: Specs

<b>HARDWARE:</b>	<b>Controls (Knobs):</b>	Tempo Output: Select Output: Type Clock Division/Multiple Phase Offset
	<b>Controls (Buttons):</b>	Edit [Latching] Option [S&H Range] Division/Multiple Quantize [Beat/Bar] Offset Quantize [Beat/Bar]
	<b>Inputs (Clock):</b>	Ext. Clock In Ext. Reset In
	<b>Outputs (Signal):</b>	8x @ +/- 5V maximum
	<b>Power Requirements:</b>	+/-12V via 16-pin, Doepfer-style IDC connector
	<b>Current Draw:</b>	+12V: approx. 135mA average -12V: approx. 110mA average +5V: NA
	<b>Dimensions:</b>	Width: 14HP Depth: Panel to IDC connector 35mm
	<b>Supplied Accessories:</b>	1x 16-pin, Doepfer-style cable 4x M3 screws 4x Nylon washers

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