8KTAKONTROL

Operating Handbook

(Rev 1.0 / March 2014)

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Introduction

The Oktakontrol (**OK**) basically is a conventional midi controller box which is **customized** to the Elektron Octatrack (**OT**) where "customized" means that the OK has the same width & height as the OT and that it is delivered pre-programmed in a way that you can connect, power up and instantly use the OK to control the OT.

The **internals** of the OK consists of two printed circuit boards: the mainboard and the supplyboard, which are developed and hand-soldered by ourselves. The manufacturing (printing, etching, drilling, plating) of the boards is done on a professional standard by www.Eurocircuits.com in Central Europe.

The **supplyboard** consists of the components for power-supply, the connections and the basic control. The basic control itself is mainly designed around an 8-bit/32KB flash microcontroller ATMEL ATmega 328 and based on **Arduino**[1]. The microcontroller is loaded with two "programs", one is the bootloader (like the operating system on your Computer, i.e. Windows 7) and the other is the software which handles the in- and outputs of the faders, buttons, LEDs etc.. This is a code developed & written by us[2], it is published open source as an Arduino sketch and can be modified by everyone who is familiar with Arduino or programming in general. Also these hyper-rocket-technology mega-geeks could write a complete own program with the Arduino IDE and load it to the Atmega328. Thus you could use the OK as your own platform to develop an own midi-box based on our solid hardware!

The **mainboard** consists of the components for the "user-interface" like the 60mm travel faders, the buttons and the LEDs. The faders and buttons are good quality ALPS components, they feel good and do a reliable job – for example the buttons are specified (by ALPS) for 10,000,000 cycles.

All parts are ROHS-compliant and lead-free soldered (btw. lead-free soldering sucks).

The **case** of the OT is made of solid powder-coated steel[3] with a silkscreen printed labeling. All knobs are made of plastic, they have a good dimensioned size and a nice tactile feel.

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[1] For more information about Arduino go to http://www.arduino.cc.

[2] While the code is developed by AG-KW, we want to point out that we use the Midi Library of François Best. This library is so great that it simply did not make any to use anything else or develop an own library. **Many thanks to François** who published his library open source under GNU GPL v3! Go to http://fortyseveneffects.com/arduino-midi-library-v4-0-is-out to gain knowledge about that.

[3] Only some early versions of the OK and maybe special editions in the future have the front and rear panel made of wood.

Quickstart

1. Connect a midi cable from MIDI-OUT of the Oktakontrol to MIDI-IN of the Octatrack.

2. Connect a standard wall-wart type AC/DC converter with an output of 9V DC and a center-positive 2.1mm barrel connector into the socket 9VDC.

   WARNING: <u>Never</u> supply the Oktakontrol with a voltage higher than 12 VDC or with any AC power! If you do so, there is serious danger for your health and the device!

   NOTE: If you supply the Oktakontrol with a voltage lower than 9V or with wrong polarization it simply won't work and you can "repair" this by using the correct supply.
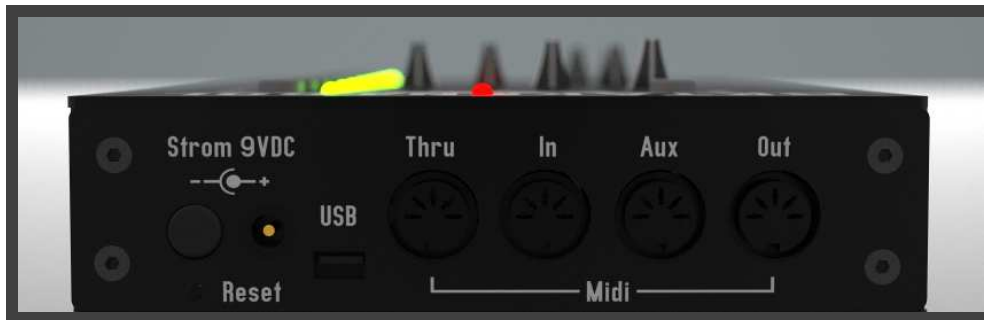
3. Push the power button which is located next to the 9VDC socket to switch on the Oktakontrol.

4. Also switch on the Octatrack and start a nice jam as you usually do.

   IMPORTANT: Make sure to enable midi controller input on the Octatrack[4].

5. Slide one of the eight faders to control the amp volume of the corresponding audio track of the connected Octatrack (i.e. fader #1 controls AMP volume of audio track #1).

6. Listen! If the Octatrack is connected to a soundsystem and its volume is cranked up to some safe but satisfying level, you should now hear the incredible effect of changing volumes.

7. Push the 8 buttons to mute and unmute tracks.

8. Press button #2 "Solo" while you press&hold the button "Funktion".

9. After you released these buttons you are in solo-mode and thus able to solo / unsolo tracks by pushing the 8 buttons.

10. Great, isn't it? Now have phun & try around or follow the manual for even more phun with the Oktakontrol!

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[4] See Oktakontrol manual chapter „Projects – The Project Menu – Midi" to see how to do that.

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Connections

9VDC	Connect a standard wall-wart type AC/DC converter with an output of 9V DC, a minimum rating of 300mA and a center-positive 2.1mm barrel connector into this socket. Next to the 9VDC socket you find the power switch. WARNING: Never supply the Oktakontrol with a voltage higher than 12 VDC or with any AC power! If you do so, there is serious danger for the health of you and the device! **NOTE: If you supply the Oktakontrol with a voltage lower than 9V or with wrong polarization it simply won't work and you can "repair" this by using the correct supply.**
MIDI IN	At MIDI-IN you can connect a MIDI-OUT of any other MIDI-compliant device. Connect a midi cable from any midi sending device here, i.e. from an external clock source. Any incoming midi message will be directed to the MIDI OUT and the MIDI THRU. Also you can receive a feedback from the OT via the OK MIDI-IN that means if connected respectively you can trigger a MIDI send request which is sent from OK to OT and OT responds with its actual setting (i.e. the state of the mutes), then the OK captures this setting.
MIDI OUT	MIDI-OUT gives out all generated MIDI-controller change values merged together with any MIDI-messages received on the MIDI-IN. The basic function of the OK is achieved by connecting OK MIDI-OUT to the MIDI-IN of the OT.
MIDI THRU	MIDI-THRU forwards any signal received on MIDI-IN without modification.
MIDI AUX	Initially this is an additional MIDI-THRU. Furthermore it is configurable via a jumper-setting internally (on the supply pcb) to act as an additional MIDI-IN or MIDI-OUT. Note: The function to act as additional IN or OUT is yet not fully developed (therefore the firmware has to be modified / scheduled by AG-KW for April 2014) – but if it works as planned, this gives you the possibility to have the MIDI feedback function while the MIDI-IN is still free for other external devices.
USB	The Mini B USB socket serves as a programming port for updating the Oktakontrol firmware.

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Initial Setting

<u>Initially</u> the Oktakontrol is delivered with the buttons and fader #1 to 8# assigned to midi channel #1 to #8 which corresponds to the midi control channels of the OTs audio tracks in its initial configuration.

Every time you power up the OK:
- Fader #1 to #8 are assigned to midi cc#25 which corresponds to audio track amp volume (amp parameter #4)
- Button #1 to #8 are assigned to midi cc#49 which corresponds to audio track mute

After power up, when you press and hold the button "Funktion" while you press one of the 8 buttons you can alternate between different functions / modes. Refer to the following chapters for more information.

The functions / modes and assignments can be modified by changing them in the Arduino Sketch OKlatestRev.ino[5]. Refer to the chapters "Uploading Code" and "Modifying Code" of this manual. As this requires some knowledge about programming in the Arduino IDE (or interest&time to gain that knowledge) we plan to develop a software for Windows/Mac for easy updating the OK and changing the assignments in a simple graphical user interface.

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[5] Which is published on http://www.ag-kw.de (OKlatestRev.zip).

Buttons

We have 10 buttons on the OK frontpanel. While the upper right button "USB Mode" is currently not used, let's have a closer look to the 9 lower buttons. The rightmost button we call the "Funktion"-button, the other eight buttons are simply called button #1 to button #8 (from left to right).

After powering up the OK, **function #1,** the **mute-mode**, is active: button #1 to #8 are for OT track muting, which means if you press one of the eight buttons, you send a controller change value at midi cc#49 on the corresponding midi channel #1 to #8 via the OK MIDI OUT.

You can **alter functions / modes** with the help of the "Funktion"-button: Press and hold the "Funktion"-button and at the same time momentarily press one of the buttons #1 to #8. This way you can assign the buttons to different functions according the table below.

A **blinking LED** #1 to #8 while pressing & holding the "Funktion"-button shows the active function, a **steady LED** shows the current states of the active function.

Function:	#1	#2	#3	#4	#5	#6	#7	#8
Mode	Mute	Solo	Track Arm	Rek. Arm	User#1	User#2	Page	Request
Midi CC#	49	50	52	53	Configurable	Configurable	N/A	61

For example: Press and hold "Funktion" & momentarily press button #2 "Solo". After release of the "Funktion"-button, **function #2,** *the* **solo-mode***, is active: the buttons #1 to #8 are for OT track solo, a controller change value at midi cc#50 on channel #1 to #8 is sent via MIDI OUT if one of the buttons #1 to #8 is pressed now.*

Function #3 and #4, Track Arm mode and Rekord Arm mode: With these functions you can arm *one shot triggers* (track triggers or record triggers) which were previously entered on the OK sequencer. The behavior / activating of these functions is the same as previously described. For more information about one shot triggers refer to *chapter "Patterns - Trig Types - One Shot Trigs"(currently on page 80) of the Octatrack manual.*

Function #5 and #6, User#1 and #2 mode: These functions are yet not assigned; one could assign these according to its own concept. A simple assignment to any midi cc# and also special functions are imaginable here (i.e. a combination of several midi cc# at once a.k.a. shortcuts or something else). Maybe user input could give us an inspiration for a nice initial assignment of User#1 and #2 (send proposals to zentrale@ag-kw.de).

Function #7, "Page" is not assigned to a midi cc# as it is used to select the "virtual fader pages", it changes the fader assignments. Go to chapter "Faders" for more information about this.

Function #8, "Request" is not assigned to a midi cc# as it is used for sending a "request" midi cc #61 via MIDI OUT. Refer to chapter "Feedback Function" for more information about this feature.

Also note this extraspecial hyperspaceshiptechnology function: We integrated an "**undo all**"-function! It works like this: For example, while you are already in mute mode, press&hold "Funktion" + momentarily press button #1 all current mutes are un-muted, all tracks are thrown out of the speakazz again. The same is with solo (while already in solo mode, press&hold "Funktion" + momentarily press button #2 = all current solos are un-solo-ed).

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Faders

We have 8 faders on the OK front panel, they are called fader #1 to fader #8 (from left to right).

After powering up the OK, **page #1** is active: fader #1 to #8 are for OT track amp volume, which means if you move one of the eight faders, you send a controller change value at midi cc#25 on the corresponding midi channel #1 to #8 via the OK MIDI OUT.

You can **alter the pages** (" virtual fader pages"), with the help of the "Funktion"-button: Press and hold "Funktion" & momentarily press button #7 "Page". After release of the buttons, you are in the **page-mode**. Respectively button #1 to #8 are to select the "virtual fader pages" with the fader assignments according the following table.

While in page-mode a **steady LED** #1 to #8 shows the active page (=current fader assignment).

Page	#1	#2	#3	#4	#5	#6	#7	#8
Alias	Amp param. #4 (Amp Vol.)	FX1 param. #6 (Mix)	Playback param. #1 (Pitch)	Playback param. #5 (Retrigger)	Playback param. #6 (Retrig-time)	FX2 param. #1 (Time)	FX2 param. #2 (Feedback)	FX2 param. #6 (Mix)
Midi CC#	25	39	16	20	21	40	41	45

For example: Press and hold "Funktion" & momentarily press button #2. After release of the "Funktion"-button, page#2 is active: when moved, the faders #1 to #8 send a controller change value at midi cc#39 on channel #1 to #8 via MIDI OUT. Midi cc#39 is for FX1 parameter #6 on the OT which - on some effects - corresponds to "Mix".

The thing here is, that the actual parameters are not constant while you alter effects on the OT, for information about the effect parameters, refer to the Octatrack manual chapter "Appendix B - Effects reference". The current assignments for the **pages #1 to #8**, shown in the table above, is something that makes sense for us - but the meaningfulness (does this word really exist in english? … sorry we are german) depends on the effects used and individual users habits. As already mentioned, currently all assignments can be modified by changing them in the Arduino Sketch and we plan to develop a software for Windows/Mac for that purpose.

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Feedback Function

The OK has an automatic and a manual feedback function. This means you can receive Octatracks current midi controller values and set these as current values for the Oktakontrols controls. To enable this you must have the OT MIDI OUT connected to the OK MIDI IN and set Audio CC Out to "EXT" or "INT+EXT" (refer to the Octatrack manual chapter "Projects – The Project Menu –Midi"). Then it goes like this:

- **Automatic** - If the setup is as described above, every time you switch on the OK or operate any of the OT controls (i.e. the encoders) while the OK is switched on, the OK takes over the midi controller values from the OT & uses it as new start points for its controls (faders & buttons).

  Example: Set a mute on the OT - this mute is automatically set in the OK. If the mute-mode is active you can see the related LED on the OK extinguish.

- **Manual** - If the setup is as described above, you can press&hold the "Funktion"-button and at the same momentarily press button #8 "Request". This starts the following sequence:
  1. On OK MIDI OUT midi cc#61 is sent out & received on OT MIDI IN.
  2. OT internally: Midi cc#61 is a "Send Request" for the OT & triggers to capture all midi cc values
  3. On OT MIDI OUT the current values of all midi controllers are sent out & received on OK MIDI IN
  4. OK internally: Takes over all midi cc values & uses it as new start points for its controls (faders & buttons

  Note: The manual feedback is very helpful when you a) change a pattern on the OT or b) switch on the OT after the OK or c) the connection between OT MIDI OUT and OK MIDI IN was temporarily interrupted.

Setup examples

To be added …

Uploading Code

The following instructions are based on a Windows computer system. For more information and especially for instructions on installing & using the Arduino environment on a MAC or Linux please go to: http://arduino.cc/en/Guide/HomePage
Step 1 to 5 are only necessary one time. Once performed, if you want to update the Oktakontrol software, you only need to re-connect the Oktakontrol via USB to your computer & repeat step 6 to 8.

1. Go to http://arduino.cc/en/Main/Software to download the Arduino environment. The current version is 1.0.5.
2. Install the Arduino environment including the Arduino USB drivers.
3. Connect the Oktakontrol via USB to your Computer – the installation routine of the necessary drivers should start automatically now.
4. Download the Midi Library[6] "Arduino_MIDI_Library_v4.0.zip" from https://github.com/FortySevenEffects/arduino_midi_library/releases/download/4.0/Arduino_MIDI_Library_v4.0.zip
5. Copy the extracted folder "MIDI" to the "libraries"-folder of the Arduino environment (the exact path depends on your configuration, for example it can be "C:\Program Files (x86)\Arduino\libraries")
6. Download "OKlatestRev.zip" (if not already done) from http://www.ag-kw.de and extract it.
7. Open the folder "OKlatestRev" and load it with the Arduino environment by double-click on "OKlatestRev.ino" (also you can start the Arduino environment first and then navigate to & open "OKlatestRev.ino" via "File" – "Open…")
8. Hit the upload button to upload the Oktakontrol software. When uploading is done "Done uploading" will appear in the lower status bar.
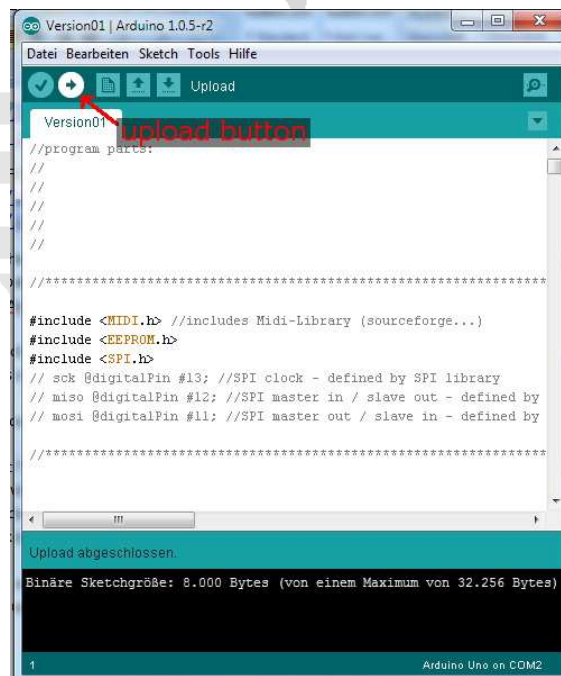
Modifying Code

To be added …

Technical Specifications

To be added …

Glossary

To be added …