

# Tubbutec Modypoly / Modysix

MIDI RETROFIT AND FEATURE EXTENSION FOR POLYSIX AND POLY-61

User Manual for firmware version v2.0

<http://tubbutec.de>

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# 1 ModyPoly / Modysix

The ModyPoly, aka Modysix is a midi retrofit and feature extension for the Korg Polysix Korg Mono/Poly and Poly-61 synthesizers. It features various additional play modes, a free definable arpeggiator, midi in and midi out, and a sustain pedal input, two additional filter LFOs and plenty other features.

This manual only describes the features different from the original Polysix and Poly-61. Great care has been taken to not alter the original behaviour, except of course for the additional features.

## 2 Play Modes

### 2.1 Play Modes Overview

In addition to the three play modes (Unison, Poly and Chord Memory) featured in the original Polysix the Modysix offers various other play modes. The new play modes are: An extended unison mode, 2-Voice Mode, 3-Voice mode and Polychord.

### 2.2 Extended Unison

The Extended Unison features adjustable key priority and re-trigger settings. This way the Polysix / Poly-61 can behave just like the monophonic synthesizer of your choice.

The features can be set using the arpeggiator's switches for direction and latch.

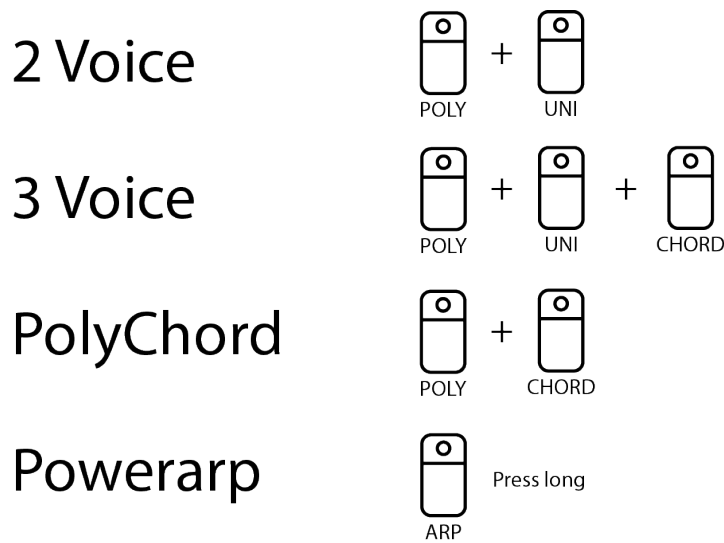


Figure 1: Play mode selection overview

Note for Poly-61 users: You can access unison mode by using midi or by installing a unison button.

### 2.2.1 Retrigger

Retrigger defines whether the gate re-triggers when playing legato. When turned off the gate stays on as long as there are one or more keys pressed, which also means that the envelope does not retrigger until you release all keys. In the original Polysix Retrigger is always turned on. Use the LATCH switch to set the re-trigger mode. Latch on -> Retrigger on. Latch off -> Retrigger off.

### 2.2.2 Priority

Priority defines how the currently played monophonic note is selected from the keyboard input. This can be used to emulate the behavior of classic monophonic synths.

Priority can be set to Upper/Lower/Last using the UP/DOWN/UPDOWN switch of the arpeggiator. In the original Polysix Priority is set to last. UPPER means the uppermost key is selected for playing, LOWER means the lower most key is selected.

When LAST is selected the 8 last played keys are used to determine the note played when a key is released.

## 2.3 3 Voice mode

The 3 voice mode is just like the normal polyphonic mode, only you have three voices instead of six. In this mode two oscillators are layered to create a denser, thicker sound. To activate 3 Voice mode press POLY, UNI and CHORD simultaneously.

## 2.4 2 Voice mode

In the 2 Voice Mode there is only two voice polyphony, but is just like the normal polyphonic mode, only you have two voices instead of six. Three oscillators are layered to create an even denser, thicker sound. To activate 3 Voice mode press POLY and UNI simultaneously.

## 2.5 Polychord

The Polychord functionality allows you to assign an individual chord to each key of the keyboard and play these chords with a single key press. Like any other play mode Polychord can be used in conjunction with the Powerarp. Combining the two gives you a versatile chord sequencer!

### 2.5.1 Switching into Polychord

To switch into Polychord mode release all keys, and press POLY and CHORD simultaneously.

### 2.5.2 Recording a new Chord

To record a new chord, play it on the keyboard and press POLY and CHORD simultaneously. The POLY led will now blink to indicate that the device is waiting for you to select the key you want the chord assigned to. Press a key and the chord will be assigned to this key. The synthesizer then returns to the play mode it was in before to speed up entry of multiple chords. This is a similar procedure to recording a chord in chord memory on the original Polysix / Poly-61. Just press POLY+CHORD instead of just CHORD.

### 2.5.3 Retrigger

Use the LATCH switch to set the re-trigger mode for Chord. Latch on -> Retrigger on. Latch off -> Retrigger off.

## 2.6 Chord

### 2.6.1 Retrigger

Use the LATCH switch to set the re-trigger mode for Chord. Latch on -> Retrigger on. Latch off -> Retrigger off.

# 3 Powerarp

## 3.1 Powerarp overview

The Powerarp mode lets you define a custom arpeggiator sequence which - just like the normal arp - works in all play modes. You can define a sequence of up to 128 notes, transpose in pitch or shift it in time. The next note is triggered by the arp clock, or midi.

## 3.2 Creating a new sequence

Hold the ARP key until it starts blinking. Now you can enter your sequence note by note. Pressing the HOLD key while holding down a key will insert a tie and make the note longer by one step. Pressing HOLD without holding down a key will insert a break with the duration of one note. The HOLD led will light up for a short while to indicate a break has been inserted.

New in version 2.0: When playing legato when recording the notes, they will also be played legato on playback. This works in all play modes. If the HiRes upgrade is installed and auto-portamento turned on, this will also insert glides into the sequence.

You can use this to program more complex rhythms, than a usual arpeggiator can provide. When finished press the arp key again to save the se-



quence and get into Powerarp mode. The sequence will be saved, even if you switch off the Polysix / Poly-61.

### 3.3 playing and transposing

To play the sequence press the middle C (C3). To transpose the sequence press key above or below the middle C. When playing staccato the sequence is reset each time you press a key, when playing legato it will transpose without resetting. Activating HOLD will make sure the sequence is not retriggered, just like playing legato. The two uppermost keys of the keyboard have a special function. The C will advance the sequence by one step, the B will move it back by one step.

### 3.4 Latch, Mode and Range

#### 3.4.1 Latch

When the latch switch is set to on, any notes played are memorized and will continue to be arpeggiated even after you lift your fingers completely from the keyboard. To change the arpeggio pattern, simply play one or more new keys.

#### **Hold**

Turn on HOLD during sequence playback to disable automatic triggering when a new key is pressed. This is especially useful if the ModyPoly is triggered from an external clock or via midi.

#### 3.4.2 Mode

The mode switch defines weather the arpeggio is played upwards, downwards or both alternating. There is a fourth arpeggio mode that can be selected by the Range switch (see below)

#### 3.4.3 Range

Set the range switch to 1OCT or 2OCT to play the sequence over a range of one or two octaves. In two octave mode notes that would extend the range of the keyboard are being folded back into the keyboards range. Set the range switch to FULL to enter random mode. In this mode you can

use the mode switch to select different random modes as follows:

UP: Normal random mode

DOWN: Non repeating random mode (two consecutive notes will never be the same)

UPDOWN: Forward/Backward random (the sequence will randomly advance or go back one step)

### 3.5 Playing a previously saved sequence

To switch directly into Powerarp mode press the ARP key until it starts blinking, then press it again without entering a sequence. The previously stored sequence can now be played.

## 4 Sustain pedal input

### 4.1 Sustain in play modes

Pressing the sustain pedal will sustain the playing notes until it is released.

### 4.2 Sustain in Arp and Powerarp

The sustain pedal can also be used in combination with the arpeggiators. When pressing the sustain pedal the notes are sustained.

When using the unison mode with arp or Powerarp the sustain pedal has a special function. While it is pressed the re-trigger is switched off, allowing

a smoother arp sound.

## 5 Midi

### 5.1 Midi in

Depending on the setting in the see config menu the Modsix receives midi on channel 1-16 or an all channels (omni).

It reacts to midi notes 36 - 97

### 5.2 Midi out

The Modysix has two separate midi out modes and sends both on two different midi channels simultaneously. You can configure the channel numbers in the config menu or turn the channels off.

Midi notes 36 - 97 are beeing sent.

#### 5.2.1 Midi out as played

On the as-played channel only the key presses on the Polysix / Poly-61 keyboard are sent. If you record this channel and send it back to the Modysix, the synth will sound exactly the same as when you played it.

This is useful for using the Polysix / Poly-61 as a midi keyboard. In this mode sustain pedal events will be sent as "sustain" midi messages.

#### 5.2.2 Midi out as sounds

On the as-sounds channel instead of the key presses and releases, midi is sent the way it actually sounds. In this mode the Modysix will output the arpeggiator, Powerarp, chord memory, Polychord, unison mode including retrigger, poly-, two,- and three voice modes. Sustain events will not be sent as midi messages but rather simulated with note on and off events.

When retrigger is turned off in unison mode the next note on event will

be sent before the note off event. By most monophonic synths this can be interpreted as a 'glide's command.

### 5.3 Arpeggiator and Sample and Hold Trigger

The Arp and Sample and Hold clocks can be selected to trigger by the internal arp or midi. (see config menu). There are two midi trigger modes. when 'midi note' is selected as the trigger input, the trigger is midi note 0 (for the Arp) and midi note 1 (for the Sample and Hold)

When 'midi clock' is selected, the Arp and Sample and Hold will trigger in sync to the received midi clock. You can choose between a number of dividers for the midi clock to achieve various clock frequencies by sending midi controller messages (see midi controller chart). The table below shows the controller values and the resulting frequency in bars. You can also set the dividers in the config menu.

Ctrl val	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
Bars	2.5	2	1.5	1	$\frac{3}{4}$	1T	$\frac{1}{2}$	$\frac{3}{8}$
Ctrl val	64-71	72-79	80-87	88-95	96-103	104-111	112-119	120-127
Bars	$\frac{1}{2}T$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{4}T$	$\frac{1}{8}$	$\frac{1}{8}T$	$\frac{1}{16}$	$\frac{1}{32}$

Table 1: Midi controller settings for arp and S/H LFO clock divider

### 5.4 Filter over midi

The Modysix features midi filter control. Controller messages received on controller number 17 will modulate the filter. The default value is 0.

The filter S/H LFO and the triangular LFO can also be controlled using midi.

### 5.5 Program change

The modysix responds to program change commands and changes the play mode. It also sends program change commands when changing the play mode. The following table shows which program number corresponds with which play mode:

Program number	Play Mode						
0	6 Voice Polyphonic						
1	Unison						
2	2 Voice Polyphonic						
3	3 Voice Polyphonic						
4	Chord Memory						
5	Polychord						
6	Unison / Share						
7	4 Voice Polyphonic						
8	3 Voice Polyphonic (Mono/poly)						
9	Random 4 Voice Polyphonic						

Table 2: Midi program numbers and play modes

## 5.6 Pitch Bend

If the hardware is installed, the pitch bend can be controlled using midi by sending pitch bend commands.

# 6 Triangular filter LFO

The Modysix features an additional lfo for the filter which outputs a triangular waveform. Its frequency can be adjusted from 0,12Hz - 8kHz using a fine and coarse control. The amount can also be adjusted. See the midi controller chart for corresponding controller numbers.

# 7 S/H filter LFO

This is a build in sample and hold style LFO that controls the filter. A random value is created on every s/h clock event and sent to the filter.

This simulates the effect of the sample and hold LFOs common in analog synthesizers, where a noise source is periodically sampled to get a new random value each time.

You can choose between three different clock sources by using the config menu. The internal arp clock, midi clock and midi trigger. The midi clocks divider can be adjusted in the config menu or via midi. When midi trigger is selected, the S/H will trigger when note C#-2 is played (second lowest midi note).

You can control the amount of this LFO by using the controller number shown in the midi controller chart or by using the config menu.

## 8 HiRes upgrade

Hires is an optional upgrade for ModyPoly. It adds high pitch resolution, microtuning and portamento. It works for Polysix and Mono/Poly (and is somewhat usable on the Poly-61).

### 8.1 Portamento

With the HiRes upgrade, ModyPoly features a constant time linear portamento which works in all play modes (unison, poly, chord, ..)

Without the HiRes upgrade installed, portamento is replaced with glisando (only semitone steps). If a short glide time is used, this sounds very similar to actual portamento.

#### 8.1.1 Selecting portamento modes

When the arp or sequencer are turned off, the MODE switch can be used to select between several portamento modes:

- UP: auto portamento (will glide when playing legato)
- DOWN: Portamento is turned on
- UP/DOWN: Portamento is OFF. Setting the portamento time to 0 is identical to turning it off.

When the arpeggiator or sequencer are turned on, the MODE switch regains its original functionality, but keeps the previously selected portamento mode.

### 8.1.2 Turning portamento OFF

If you do not intend to use portamento, it is best to turn it off completely. This can be done by setting the portamento time to 0 in the config menu (see config menu)

### 8.1.3 Adjusting portamento time

There are three ways to adjust the portamento time: Midi, config menu and the portamento knob.

- Midi controller number 26 can be used to adjust the portamento time directly.
- You can also use the config menu to set the portamento time (see config menu)
- If the portamento knob is installed, it will set the portamento time as well. Midi and knob times will be added internally.

## 8.2 Custom tuning

The HiRes upgrade features full microtonal support for Polysix and Mono/Poly. HiRes uses a high quality 16 bit DAC which results in an effective resolution of 0.2 cent. Up to 4 tunings can be saved in the ModyPoly and recalled using the config menu. Real time sysex tuning messages are also supported and allow instant retuning of any note.

### 8.2.1 Upload tunings using Scala

ModyPoly supports 'midi tuning standard bulk tuning dump 3 byte' sysex messages to upload custom tunings. One software that supports this is the Tuning and Scale management and editor Scala by Manuel Op de Coul. After loading a tuning into Scala, you need to configure it to work with ModyPoly. Go to the options menu (EDIT -> Preferences) and switch to the Synth tab. Select '107: MIDI tuning Standard bulk tuning dump, 3 byte' as tuning model. Set the device ID to 0. MTS preset selects which

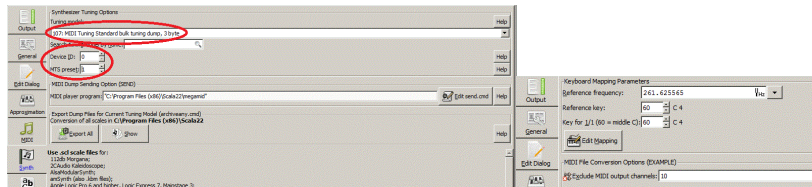


Figure 2: Synth and Midi tabs in Scala

tuning slot you would like to save this tuning into. Tuning slot 1-4 can be used to store a tuning indefinitely. Tuning slot 0 is special and can be used for testing. Uploading into slot 0 will change the tuning immediately, but it will not be saved after powerdown.

You might have to adjust parameters in the MIDI tab as well. Here you can define how the tuning is mapped to the synthesizer keys. If you feel your scale is too low or too high, change these parameters to adjust that. Increasing the Reference key will move the scale down on the keyboard, decreasing it will move it up.

Finally press OK to save your settings.

To upload the tuning press Send in Scala. You might have to select the correct midi output device as well.

## 8.2.2 Load tunings

To load tunings on the ModyPoly, switch into the config menu and press the TUNING key (see config menu). You can now select one of five tuning slots using the lowest 5 keyboard keys. The lowest key will always load 12TET, the default tuning. Keys 1-4 load the tunings uploaded into tuning slots 1 - 4. After loading the tuning, exit the config menu.

## 8.3 Voice spread

HiRes can detune the individual voices of the Polysix in a controlled way to produce thicker sounds when layering voices, or out-of tune sounds. The same principle is used in the Polysix in UNISON mode, only that here the detuning is fixed.

Detuning amount can be set using midi controller number 27



## 8.4 Precision pitch bend

With the HiRes upgrade you can activate an alternative, precision pitch bend mode. It will precisely bend  $\pm 1$  octave, but has one disadvantage compared to the 'normal' pitch bend mode: You can not bend below the lowest note. So when using notes in the lowest octave + pitch bend, you must keep that in mind.

The mode can be activated by selecting 'HiRes bend' in the config menu. Press the lowest key (OFF) for normal pitch bend mode, and press the 1 key (C#) to turn it on.

# 9 Config menu

In the config menu various parameters can be adjusted. For some parameters a value can be selected by using the lower 17 key of the keyboard, others can be selected with a single key press. Figure 1 below shows the parameters and how they are assigned to the keys.

## 9.1 Enter and exit the config menu

To enter the config menu press the HOLD button until it starts blinking. To exit the config menu press it again.

## 9.2 Configure Midi Channels

Midi send and receive channels can be configured by pressing 'Midi In', 'Midi out as-sounds' and 'Midi out as-played' key and then selecting the channel with the lower keys. Midi in channel can be switched to 'omni', midi out channels can be turned off.

## 9.3 Configure arp trigger

The arp trigger source can be selected by pressing the ARP 'Internal', 'Midi note', and 'midi clock' keys.

The midi clock divider for the arp can be adjusted by pressing the ARP 'Divider' key and then selecting the divider with the lower 17 keys. The table below shows which key belongs to which divider.

## 9.4 Configure S/H trigger

The S/H trigger source can be selected by pressing the S/H 'Internal', 'Midi note', 'and midi clock' keys.

The midi clock divider for the S/H can be adjusted by pressing the S/H 'Divider' key and then selecting the divider with the lower 17 keys. The table below shows which key belongs to which divider.

## 9.5 S/H LFO amount

The S/H LFO amount can be set by pressing the S/H amount key and then using the lower 17 keys to set the amount. The OFF key will switch the S/H lfo off.

## 9.6 Pitch bend calibration

To perform pitch bend calibration set the tune knob to the center position, make sure the pitch bend wheel is at center and then use midi to send midi pitch bend messages until the synth is in tune. In the config menu press 'pitch bend cal' to save the current setting as the new pitch bend center position.

## 9.7 Portamento time

Press the 'Porta time' key, then use the lowest 17 keys to set the portamento time. The lowest key will turn portamento off, key 1 is minimum, key 16 is maximum portamento time. Better control can be achieved using midi or the optional portamento knob.

## 9.8 Tuning

Press the TUNING key. You can now select one of five tuning slots using the lowest 5 keyboard keys. The lowest key will always load 12TET, the

default tuning. Keys 1-4 load the tunings uploaded into tuning slots 1 - 4. After loading the tuning, exit the config menu.

## 9.9 Pitch bend mode

Select 'HiRes bend' in the config menu. Press the lowest key (OFF) for normal pitch bend mode, and press the 1 key (C#) to turn it on.

## 9.10 Factory reset

To perform a factory reset press the highest note on the keyboard (C5). It will take a couple of seconds to complete. When the HOLD led starts blinking again, factory reset is finished.

Key	1	2	3	4	5	6	7	8
Bars	2.5	2	1.5	1	$\frac{3}{4}$	1T	$\frac{1}{2}$	$\frac{3}{8}$
Key	9	10	11	12	13	14	15	16
Bars	$\frac{1}{2}T$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{4}T$	$\frac{1}{8}$	$\frac{1}{8}T$	$\frac{1}{16}$	$\frac{1}{32}$

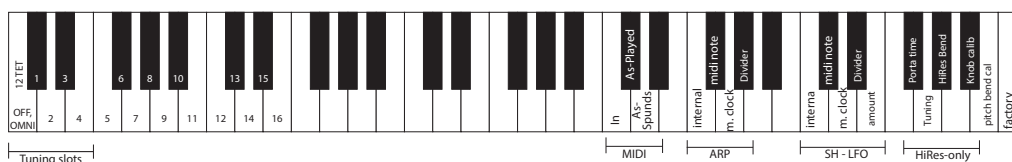


Figure 3: Config mode keyboard assignment

## 10 Tips and tricks

### 10.1 Transferring a melody to Powerarp

You can transfer a melody from an external sequencer to the Modysix Powerarp sequencer by going into Powerarp record mode and then sending the melody to the Modysix midi in channel.

### 10.2 Use of Powerarp transpose and Polychord

You can use the combination of Powerarp transpose and Polychord in multiple creative ways. You could for example save the notes C to B in the first octave, some minor and major chords in the second and some sept chords in the third. After recording a Powerarp sequence in the first octave you can transpose to play either single notes, or chords. You can use the same trick to 'transpose' between different melodies.

### 10.3 Copy a Polychord

If you want to move or copy a chord to a different key in Polychord mode, play it, then press POLY+CHORD to record it again.

# 11 Appendix

## 11.1 Midi controller chart

note: controller numbers in the chart are in the range of 0-127. If your midi controller displays controller numbers as 1-128 you have to add 1 to the numbers below.

Controller number	Usage	Range
16	Arp clock divider	* see table 1
17	Filter cutoff	0-127
18	S/H LFO amount	0-127
19	S/H LFO divider	0-127 *see table 1
21	CV2 (if installed)	0-127
22	CV3 (if installed)	0-127
23	Triangular lfo frequency coarse	0-127
24	Triangular lfo frequency fine	0-127
25	Triangular lfo amount	0-127
26	Portamento time	0-127
27	Detuning / Voice spread amount	0-127
64	Sustain	off:0-63,on:64-127
120	All Sound Off	-
123	All Notes Off	-

Table 3: Midi receive controller numbers chart

## 11.2 Troubleshooting

### 11.2.1 Midi in not working

Are you sending on the correct channel? Try all 16 channels or configure the midi in channel using the config menu.

The Modysix expects midi input in a range of 6 octaves from C0 to C5. Check if you are sending in this range.

### 11.2.2 Midi loop back problems

If you experience, weired phasing effects, chord memory and arpeggiator not working as expected or similar problems you are most likely victim of midi loop back. A possible cause could be your DAW sending the received midi back to the output or your midi interface having a loop back function. To check if midi loop back is the cause disconnect the midi in (or out) connection and see if the problem disappears.

### 11.2.3 Midi filter control and S/H LFO not working

This is caused by either not sending the midi controller information on the midi in channel or the filter cable not soldered to the correct location on the Polysix / Poly-61 board.

#### **Arp stopped working**

Check the arp clock source and set it to 'internal'.

## 11.3 Thanks

go to

Norman Hecht

Stephan Glowatzky

for feature suggestions and beta testing

Nick Crofts

for proof reading

Tobias Munzer

who wrote this manual

Alexandra Cielas

for everything else

## 11.4 Config menu keyboard overview

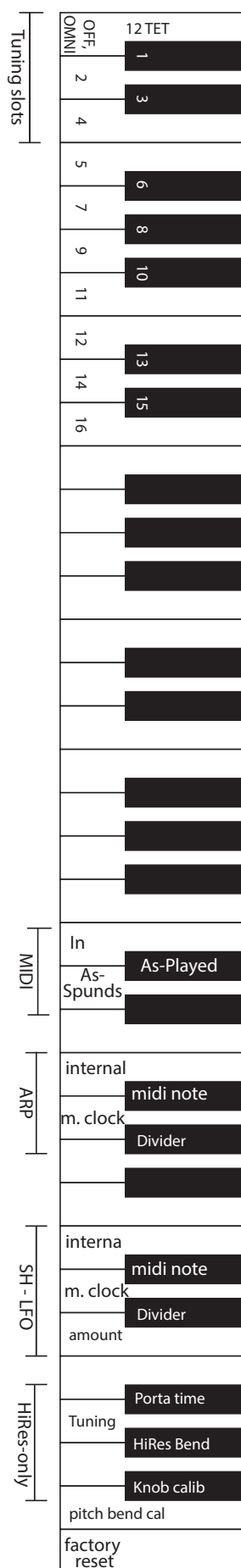


Figure 4: Config menu options on keyboard