

Introduction

Congratulations! The MFB-SYNTH II is a monophonic programmable MIDI-controlled analogue synthesizer module with an integrated 32 step sequencer.

Setup

Plug the power supply into the connector of your MFB-SYNTH II. The Audio Out has to be connected to a mixing console or amplifier. Connect your keyboard's MIDI output to MIDI In of the MFB-SYNTH II then. Finally switch on the SYNTH II. The display should read 01 with the **User** button illuminated.

Function

The MFB-SYNTH II contains all classical elements of analogue synthesis.

The sound source are three voltage controlled oscillators VCO1, VCO2 and VCO3. Each VCO has its own waveform selector (**Wave**) that can toggle between sawtooth, square and triangle. VCO3 allows control of the square wave symmetry (pulsewidth). Turn left from center position to set the pulsewidth, turn right from center to activate a pulsewidth automodulation (by an LFO, see Setting system parameters).

Press **Shift** and **Wave** to set VCO1 to Oscillator Sync Mode (VCO1 will synchronize VCO2's waveform start). Pressing **Shift** and **Wave** in the VCO2 and VCO3 section will activate ring modulations (VCO1 * VCO2 and or VCO2 * VCO3) that can be used to produce additional harmonics.

The base pitch is controlled by the oscillators **Octave** switch. Select between 16', 8' and 4' (32', 16' and 8' for VCO3). Both VCO2 and VCO3 can be detuned by plus minus 1 octave with the **Interval** knobs, expanding the range to 64'-2'.

Tune controls the overall tuning of the MFB-SYNTH II.

The levels of all three oscillators, the additional **noise generator** and the signal connected to the Audio Input are adjusted in the mixer. From here the signal enters the voltage controlled 24 dB/octave lowpass filter (VCF). **Cutoff** sets the frequency where the filter starts working.

Emphasis enhances this working point for clear audibility (Resonance). Here, very high settings cause the filter to self-oscillate.

Contour sets the amount of envelope **ADSR1** on the cutoff frequency while **Key** does the same incoming pitch information (MIDI notes or CV).

The last stage in the signal flow is the voltage controlled amplifier (VCA). It controls the level of the synthesized signal. It is dynamically shaped by the second envelope generator **ADSR2**. Finally **Master** sets the overall level for the output.

Both envelopes **ADSR1** and **ADSR2** offer four parameters: **Attack** (time from zero level to maximum VCA level, initiated by pressing of a key), **Decay** (time from maximum VCA level to Sustain level), **Sustain** (level while holding down a key, after passing the decay time). **Release** sets the time to fade out from sustain level to zero level after releasing a key.

The MFB-SYNTH II has two LFOs (Low frequency oscillators) to modulate various parameters. They can be controlled in speed (**Rate**).

Wave selects the available waveforms. LFO1 offers triangle, sawtooth, square; LFO2 triangle, sawtooth and random wave. Pressing **Shift** and **Wave** activate the LFO's One shot mode. Here

the waveform is played only once when hitting a key. This is useful for using the LFOs as additional basic envelope shapers.

MOD.VCO controls the intensity of pitch modulation by one of the LFOs (see Setting system parameters). Turn left from center to achieve an increasing modulation for all three VCOs. Turn **MOD.VCO** right from center to modulate the pitch of VCO1 and VCO2 by the output of VCO3 (FM).

MOD.VCF sets the modulation intensity for the filter cutoff. Again it's a bipolar control. Turning the knob left from its center position activates LFO modulation of the filter while right turns will use an oscillator signal to modulate the filter with much high rates (Filter FM). Finally **MOD.VCA** sets the amount of VCA level modulation either by LFO1 or LFO2.

Preset and User memory locations

The MFB-SYNTH II holds 50 (factory restorable) preset and 49 User memory locations. To recall a preset press and hold **Preset** and C1/1...C3/25 for the first 25 numbers. Add **Shift** for the upper 25 presets (26-50). To recall a user memory press and hold **User** and C#1/2...C3/25 for location 1-24. Add **Shift** to access locations 25-49. The display will show the corresponding location. User location C1/1 is no memory. It is used to switch to the actual knob switch setting of the synth (Manual mode).

Remember: After having recalled a memory location the actual knobs and switches may not correspond to the stored parameters. They have to be moved or switched for edits. Only Master Volume and Tune are not stored and therefore always in the right position.

To store a setting hit **Shift** and **Record** (the display will show 2 dots), then press either **User** or **Preset** followed by the memory location you want to use (C1/2...C3/25). Use **Shift** to access the upper 25 locations. On successful storage the synth will exit record mode.

To recall the factory presets press **Shift** and **Preset** while switching the machine on. All your presets will be gone and be automatically replaced by the factory setting

Sequencer

The step sequencer can be programmed by the 25 integrated keys (C1/1...C3/25). Use **Shift** for two additional octaves. To select a sequence press and hold **Sequence** and C1/1...C3/25. The display will show the selected sequence location.

To record the sequence press **Shift** and **Record** (the display will 2 dots). Hit the keys to set pitches. Breaks are set pressing **Play**. Legato Notes can be set by holding the key and hitting the Pause button; e.g. C2+Pause, C2= 1/8 Note or C2+Pause, C2+Pause, C2= 1/4 Note.

Each sequence can hold up to 32 steps. The last step is confirmed by pressing **Record**.

Play will start playback of the sequence in loop mode. The speed is set by the **Data** knob. (Hit **Tempo** first). It is displayed in BpM (one dot will indicate Tempi above 100, two dots above 200).

In playback mode the sequence can be transposed by **Shift** and C1/1...C3/25 or an external keyboard. It is even possible to recall another sequence while playback (Press and hold

Sequence plus **C1/1...C3/25**). The new sequence will start when the actual sequence reaches its last step.

It is even possible to change the steps 1-16 of the active sequence while it's playing. Select the step on the keyboard by pressing **C1/1...D#2/16** and change the pitch with the data encoder. To store the edited sequence press **Shift** and **Record**.

Glide

To achieve a continuous pitch transition between two played keys use the **Glide** function. The knob sets the speed of the transition.

Setting the MIDI Channel

Press **Shift** and then **Tempo** to set the MIDI Channel with the DATA encoder.

Audio In

External audio sources can be connected to the Audio Input jack. It is directly routed to the filter (VCF). In order to let the incoming signal pass through one has to trigger the VCA envelope. Use the **Audio In** to control the level.

In case no external audio source is connected to the **Audio In** the output of the VCA is fed back to the filter. Increasing levels will result in a controllable **Feedback** loop.

CV In

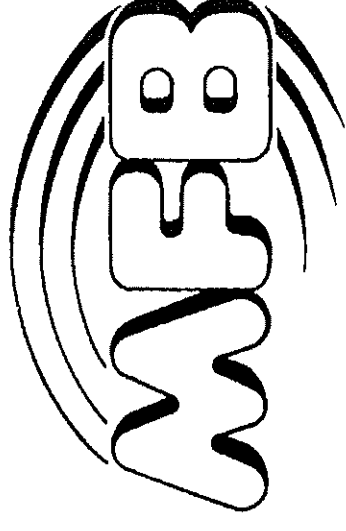
The CV In connector is a stereo jack. It can be used to control the pitch of the MFB-SYNTH II. The control voltage must arrive at the tip, the Gate information on ring 1. The gate information has to be positive with at least 5V. The 1V/Oct CV spreading can be fine tuned (see Setting system parameters).

Other functions

The MFB-SYNTH II is equipped with MIDI. It can be played dynamically using keyboard velocity information. Activate Dynamic VCF and/or Dynamic VCA to control filter cutoff and level (see Setting system parameters).

The synthesizer corresponds to MIDI clock, Start and Stop informations when it is set to external clock (**SYNC**, see Setting system parameters). When set to internal the MIDI clock, Start and Stop information are sent to the MIDI output.

Incoming MIDI information of Pitchbend and Mod-Wheel are reflected. The system setup (see Setting system parameters) sets the amount of pitch bend and the destination of the Mod-Wheel. The speed of the modulation is controlled by the **Rate** knob.



Owners manual

MFB-SYNTH II

Midi Implementation

Function	Transmitted	Recognized	Remarks
Note ON	9nH, v = 1 - 127	9nH, v = 1 - 127	
Note OFF	9nH, v = 0	9nH, v = 0 or 8nH	
Contr.Change			
Mod.Wheel	no	1	7 Bit
Glide	5 + 37	5 + 37	10 Bit
Mod.Vco	6 + 38	6 + 38	10 Bit (64+00=OFF)
Pulse	8 x 40	8 + 40	10 Bit (64+00=OFF)
Rate1	9 + 41	9 + 41	10 Bit
Interval 1	10 + 42	10 + 42	14 Bit
Interval 2	11 + 43	11 + 43	14 Bit
Rate2	12 + 44	12 + 44	10 Bit
Level VCO1	13 + 45	13 + 45	10 Bit
Level VCO2	14 + 46	14 + 46	10 Bit
Level VCO3	15 + 47	15 + 47	10 Bit
Level Noise	16 + 48	16 + 48	10 Bit
Audio In	17 + 49	17 + 49	10 Bit
Mod.VCF	18 + 50	18 + 50	10 Bit (64+00=OFF)
Mod.VCA	19 + 51	19 + 51	10 Bit (64+00=OFF)
KeyFollow	20 + 52	20 + 52	10 Bit
Cutoff	21 + 53	21 + 53	14 Bit
Emphasis	22 + 54	22 + 54	10 Bit
Contour	23 + 55	23 + 55	10 Bit
Attack1	24 + 56	24 + 56	10 Bit
Decay1	25 + 57	25 + 57	10 Bit
Sustain1	26 + 58	26 + 58	10 Bit
Release1	27 + 59	27 + 59	10 Bit
Attack2	28 + 60	28 + 60	10 Bit
Decay2	29 + 61	29 + 61	10 Bit
Sustain2	30 + 62	30 + 62	10 Bit
Release2	31 + 63	31 + 63	10 Bit
Octave1	80	80	2 Bit
Wave1	81	81	2 Bit
Octave2	82	82	2 Bit
Wave2	83	83	2 Bit
Octave3	84	84	2 Bit
Wave3	85	85	2 Bit
Wave.Mod1	86	86	3 Bit
Wave.Mod2	87	87	3 Bit
PRG Change			
User Memory	01 - 49	01 - 49	
Presets	50 - 99	50 - 99	

Setting system parameters

To alter the MFB-SYNTH II's basic settings press **Tempo** followed by **Record**. The display has to show two dots. Use **C1/1...C3/25** for the following edits. The bold printed settings are factory preset.

C1/1	MOD.VCO	0 = LFO1	1 = LFO2
C#1/2	PWM	0 = LFO1	1 = LFO2
D1/3	MOD.VCF	0 = LFO1	1 = LFO2
D#1/4	MOD.VCF	0 = VCO1	1 = VCO2
E1/5	SYNC	0 = internal	2 = VCO3
F1/6	Dynamic VCF	0 = Off	1 = external
F#1/7	Dynamic VCA	0 = Off	1 = On
G1/8	Pitch Bender	0 = +/- 1 semi	1 = +/- 3 semi
G#1/9	Mod.Wheel	0 = VCO	1 = VCF
A1/10	CV In	0 = Off	1 = VCO
A#1/11	PRG Change	0 = Off	1 = MIDI Out
B1/12	PRG Change	0 = Off	1 = MIDI In
C2/13	Contr. Change	0 = Off	1 = MIDI Out
C#2/14	Contr. Change	0 = Off	1 = MIDI In
D2/15	Sequence Out	0 = Off	1 = MIDI Out
B2/24	CV In Tune	minus 1	
C3/25	CV In Tune	plus 1	

Parameter visualisation, MIDI-Controllers

Each stored parameter value in a programm can be viewed. Press and hold **Shift** and **Tempo** followed by one of the 25 note buttons.

C1/01	RATE LFO1	C#1/02	PULSE
D1/03	MOD.VCO	D#1/04	GLIDE
E1/05	RATE LFO2	F1/06	INTERVAL VCO3
F#1/07	INTERVAL VCO2	G1/08	MIXER NOISE
G#1/09	MIXER VCO3	A1/10	MIXER VCO2
A#1/11	MIXER VCO1	B1/12	MOD.VCO
C2/13	MOD.VCF	C#2/14	ATTACK ADSR2
D2/15	ATTACK ADSR1	D#2/16	KEY
E2/17	DECAY ADSR2	F2/18	DECAY ADSR1
F#2/19	CUTOFF	G2/20	SUSTAIN ADSR2
G#2/21	SUSTAIN ADSR2	A2/22	EMPHASIS
A#2/23	RELEASE ADSR2	A2/24	RELEASE ADSR1
C3/25	CONTOUR		

Presets (Preset + Keyboard)

No.	Name	Category
01	Typical	Lead
02	Metasync	Lead
03	Bobcat	Lead
04	Attack Bass	Bass
05	Mind Scanner	FX
06	Small PWM	Lead / Bass
07	FM Bass	Bass / Seq
08	Random Step-VCF	Bass / Seq
09	Channel Cord	Seq
10	Sweep Ring	Seq / Lead
11	Glider	Lead / Seq
12	Dual Ring	Seq / Lead
13	Slide Saw	Lead
14	LFO Liner	Bass / Seq
15	90s Detuned Hook	Seq / Lead
16	Thin & Ugly	Seq
17	Less Paul	"Guitar"
18	Messing Flute	Lead
19	DX Plus	Lead / Seq
20	Soft Drivin	Lead
21	Phatt Bass	Bass / Sub
22	Full Square	Lead / Seq
23	S&H Filter	Lead
24	Dirty Larry	Lead / Seq
25	Sharp Overtone	Lead

Presets (Shift + Preset + Keyboard)

No.	Name	Category
01	Soft Jazzy	Organ
02	Mono Divider	Organ
03	Unmelodic Blaster	FX / Bass
04	Cosmic Background	FX
05	Stepping Filter	Seq
06	High Tizzle	Seq
07	Soft High Sync	Lead
08	Falling Formant	FX
09	Melodymaker	Lead
10	Simply Nice	Lead
11	Disintegrated Voice	FX
12	Metallic Voice	FX / Seq
13	Tok Bass	Bass
14	Little Sweeper	Seq
15	Soft DX	Seq
16	Tackle Sync	Seq / Lead
17	Full Bandwide	Lead / Bass
18	Growl Bass	Bass
19	Drush Tone	Seq
20	Analog SID-Chip	Lead / FX
21	Cowbell (ca. D1)	Drum
22	Drive Kick (C1-C2)	Drum
23	closed Hihat	Drum
24	Dance Kick	Drum
25	Snare (C1-C2)	Drum