FLAME

MIDI-TALKING-SYNTH

USER MANUAL

http://flame.fortschritt-musik.de

1. Introduction

The FLAME MIDI TALKING SYNTH is a small-sized MIDI-controlled sound module based on the analogue Speakjet ™ chip, produced by the U.S. company Magnevation LLC. Originally designed for basic artificially generated speech output in American English tongue it was then refined and further developed as an 8-bit sound module with speech-like sounds and synthetic robot voices as well as beeps, alarms, noise and retro-style sci-fi sounds.

Due to the structure of the Speakjet ™ (with its complex sound synthesizer, preset sounds and serial interface) it offers an impressive range of possibilities. It contains 72 speech elements (allophones), 43 sound effects, and 12 DTM touch tones. The idea was to create sounds, patterns and sequences in the 8-bit style of the 80s or other retro sounds for making music instead of just simulating speech. Most allophones can be tuned and used tonally.

The FLAME MIDI TALKING SYNTH contains two Speakjet ™ chips to produce a richer and more complex tonal variety as well as generating a pseudo stereo effect.

Since the Speakjet ™ has not originally been laid out for the purpose of making music it is actually not fully controllable via MIDI input, i.e.: once sounds are triggered they cannot be directly stopped by Note Off messages from a MIDI keyboard or a sequencer. Thus a MIDI-controlled audio tremolo has been implemented in the FLAME MIDI TALKING SYNTH virtually allowing MIDI control and enabling an easier integration into a MIDI setup.

The FLAME MIDI TALKING SYNTH lets you play back preset words in its EXPANDER mode via an external MIDI keyboard or a sequencer. In addition you can use the FLAME MIDI TALKING SYNTH as a stand-alone MIDI controller since all controls and joysticks send MIDI control/change data to the MIDI-OUT connector.

2. Technical Design

The internal sound is generated by the two independently controlled Speakjet ™ chips. Each of them provides a mono audio output (32 kHz PWM output) through a 6.3 mm stereo socket. The right audio channel is assigned to chip A, the left channel to chip B. An insert Y cable splits both channels into two mono audio outputs, allowing you to position the channels individually within the stereo sound field with any external mixing device.

The sound level ratio of both chips can be adjusted with the MIX control. An equal sound level is obtained by turning the MIX control to the centre position. All functions are clearly visible on the front panel with the start/ stop /MIDI-sync/ tempo functions on the upper right-hand corner, sound/ tremolo/ scale/ note/ pitch and random functions in the middle. The HOLD-switches are used to freeze the position of the joysticks.

The REC-switches are used to play back the recorded movements of the joysticks. You can switch between the modes SEQUENCER (SEQ) and EXPANDER (EXP) with the switch in the middle of the panel.

3. Basic Operation

In SEQ mode sounds can be played manually. While the SEQUENCER is stopped (upper right switch is set to its lower position 'STOP') the TREMOLOS must be switched off (switches A and B in the TREMOLO section are set to their lower positions) in order not to interrupt the sound. The HOLD and REC switches should be in their upper positions.

The FLAME MIDI TALKING SYNTH is played by using the joystick TALK. Move the joystick out of its centre position to trigger any sounds (when the joystick is in the exact centre position, no sounds are triggered). As the HOLD function is inactive (i.e.: HOLD switch is in upper position), the joysticks movements are automatically recorded over a period of two measures. When you activate (i.e.: toggle down) the HOLD switch, the current position of the joystick will freeze and any further movements will have no effect.

Toggle down the REC switch to play back the recorded movements (any manual agitation of the joystick has no effect now). The tempo of the play-back depends on the internal respectively external MIDI tempo. The MIDI tempo is signalled by the SCALE LED, which flashes at the beginning of each measure serving as a visual control mechanism for the recording period.

The sounds you play depend on their note values (position of the joystick, scale, SCALE-switch). Moving the joystick vertically alters the pitch within a range of 3 octaves. Moving the joystick horizontally changes the formants of the sound (male-female) giving it the typical robot-like sound effect. Use the HOLD and REC switches to freeze and play-back the sounds you play.

Once the sequencer has been started (internally or externally), you can interrupt the audio signal with the TREMOLO by toggling up one or both TREMOLO switches. The LEDs indicate the rhythm (flashing = audio on). This can be set individually for each Speakjet ™ chips. The 8/16 switch enables you to switch the quantization between quavers and semi quavers. The next switch to the right sets up the phase. Both settings apply for A and B.

It is not possible to trigger sounds in the SEQ mode via external MIDI note.

In the EXP mode the synthesizer works just like a drum expander module. Words and sounds are triggered only by received MIDI notes. No sequencer/ tremolo/ random or scale functions are available in this mode.

4.1. SEQUENCER MODE

As outlined above in this mode sounds are played manually and are interrupted by the MIDI clock-controlled TREMOLO.
Sounds can also be played without sequencer running. The sequencer is controlled by the internal or external MIDI clock and sends MIDI TIMING data (start/ stop/ clock) when running.

4.1.1. TALK / SOUND

joystick TALK

This is the control that triggers the sound. No sound is triggered in the centre position unless the corresponding switch HOLD or REC are in the lower position and generate frozen or recorded joystick data.

64 sounds can be played. They are arranged in 8 lists each containing 16 sound elements. Each sound bank contains different lists. Above the centre position the sounds of the lists are played individually. Below the centre position the sounds of the lists are played in sequence depending on the joystick's position.

This way short sequences can be played in loops, which consist of up to 16 elements. Some of the 12 sound banks contain fewer elements so that it is easier to find the same sounds.

HOLD switch (Talk)

This switch freezes the current position of the joystick.
Only those sounds are played back.

Please note: No sounds are played while the joystick is in centre position.

REC switch (Talk)

With this switch the joystick movement is continually recorded over the period of two measures. When the switch is toggled down, the recorded movements are played back. Manual playing is not possible then.

Please note that the tempo depends on the MIDI tempo. The LED flashes for every bar signalling the recording window (when sequencer is stopped). Recording as well as playing back lasts two bars and is then continually repeated. When the sequencer is started the MIDI clock LEDs give a visual control.

LOOP switch

In the lower position (LOOP on) any chosen sound is repeated continually. In the upper position (LOOP off) the sound elements are only played once. This applies for Speakjet A and B.

SOUND turn-switch

12 patches are available. You can switch between them at runtime. There are two sound banks for each patch for each Speakjet which are triggered with the SOUND TALK/ SYNTH switch.

SOUNDS TALK: lists with allophones that can be played tonally.
SOUNDS SYNTH: lists with effect sounds that cannot be played tonally.

See appendix for an overview of all patches.

SPEED control

Playback velocity of the allophones: left = slow, right = fast.
SPEED and TEMPO should not be mixed up. The TEMPO control regulates the playback tempo of the internal sequencer with effect on the tremolo while the SPEED control changes the duration of the generated talk/ synth sounds (not MIDI synchronized).

MIX control

MIX control controls the volume for Speakjet A and B. In the centre position they have the same volume.
Please note: this control is digital. Delays are possible as the data has to be processed in the internal Speakjet buffer (FIFO). This can affect different SPEED settings.

4.1.2. NOTE / SCALE

joystick NOTE

Horizontal movements affect the sound by changing the formants (male/ female), vertical movements alter the pitch (depending on the setting of the SCALE filter). When SCALE is switched off, all semitones can be played within a range of 3 octaves. When SCALE is switched on, the notes of a set scale are played.

SCALE switch

ON/OFF - activates/ deactivates the key filter
DUR/MOLL - toggles between major key (DUR) and harmonic minor key (MOLL)
TURNING SWITCH - chooses the key

4.1.3. TREMOLO

TREMOLO only works when the sequencer is started with internal/ external MIDI clock/ tempo. It can be switched on for each Speakjet individually.

When both are switched on the phase can be shifted with the PHASE switch.

The 8/16 switch determines the beat. Visual control is provided by two LEDs.

4.1.4. RANDOM

A number of random algorithms are implemented in the device that can be triggered by different positions of the RANDOM switch for each Speakjet (A and B). There is no random effect in the centre position as different algorithms work in the right and in the left position. Starting from the centre position various effects can be triggered.

Moving to the left affects first pitch, then speed, then volume. It is most intense in the very left position. Any random variations start from the positions of the NOTE/ SPEED/ MIX controls.

The changes are not always linear and do not cover the whole range of all values, so experimenting can have interesting results.

4.1.5. MIDI SEQUENCER

To use the internal sequencer the left switch above the TEMPO control must be set to INT (internal MIDI clock). Now the sequencer can be started and stopped with the START/ STOP switch. In this modus the device works as a MIDI master and externally connected devices can run synchronously via the MIDI clock. The tempo is controlled by the TEMPO control. The control range extends from tempo 20 to 220. In the centre position the approximate tempo is 115. Please note that not all tempi can be set by the control due to the limited resolution.

To use the sequencer as a slave the SYNC switch must be set to EXT (external MIDI clock). Now the sequencer can be controlled by a external sequencer via the MIDI clock (START/ STOP/ CLOCK). Please note: The device does not understand CONTINUE. The TEMPO control has no effect on the tempo played. It continues to send as a MIDI controller and can be used for other tasks as well.

Please note: When the sequencer is running with the external clock you can switch to INT during normal operation and leave it running with the current tempo setting "out of time" (right switch must be on START). If you want to switch back to EXT it runs in sync with the external MIDI clock as it continues to register the external clock. Rhythmic variations can be tried this way during normal operation.

The red LED signals the first beat of a bar, the yellow one the quarter note.

The MIDI sequencer (INT and EXT) always sends the MIDI clock data via MIDI OUT. It does not send NOTE ON/ OFF data.

Attention: Should problems with the timing arise with the external synchronisation, it should be checked if the device receives more than just MIDI clock data. Additional data such as ProgramChange, controlChange, SysEX- or note data should be avoided or filtered out!

4.2. EXPANDER MODE

In this mode the device works like a sound expander, like a drum module in fact. This means that certain sounds and whole words are assigned to different keys and only those can be played on the keyboard. The assigned words and sounds are listed in the attachment. The device is set on MIDI channel 10 and the setting cannot be changed. The sounds also can be changed with the SPEED control and with the joystick NOTE. Joystick HOLD can be used as well. Turn the SOUND switch to select patches. Any other functions are inactive. Only the sending of MIDI control data is the same as in the SEQ mode.

Please note: Speakjets A and B generate the same sounds in this mode.

Attention: The MIX control should be in the centre position before switching from SEQ to EXP mode to hear both Speakjets.

The position of the TREMOLO switch has no effect on the audio output in this modus. It is always switched on.

The red scale LED signals received MIDI notes.

4.3. MIDI CONTROLLER

All controls send MIDI control-change data during runtime. Each control sends on both MIDI channels 1 and 2 using the same control change number. See the appendix for further information on which numbers are assigned to which control.

Please note: In SEQ mode data-sending is linked to the tick of the internal or external MIDI clock and therefore depends on the given tempo.

In the EXP mode data is sent faster as there is no MIDI clock. Also two identical data values are never sent in succession in order to reduce the data flow — only when the data value of a controller changes new data is sent.

APPENDIX

LIST OF MIDI CONTROLLER NUMBERS

MIX:	control change 7 (volume)
RANDOM:	control change 1 (modulation)
SPEED:	control change 71 (harmonic)
TEMPO:	control change 72 (release time)
JOY TALK x:	control change 91 (effect depht)
JOY TALK y:	control change 92 (effect depht)
JOY NOTE x:	control change 93 (effect depht)
JOY NOTE y:	control change 94 (effect depht)

Please note:
Transmitted MIDI channels are fixed on 1 + 2
All value ranges are between 0..127

SOUNDS SEQUENCER MODE

No	Talk-A	Talk-B	Synth-A	Synth-B
1	Babble01	Babble01	Robot01	Robot01
2	Babble02	Babble02	Beeps01	Beeps01
3	Babble03	Babble03	Biological01	Biological01
4	Babble04	Babble04	Alarms01	Alarms01
5	Babble05	Babble05	TouchTone01	TouchTone01
6	Babble06	Babble06	Alarms01	TouchTone01
7	Babble07	Babble07	TouchTone01	Biological02
8	Babble08	Babble08	Noise02	Noise02
9	Babble09	Babble09	Noise01	Noise01
10	Babble10	Babble10	Noise01	Noise02
11	Babble06	Babble08	Robot01	TouchTone01
12	Babble03	Babble04	Beeps01	Alarms01

SOUNDS EXPANDER MODE

Patch	Sounds	Patch	Sounds
1	Words: short words + numerics / times	7	Sound Effects
2	Words: short words + technics / astronautics	8	Words: short words + numerics / times
3	Words: short words + music / pop culture	9	Words: short words + technics / astronautics
4	Words: short words + nature / people	10	Words: short words + music / pop culture
5	Words: short words + phrases	11	Words: short words + nature / people
6	Phoneme + Allophone	12	Words: short words + phrases

PATCHES

Patch 1+8 numerics / times	
Note	Words
0-35	sounds one
36	I
37	I'am
38	you
39	you are
40	it`s
41	too
42	now
43	not
44	don`t
45	because
46	and
47	or
48	zero
49	one
50	two
51	three
52	four
53	five
54	six
55	seven
56	eight
57	nine
58	ten
59	eleven
60	twelve
61	hundert
62	million
63	time
64	second
65	minute
66	hour
67	day
68	week
69	months
70	year
71	age
72-127	sounds one

Patch 2+9 technics / astronautics	
Note	Words
0-35	sounds two
36	I
37	I'am
38	you
39	you are
40	it`s
41	too
42	now
43	not
44	don`t
45	because
46	and
47	or
48	plastic
49	electronic
50	laser
51	wire
52	computer
53	radio
54	transmission
55	robot
56	gasoline
57	car
58	machine
59	system
60	atom
61	neutrons
62	orbit
63	satelit
64	rocket
65	beam
66	fly
67	moon
68	universe
69	galaxy
70	black hole
71	lift off
72-127	sounds two

Patch 3+10 music / pop culture	
Note	Words
0-35	sounds three
36	I
37	I'am
38	you
39	you are
40	it`s
41	too
42	now
43	not
44	don`t
45	because
46	and
47	or
48	guitar
49	synthesizer
50	drums
51	sticks
52	bass
53	strings
54	play
55	stop
56	music
57	rock`n`roll
58	punkmusic
59	tekkno
60	dancemusic
61	concert
62	t-shirt
63	fans
64	show
65	comic
66	manga
67	drugs
68	sex
69	mystery
70	power
71	error
72-127	sounds three

Patch 4+11 nature / people	
Note	Words
0-35	sounds four
36	I
37	I'am
38	you
39	you are
40	it`s
41	too
42	now
43	not
44	don`t
45	because
46	and
47	or
48	dream
49	sunshine
50	flower
51	water
52	rain
53	ocean
54	clouds
55	sky
56	world
57	wonderfull
58	girl
59	woman
60	lady
61	boy
62	man
63	gay
64	sister
65	brother
66	muther
67	futher
68	lips
69	eyes
70	hair
71	body
72-127	sounds four

Patch 5+12 phrases	
Note	Words
0-35	sounds five
36	I
37	I'am
38	you
39	you are
40	it`s
41	too
42	now
43	not
44	don`t
45	because
46	and
47	or
48	O.K.
49	yes
50	no
51	down
52	up
53	left
54	right
55	turn
56	on
57	off
58	under
59	in
60	here
61	wrong
62	nice
63	cool
64	giant
65	free
66	old
67	talk about
68	please
69	hurry
70	attention
71	thank you
72-127	sounds five

Patch 6
Phoneme + Allophone

Note	Sound	Sample Words	Note	Sound	Sample Words
0-36	IY	See, Even, Feed	72	OWWW	Go, Hello, Snow
37	IH	Sit, Fix, Pin	73	JH	Dodge, Jet, Savage
38	EY	Hair, Gate, Beige	74	VV	Vest, Even
39	EH	Met, Check, Red	75	ZZ	Zoo, Zap
40	AY	Hat, Fast, Fan	76	ZH	Azure, Treasure
41	AX	Cotten	77	DH	There, That, This
42	UX	Luck, Up, Uncle	78	BE	Bear, Bird, Beed
43	OH	Hot, Clock, Fox	79	BO	Bone, Book Brown
44	AW	Father, Fall	80	EB	Cab, Crib, Web
45	OW	Comb, Over, Hold	81	OB	Bob, Sub, Tub
46	UH	Book, Could	82	DE	Deep, Date, Divide
47	UW	Food, June	83	DO	Do, Dust, Dog
48	MM	Milk, Famous	84	ED C	ould, Bird
49	NE	Nip, Danger, Thin	85	OD	Bud, Food
50	NO	No, Snow, On	86	GE	Get, Gate, Guest
51	NGE	Think, Ping	87	GO	Got, Glue, Goo
52	NGO	Hung, Song	88	EG	Peg, Wig
53	LE	Lake, Alarm	89	OG	Dog, Peg
54	LO	Clock, Plus, Hello	90	CH	Church, Feature
55	WW	Wool, Sweat	91	HE	Help, Hand, Hair
56	RR	Ray, Brain, Over	92	HO	Hoe, Hot, Hug
57	IYRR	Clear, Hear, Year	93	WH	Who, Whale, White
58	EYRR	Hair, Stair, Repair	94	FF	Food, Effort, Off
59	AXRR	Fir, Bird, Burn	95	SE	See, Vest, Plus
60	AWRR	Part, Farm, Yarn	96	SO	So, Sweat
61	OWRR	Corn, Four, Your	97	SH	Ship, Fiction, Leash
62	EYIY	Gate, Ate, Ray	98	TH	Thin, month
63	OHIY	Mice, Fight, White	99	TT	Part, Little, Sit
64	OWIY	Boy, Toy, Voice	100	TU	To, Talk, Ten
65	OHIH	Sky, Five, I	101	TS	Parts, Costs, Robots
66	IYEH	Yes, Yarn, Million	102	KE	Can't, Clown, Key
67	EHLL	Saddle Spell	103	KO	Comb, Quick, Fox
68	IYUW	Cute, Few	104	EK	Speak, Task
69	AXUW	Brown, Thousand	105	OK	Book, Took, October
70	IHWW	Two, New, Zoo	106	PE	People, Computer
71	AYWW	Our, Ouch, Owl	107-128	PO	Paw, Copy

Patch 7
Sound Effects

Note	Sound
0-36	Robot 01
37-45	Robot 02-10
46-55	Alarm 01-10
56-65	Beeps 01-10
66-75	Biological 01-10
76-85	DTMF 0-9
86	DTMF *
87	DTMF #
88	Sonar Ping
89	Pistol Shot
90-127	Wow