Synth Engine

Synthesis types: FM, subtractive, additive
Polyphony: 300 voice
Multitimbrality: 300 voice / 16 part
Part: respond to any MIDI channel, plays 1 patch, poly or mono with portamento, volume/pan setting
Patch: stacks up to 128 voices, split/layered by key and velocity, tuning/transpose, panning, round-robin, exclusion groups, delayed triggers with the voice sequencer
Voice sequencer: 128-step/128-event polyphonic arpeggiator triggered on key press, MIDI synced or fixed tempo, loopable
Voice: 6-OP FM with user-editable algorithms, random voice generation
Oscillators: 6 per voice, 48 waveforms, fixed(0Hz-25Khz) / ratio(0-40) frequency modes, velocity response, key volume scale
Filter: 1 per voice, multimode highpass/lowpass, resonant
Envelope generator: 14 per voice (6x volume, 6x pitch, 1x filter cutoff, 1x pan), 6-point curves, linear/exponential, with loop points
LFO: 1 per voice, 48 waveforms, 13 masks, speed/delay/attack parameters, MIDI clock sync, fixed/random/common phase modes, per-oscillator FM/AM depth
Modulation matrix: 8 cords per voice, 139 sources, 224 destinations
Performance: 256 slots, stores patch/part MIDI channel associations, effect setup, output routing and knob assignations
Rendering modes: high-quality FM (interpolated oscillators), old-school FM (no interpolation)

MIDI Connectivity

3x MIDI DIN: In, Out, Thru
1x MIDI USB device (In, MIDI class-compliant)
1x MIDI USB host (In, max. 1000mA)
1x MIDI-RTP (In, AppleMIDI protocol, fixed/auto IP)

The 4 MIDI inputs are merged together and can be used simultaneously.

Audio

8x audio outputs (4x stereo pairs, 6.35mm jack), balanced
Headphones output (stereo 6.35mm jack), unbalanced, separate volume control
Internal resolution: 32-bit
DAC: 24-bit, 108dB signal-to-noise ratio
Output level: MKI 1.7V RMS (5Vpp) / **MKII** 5V RMS (14Vpp)
Digital audio rendering to USB drive (.wav)

Audio outputs are fully isolated and do not require any ground loop isolator.

MIDI Features

Custom **velocity curves** (6 curves + scale/offset setting)
Global **transpose** (+60/-60 semitones)
Global **tuning** (374-550Hz)
MIDI filters per message type, per channel
MIDI file player (USB drive .mid file playback)
MPE support

Microtunings

32 slots for **custom microtunings**

Scale, simple mode: up to 32 notes, octave stretching, tuning by cents (0-1200)
Scale, advanced mode: custom frequency for all 128 notes, precision up to 0.01Hz

Scala file import from USB

Waveforms

48 user-editable waveforms

Waveform edition: by drawing on screen, .wav file import from USB, edition via onboard editing functions
Sound editing functions: Flip horizontally, flip vertically, smooth waveform, change volume, center, mix two waveforms together, crossfade, multiply by itself, maximize, add harmonic

Effects

2x 32-bit multi-effect DSP

Effects: 7 reverbs, 2 delays, stereo chorus, 5 distortion algorithms, bitcrush, phaser, rotary, 3-band equalizer, auto-wah, L/R phase shift, shimmer, stereo to mono mixer
Routing modes: series, parallel, hybrid

Independent FX1/FX2 send for each part

Sound Presets

MKI	MKII
399 patches	495 patches
521 voices	686 voices

Modulation Matrix

Sources: note number, velocity, key release velocity, aftertouch, polyphonic aftertouch, pitch bend, LFO, current number of playing notes, random number generator, envelope, MIDI CC (0-127), MIDI clock BPM

Operator destinations: operator volume, frequency multiplier, frequency coarse, frequency fine, waveform, initial phase, LFO AM depth, LFO FM depth, envelope speed, envelope segment 1-5 time, envelope point 1-6 vertical position

Global destinations: voice volume, frequency coarse, frequency fine, LFO speed, LFO AM depth, LFO FM depth, LFO waveform, LFO mask, LFO phase, LFO MIDI sync ratio, filter cutoff, filter cutoff (preserve envelope), filter resonance, filter dry/wet, filter lowpass/highpass, filter envelope speed, filter envelope segment 1-5 speed, pan, pan envelope speed, pan segment 1-5 time, pan envelope height, feedback source, feedback level, algorithm (selects from 32 algo presets)

Display

7 inch IPS capacitive touch screen with multitouch support

Refresh rate: 60 frames per second
Backlight intensity adjustment

Storage

Voice: up to 3328 voices (26 banks of 128 voices), sorting by bank or category (32 user-editable categories)
Patch: up to 3328 patches (26 banks of 128 patches)
Performance: 256 slots
Tunings: 32 slots
Waveforms: 48 slots

Search by name feature for voices and patches.
Element import/export from USB drive.
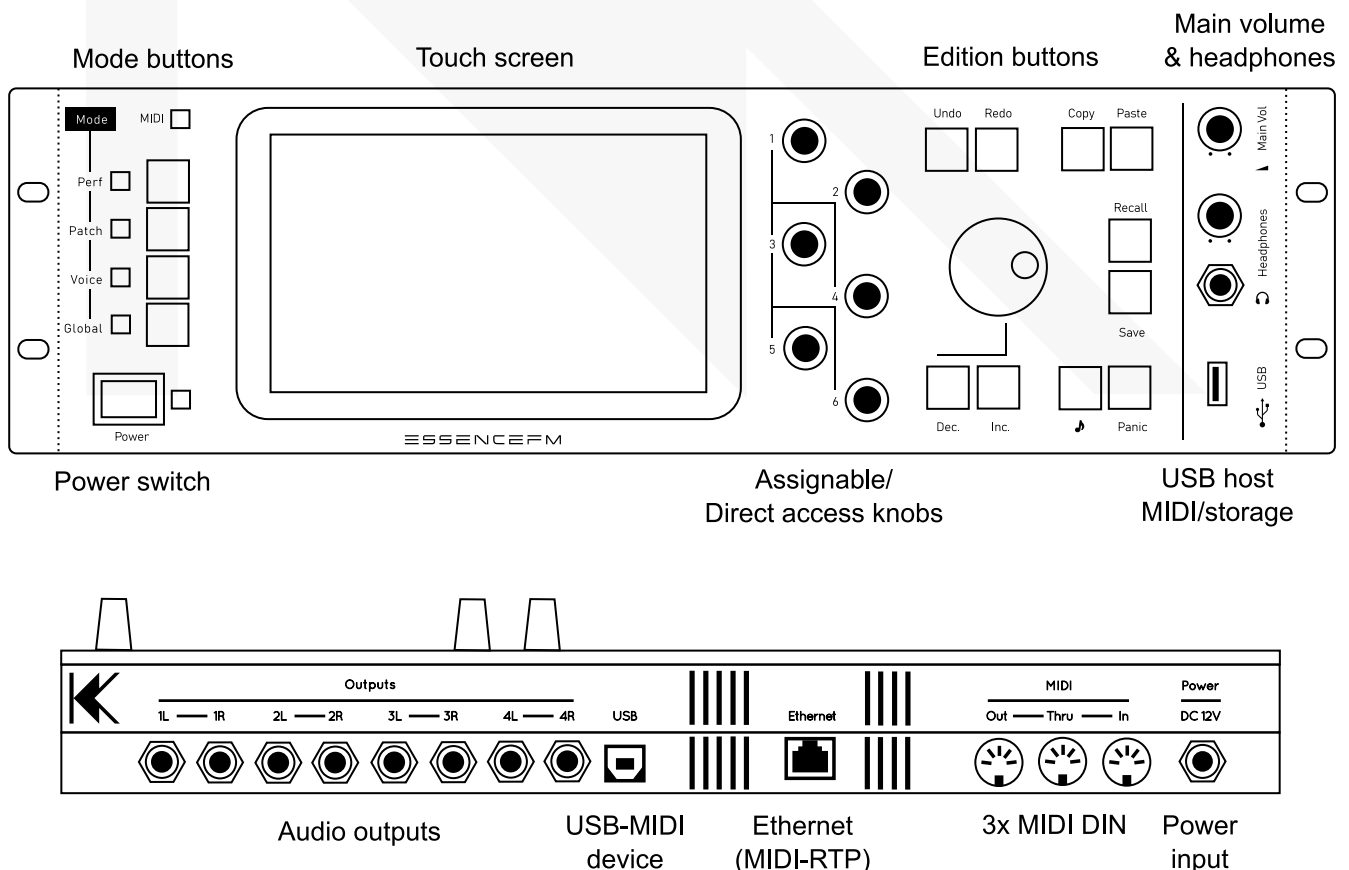Yamaha DX7 sound import (1/32-voice SysEx dumps).

General

MKI / MKII

Controls: 14x mechanical switches (buttons), 7x rotary encoders, 2x analog potentiometers (volume knobs)
Power supply: AC in 100-240V, DC out 12V 2A
Power consumption: ~10W
Warranty: 2 years manufacturer

MKII

Synth size: 427 (width, without including rack ears) x 133 (height) x 103mm (depth, without including knob height)
Synth weight: approx. 2Kg
Package size: 500 x 200 x 200mm
Package weight: approx. 3Kg

Front panel & connectors

Mode buttons   Touch screen   Edition buttons   Main volume & headphones

Power switch   Assignable/Direct access knobs   USB host MIDI/storage

Audio outputs   USB-MIDI device   Ethernet (MIDI-RTP)   3x MIDI DIN   Power input
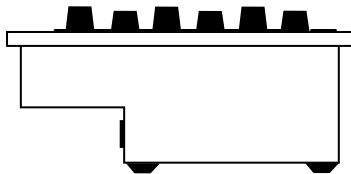
Mounting Options
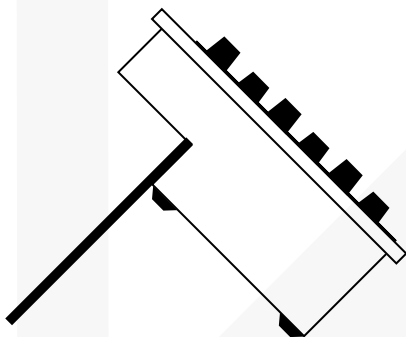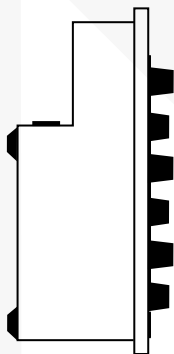
MKI

Table-top (flat)

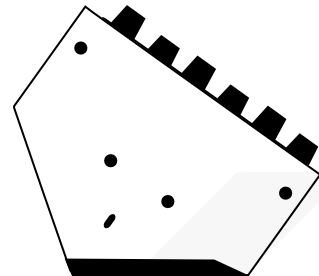### Table-top (tilted)

Rack mount
(rack ears are built into the front panel)
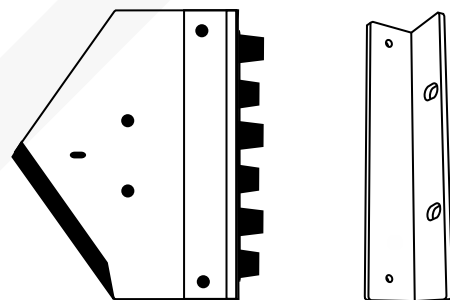
MKII

Table-top (tilted)

Rack mount
(removeable rack ears)

Packaging

MKI

- EssenceFM MKI synthesizer
- Printed user manual
- External power supply
- Tilted support brackets
- Screws

MKII

- EssenceFM MKII synthesizer
- Printed user manual
- External power supply
- Rack ears
- Screws

MIDI Implementation

Note on
Note off
Program change
Pitch bend
Aftertouch
Polyphonic aftertouch
SysEx MIDI reset (GM, GS or XG)
DX7 1-voice dump SysEx (only on voice page)
MIDI clock
MIDI reset (cut all notes and reset controllers)
CC0-127 as sources in modulation matrix
CC5 portamento speed (mono mode only)
CC6 NRPN parameters for pitch bend range and channel transpose
CC7 channel volume
CC8 channel pan (same as CC10)
CC10 channel pan
CC11 expression pedal (controls voice volume by default if enabled in settings)
CC32 bank select LSB
CC39 performance select MSB
CC40 performance select LSB (then loads the selected performance)
CC47-48 selects the effect type for FX1 and FX2
CC51-55 control FX1 parameters
CC56-60 control FX2 parameters
CC61 FX1 output level
CC62 FX2 output level
CC64 sustain pedal
CC66 sostenuto pedal

CC90 part dry level
CC91 part FX1 send level
CC92 effect routing mode (parallel, chained or hybrid)
CC93 part FX2 send level
CC96 data increment (same as pressing the INC button)
CC97 data decrement (same as pressing the DEC button)
CC98 NRPN LSB
CC99 NRPN MSB
CC100 RPN LSB
CC101 RPN MSB
CC120 all sound off
CC121 reset all controllers
CC123 all notes off
CC126 mono mode
CC127 poly mode