A digital piano is shown from a high angle. On top of the piano, there is a tablet displaying a blue synthesizer interface with various parameters like Volume, Reverb, Chorus, Soft, Sustain, Pitch sens, and Decay. To the left of the tablet, there is a small figurine of a character. The piano keyboard is visible in the foreground.

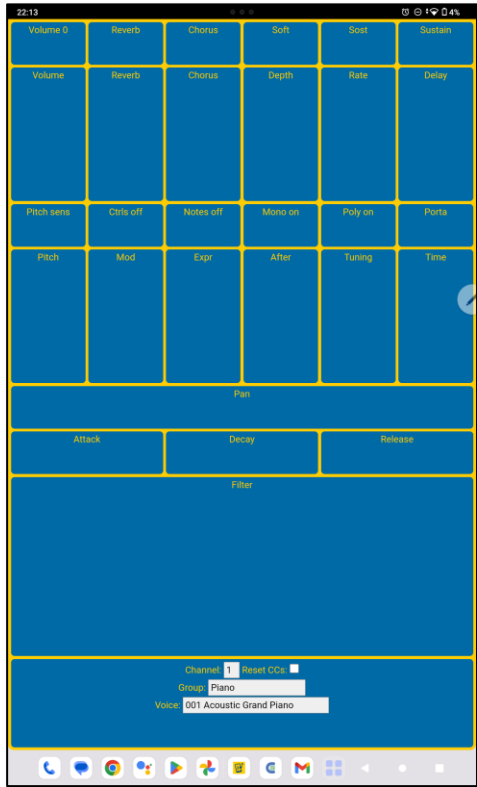
MIDIPads, or “How I turned my piano into a synthesizer”

Anders Borg

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Revision 12

Principle



Android or iOS
tablet or phone

MIDI
Over
BLE



Arduino + BLE + MIDI
(running MIDISmart.ino)

Synth Engine



MIDI



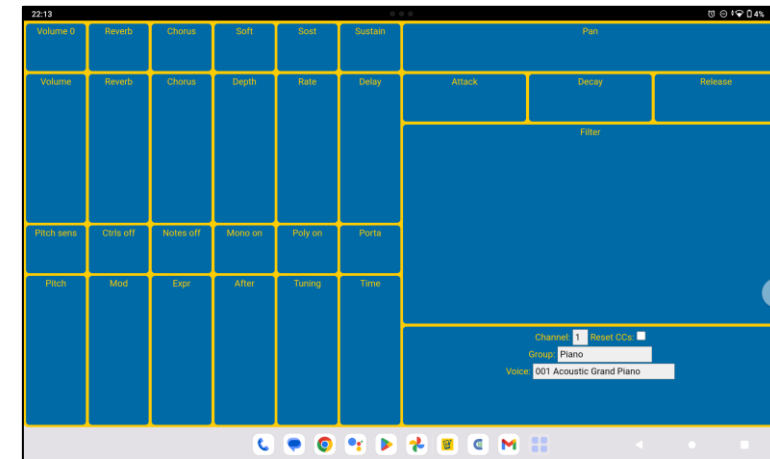
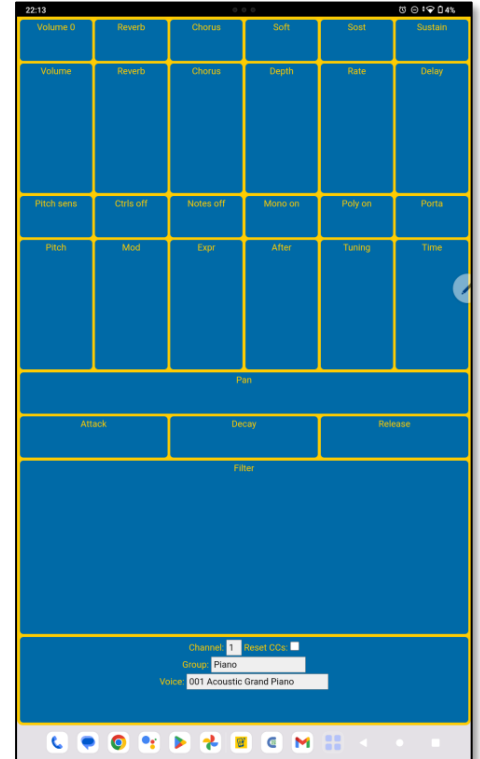
Keybed



Digital instrument with MIDI and
optimally supporting GM2 fully

MIDIPads

- Supports X/Y, X, Y and button pads
- Pads can be tapped or dragged
- Supports initial values
- Supports optional reset to initial value on release
 - Currently used for pitch bend and aftertouch
- Buttons can have multiple states that are stepped through
 - Currently used for pitch sensitivity, reverb type and chorus type
- Pads are configured via data in code, so easy to modify
- Can send Control Change, Pitch Bend, Channel Pressure and Program Change as per GM2
- Supports selecting voice for GM2 compatible instruments
 - Yet currently optimized for Medeli SP4200
- Vertical and horizontal layouts (automatic) optimized for tablets



What MIDIPads can practically control

- Filter: cutoff, resonance
- Volume: level, pan, off
- Reverb: type, level
- Chorus: type, level
- Pedals: soft, sostenuto, sustain
- Vibrato: strength, rate, delay
- Envelope: attack, decay, release
- Pitch: range, level
- On/off switches: sound, controls, notes, mono, poly
- Modulation: level
- Expression: level
- Aftertouch: level
- Portamento: level, time
- Instrument: group, specific instrument (GM/GM2), reset controllers at change

Not the least filter, vibrato, chorus type, modulation and pitch bend bring life to otherwise dull/static sounds like lead synth

MIDISmart.ino

- Receives MIDI messages via BLE that it sends to MIDI OUT
- Handles MIDI THRU between MIDI IN and MIDI OUT
- Handles conflicts between MIDI via BLE and MIDI THRU
- Based on Arduino + MIDI Shield + BLE Shield
- Could be made much smaller
- Knobs and buttons are not used



Medeli SP4200 or other piano/keyboard/synth

- Medeli SP4200: low-cost GM2 compatible digital stage piano with many instruments, accompaniment, lessons etc
- Old-type MIDI is used for MIDIPads but it has also MIDI via USB
- A registration resets voice volumes
 - Needed as SP4200 doesn't support Local Control Off
- Reacts well to most messages sent



Future

- Direct communication with keyboard via USB and/or Bluetooth
- Multiple panes with different configurations, e.g.:
 - Generic pads
 - Focused pads (e.g. the whole screen for filter dynamics)
 - Bank and Program selection
 - Beats/Arpeggiator (matrix or other)
 - Echo
 - Real time MIDI Logger