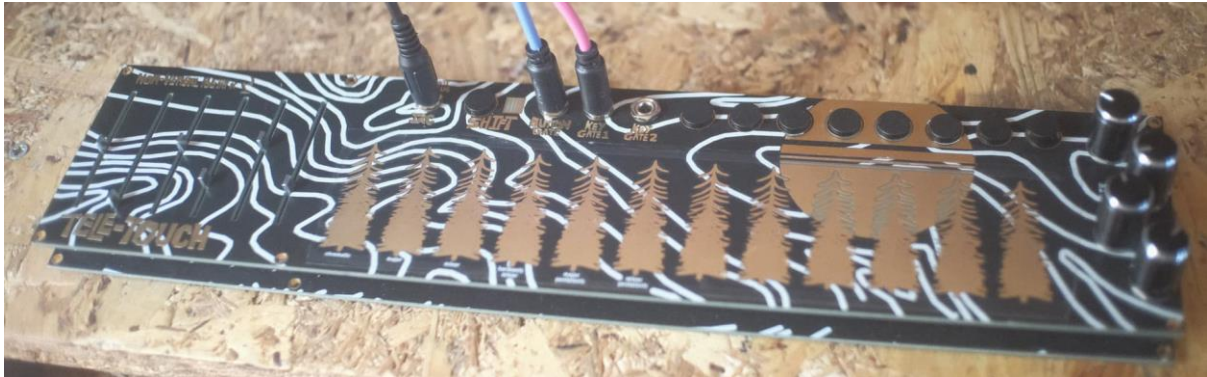# Teletouch operation manual



Teletouch is a capacitive touch plate keyboard that outputs USB midi and i2c messages.

Its interface consists of:

- 6 faders
- 12 tree shaped touch plate keys
- A shift button and light
- 8 buttons
- 4 potentiometers

And the outputs consist of:

- A stereo jack i2c port
- Teensy USB socket (for power and midi out)
- 3 mono jacks that output gates

## Connecting teletouch

To use teletouch as a midi controller, simply connect to a midi host and set the host to listen on midi channel to 1. (more on changing the midi channel under 'customising')
NOTE: Teletouch is a USB midi device, and therefore can only be used to control a midi host such as a computer or Norns.


To use teletouch as an i2c controller for teletype or Crow, connect the i2c jack to a device such as txb or xoxo modular MIDIXO. An i2c to stereo jack adapter can be diy'd quite easily, with details of the connections on the lines 'users guide to i2c' thread.

⚠️ WARNING – i2c is not designed as a patchable connection and directly exposed pins in your modules microcontrollers. Stray static and shorting through patching a jack cable can result in permanent damage to modules.

Only patch your i2c Jack when both your modular case and teletouch are UNPOWERED. And never leave one end of an i2c jack unpatched laying on a desk, prone to stray static while the other is plugged in.

## Calibrating

Teletouch is able to output a 'pressure' value based on the capacitance read from a key. This capacitance is very sensitive and can change depending on things like humidity and tiny differences between pcbs, and even differences between keys on individual teletouches.

For this reason, the keys need to be calibrated every so often, to successfully detect note on/off presses, and have the pressure value mapped to a useful range.

To calibrate, hold the shift button until the indicator led flashes. Now, touch a key. The led will start blinking very fast, indicating new values are being read. Roll your finger all the way on to the key so you are touching as much of the key as you can, then roll your finger off, making sure your finger leaves the pad at the very peak of the tree, with the gentlest touch you can. Doing so will ensure the absolute maximum and minimum presses to the pad will be logged. Now repeat for all remaining keys. It doesn't matter how many times you do this to a key in calibration mode, as the most recent press will always be the recorded one. To leave calibration mode, hold shift again until the led blinks.

Calibration persists over power downs so you will only need to calibrate occasionally.

## Using teletouch – midi

Teletouch over midi is quite straightforward. Knobs send midi cc messages 1-4. Faders send midi cc messages 5-10.

The touch plates send midi notes according to the selected scale fully polyphonically, using the pressure value for velocity.

Pressure is also sent over midi cc 0, and is always derived from the right most held key.

The buttons also play midi notes, though these have fixed velocity. I personally like to use them for basslines.

To select the keyboards octave¸ hold shift and press a button 1-8.

To change the octave spanned by the buttons, hold shift and turn the knob labelled 'button octave'

To shift the root note of the scale (transpose), hold shift and turn the knob labelled transpose.

To select the scale played by the keyboard and buttons, hold shift and tap one of the touch plates with a scale name below. While shift is held, touch plates and buttons will not play notes.

Scales, transposition and octaves do not currently persist over power downs in midi or i2c mode, so you will need to set this up each time you power on.

# Using teletouch – i2c

Using teletouch over i2c is a little more complicated, but opens up a world of programmatic possibilities.

Teletouch makes use of teletypes generic i2c ops. Its worth noting down what does what, because they aren't as easy to remember as regular ops.

Teletouch also works around a classic problem teletype has faced with i2c controllers in the past- that of needing to poll the i2c bus so fast it becomes unstable.

Teletouch solves this through its trigger outs. The button gate goes high when a button is pressed and goes low when released. Key1 gate does the same but when a single touch plate is pressed. Key2 only goes high when a key is already held and a second key is pressed.

These gates can be used to poll a note value once, when the appropriate gate hoes high, resulting in instant reading of a key press without delay or destabilising the i2c bus.

The touch plate scale, octave and offset values and shift functions are the same over i2c as the are over midi, but the button values are fixed as values 0-7, for better decoupled use in controlling things within teletype. Try using buttons to trigger scripts, toggle metro on and off or even switch between which pattern is active.

Teletouch isn't just designed as a playable keyboard, it, is also intended as a full control station for interacting with teletype scenes.

**The ops**

IIA 41 - sets the generic i2c ops to listen on teletouches address. (if you have changed the address in teletouches code, make sure you use your new number here)

IIQ 1– returns the midi note value of key 1 (First held key)

IIQ 2 – returns the midi note value of key 2 (second held key – only updates on keypresses made while another key is already held- making 2 note polyphony possible)

IIQ 3 – returns the value of the last pressed button (0-7)

IIQ 4 – returns the pressure value of currently held key (0-16383)

IIQ 5-8 – returns values of knobs (0-16383)

IIQ 9-14 – returns values of sliders (0-16383)

Remember – the SCALE op can be used with any of the teletouch ops to re-map the values to a range you can use.

Please see the 'Introducing Teletouch' thread for examples, tips and tricks and pre-made teletype code

## Customising settings

For now, teletouch can only have its i2c address and midi channel changed in the firmware. To make this change, open the teletouch.ino file using teensyduino (find the download for this on the teletouch website or the lines thread) and change the number in the 4th or 5th line, as explained in the comments on these lines, then make sure the teensy is connected and in bootloader mode, and press the upload arrow at the top of the window to Flash the teensy with the new code.