

## Cross-Slider Surface module operation with Boost Mode

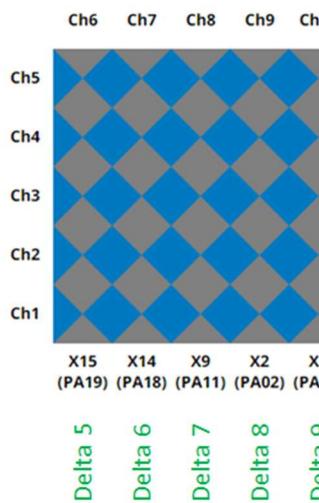
### Problem

The existing surface modules 0x0021 and 0x0025 uses horizontal + vertical number of deltas to compute X,Y position.

To get H+V deltas, lump mode is used.

Vertical deltas: Lump Xs and scan through individual Y. (Lump X + Individual Y)

Horizontal deltas: Lump Ys and scan through individual X. (Individual X + Lump Y)



When Boost Mode is enabled, it is still possible to achieve lump configuration using in non-4P project as follows.

{X(15) | X(14) | X(9) | X(2) | X(3), X\_NONE, X\_NONE, X\_NONE}, Y8, etc...

But the benefits of using 4P will be unused in this approach (not an optimal solution to lump multiple X lines with same polarity).

### Solutions

Include some modifications in touch.c file as follows.

- Perform 4P measurement (without using lump)
- From H\*V node deltas, compute H+V node deltas. Lump is nothing but combination/addition of sensors. Lump sensor's delta will be equal to sum of individual sensor's delta.
  - The signal/delta will be a summed (as shown in following image) before passing to key's module.
  - Key module's calibration request will be mapped to acquisition module accordingly.

Horizontal Deltas

Ch20	Ch21	Ch22	Ch23	Ch24	Y16 (PA22)
Ch15	Ch16	Ch17	Ch18	Ch19	Y17 (PA23)
Ch10	Ch11	Ch12	Ch13	Ch14	Y10 (PA14)
Ch5	Ch6	Ch7	Ch8	Ch9	Y4 (PA05)
Ch0	Ch1	Ch2	Ch3	Ch4	Y8 (PA10)
X15 (PA19)	X14 (PA18)	X9 (PA11)	X2 (PA02)	X3 (PA03)	

Delta 5  
Delta 6  
Delta 7  
Delta 8  
Delta 9

→ Signal 5 = (ch0+ch5+ch10+ch15+ch20)/5

Vertical Deltas

Ch20	Ch21	Ch22	Ch23	Ch24	Y16 (PA22)
Ch15	Ch16	Ch17	Ch18	Ch19	Y17 (PA23)
Ch10	Ch11	Ch12	Ch13	Ch14	Y10 (PA14)
Ch5	Ch6	Ch7	Ch8	Ch9	Y4 (PA05)
Ch0	Ch1	Ch2	Ch3	Ch4	Y8 (PA10)
X15 (PA19)	X14 (PA18)	X9 (PA11)	X2 (PA02)	X3 (PA03)	

Delta 4

Delta 3

Delta 2

Delta 1

Delta 0 Signal 0 = (ch0+ch1+ch2+ch3+ch4)/5

## Result

This approach works well with the existing surface modules. Can use for 1 touch solution and 2 touch gesture applications.