

MP-29

Tactile Touchscreen Calculator



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HPCC 2020 Virtual Conference

About me

- mpark on hpmuseum.org forum
- HP-25C, HP-42S

Making a calculator!

So many questions:

- CPU / software?
- Display?
- Case?
- The big one: keys?

Keys

- Switches?
- Keycaps?
- Print on keys?
- Print on faceplate?
- Keys with built-in displays?

Display switch



Touchscreen

Pro:

- Unlimited layout possibilities
- Dynamic
- Familiar
- Can also serve as display

Con:

No tactile feedback

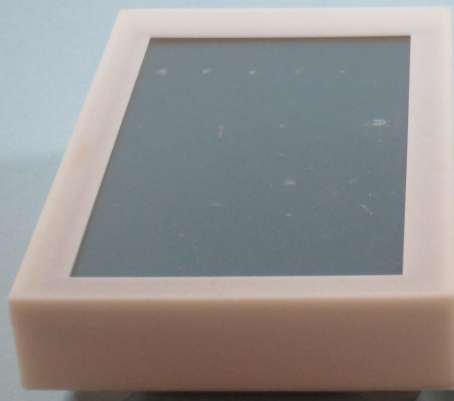
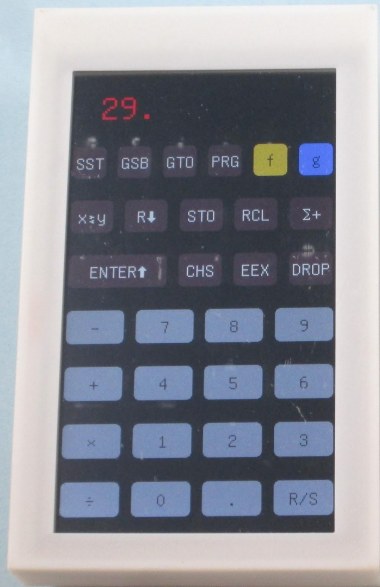


HP-29C



MP-29

- My take on the HP-29C
- Not an emulator or a simulator; more of an homage
- IEEE-754 double-precision (64 bits)



29.

BST RTN LBL OFF f g

% i DEG

CL PREFIX GRD RAD DEG

$x < 0$ e^x 10^x $\rightarrow P$

$x > 0$ \sin^{-1} \cos^{-1} \tan^{-1}

$x \neq 0$ FRAC x^2 ABS

$x = 0$ $\rightarrow H$ π $1/x$

Entry RPN

- When typing a number, Enter key terminates input
- Otherwise, Enter duplicates top of stack
- Enter -> End



XYZ

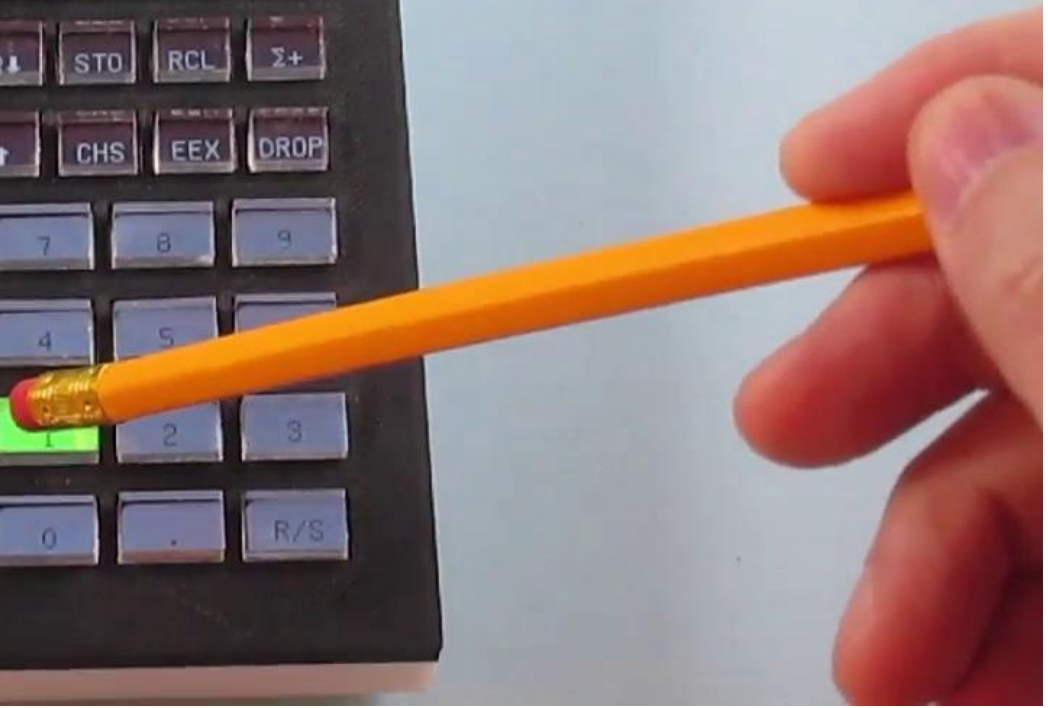
- Tactile feedback in the vertical direction
- No help in the horizontal plane



Calculators gotta calculate

- Computing a famous number
- Calculator forensics test

8.00



Memory

- 100 memory registers (0-99)
- Indirection on any register

RCL _

SST	GSR	GTO	PRG	f	g
x _≠ U	R↓	STO	RCL	Σ+	
ENTER↑	CHS	EEX	+		
-	7	8	9		
+	4	5	6		
×	1	2	3		
=	0	.	R/S		

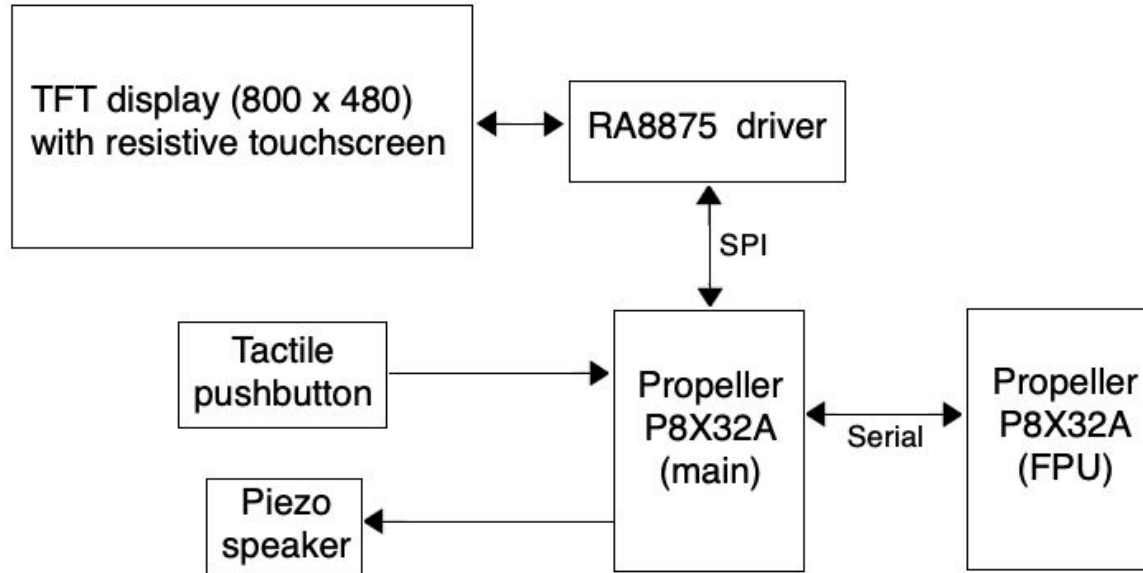


Programming

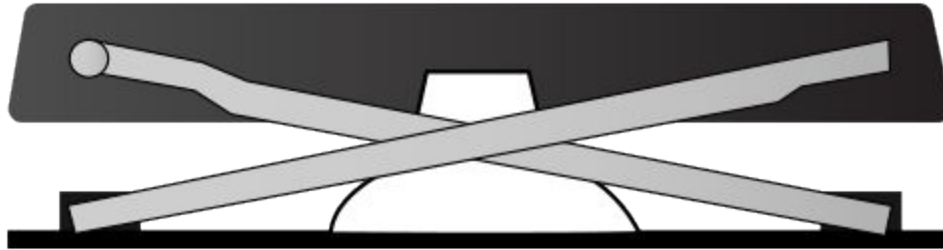
- 100 steps (0-99)
- 100 labels (0-99)
- Save/load programs

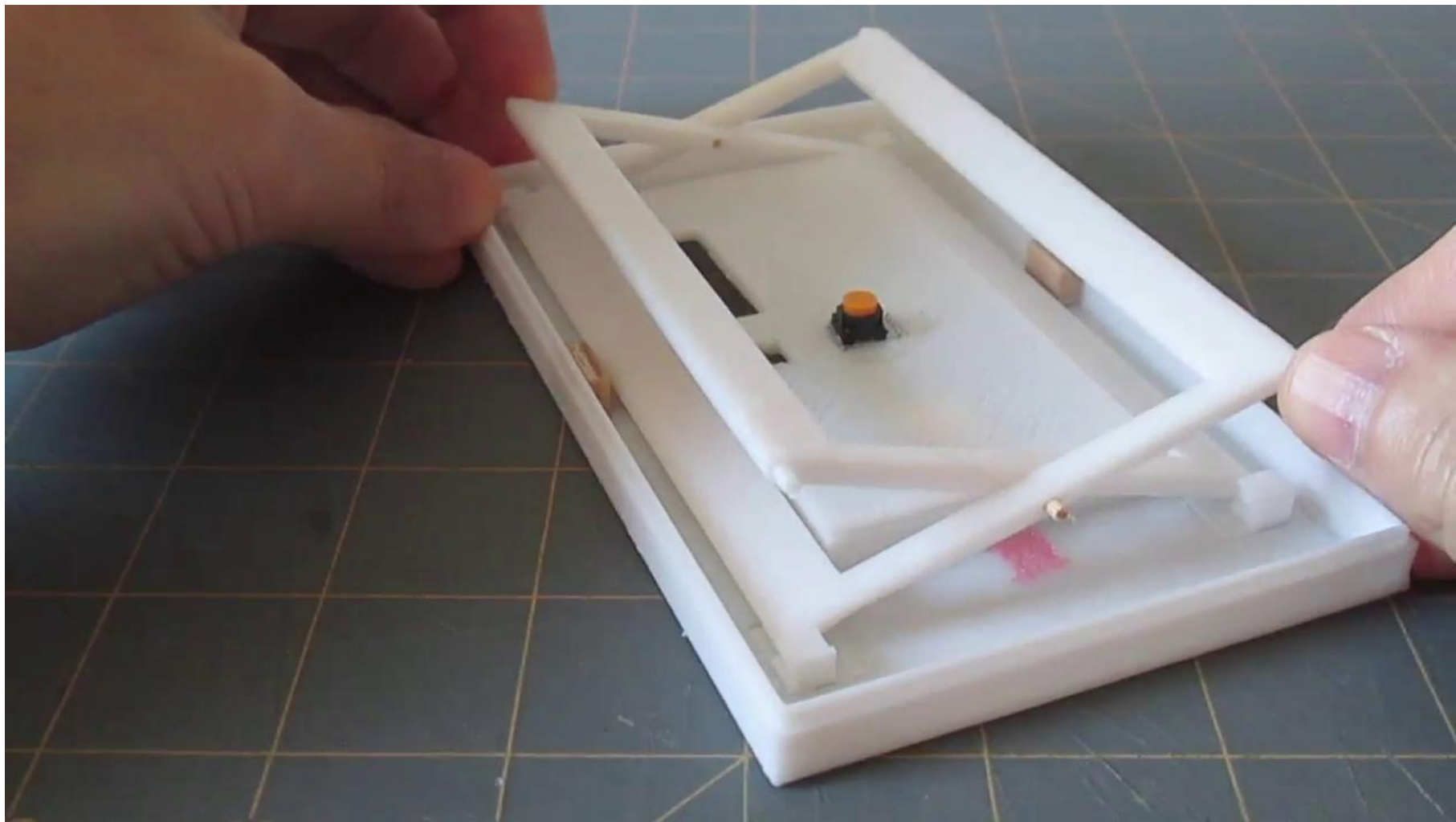


MP-29 block diagram



Touchscreen mount





Future work

- Fix bugs
- Stiffer scissors mechanism
- Alternative mechanisms
- Experiments in dynamic layout

Thanks

- To my long-suffering wife, Ioana
- To the HPCC conference organizers
- To the hpmuseum.org forum community

