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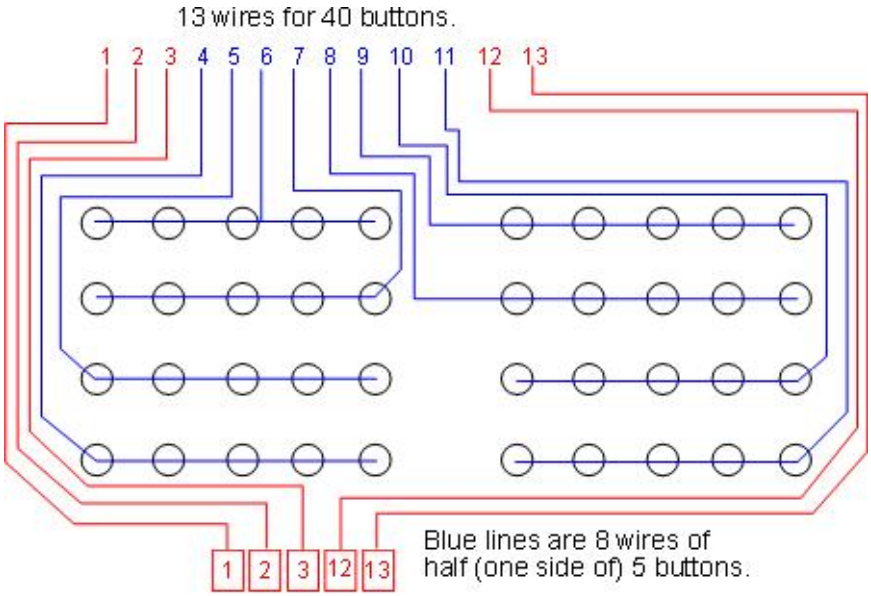
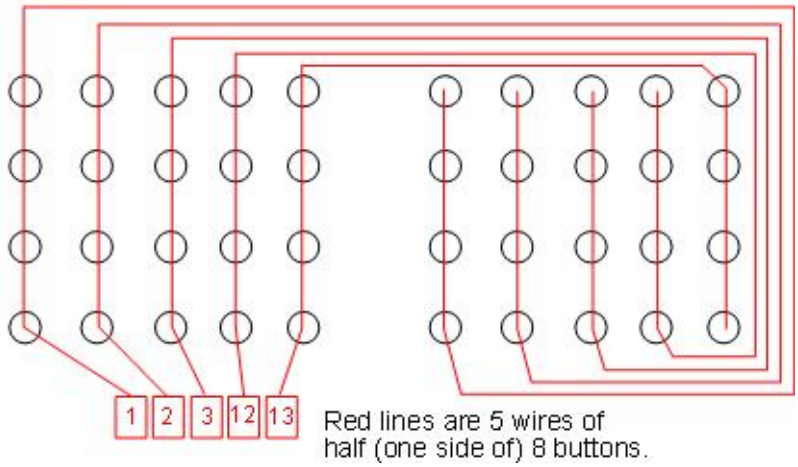
A Speak&* has a membrane button matrix. There is not a polarity signal, instead there is an address system. There are 13 wires to carry information from 40 buttons to the chip. If you look at the button membrane you will see 5 wires that each connect to half (one side) of 8 buttons, and 8 wires that each connect to half (one side) of 5 buttons. So 5 wires with half of 8 buttons each is half (one side) of 40 buttons total. 8 wires with half of 5 buttons each is half (one side) of 40 buttons total. You can follow where a red and a blue line cross to the numbers of the wires. If "A" is second row and farthest right the wires 8 and 13 make the Speak&* say "A". "B" is 8 and 12. "I" is 7 and 2.
The membrane is 3 pieces of plastic with conductive material printed on one side of two pieces. These two pieces face one another trace-to-trace. The third piece of plastic has holes where the horizontal and vertical traces cross. This limits contact areas, and forces space between crossing traces. The two printed pieces are joined on one side so that horizontal and vertical traces can be on one side together, easier to plug into a socket on a pcb.
This membrane can be reproduced with momentary switches if planned carefully with mounting and wiring.





The following are the addresses for buttons on my Speak & Spell. These numbers correspond to how I decided to number the wires of the ribbon.
If you pop off the front cover of your S&S and look at the back of the membrane pad (which obviously you cannot actually see) the wire on the left is 1 and to the right is 13, illustrated it the images above.
On/Spell :: 6,1
Say It :: 6,2
Letter :: 6,3
Secret Code :: 6,12
Mystery Word :: 6,13
Clue :: 9,1
Repeat :: 9,2
Replay :: 9,3
Go :: 9,12
Off :: 9,13
A :: 8,13
B :: 8,12
C :: 8,3
D :: 8,2
E :: 8,1
F :: 7,13
G :: 7,12

H :: 7,3
I :: 7,2
J :: 7,1
K :: 10,13
L :: 10,12
M :: 10,3
N :: 10,2
O :: 10,1
P :: 5,13
Q :: 5,12
R :: 5,3
S :: 5,2
T :: 5,1
U :: 11,13
V :: 11,12
W :: 11,3
X :: 11,2
Y :: 11,1
Z :: 4,13
' :: 4,12
#/Module Select :: 4,3
\/Erase :: 4,2
^/Enter :: 4,1

cappy@sailormouth.org