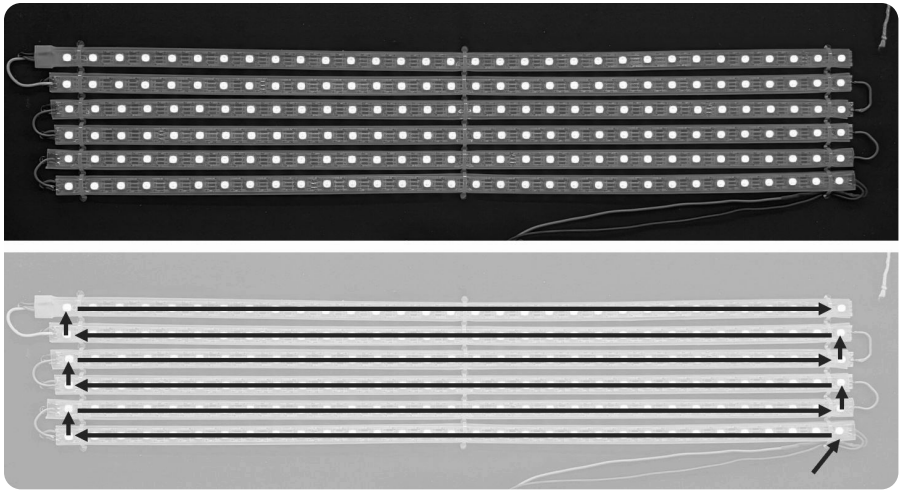
Coordinate Conversion Peripheral



ECE 2031 L02 Group 25

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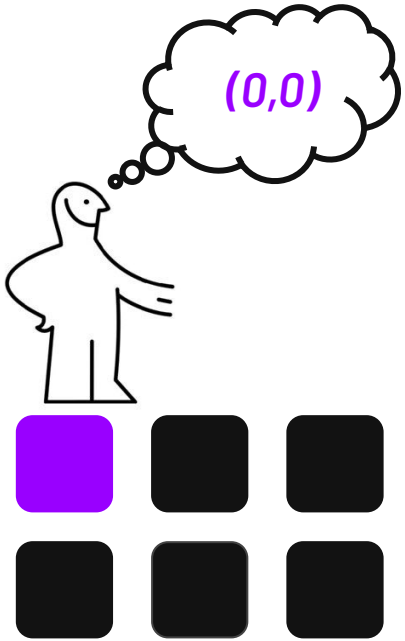
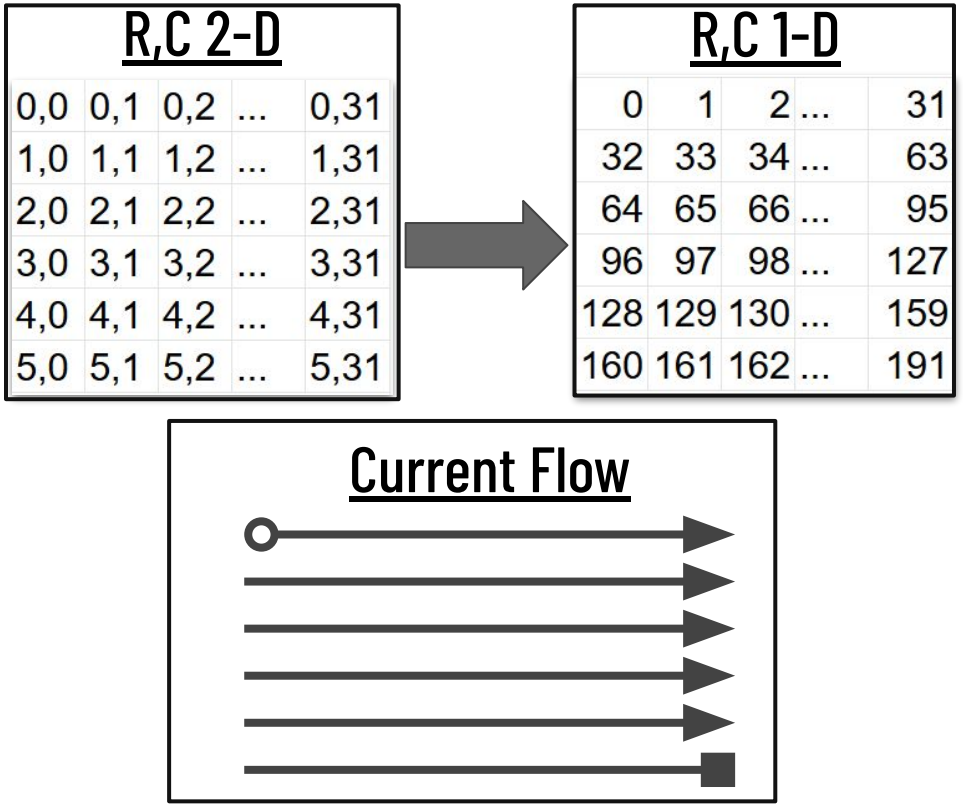


OUT	0000 0000	Target Col/Row [7..0]
IN	0000 0000	NeoPixel Index [7..0]

Peripheral Mechanics Step 1

Translate 2-Dimensional array coordinate system to 1-Dimensional array



Peripheral Mechanics Step 2

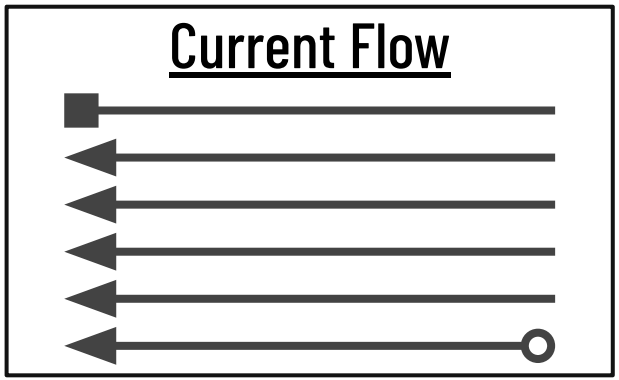
- Reverse the entire 1-Dimensional array
- Coordinate_Flip = abs(Coordinate_1D - 191)

R,C 1-D

0	1	2	...	31
32	33	34	...	63
64	65	66	...	95
96	97	98	...	127
128	129	130	...	159
160	161	162	...	191

R,C 1-D Reversed

191	...	162	161	160
159	...	130	129	128
127	...	98	97	96
95	...	66	65	64
63	...	34	33	32
31	...	2	1	0



Peripheral Mechanics Step 3

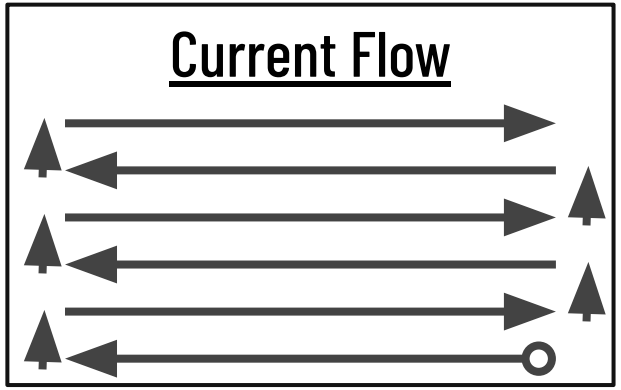
- Reverse direction of all even rows
- Flow/order of array now matches Neopixels peripheral
- Coordinate_Idx = ((6-Row)*32-1-Coordinate_Flip) + (6-Row-1)*32

R,C 1-D Reversed

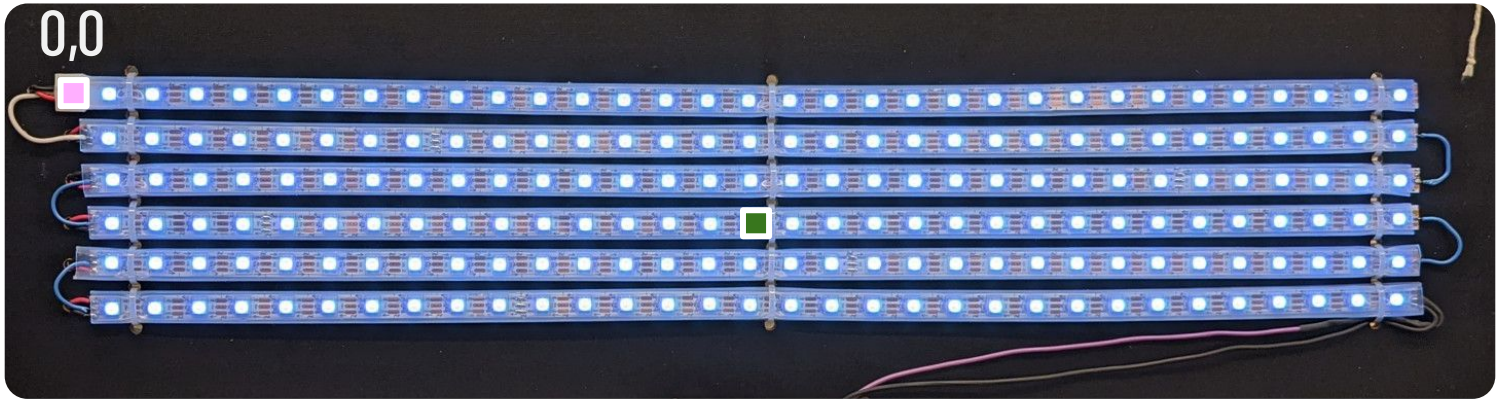
191	...	162	161	160
159	...	130	129	128
127	...	98	97	96
95	...	66	65	64
63	...	34	33	32
31	...	2	1	0

R,C 1-D Neopixel

160	161	162	...		191
159	...		130	129	128
96	97	98	...		127
95	...		66	65	64
32	33	34	...		63
31	...		2	1	0



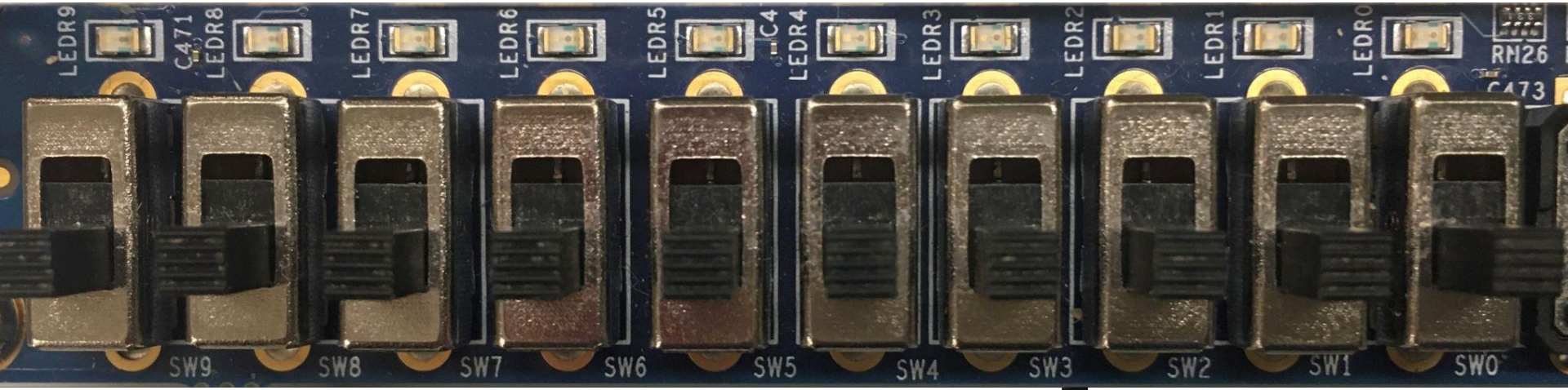
Kirby Game



Kirby/player

Fruit

Demo - DE10 Guide



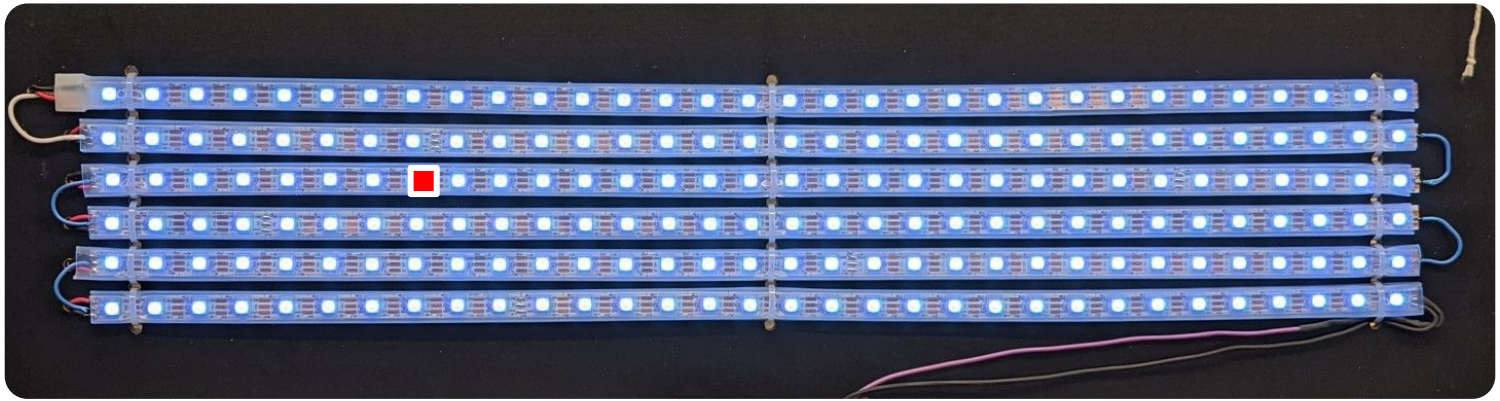
2^4 2^3 2^2 2^1 2^0 | 2^2 2^1 2^0

Column XX (00-31)

Row X (0-5)

KEY0 - Reset

Dimensions and Error Handling



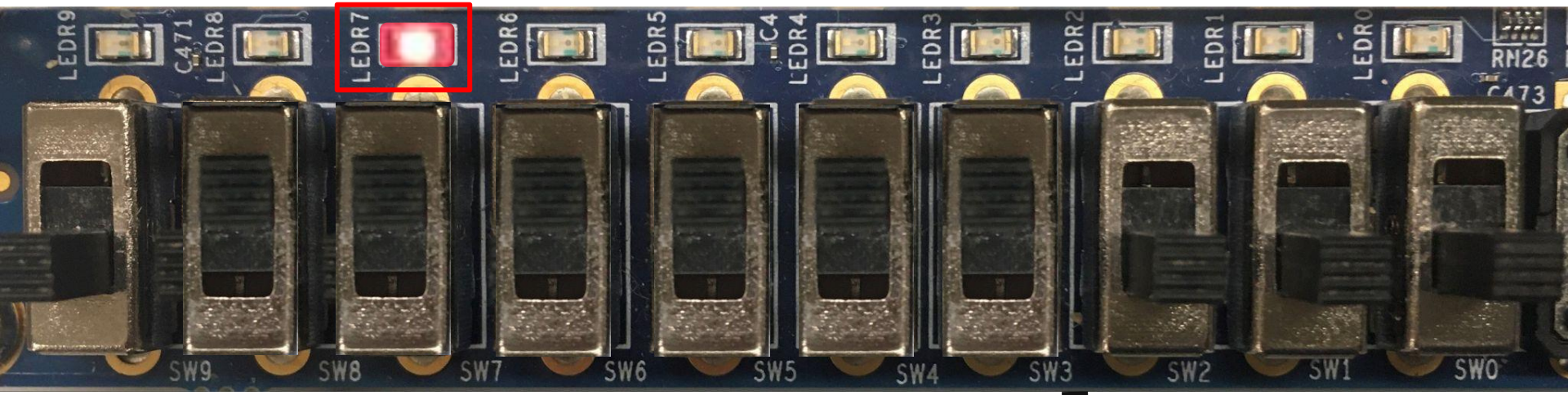
Invalid Pos

Error: 0xFF

OUT	0000 0000	Max Col/Row [7..0]
IN	Target Col/Row [15..7]	Errno [7..0]

Column Error - DE 10 Guide

Col Err



2^4 2^3 2^2 2^1 2^0 | 2^2 2^1 2^0

Column 63 > 31 | Row 0

Row Error - DE 10 Guide