

Type 1 :

0710128, iclab 167  
賴傳心

88	88	57	57
88	88	57	57
129	129	37	37
129	129	37	37

(0, 1, 4, 5)

(2, 3, 6, 7)

(8, 9, 12, 13)

(10, 11, 14, 15)

Fig 4. Example of type1

Step :

- ① sum the four histogram
- ② use window method with length = 5  
and do some change due to the pulse

```

module bus_sum (
    // in
    tp,
    b0, b1, b2, b3, b4,
    // out
    sol
);
parameter LEN = 7;
input [1:0] tp;
input [LEN:0] b0, b1, b2, b3, b4;
output [LEN+4:0] sol;

wire [LEN+1:0] a0 = (tp==0 || tp==1) ? b0 + 15 : b0;
wire [LEN+1:0] a1 = (tp==0 || tp==1) ? 0 : b1 << 1;
wire [LEN+1:0] a2 = (tp==0 || tp==1) ? b2 + 15 : b2 << 1;
wire [LEN+1:0] a3 = (tp==0 || tp==1) ? 0 : b3 << 1;
wire [LEN+1:0] a4 = (tp==0 || tp==1) ? b4 + 15 : b4;

wire [LEN+2:0] c0 = a0 + a1;
wire [LEN+2:0] c1 = a2 + a3;

wire [LEN+3:0] d0 = c0 + c1;

assign sol = d0 + a4;
endmodule

```

Pulse shape:

✓ ✓ ✓

type0 & type1: {0.3, 0, 0.3, 0, 0.3}

type2 & type3: {0.1, 0.4, 0.3, 0.2, 0.1}

Ex : distance = 100

Histo 0

Noise

Histo 1

Noise

sum

Easier to find  
the right dis.

