University Program Design Laboratory Package

November 1997, ver. 1.1 User Guide Supplement

This user guide supplement provides updated pin-out and timing information for the UP 1 Education Board. This supplement should be used together with the *University Program Design Laboratory Package User Guide*.

Pin-Out Information

Table 1 provides updated pin-out information for the MAX_EXPANSION port on the UP 1 Education Board.

Table 1. MAX_EXPANSION Signal Names & Device Connections (Part 1 of 2)

Hole Number	Signal/Pin, *Note (1)*	Hole Number	Signal/Pin, *Note (1)*
1	RAW	2	GND
3	VCC	4	GND
5	VCC	6	GND
7	No Connect	8	No Connect
9	No Connect	10	No Connect
11	No Connect	12	GCLRn/1
13	OE1/84	14	OE2/GCLK2/2
15	4	16	5
17	6	18	8
19	9	20	10
21	11	22	12
23	15	24	16
25	17	26	18
27	20	28	21
29	22	30	25
31	24	32	27
33	29	34	28
35	31	36	30
37	33	38	34
39	35	40	36
41	37	42	40
43	39	44	41
45	44	46	46

Table 1. MAX_EXPANSION Signal Names & Device Connections (Part 2 of 2)			
Hole Number	**Signal/Pin,** *Note (1)*	**Hole Number**	**Signal/Pin,** *Note (1)*
47	45	48	48
49	50	50	49
51	52	52	51
53	54	54	55
55	56	56	57
57	VCC	58	GND
59	VCC	60	GND

Note:
(1) The updated pin numbers are highlighted in gray.

Table 2 shows updated pin-out information for the FLEX_EXPAN_C port on the UP 1 Education Board.

Table 2. FLEX_EXPAN_C Signal Names & Device Connections (Part 1 of 2)			
Hole Number	**Signal/Pin,** *Note (1)*	**Hole Number**	**Signal/Pin,** *Note (1)*
1	RAW	2	GND
3	VCC	4	GND
5	VCC	6	GND
7	No Connect	8	DI1/99
9	DI2/92	10	DI3/210
11	DI4/212	12	DEV_CLR/209
13	DEV_OE/213	14	DEV_CLK2/211
15	175	16	181
17	182	18	183
19	184	20	185
21	186	22	187
23	188	24	190
25	191	26	192
27	193	28	194
29	195	30	196
31	198	32	199
33	200	34	201
35	202	36	203
37	204	38	206
39	207	40	208
41	214	42	215
43	217	44	218

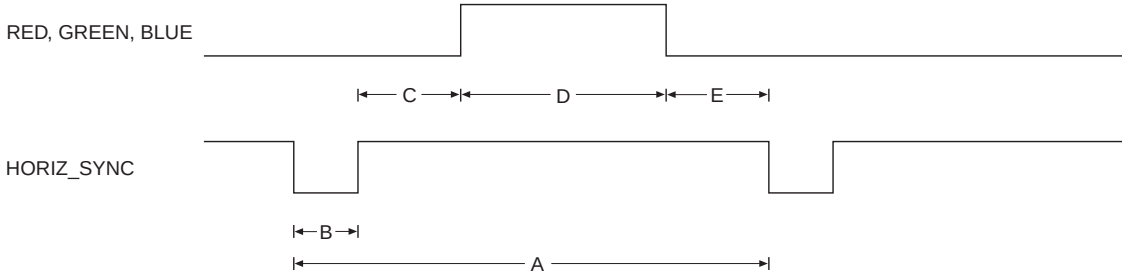
Table 2. FLEX_EXPAN_C Signal Names & Device Connections (Part 2 of 2)			
Hole Number	**Signal/Pin,** *Note (1)*	**Hole Number**	**Signal/Pin,** *Note (1)*
45	219	46	220
47	221	48	222
49	223	50	225
51	226	52	227
53	228	54	229
55	230	56	231
57	VCC	58	GND
59	VCC	60	GND

Note:
(1) The updated pin numbers are highlighted in gray.

VGA Timing Information

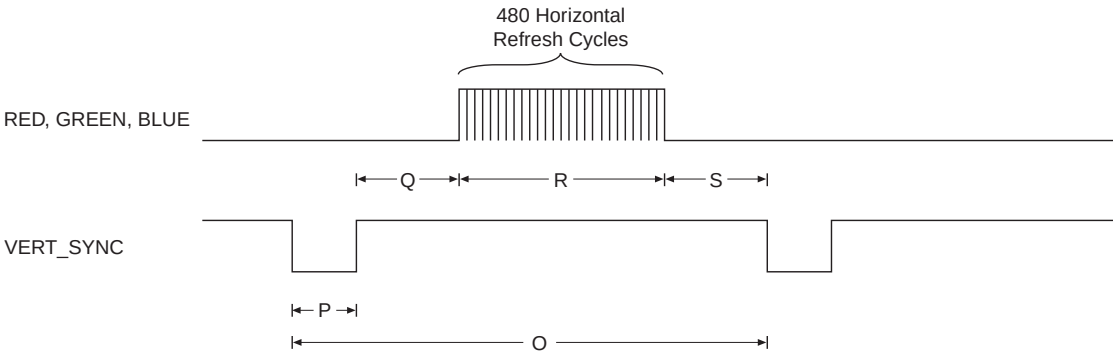
For the VGA monitor to work properly, it must receive data at specific times with specific pulses. Horizontal and vertical synchronization pulses must occur at specified times to synchronize the monitor while it is receiving color data. Figures 1 and 2 show updated timing waveforms for color information with respect to horizontal and vertical synchronization signals.

Figure 1. Horizontal Refresh Cycle



Parameters	A	B	C	D	E
Time	31.77 µs	3.77 µs	1.89 µs	25.17 µs	0.94 µs

Figure 2. Vertical Refresh Cycle



Parameters	O	P	Q	R	S
Time	16.6 ms	64 µs	1.02 ms	15.25 ms	0.35 ms

The following updated equations determine the time required for a monitor to update each pixel and to update a whole screen.

$T_{pixel} = 1 / f_{CLK} = 40$ ns

$T_{ROW} = A = B + C + D + E$
$= (T_{pixel} \times 640 \text{ pixels}) + \text{row} + \text{guard bands} = 31.77$ µs

$T_{screen} = O = P + Q + R + S$
$= (T_{ROW} \times 480 \text{ rows}) + \text{guard bands} = 16.6$ ms

Where:
T_{pixel} = Time required to update a pixel
f_{CLK} = 25.175 MHz
T_{ROW} = Time required to update one row
T_{screen} = Time required to update the screen
B, C, E, P, Q, S = Guard bands

101 Innovation Drive
San Jose, CA 95134
(408) 544-7000
http://www.altera.com
University Program:
university@altera.com
Literature Services:
(888) 3-ALTERA
lit_req@altera.com