

1 File: IDEHA58A. PLD
2 Date: Aug. 1, 1992

3
4 This file contains the logic necessary for a GAL22V10 to provide
5 handshaking signals, clocks, and chip selects for the discrete
6 version of the Powermate IDE Host Adapter Card (schematic file
7 IDEHA7. SCH). Card I/O ports as follows:

Addr	Input	Output
01	Error Register	Not Used (WPC Register)
02	Sector Count Register	Sector Count Register
03	Sector Number Register	Sector Number Register
04	Cylinder Low Register	Cylinder Low Register
05	Cylinder High Register	Cylinder High Register
06	SDH Register	SDH Register
07	Status Register	Command Register
58	Lower Byte Data Register	Lower Byte Data Register
59	Upper Byte Data Register	Upper Byte Data Register
5A	Alternate Status Register	Fixed Disk Control Register
5B	Digital Input Register	Not Used

23 GAL22V10
24 1: I TYP, 2: WR, 3: AO, 4: A1,
25 5: A2, 6: A3, 7: A4, 8: A5,
26 9: A6, 10: A7, 11: RD, 13: IORQ,
27 14: E245, 15: CLKW, 16: CLKR, 17: WRU,
28 18: RDU, 19: IOR, 20: IOW, 21: CS3,
29 22: CS1, 23: A2B

32 To send 16 bit data:
33 First send upper byte to port 59H and latch it into "write" FFs
34 with CLKU, but do not enable LS245 or "write" FF outputs and
35 do not send IOW
36 Then send lower byte to port 58H, enable LS245 and "write" FF
37 outputs, and send IOW

39 To receive 16 bit data:
40 First read lower byte from port 58H by sending IOR and enabling
41 LS245 outputs (latch the upper byte into "read" FFs with CLKU)
42 Then read the upper byte from port 59H by enabling "read" FFs;
43 do not enable LS245 and do not send IOR

45 | Low: IOW, IOR, WR, RD, IORQ, CS1, CS3, E245, RDU, WRU

46 | A2B = A2 # (A[7..0]==5AH) # (A[7..0]==5BH)

49 Issue IOW for write to 02H-07H, 58H (ignore 59H), and 5AH
50 IOW = (WR & IORQ & A[7..0]>=02H & A[7..0]<=07H)
51 # (WR & IORQ & A[7..0]==58H)
52 # (WR & IORQ & A[7..0]==5AH)

54 Issue IOR for read from 01H-07H, 58H (ignore 59H), 5AH, & 5BH
55 IOR = (RD & IORQ & A[7..0]>=01H & A[7..0]<=07H)
56 # (RD & IORQ & A[7..0]==58H)
57 # (RD & IORQ & A[7..0]==5AH)
58 # (RD & IORQ & A[7..0]==5BH)

59 ♀
60 Enable LS245 for all I/O from 01H to 07H, 58H, 5AH, and 5BH
61 E245 = (IORQ & A[7..0]>=01H & A[7..0]<=07H)
62 # (IORQ & A[7..0]==58H)
63 # (IORQ & A[7..0]==5AH)
64 # (RD & IORQ & A[7..0]==5BH)

66 | CLKW = (WR & IORQ & A[7..0]==59H) | Clock write FFs on write to 59H
67 | CLKR = (RD & IORQ & A[7..0]==58H) | Clock read FFs on read from 58H
68
69 | CS1 = (A[7..0]>=01H & A[7..0]<=07H) | Address range 01H-07H & 58H
70 | # (A[7..0]==58H)

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71 | CS3      = A[7..0]==5AH # A[7..0]==5BH | Aux Registers @ 5AH & 5BH
72
73 | RDU      = RD & IORQ & A[7..0]==59H | Enable read FFs on read from 29H
74 | WRU      = WR & IORQ & A[7..0]==58H | Enable write FFs on write to 28H
75
76 | Signature: "IDEHA58a"
77

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RESOLVED EXPRESSIONS (Reduction 2)

Signal name	Row	Terms									
A2B	2 3	A1 A2	A3	A4	A5'	A6	A7'				
IOW	35	WR	A0'	A2'	A3	A4	A5'	A6	A7'	IORQ	
	36	WR	A1	A3'	A4'	A5'	A6'	A7'	IORQ		
	37	WR	A2	A3'	A4'	A5'	A6'	A7'	IORQ		
IOR	50	A0'	A2'	A3	A4	A5'	A6	A7'	RD	IORQ	
	51	A1	A2'	A3	A4	A5'	A6	A7'	RD	IORQ	
	52	A0	A3'	A4'	A5'	A6'	A7'	RD	IORQ		
	53	A1	A3'	A4'	A5'	A6'	A7'	RD	IORQ		
	54	A2	A3'	A4'	A5'	A6'	A7'	RD	IORQ		
E245	123	A1	A2'	A3	A4	A5'	A6	A7'	RD	IORQ	
	124	A0'	A2'	A3	A4	A5'	A6	A7'	IORQ		
	125	A0	A3'	A4'	A5'	A6'	A7'	IORQ			
	126	A1	A3'	A4'	A5'	A6'	A7'	IORQ			
	127	A2	A3'	A4'	A5'	A6'	A7'	IORQ			
CLKW	112	WR	A0	A1'	A2'	A3	A4	A5'	A6	A7'	IORQ
CLKR	99	A0'	A1'	A2'	A3	A4	A5'	A6	A7'	RD	IORQ
CS1	11	A0'	A1'	A2'	A3	A4	A5'	A6	A7'		
	12	A0	A3'	A4'	A5'	A6'	A7'				
	13	A1	A3'	A4'	A5'	A6'	A7'				
	14	A2	A3'	A4'	A5'	A6'	A7'				
CS3	22	A1	A2'	A3	A4	A5'	A6	A7'			
RDU	67	A0	A1'	A2'	A3	A4	A5'	A6	A7'	RD	IORQ
WRU	84	WR	A0'	A1'	A2'	A3	A4	A5'	A6	A7'	IORQ

SIGNAL ASSIGNMENT

Pi n	Si gnal name	Col umn	Rows			Acti vi ty	
			Beg	Avai l	Used		
1.	I TYP	0	-	-	-	Hi gh	(Cl ock)
2.	WR	5	-	-	-	Low	
3.	A0	8	-	-	-	Hi gh	
4.	A1	12	-	-	-	Hi gh	
5.	A2	16	-	-	-	Hi gh	
6.	A3	20	-	-	-	Hi gh	
7.	A4	24	-	-	-	Hi gh	
8.	A5	28	-	-	-	Hi gh	
9.	A6	32	-	-	-	Hi gh	
10.	A7	36	-	-	-	Hi gh	
11.	RD	41	-	-	-	Low	
13.	IORQ	43	-	-	-	Low	
14.	E245	39	122	9	5	Low	(Three-state)
15.	CLKW	34	111	11	1	Hi gh	(Three-state)
16.	CLKR	30	98	13	1	Hi gh	(Three-state)
17.	WRU	27	83	15	1	Low	(Three-state)
18.	RDU	23	66	17	1	Low	(Three-state)

