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1: Module   CHERST
2: Title    'MUX DATA FROM HP TO ASIC for CHER board'
3:
4: "-----"
5: " Last Modified:    8/11/99
6: " This CPLD is used by CHERII and contains the following logic "
7: " 1) The State mach of the front-end Glink "
8: " IDLE, HEADER, DATA, ILLEGAL "
9: " 2) The nine strobe pulses for the three ASIC boards "
10: " 3) Abort detection and pulse for other logic [ABORTP] "
11: " Changed Polarity 1/29/98 ( now true low ) "
12: " 4) The data gate used at the front-end [DGATE] "
13: " 5) The data latch pulse [LAT_DATA] "
14: " 6) Corrected state ms4 equation 8/11/99 "
15: "-----"
16:
17: " Inputs
18: HPSTRB      PIN;
19: ADJSTRB     PIN;
20: !HPCAVT     PIN;
21: !HPDAVT     PIN;
22: HPDA00      PIN;
23: HPDA01      PIN;
24: HPDA02      PIN;
25: HPDA03      PIN;
26: FE_CLR      PIN;
27: !LINKRDY   PIN;
28: !BSYERR     PIN;
29:
30: "!MRST      PIN; used for powerup reset, this gets 'ored' with"
31: "          FE_CLR and ABORT at the GLB level"
32: PLSI PROPERTY 'Y1_as_reset on';
33:
34: " Outputs
35: SM1A3..SM1A1  pin istype 'reg,buffer';
36: SM2A3..SM2A1  pin istype 'reg,buffer';
37: SM3A3..SM3A1  pin istype 'reg,buffer';
38: SM1A1D  node istype 'collapse';
39: SM1A2D  node istype 'collapse';
40: SM1A3D  node istype 'collapse';
41: SM2A1D  node istype 'collapse';
42: SM2A2D  node istype 'collapse';
43: SM2A3D  node istype 'collapse';
44: SM3A1D  node istype 'collapse';
45: SM3A2D  node istype 'collapse';
46: SM3A3D  node istype 'collapse';
47: !DGATE  pin istype 'buffer';
48: ESTART  node istype 'collapse';
49: DSTART  node istype 'collapse';
50: EVTEND  node istype 'collapse';
51: "MRESET  node istype 'com';
52: LRDY     node istype 'reg,buffer';
53: LRDYA    node istype 'reg,buffer';
54: LRDYB    node istype 'reg,buffer';
55: ABORTP   pin istype 'buffer';
56: ABORT    node istype 'collapse';

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57: ABTDY    node istype 'reg,buffer';
58: ABTDLY   node istype 'reg,buffer';
59: ABTDLAY  node istype 'collapse';
60: LAT_DATA pin istype 'buffer';
61: LRDYCLR  node istype 'com';
62: MRESET   pin istype 'com' ;
63: MEZZ1 = [SM1A3..SM1A1];
64: MEZZ2 = [SM2A3..SM2A1];
65: MEZZ3 = [SM3A3..SM3A1];
66:
67: ST00,ST01 pin istype 'reg,buffer';
68: STREG = [ST01,ST00]; " State machine for the Event"
69:
70: st0=[0,0];"IDLE state"
71: st1=[0,1];"HEADER state"
72: st2=[1,0];"DATA state"
73: st3=[1,1];"ILLEGAL state"
74:
75: MS03,MS02,MS01,MS00 pin istype 'reg,buffer';
76: MSREG= [MS03,MS02,MS01,MS00]; " State machine for Mezzanine and ASIC select"
77:
78:
79: ms0 =[0,0,0,0];
80: ms1 =[0,0,0,1];
81: ms2 =[0,0,1,0];
82: ms3 =[0,0,1,1];
83: ms4 =[0,1,0,0];
84: ms5 =[0,1,0,1];
85: ms6 =[0,1,1,0];
86: ms7 =[0,1,1,1];
87: ms8 =[1,0,0,0];
88: ms9 =[1,0,0,1];
89: ms10=[1,0,1,0];
90: ms11=[1,0,1,1];
91: ms12=[1,1,0,0];
92: ms13=[1,1,0,1];
93: ms14=[1,1,1,0];
94: ms15=[1,1,1,1];
95:
96: equations
97:
98: ABORT    = HPCAVT & HPDA03 & LINKRDY;
99: ESTART   = HPCAVT & HPDA00 & LINKRDY;
100: DSTART   = HPCAVT & HPDA01 & LINKRDY;
101: EVTEND   = HPCAVT & HPDA02 & LINKRDY;
102: MRESET   = FE_CLR # ABTDY # LRDYCLR;
103:
104: " FE_CLR is the normal clear of busy and status flags after an event."
105: " ABORT is a pulse received over the link if the event needs to be terminated"
106: " for some reason. There is also a pulse on ABORT at powerup or on front"
107: " panel reset to clear all status conditions."
108:
109: DGATE     = ST00 # ST01;
110: LAT_DATA  = HPSTRB & HPDAVT;"Latch all 'data' cycles"
111:
112: MEZZ1.CLK = ADJSTRB;

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113: MEZZ2.CLK = ADJSTRB;
114: MEZZ3.CLK = ADJSTRB;
115: MEZZ1.AR = MRESET;
116: MEZZ2.AR = MRESET;
117: MEZZ3.AR = MRESET;
118:
119: "Clear pulse @ powerup when Linkrdy occurs the first time"
120: LRDY.CLK = !LRDY & HPSTRB;
121: LRDY.D = LINKRDY;
122: LRDYA.CLK = HPSTRB;
123: LRDYA.D = LRDY;
124: LRDYB.CLK = HPSTRB;
125: LRDYB.D = LRDYA;
126: LRDYCLR = LRDYA & !LRDYB;
127: "This clears everything after the link is ready on powerup"
128: " or after a manual reset. 'OR' into the ABORT logic"
129:
130: "ABORT pulse to outside world"
131: ABTDY.D = ABORT;
132: ABTDY.CLK = HPSTRB;
133:
134: ABTDLY.D = ABTDY;
135: ABTDLY.CLK = HPSTRB;
136:
137: "External abort pulse(ABORTP) is two clock cycles long"
138: ABTDLAY = ABTDY # ABTDLY;
139: ABORTP = !(ABTDLAY # LRDYCLR);"Polarity changed 1/29/98"
140:
141: SM1A1D = ST01 & !MS03 & !MS02 & !MS01 & !MS00 & HPDAVT & !BSYERR;
142: SM1A1.D = SM1A1D;
143: SM1A2D = ST01 & !MS03 & !MS02 & !MS01 & MS00 & HPDAVT & !BSYERR;
144: SM1A2.D = SM1A2D;
145: SM1A3D = ST01 & !MS03 & !MS02 & MS01 & !MS00 & HPDAVT & !BSYERR;
146: SM1A3.D = SM1A3D;
147: SM2A1D = ST01 & !MS03 & !MS02 & MS01 & MS00 & HPDAVT & !BSYERR;
148: SM2A1.D = SM2A1D;
149: SM2A2D = ST01 & !MS03 & MS02 & !MS01 & !MS00 & HPDAVT & !BSYERR;
150: SM2A2.D = SM2A2D;
151: SM2A3D = ST01 & !MS03 & MS02 & !MS01 & MS00 & HPDAVT & !BSYERR;
152: SM2A3.D = SM2A3D;
153: SM3A1D = ST01 & !MS03 & MS02 & MS01 & !MS00 & HPDAVT & !BSYERR;
154: SM3A1.D = SM3A1D;
155: SM3A2D = ST01 & !MS03 & MS02 & MS01 & MS00 & HPDAVT & !BSYERR;
156: SM3A2.D = SM3A2D;
157: SM3A3D = ST01 & MS03 & !MS02 & !MS01 & !MS00 & HPDAVT & !BSYERR;
158: SM3A3.D = SM3A3D;
159:
160: STREG.CLK = ADJSTRB;
161: STREG.AR = MRESET # !LINKRDY;
162: MSREG.CLK = ADJSTRB;
163: MSREG.AR = MRESET # !LINKRDY;
164:
165: state_diagram STREG;" State machine for the Event"
166:
167: state st0: "IDLE STATE"
168:     if(ESTART)then st1

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169:         else st0;
170:
171: state st1: "HEADER STATE"
172:     if(DSTART)then st2
173:     else st1;
174:
175: state st2: "DATA STATE"
176:     if(EVTEND # ABORT) then st0
177:     else st2;
178:
179: state st3: "Illegal state recovery"
180:     goto st0;
181:
182: state_diagram MSREG;" State machine for Mezzanine and ASIC select"
183:
184: state ms0: "M1A1 STATE"
185:     if(HPDAVT & ST01 & !ST00)then ms1
186:     else ms0;
187: state ms1: "M1A2 STATE"
188:     if(HPDAVT & ST01 & !ST00)then ms2
189:     else ms1;
190: state ms2: "M1A3 STATE"
191:     if(HPDAVT & ST01 & !ST00)then ms3
192:     else ms2;
193: state ms3: "M2A1 STATE"
194:     if(HPDAVT & ST01 & !ST00)then ms4
195:     else ms3;
196: state ms4: "M2A2 STATE"
197:     if(HPDAVT & ST01 & !ST00)then ms5
198:     else ms4
199: state ms5: "M2A3 STATE"
200:     if(HPDAVT & ST01 & !ST00)then ms6
201:     else ms5;
202: state ms6: "M3A1 STATE"
203:     if(HPDAVT & ST01 & !ST00)then ms7
204:     else ms6;
205: state ms7: "M3A2 STATE"
206:     if(HPDAVT & ST01 & !ST00)then ms8
207:     else ms7;
208: state ms8: "M3A3 STATE"
209:     if(HPDAVT & ST01 & !ST00)then ms0
210:     else ms8;
211: state ms9: "Illegal state recovery"
212:     goto ms0;
213: state ms10: "Illegal state recovery"
214:     goto ms0;
215: state ms11: "Illegal state recovery"
216:     goto ms0;
217: state ms12: "Illegal state recovery"
218:     goto ms0;
219: state ms13: "Illegal state recovery"
220:     goto ms0;
221: state ms14: "Illegal state recovery"
222:     goto ms0;
223: state ms15: "Illegal state recovery"
224:     goto ms0;
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225: **end**  
226: