

## HP85 Disk Project v1.0 by ©Mike Gore Feb 2015

### Schematics and Pin-out information for HP85 Disk Project

PIN	CPU Function	Role	CPU to component connection notes	GPIO Name	GPIO Pin
<b>1</b>	PB0	GPIO	<b>120R to 5 GPIO pin, GPIO pin 10K to VCC</b> 2 HC32 Parallel Poll Circuit	<b>EOI</b>	<b>5</b>
<b>2</b>	PB1		<b>120R to 6 GPIO pin, GPIO pin 10K to VCC</b>	<b>DAV</b>	<b>6</b>
<b>3</b>	PB2	PP	12 RCLK HC595 Parallel Poll Circuit Latch		
<b>4</b>	PB3	/CS	/CS 1 Micro SD		
<b>5</b>	PB4(SS SPI)	NC			
<b>6</b>	PB5(MOSI SPI)	SPI	1K to 3 'MOSI Micro SD 4 ISP 14 SER HC595 Parallel Poll Circuit		
<b>7</b>	PB6(MISO SPI)	SPI	1K to 4 'MISO Micro SD 1 ISP		
<b>8</b>	PB7(SCK SPI))	SPI	1K to 2 'SCK Micro SD 11 SRCLK HC595 Parallel Poll Circuit 3 ISP		
<b>9</b>	/RESET		1K to VCC 5 ISP Reset button		
<b>10</b>	VCC	5V	4 VCC 5V FT232RL 5 VCC Micro SD 2 VCC ISP 5 VCC DS1307 RTC BOARD 16 VCC HC 595 Parallel Poll Circuit 14 VCC HC 32 Parallel Poll Circuit 14 VCC HC 05 Parallel Poll Circuit 0.1uf GND 22uf GND		
<b>11</b>	GND	GND	6 GND FT232RL 6 GND Micro SD 6 ISP 4 GND DS1307 RTC BOARD 8 GND HC 595 7 GND HC 32 7 GND HC 05 <b>12,18,19,20,21,22,23,24 GPIO GND</b>	<b>GND</b>	<b>12 18 19 20 21 22 23 24</b>
<b>12</b>	XTAL2		20MHZ 22pf GND		
<b>13</b>	XTAL1		20MHZ 22pf GND		
<b>14</b>	PD0 (RXD0)	RS232	3 TXD FT232RL		
<b>15</b>	PD1 (TXD0)	RS232	2 RXD FT232RL		
<b>16</b>	PD2	GPIO	<b>120R to 7 GPIO pin, GPIO pin 10K to VCC</b>	<b>NRFD</b>	<b>7</b>

<b>17</b>	PD3	GPIB	<b>120R to 8 GPIB pin, GPIB pin 10K to VCC</b>	<b>NDAC</b>	<b>8</b>
<b>18</b>	PD4	GPIB	<b>120R to 9 GPIB pin, GPIB pin 10K to VCC</b> 10 /SRCLR HC595 Parallel Poll Circuit	<b>IFC</b>	<b>9</b>
<b>19</b>	PD5	GPIB	<b>120R to 10 GPIB pin, GPIB pin 10K to VCC</b>	<b>SRQ</b>	<b>10</b>
<b>20</b>	PD6	GPIB	<b>120R to 11 GPIB pin, GPIB pin 10K to VCC</b> 3 HC32 Parallel Poll Circuit	<b>ATN</b>	<b>11</b>
<b>21</b>	PD7	GPIB	<b>120R to 17 GPIB pin, GPIB pin 10K to VCC</b>	<b>REN</b>	<b>17</b>
<b>22</b>	PC0(SCL)	<b>I2C</b>	1 SDA DS1307 RTC BOARD		
<b>23</b>	PC1(SDA)	<b>I2C</b>	2 SCL DS1307 RTC BOARD		
<b>24</b>	PC2(TCK JTAG)	NC			
<b>25</b>	PC3(TMS JTAG)	NC			
<b>26</b>	PC4(TD0 JTAG)	NC			
<b>27</b>	PC5(TDI JTAG)	NC			
<b>28</b>	PC6(TOSC1)	<b>NC</b>			
<b>29</b>	PC7(TOSC2)	<b>NC</b>			
<b>30</b>	AVCC		<b>VCC 10</b>		
<b>31</b>	GND		<b>GND 11</b>		
<b>32</b>	AREF	0.1uf	0.1uf to GND 11		
<b>33</b>	PA7	GPIB	<b>120R to 16 GPIB pin, GPIB pin 10K to VCC</b>	<b>D8</b>	<b>16</b>
<b>34</b>	PA6	GPIB	<b>120R to 15 GPIB pin, GPIB pin 10K to VCC</b>	<b>D7</b>	<b>15</b>
<b>35</b>	PA5	GPIB	<b>120R to 14 GPIB pin, GPIB pin 10K to VCC</b>	<b>D6</b>	<b>14</b>
<b>36</b>	PA4	GPIB	<b>120R to 13 GPIB pin, GPIB pin 10K to VCC</b>	<b>D5</b>	<b>13</b>
<b>37</b>	PA3	GPIB	<b>120R to 4 GPIB pin, GPIB pin 10K to VCC</b>	<b>D4</b>	<b>4</b>
<b>38</b>	PA2	GPIB	<b>120R to 3 GPIB pin, GPIB pin 10K to VCC</b>	<b>D3</b>	<b>3</b>
<b>39</b>	PA1	GPIB	<b>120R to 2 GPIB pin, GPIB pin 10K to VCC</b>	<b>D2</b>	<b>2</b>
<b>40</b>	PA0	GPIB	<b>120R to 1 GPIB pin, GPIB pin 10K to VCC</b>	<b>D1</b>	<b>1</b>

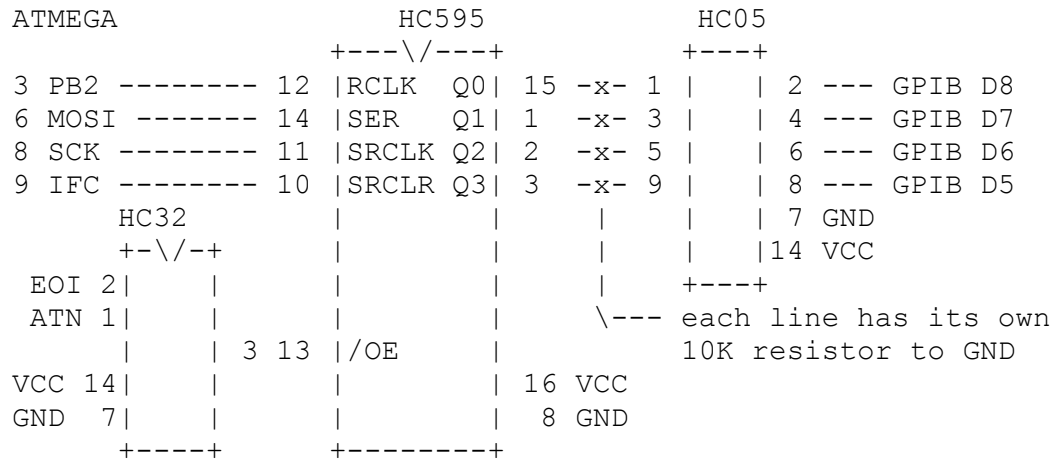
## AVR ATMEGA1284P pin assignments for HP85 Disk

- **GPIO:** Each GPIO pin (8 data and 8 control lines ) attach to CPU with a 120 ohm current limit resistor .
  - Each GPIO pin (8 data and 8 control lines ) have a 10K pull-up resistor to VCC.
- **ISP header:** MOSI,MISO,SCK,/Reset connects directly to ISP header
- **Micro SD Interface:** MOSI,MISO,SCK attach to CPU function via a 1k series resistor.
  - **Micro SD interface has level shifters and internal 5V to 3.3V regulator**
  - **Ebay:** Micro SD Storage Board Mircro SD TF Card Memory Shield Module SPI For Arduino
    - Card must have 3.3v conversion hardware
- **RS232 TTL:** connect to FTDI232 **USB** board which also provides **5V VCC** power to all circuits..
  - Ebay: FT232RL 3.3V 5V FTDI USB to TTL Converter Adapter Module for Arduino Mini Port
    - Attach 5V to project VCC , GND to project ground, set card to 5V if option exists
- **I2C:** SCL,SDA connect to optional DS1307 RTC board with each line having a 2k2 pull-up

ATMEGA1284P (and ATMEGA644P)									
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5	EOI	INT0	PB0	1	40	PA0	D1	1	
6	DAV	INT1	PB1	2	39	PA1	D2	2	
	PP	INT2	PB2	3	38	PA2	D3	3	
SD	/CS	PWM	PB3	4	37	PA3	D4	4	
	NC	PWM	PB4	5	36	PA4	D5	13	
SD		MOSI	PB5	6	35	PA5	D6	14	
SD		MISO	PB6	7	34	PA6	D7	15	
SD		SCK	PB7	8	33	PA7	D8	16	
10K	pullup	/RST	9	32	AREF		0.1uf		
	+5	VCC	10	31	GND		GND		
	GND	GND	11	30	AVCC		+5		
20MHZ		XTAL2	12	29	PC7		NC		
20MHZ		XTAL1	13	28	PC6		NC		
	RX	RX0	PD0	14	27	PC5	TDI	JTAG	
	TX	TX0	PD1	15	26	PC4	TDO	JTAG	
7	NRFD	RX1	PD2	16	25	PC3	TMS	JTAG	
8	NDAC	TX1	PD3	17	24	PC2	TCK	JTAG	
9	IFC	PWM	PD4	18	23	PC1	SDA	I2C	
10	SRQ	PWM	PD5	19	22	PC0	SCL	I2C	
11	ATN	PWM	PD6	20	21	PD7	PWM	REN	17
+-----+									

## Parallel Poll Response circuit

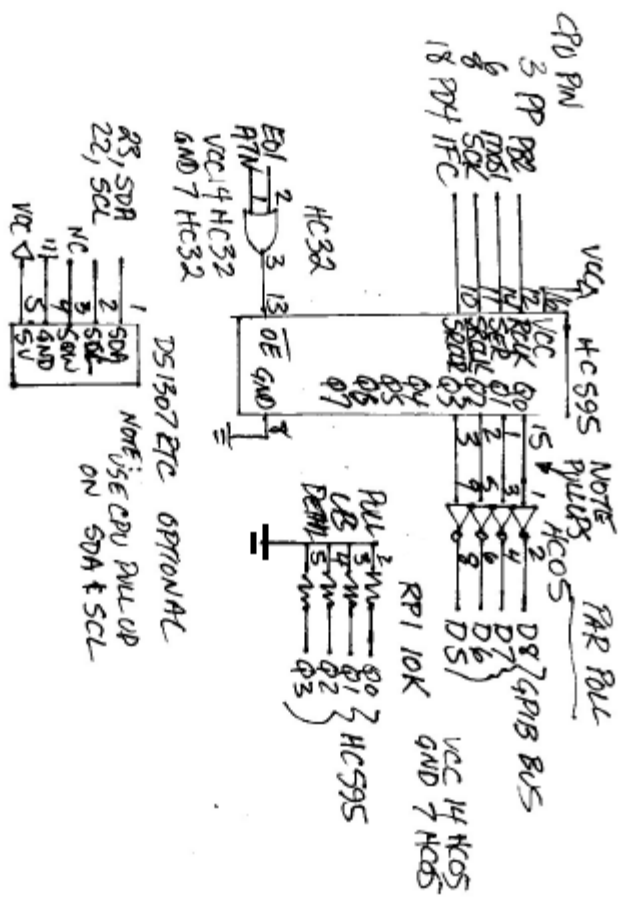
- Uses: Three chips 74HC05, 74HC32, 74HC595
- Parallel Poll Response must be less then 2 Microseconds therefore we use hardware to do it!



Notes: When both EOI and ATN are low the HC32 enables HC595 outputs

- If any HC595 output is high the GPIB bus bit will be pulled low
- IFC low resets the outputs low





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