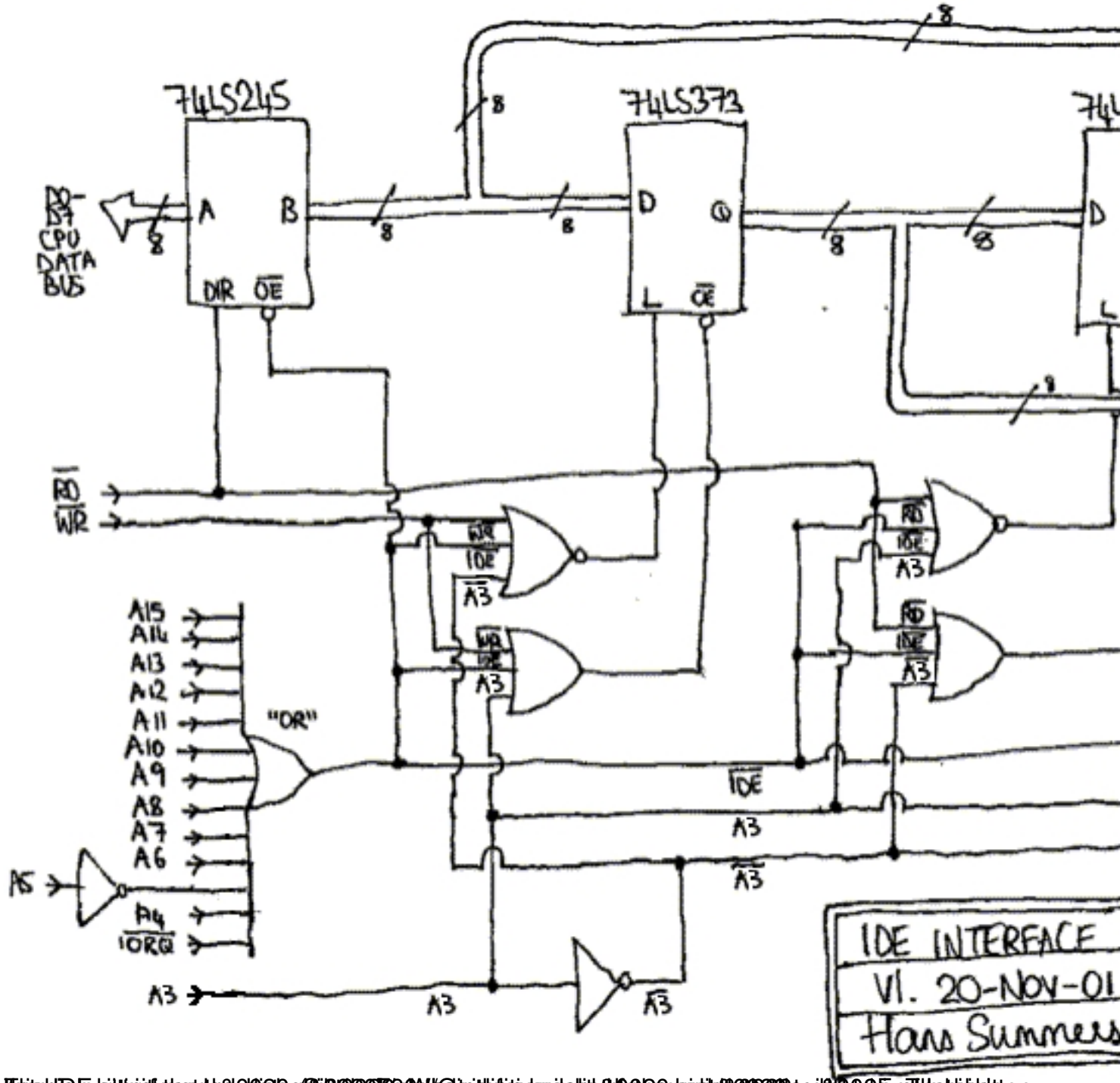
This page describes the proposed IDE hard disk interface. The IDE specification is simpler than SCSI so has been chosen for the prototype. The IDE interface would be almost trivial but for the fact that the IDE databus is 16 bits wide, whereas the eZ80 data bus is only 8 bits wide. It is possible to connect only 8 bits of the IDE bus directly to the eZ80 data bus, but doing this sacrifices half the capacity of the disk drive.

The solution here is to buffer the high byte of the data word in an 8-bit latch, which is read/written to on an additional port number. There are a number of examples of this on the internet, with circuit diagrams and sample code (see list of links below). The information and circuit described here are derived from these project pages. Below is the draft circuit diagram.



CPC NG I/O Addresses for IDE Registers

The following table describes the port mapping of the IDE interface:

Port	Register	Function

&0020	IDELO	Data Port (low byte)
&0021	IDEERR	Read: Error Register; Write: Precomp
&0022	IDESECTC	Sector Count
&0023	IDESECTN	Sector Number
&0024	IDECYLLO	Cylinder Low
&0025	IDECYLHI	Cylinder High
&0026	IDEHEAD	Drive/Head
&0027	IDESTTS	Read: Status; Write: Command
&0028	IDEHI	Data Port (High Byte)
&0029		
Not Used		
&002A		
Not Used		
&002B		
Not Used		
&002C		
Not Used		

&002D		
Not Used		
&002E	IDECTRL	Read: Alternative Status; Write; Device Control
&002F	IDEADDR	Drive Address (Read Only)

IDE Project Links

These are links to IDE projects with circuit diagrams, information, sample code and more.

http://www.gaby.de/gide/ All about the GIDE interface
http://home.freiepresse.de/befis/hdif_e.htm ZX81 Harddisc
http://members.lycos.co.uk/leeedavison/6502/ide/index.html IDE bus interface circuit
http://8bs.aussie.nu/subide.htm BBC IDE interface
http://home.hccnet.nl/g.baltissen/ide.htm IDE interface for the Commodore 64/128
http://www.pjrc.com/tech/8051/ide/ 8051 IDE Hard Drive Interface
http://www.students.tut.fi/~leinone3/ide.html IDE Harddisk project for the Amiga 500
http://blkbox.com/~jdbaker/SmallSys/8bitIDE.html IDE Devices on 8-bit machines
http://www.angelfire.com/wa2/ratgod/odcp/data.html IDE Project
http://home.freeuk.net/c.ward/6502/index.html Chirs Ward's 6502 Computer system (incl IDE)
http://members.tripod.com/~piters/zx.htm Spectrum Hardware DIY: IDE interface
http://sorry.vse.cz/~xrihp01/speccy/hardware/zxide/ Spectrum IDE interface (in Czeckoslovakian)
http://www.icon.co.za/~dantohi/ 48K ZX Spectrum expansion system
http://members.freemail.absa.co.za/dan_antohi/ 48K ZX Spectrum expansion system (mirror)

IDE Register descriptions

This section describes the IDE register useage.

&0021 (write): Write Precomp: A write to this port sets the "Write Precompensation Cylinder divided by 4". Not sure what this means.

&0021 (read): Error Register: The contents of the error register when in diagnostic mode are shown in this table:

Value	Error
1	No Error detected
2	Formatter device error
3	Sector buffer error
4	ECC circuitry error
5	Controlling microprocessor error

The contents of the error register (read &0021) when in operation mode are shown in this table:

Bit	Value	Meaning
0	0	DAM found

1	DAM not found	
1	0	Track 000 found

1	Track 000 not found	
2	0	Command completed

1	Command aborted	
3	0	Reserved
4	0	ID found

1	ID not found	
5	0	Reserved
6	0	No error

1	Uncorrectable ECC error	
7	0	Block OK

1	Bad Block detected

&0026: Drive/Head: Bit 4 of the drive/head register selects drive 0 or drive 1, and bits 3-0 select the head.

&0027 (read): Status: Bits in the status register are set to 1 to indicate one of the following conditions:

Bit	Condition
0	Previous command ended in an error
1	Index: set to 1 each disk revolution

2	Disk data read successfully corrected
3	Sector buffer requires servicing
4	Seek complete
5	Write fault
6	Drive is ready
7	Controller is executing a command

&0027 (write): Command: Writes to the command register are as follows:

Command	Function
98 E5	check power mode (IDE)
90	execute drive diagnostics

50	format track
EC	identify drive (IDE)
97 E3	idle (IDE)
95 E1	idle immediate (IDE)
91	initialise drive parameters
1x	recalibrate
E4	read buffer (IDE)
C8	read DMA with retry (IDE)
C9	read DMA without retry (IDE)
C4	read multiples (IDE)
20	read sectors with retry
21	read sectors without retry
22	read long with retry
23	read long without retry
40	read verify sectors with retry
41	read verify sectors without retry
7x	seek

EF	set features (IDE)
C6	set multiple mode (IDE)
99 E6	set sleep mode (IDE)
96 E2	standby (IDE)
94 E0	standby immediate (IDE)
E8	write buffer (IDE)
CA	write DMA with retry (IDE)
CB	write DMA with retry (IDE)
C5	write multiple (IDE)
E9	write same (IDE)
30	write sectors with retry
31	write sectors without retry
32	write long with retry
33	write long without retry
3C	write verify (IDE)
9A	vendor unique (IDE)
C0-C3	vendor unique (IDE)

8x	vendor unique (IDE)
F0-F4	EATA standard (IDE)
F5-FF	vendor unique (IDE)