64HDD - CBM Disk and Protocol Emulator Specification

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Devices	currently 8, independent paths, numbers 8-15				
D81 Disks	D81 transfer with 1.44Mb Floppy, external routine				
D2M Disks	D2M transfer with 1.44Mb Floppy, external routine				

PC Hardware		**Version Codes**	
CPU	minimum 386sx33, all-in-one boards	0.5	First release, MSDOS support done
O/S	MSDOS	0.6	LFN support for MSDOS file system
HDD	any BIOS type	0.7	D64 and D71 support (incl. direct access) done
CDROM	any w/ MSDOS driver	0.8	D81 support (incl. direct access, 1.44 drv) done
Floppy	any BIOS type	0.9	H64 support (incl. direct access) done
RTC	any BIOS type	1.0	Official release, with drivers & utils, instructions
LPT	1-3, old type SPP for X1541	1.1	FD2000 Emulation (copyright issues?)
Cable	X1541, XE1541, Parallel UserPort	2.0	CBM Burst Mode support
Parallel Cable	Parallel loader/cable to UserPort	3.0	Jiffy DOS Mode Support (copyright issues?)
CD-Audio Cable	Optional, can use headphones /speakers		
Start "Beep"	requires PC speaker		
Drive "LED"	Keyboard Scroll-Lock flash implemented		
Drive "clicking"	requires PC speaker		

Protocol			
CBM	Yes	In the longer term, perhaps printer support (ie through second LPT port)
Pwr-Load	Yes	Parallel cable and loaders required. Optional Kernal ROM available.
CBM Burst	Long Term??	Needs 1 extra cable wire for SRQIN
JiffyDOS	Long Term??	Maybe done before CBM Burst
Reset	Emulator will "reset" on serial reset signal, unless -noreset specified

	Mode==>>	1541EMU	1571EMU	1581EMU	FD2000EMU	Native	MSDOS	Win95 LFN	T64-EMU	LNX-EMU
FileFormat	ImageExtension	D64	D71	D81	D2M	H64	8.3	16.3	T64	LNX
	ImageName	8.3	8.3	8.3	8.3	8.3	8.3	16.3	8.3	8.3
	Format	std	std	std	std	std	-	-	std	std
	Tracks	35/40	35/40	std	std	255	-	-	std	std
	Sectors	std	std	std	std	255	-	-	std	std
	Dir_Entries	std	std	std	std	Track 1	-	-	std	std
	ROMs emu?	Planned	Planned	Planned	Plan for 1581	Plan for 1581	-	-	-	-
	RAM emu?	Planned	Planned	Planned	Plan for 1581	Plan for 1581	-	-	-	-
	CPU emu?	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	-	-	-	-
	I/O emu?	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	-	-	-	-
	Timing Emu?	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	-	-	-	-

Features	Mode==>>	1541EMU	1571EMU	1581EMU	FD2000EMU	Native	MSDOS	Win95 LFN	T64-EMU	LNX-EMU
Load $	load/change dir	Yes	Yes	Yes	Yes	Planned	Original	Yes	Original	Original
Load $$	load header/free	Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
Load PRG	load prog for execution	Yes	Yes	Yes	Planned	Planned	Original	Yes	Original	Original
Save PRG		Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
Read SEQ		Yes	Yes	Yes	Planned	Planned	Yes	Yes	Unplanned	Unplanned
Write SEQ		Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
Read USR	SEQ or direct	SEQ	SEQ	SEQ	Planned	Planned	Yes, SEQ	Yes, SEQ	Unplanned	Unplanned
Write USR	SEQ or direct	Planned	Planned	Planned	Planned	Planned	Yes, SEQ	Yes, SEQ	Unplanned	Unplanned
Read REL		Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
Write REL		Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
REL	SuperSideSector	No	No	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned

Command Channel										
New		Planned	Planned	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned
	Type	clear disk	clear disk	clear disk	clear disk	clear disk	create IMG	create IMG		
Initialise		Planned	Planned	Planned	Planned	Planned	Ack.ID	Ack.ID	Unplanned	Unplanned
	Type	load BAM	load BAM	load BAM	load BAM	load BAM	-	-		
Validate		Planned	Planned	Planned	Planned	Planned	Ack.	Ack.	Unplanned	Unplanned
	Type	std-emu	std-emu	std-emu	std-emu	std-emu	-	-		
Rename		Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
	Type	std-emu	std-emu	std-emu	std-emu	std-emu	ren	LREN		
Copy		Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
	Type	std-emu	std-emu	std-emu	std-emu	std-emu	copy/merge	copy/merge		
Scratch		Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
	Type	std-emu	std-emu	std-emu	std-emu	std-emu	del	LDEL		

Error Channel		Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes

Direct Access Commands										
U0	switch ROMs	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned
U0>+chr$(drive)	enable new drive	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
U1	read t&s	Yes	Yes	Yes	Yes	Planned	Unplanned	Unplanned	Unplanned	Unplanned
U2	write t&s	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
B-P	buffer pointer	Yes	Yes	Yes	Yes	Planned	Unplanned	Unplanned	Unplanned	Unplanned
M-R	read RAM/ROM	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
M-W	write RAM/ROM	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
M-E	No CPU emu	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned

Code	Description	1	2	3	4	5	6	7	8	9
B-A	Block Alloc	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
B-F	Block Free	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
B-E	No CPU emu	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned
B-R	read t&s	Yes	Yes	Yes	Yes	Planned	Unplanned	Unplanned	Unplanned	Unplanned
B-W	write t&s	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
UJ	locks 1541	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
UI	locks 1541	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
U3-U9	No CPU emu	U9	U9	U9	U9	Planned	U9	U9	U9	U9
/0	create/set partition	Unplanned	Unplanned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
/	root partition	Unplanned	Unplanned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
&	load USR to mem	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
#	specify buffer	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
$0, chan#0	open dir for read	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Unplanned	Unplanned
$0, chan#1	open dir for write	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned
$0, chan#2	open dir Bit-Map	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned	Unplanned	Unplanned

CMD Commands

Code	Description	1	2	3	4	5	6	7	8	9
$=T:	send time stamp	Planned	Planned	Planned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
$=P:	list partitions	Planned	Planned	Planned	Planned	Planned	Yes	Yes	Planned	Planned
MD	make directory	Unplanned	Unplanned	Unplanned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
RD	remove directory	Unplanned	Unplanned	Unplanned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
CD	change directory	Unplanned	Unplanned	Unplanned	Planned	Planned	Yes	Yes	Unplanned	Unplanned
CP	change partition	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
G-P	info partition	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned
S-C	SCSI command	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned
L:	Lock/Unlock a file	Planned	Planned	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned
T-R	read RTC time	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
T-W	write RTC time	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes

Native Commands

Code	Description	1	2	3	4	5	6	7	8	9
$	load/change dir	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Unplanned	Unplanned
T: or T:time	get/set RTC time	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
D: or D:date	get/set RTC date	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
DAY:	get DayOfWeek	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
F:letter	free space	Yes, MSD	Yes, MSD	Yes, MSD	Yes, MSD	Planned	Yes	Yes	Yes, MSD	Yes, MSD
EXIT:code	force emulator ex	Yes, MSD	Yes, MSD	Yes, MSD	Yes, MSD	Planned	Yes	Yes	Yes, MSD	Yes, MSD
TR:	move images	Planned	Planned	Planned	Planned	Planned	Planned	Planned	Planned	Planned
MOUSE:	mouse position	Yes, MSD	Yes, MSD	Yes, MSD	Yes, MSD	Planned	Yes	Yes	Yes, MSD	Yes, MSD
T1581:	D81 to 1.44FDD	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Yes	Yes	Unplanned	Unplanned
F1581:	1.44FDD to D81	Unplanned	Unplanned	Unplanned	Unplanned	Unplanned	Yes	Yes	Unplanned	Unplanned
$0, chan#3	fast dir	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
$0, chan#4	fast dir, with t/d	Planned	Planned	Planned	Planned	Planned	Planned	Planned	Unplanned	Unplanned
AP	add partition	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
DP	change partition	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
IP	partition info	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
MSD:	Execute EXE	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
SFN:	Set SFN mode	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
LFN:	Return to LFN	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes
SPEED:	Give Speed settings	Yes	Yes	Yes	Yes	Planned	Yes	Yes	Yes	Yes

Custom Mode Support

Geos	Desktop Accessory for $ and other commands (Collette's DOS Wedge or custom?)
	VLIR files should work if direct access, command and error channels supported ??
	(hopefully TurboDOS doesn't require executes)
	Preferably will not require generic desktop, eg TopDesk
	Will require GeoBoot version so as to start from non-1541 disk, and non-8 drive number
	May need to implement CMD partition support in order to work
Fast Loaders	Depends upon function, not if require 1541 CPU execution
Parallel Loader	D0-D7 Cable to UserPort
	Load with unit990-999 sends machine specific fastloader
	CLOCK and DATA line used to syncronise data transfer
	Only load /read supported, up to 16Mb
MSDOS	Strip filenames of illegal characters, including spaces and crunch into 8.3 format
	Default extension is PRG, unless specified by "0:name,type,mode" to be PRG, SEQ, USR
	LongFileName 16.3 format to be supported with LFN add-in.
Native	Essentially operate as a 1581 drive with sectors 0-255.
	Extended track 1 directory /BAM to include 255 sectors for directory (ie 2024 entries), move to track 1
	Undecided on filename extension and specification.
	H64 for fixed 255 tracks, or F64 for "flexible" format allowing runtime determination of tracks?
CBM ROMS	Loadable (must be in start-up directory)
Time/Date	Standard with MSDOS
	GEOS format used on normal CBM disks (with year fix), but only if configured by switch
	Listed only with "fast" directory request or with CMD $=t: format
Fast Dir	ASCII directory info read from "$" opened by data channel #3
	ASCII directory info (with Time/Date Stamp) read from "$" opened by data channel #4
1.44FDD Utils	Transfer of D81/D2M to/from FDD by special T1581: and F1581 command channel instructions
Mouse Utils	PC Mouse Position set/get via Command channel, low resolution
CD-AUDIO	Available with CD-AUDIO Extension program and optional cable to SID input