



## Z207 Floppy Controller Testing

January 2025

Testing several Z207 Floppy Controllers with different FD1797 Controller Chips, CPU speeds and Wait States. The new motherboard, #85-2806-1, had the full Zenith 8MHz Speedup Mod installed.

### Notes:

- The floppy controller pictured has the Barfield modification installed (the orange wires).
- The Floppy Drive for all tests was a **Teac FD-55BV-06-U**, 360Kb floppy drive.
- Due to inherent board and controller chip differences, your test results may be different.
- "Z-100 LifeLine" issue #78 discusses Z-100 CPU speedup impact on Z-207 Floppy Controllers.
- All tests used DIAG, the Zenith Diagnostics Disk Utilities, version 3.
- All four boards worked fine at 5MHz CPU speed.
- I had thought -2 controllers were 8MHz versions, but as you can see, there are no speed differences.
- 9.44 MHz testing was completed with and without Wait States by a jumper at J106-1:  
The differences between WS0 and WS2 were quite noticeable.  
WS0 - No wait states added, no jumper; good to 8MHz CPU.  
WS2 - Add two Wait States by a jumper at WS2; required above 8MHz.  
WS3 - Add an additional wait in extreme cases, but generally found no improvement.
- A certain board/controller chip combination may cause a "Primary Z207 Controller Error" at power up.
- DIAG Controller Test may result in the errors:  
C1 - "Floppy Drive Failure"  
C2 - "Controller Access Failure, check U29, U22"  
C3 - "Controller Register Failure, check U22"  
C4 - "Head Load Time Error, check U33, U15"
- DIAG Drive Test may result in the errors:  
D1 - "Index Mark Detection Error"  
D2 - "Rotational Speed Error", no RPM displayed  
D3 - "Recording Density Error, check U30"  
D4 - "Write Protect Disable Error"  
D5 - "Address Mark Detection Error"  
D6 - "CRC Detection Error"  
D7 - "Side Selection Error, check U30"  
D8 - "Recoverable Error Rate Exceeded"  
D9 - Stalled during the Recording Density Test.  
D10 - Finished OK, after errors were displayed.
- FORMAT A:/s/v may result in several errors:  
F1 - "Error in disk formatting. Check write protect tab or media unusable. Format failure."  
F2 - Noisy seeks, I quit immediately to prevent damage.  
F3 - Stalling and/or failure later.  
F4 - Multiple bad sectors.  
F5 - Single bad sector and number.

## Z207 Floppy Controller #3684 Circuit Board (85-2807-2):

**Note:** Board gave consistent "Recording Density Error, Check U30" during the DIAG Drive Test; either failed with error, or at higher CPU speeds, just stalled during the test. But, in each case that did not stall, the drive continued tests fine. Found U30 bad.

	ZDOS3 @ 8.34MHz (WS0)	ZDOS4 @ 9.44MHz (WS0)	ZDOS4 @ 9.44MHz (WS2)
<b>w/FD1797PL-02 (8405) Floppy Controller</b>			
DIAG Controller Test:	ok	Ok, C2 on 2nd try, C3 after.	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	Ok, 301 RPM	Ok, 300 RPM
FORMAT A:/s/v:	ok	Ok	Ok
<b>w/FD1797PL-02 (8232) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	Ok, 300 RPM	Ok, 300 RPM
FORMAT A:/s/v:	ok	Ok	Ok
<b>w/FD1797CL-02 (8312) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	D2,D10; OK 300 RPM	Ok, 301 RPM
FORMAT A:/s/v:	ok	Ok at first, then F2!	Ok
<b>w/FD1797B-02 (8217) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 30% C1
DIAG Drive Test:	ok, 300 RPM	D2,D8, Fail.	Ok, 301 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8449) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 1st, C3	Ok, but 20% C1
DIAG Drive Test:	ok, 301 RPM	D2, D8, Fail	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8449A) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 30% C1
DIAG Drive Test:	ok, 300 RPM	D2, D10	Ok, 300 RPM
FORMAT A:/s/v:	ok	Ok at first, F2	Ok
<b>w/FD1797PL (8431) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 30% C1
DIAG Drive Test:	ok, 300 RPM	D2, D8	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok

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## Z207 Floppy Controller #25-1 Circuit Board (85-2807-2):

**Note:** Board NOT FOR SALE, 50-pin connector modified for 34-pin plug.

**Note:** Board previously tested to 10 MHz!, with FD1797PL (8449A) installed!

	ZDOS3 @ 8.34MHz (WS0)	ZDOS4 @ 9.44MHz (WS0)	ZDOS4 @ 9.44MHz (WS2)
<b>w/FD1797PL-02 (8405) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	Ok, 300 RPM	Ok, 301 RPM
FORMAT A:/s/v:	ok	Ok	Ok
<b>w/FD1797PL-02 (8232) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	D2,D8 - 84,84,31	Ok, 300 RPM
FORMAT A:/s/v:	ok	F2	Ok
<b>w/FD1797CL-02 (8312) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	D2, D10	Ok, 300 RPM
FORMAT A:/s/v:	ok	F1,F2 on 2nd try	Ok
<b>w/FD1797B-02 (8217) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 10% C1
DIAG Drive Test:	ok, 301 RPM	D2, D5, D6, quit.	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8449) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	D1,D2,D5,D6, stalled	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8449A) Floppy Controller</b>			
DIAG Controller Test:	ok	Originally on board at 10MHz! C3,C2,C1,C4	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	D2	Ok, 301 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8431) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 20% C1
DIAG Drive Test:	ok, 301 RPM	D2,D3,D4,D5,D6, stall	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok

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## Z207 Floppy Controller #38-4 Circuit Board (85-2807-2):

**Note:** Board NOT FOR SALE, 50-pin connector modified for 34-pin plug.

	ZDOS3 @ 8.34MHz (WS0)	ZDOS4 @ 9.44MHz (WS0)	ZDOS4 @ 9.44MHz (WS2)
<b>w/FD1797PL-02 (8405) Floppy Controller</b>			
DIAG Controller Test:	ok	C3 after 1st, C2 after tests	Ok, but 50% C1
DIAG Drive Test:	ok, 300 RPM	Ok, 300 RPM	Ok, 300 RPM
FORMAT A:/s/v:	ok	Ok	Ok
<b>w/FD1797PL-02 (8232) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	D2, D8 - 64,64,14	Ok, 300 RPM
FORMAT A:/s/v:	ok	F2	Ok
<b>w/FD1797CL-02 (8312) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	D2, D9	Ok, 301 RPM
FORMAT A:/s/v:	ok	F2	Ok
<b>w/FD1797B-02 (8217) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	D2, D5, D6, D7, stall.	Ok, 301 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8449) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 25% C1
DIAG Drive Test:	ok, 300 RPM	D2,D7,D8 on seeks, stall	Ok, 300 RPM
	Long delays between tests on 2nd run; D2,D4,D5,D6,Quit!		
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8449A) Floppy Controller</b>			
DIAG Controller Test:	ok	C2 after 1st	Ok, but 20% C1
DIAG Drive Test:	ok, 300 RPM	D2, D8	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok
<b>w/FD1797PL (8431) Floppy Controller</b>			
DIAG Controller Test:	ok	C2	Ok, but 20% C1
DIAG Drive Test:	ok, 301 RPM	D2, D5, D6, stalls!	Ok, 301 RPM
FORMAT A:/s/v:	ok	Did not try	Ok

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## **Z207 Floppy Controller #43-3 Circuit Board (85-2807-2):**

**Note:** Board NOT FOR SALE, **bad offset silkscreen!**

**Note:** I used this board to test for best 96LS02 chips, best 6 of 14!

**Note:** To reduce the possibility of the motherboard affecting the testing, I also tried faster chips at all the most applicable chips on the motherboard, which already had the full Zenith Speedup Mod.

### **ZDOS3 @ 8.34MHz (WS0)**

### **ZDOS4 @ 9.44MHz (WS0)**

### **ZDOS4 @ 9.44MHz (WS2)**

#### **w/FD1797PL-02 (8405) Floppy Controller**

DIAG Controller Test:	ok	C3 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	Ok, 301 RPM	Ok, 300 RPM
FORMAT A:/s/v:	ok	Ok	Ok

#### **w/FD1797PL-02 (8232) Floppy Controller**

DIAG Controller Test:	ok	C2 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	D2, D10	Ok, 300 RPM
FORMAT A:/s/v:	ok	F2	Ok

#### **w/FD1797CL-02 (8312) Floppy Controller**

DIAG Controller Test:	ok	C1, C2 after	Ok, but 10% C1
DIAG Drive Test:	ok, 301 RPM	D2, D10	Ok, 300 RPM
FORMAT A:/s/v:	ok	F2	Ok

#### **w/FD1797B-02 (8217) Floppy Controller**

DIAG Controller Test:	ok	C2	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	D2, D8	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok

#### **w/FD1797PL (8449) Floppy Controller**

DIAG Controller Test:	ok	C2 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 301 RPM	D2, D8	Ok, 300 RPM
FORMAT A:/s/v:	ok	Did not try	Ok

#### **w/FD1797PL (8449A) Floppy Controller**

DIAG Controller Test:	ok	C2 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	D2, D10	Ok, 301 RPM
FORMAT A:/s/v:	ok	F2	Ok

#### **w/FD1797PL (8431) Floppy Controller**

DIAG Controller Test:	ok	C3 after 1st	Ok, but 10% C1
DIAG Drive Test:	ok, 300 RPM	Ok, 301 RPM	Ok, 300 RPM
FORMAT A:/s/v:	ok	Ok	Ok

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