

**FD-2**

**User's Manual**

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**Peripheral Technology  
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## FD - 2

The FD-2 is an s-30 size card designed to control up to four drives, single sided/single density to double sided/double density. The FD-2 is compatible with any 6800/6809 S-50 system and can be configured for either four or sixteen addresses per I/O slot. The FD-2 is both hardware and software compatible with SWTPC DC-1, DC-2, DC-3 and DC-4 type controllers and can use off the shelf versions of Flex with no modifications. Double density operation on a 6800 computer requires a clock frequency of 894 KHZ or greater and new diskette drivers and diskette format program. Both are available as a package from Peripheral Technology. The FD-2 will operate in 2.0 MHZ systems without using any slow I/O circuitry.

# Installation

- 1) If you have purchased the complete system you need only to perform steps 2, 3, 4, 6 and 9. The delivered configuration of the FD-2 is for sixteen addresses per I/O slot and for a 6809 computer.
- 2) The FD-2 must be configured for either four or sixteen addresses per I/O slot. For SWTPC/6800 and most other 6800 systems this will be four addresses per I/O slot. For SWTPC/6809 with MP-B3 or MP-MB mother boards and most other 6809 systems this will be sixteen addresses per I/O slot.

\*\*\*\* IMPORTANT \*\*\*\*

On systems that use four addresses per I/O slot, a jumper must be installed on the mother board. Connect this jumper from I/O select #5 to UDS #3. No jumper is necessary in systems that use sixteen addresses per I/O slot.

- 3) Install the jumpers for four or sixteen addresses per I/O slot.

(4 addresses)	jumper	9-10	12-13
	No jumper	10-11	13-14
(16 addresses)	jumper	10-11	13-14
	No jumper	9-10	12-13

Note: See parts placement page for jumper locations

- 4) On 6800 systems install a jumper from 26-27.  
On 6809 systems install a jumper from 25-26.
- 5) If write precompensation is required remove the jumper from 4-5. this is pre-adjusted to 100ns. See the setup procedure if a different value is needed.

6) On systems that use four addresses per I/O slot plug the controller into slot#6.

On systems that use sixteen addresses per I/O slot plug the controller into slot #1.

Note: I/O slots are numbered 0 to 7.

7) Configure the jumpers on your floppy diskette drive (s). If you have bought the complete system this has already been performed. Because of the number of brands available no attempt will be made to cover all brands of drives, however, some drives are covered in the appendix. The general requirements for drive configuration are :

- (1) Selection of drive select ( 0, 1, 2, or 3)
- (2) Select multiplexed operation
- (3) Head should load on drive select.

8. Connect the cable between the controller and the drive(s).

Caution: Be certain that pin 1 on the controller connects to pin 1 on the drive(s) or damage may result to both the drives(s) and controller.

9. This completes installation of the FD-2 controller card.

Specific system startup instructions are included in the Flex manual. Consult those instructions for booting the system.

Note: The "D" command in the SWTPC monitor does not reliability boot the system. Use the boot program in the appendix or the one supplied in the flex manual for reliable boot operation. . the "U" bootstrap command in SWTPC's SBUG monitor does work ok.

## **Setup And Alignment Of The Fd-2 Data Separator**

Caution: Alignment is performed by Peripheral Technology when the board leaves our factory. Alignment/setup is not required or recommended unless the user changes the WD2797. The user should have technical experience and the use of an oscilloscope. It is not possible to adjust the Data Separator by trial and error.

### **Data Separator**

- 1) Press the computer's reset button.
- 2) install a jumper between pins 23 and 24. See parts placement page for jumper locations.
- 3) Observe the pulse width on pin 29 of the WD2797.
- 4) Adjust R14 for 1000 ns pulse width.
- 5) Observe the frequency on pin 16 of the WD2797.
- 6) Adjust C7 for 125 KHZ
- 7) Remove the jumper between pins 23 and 24.

### **Write Pre-Compensation**

- 1) Press the computer's reset button.
- 2) Install a jumper between pins 23 and 24.
- 3) Observe the pulse width on pin 31 of the WD2797.
- 4) Adjust R15 for desired pulse width (write pre-compensation value)
- 5) Remove the jumper between pins 23 and 24.

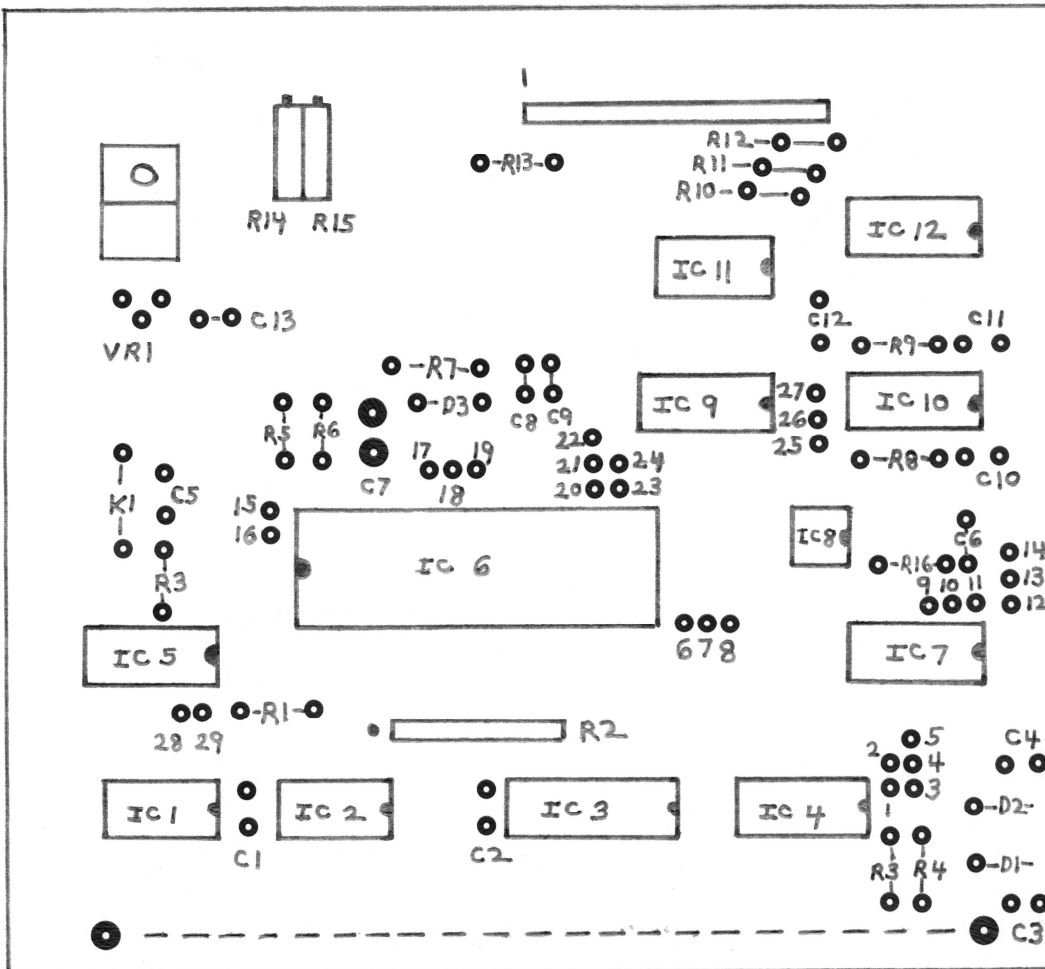
## FD-2 Jumper Description

1-2	Jumper for +12V to pin 40 of 1771/279X socket
3-4	Jumper for -5V to pin 1 of the 1771/279X socket
4-5	Shorted No write pre-compensation Open for pre-compensation
6-7	Jumper - Select 5-1/4" Drives
7-8	Jumper - Select 8" Drives
9-10	Jumper - 4 addresses per I/O slot select
10-11	Jumper - 16 addresses per I/O slot select
12-13	Jumper - 4 addresses per I/O slot select
13-14	Jumper - 16 addresses per I/O slot select
15-16	Jumper if using WD2797, no Jumper for WD1771
17-18	Jumper if using WD2797
18-19	Jumper if using WD1797
20-21	Jumper if using WD2797
21-22	Jumper if using WD1771
23-24	Test position/setup position,
25-26	Jumper - 6809 Drive ready Jumper
26-27	Jumper - 6800 Drive ready Jumper
28-29	Jumper if using WD2797

# Parts List FD-2

Quantity	Designation	Description
3	R1,R5,R6	10K 1/4 Watt Resistor
1	R2	1K 10 Pin Sip Resistor
1	R7	1K 1/4 Watt Resistor
1	R8	47K 1/4 Watt Resistor
1	R9	180K 1/4 Watt Resistor
4	R10-R13	150 1/4 Watt Resistor
1	R14	50K 18 turn Pot
1	R15	10K 18 turn Pot
1	R16	1M 1/4 Watt Resistor
1	R17	4.7M 1/4 Watt Resistor
6	C1,C2,C6	
	C8,C9,C12	0.1 uf Disc Cap
1	C5	15 pf
1	C7	9-50 pf Variable Capacitor
3	C10,C11,C13	100 uf 16V Electrolytic Capacitor
1	IC1	74LS32
1	IC2	74LS00
1	IC3	DP8304
1	IC4	74175
1	IC5	4049
1	IC6	WD2797
2	IC7,IC12	7442
1	IC8	555
1	IC9	74367
1	IC10	9602
1	IC11	7406
1	D3	1N4148
1	VR1	7805
1	K1	1.0 MHZ Crystal
1		17x2 make header
3		10 pin female molex socket
1		8 Pin IC Socket
3		14 Pin IC Socket
6		16 Pin IC Socket
1		20 Pin IC Socket
1		40 Pin Ic Socket
3		3 pin header strips
1		2 Pin header strip
5		Shorting Plugs
1		Heat sink
1		6-32 x 3/8 screw
1		#6 Washer
1		6-32 Nut
1		Index Pin for Molex Connector
1		FD-2 Board

# Parts Placement FD-2



FD-2 PARTS PLACEMENT	
PERIPHERAL TECHNOLOGY	
02/19/83	SCALE - 1:1





BOOT

7-17-83 TSC ASSEMBLER PAGE 1

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4      * THIS PROGRAM IS USED TO BOOT FLEX WITH A FD-1 OR
5      * FD-2 CONTROLLER CARD
6      *
7      * COPYRIGHTED 1983 BY PERIPHERAL TECHNOLOGY
8      *
9      8014      DRVREG EQU    $8014
10     8018      COMREG EQU    $8018
11     801A      SECREG EQU    $801A
12     801B      DATREG EQU    $801B

14     0100      ORG    $0100

16     0100 4F      START  CLR A          SELECT DRIVE 0
17     0101 B7 80 14      STA A  DRVREG  WRITE TO DRIVE SELECT REGISTER
18     0104 B6 80 18      LDA A  COMREG  READ COMREG TO ALLOW MOTOR TO START
19     0107 CE FF FF      LDX  ##FFFF  WAIT FOR MOTOR TO START
20     010A 01      WAIT   NOP          "
21     010B 01      NOP          "
22     010C 09      DEX          "
23     010D 26 FB      BNE  WAIT      "
24     010F 86 0B      LDA A  ##0B  ISSUE RESTORE COMMAND
25     0111 B7 80 18      STA A  COMREG  "
26     0114 8D 2A      BSR  DELAY  WAIT BEFORE READING STATUS REGISTER
27     0116 F6 80 18  WAIT1  LDA B  COMREG  WAIT FOR RESTORE TO COMPLETE
28     0119 C4 01      AND B  #1  "
29     011B 26 F9      BNE  WAIT1  "
30     011D 7F 80 1A      CLR  SECREG  SET SECTOR REGISTER TO 0
31     0120 86 9C      LDA A  ##9C  READ SECTOR COMMAND
32     0122 B7 80 18      STA A  COMREG  EXECUTE READ COMMAND
33     0125 8D 19      BSR  DELAY  WAIT BEFORE READING STATUS REGISTER
34     0127 CE 24 00      LDX  ##2400  LOAD ADDRESS
35     012A B6 80 18  READ  LDA A  COMREG  READ STATUS REGISTER
36     012D 85 02      BIT A  #2  CHECK FOR DRQ
37     012F 26 07      BNE  READ1  YES = READ DATA
38     0131 85 01      BIT A  #1  CHECK FOR BUSY
39     0133 26 F5      BNE  READ  YES = REPEAT LOOP
40     0135 7E 24 00      JMP  $2400  EXECUTE LOADED PROGRAM
41     0138 B6 80 1B  READ1  LDA A  DATREG  GET DATA
42     013B A7 00      STA A  X  STORE IT
43     013D 08      INX          BUMP LOAD POINTER TO NEXT LOCATION
44     013E 20 EA      BRA  READ  GET NEXT BYTE
45     0140 8D 00      DELAY  BSR  DELAY1  DELAY ROUTINE
46     0142 8D 00      DELAY1  BSR  DELAY2
47     0144 39      DELAY2  RTS
48      END

```

NO ERROR(S) DETECTED