

Peripheral Technology

FD-1

Peripheral Technology
1250 E Piedmont Rd
Marietta GA 30062

FD-1

The FD-1 was designed to be software compatible with SWTPC and TSC disk software. TSC has announced version 2.0 of FLEX which has been upgraded to include random access files. Included with version 2.0 are TSC's editor, assembler, utility programs, user manuals, and advanced programmers manual. Price of version 2.0 is \$150.00. When ordering specify the SWTPC Mini-Floppy version.

TSC's address is:

TSC

Address Deleted
No longer Valid

For those who need power supply requirements, the voltage necessary for the SA-400 is:

12V @ 1.8 Amps
5V @ 0.7 Amps

A power supply and cabinet is available from:

Peripheral Technology
1250 E Piedmont Rd
Marietta, GA 30062

Construction

1. Obtain all components from local electronic. mail-order, or other sources. Peripheral Technology can supply some of the hard to find components.
2. Check board for etching problems (I.E. shorts, open traces, feed-thrus. especially at 34-pin header at top.)
3. Install all resistors
4. Install all capacitors
5. Install all sockets, (If you plan to use them) insure proper seating against board. We will not accept boards for repair that are not socketed.
6. Install zeners
7. Install edge connectors on top side of board. Insure proper seating against board. When installing the 34 pin connector, position it to the far right for proper pin out positioning. There is room for a 50 pin header but this is for later possible use with a full size floppy.
8. Install regulator along with heat sink.
9. Fill all remaining feed-thrus with solder for added current capability and integrity of feed-thru connection.
10. With board assembled go back and check for solder shorts and for feed-thru problems with inadequate flowing of solder from bottom to top of board. This may indicate opens between board surfaces.

Check Out

1. With all IC chips removed, install the board into I/O slot #6 and check the voltages at the +5, +12, -5 volt levels. They should be + - 5%. If not check zeners, capacitors and other associated components within the power busses.
2. With all voltage levels correct, install all chips except the 40-pin 1771 floppy controller chip. Check for proper chip placement and orientation. Install into I/O card slot #6 and recheck voltages. If O.K. turn power off, remove board, and install the 1771 being careful of static charges that may destroy your expensive chip.
3. A jumper must be installed from I/O #5 enable to UDS #3 for drive selection (for SWTPC motherboard)
4. The controller is ready for checkout, but now you must concern yourself with the Shugart drive(s). The SA400 as shipped from the factory has been configured for drive 0 selection. If you plan to use dual drives one drive must be re-strapped for drive #2. Shugart uses a 7-pin DIP located where J-1 is connected on the board. The jumpers are organized as follows:

-	-	MH	(Leave as is)
-	-		(Not labeled)
-	-	MX	(open by bending out of pack)
-	-	DS	(Drive #3 select)
-	-	DS	(Drive #2 select)
-	-	DS	(Drive #1 select)
-	-	HL	(Leave as is)

Notes:

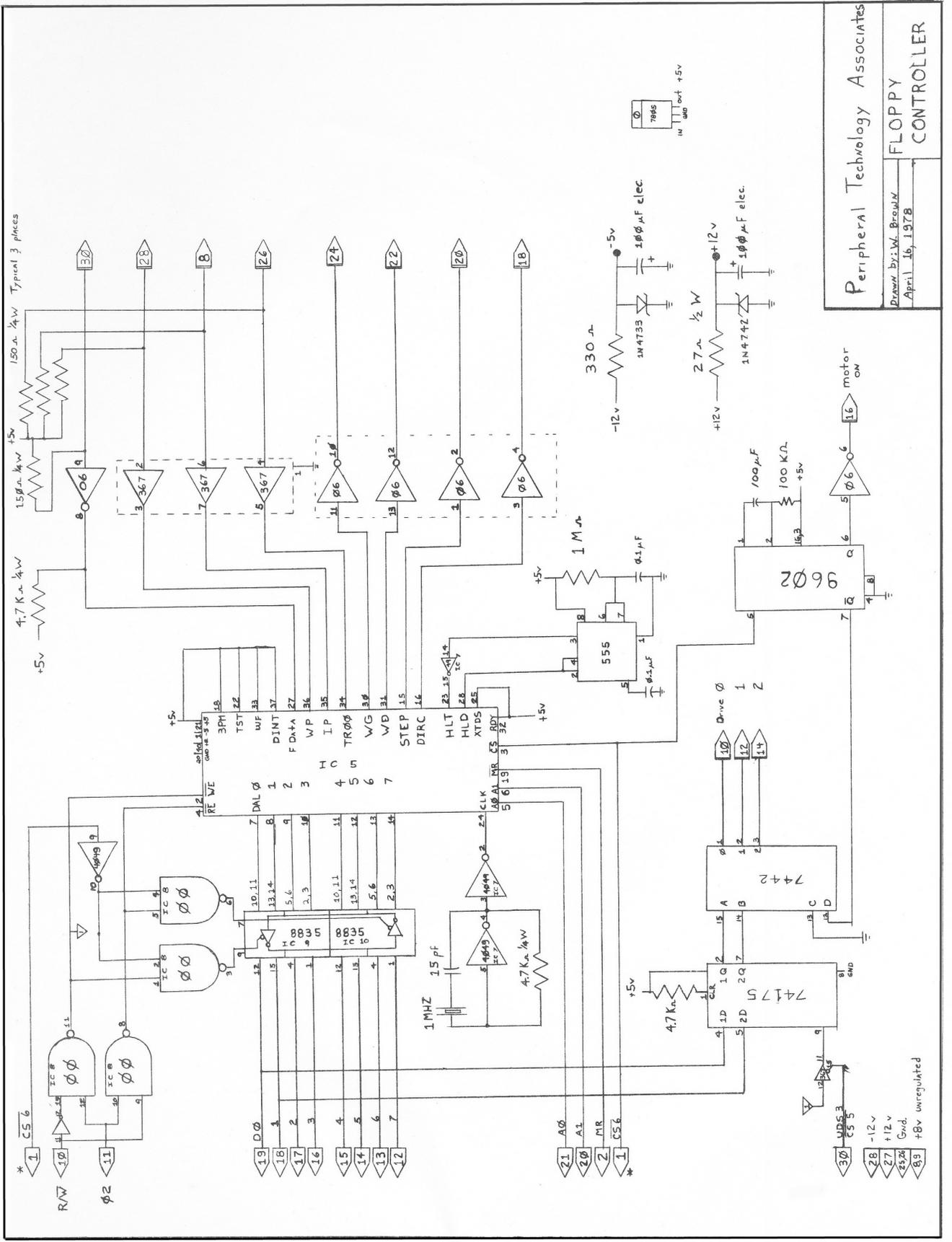
- A. Only one jumper is to be inserted for drive select. If you have only one drive you must install a jumper for drive select #1. The other two must be left open.
- B. When connecting the cable between the controller and the drive(s) be certain that pin 1 on the drive connects to pin 1 on the controller.

Parts List FD-1

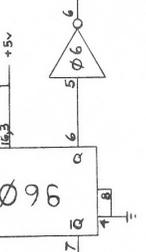
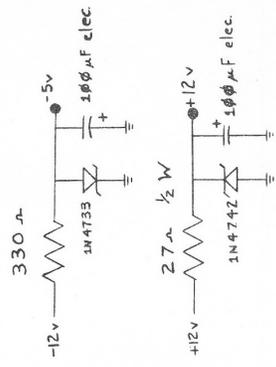
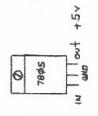
R1-R4	150	1/4W 5% carbon resistor
R5	4.7K	"
R6	1.0M	"
* R7	150K	"
R8	4.7M	"
R9	470	"
R10	33	"
R11	330	"

R7 may be varied to change the time out of the SA-400 motor

C1-C5	0.1uF	Disc capacitor
C6	15pf	"
C7-C8	100uF	Electrolytic (Radial)
C9-C10	20uF	Electrolytic (Radial)
IC1	7406	Open-collector quad nand gate
IC2	74367	Tri-State bus driver
IC3	7442	BCD to 1 multiplexer
IC4	555	timer
IC5	1771-01	Floppy controller
IC6	9602	re-triggerable one-shot multivibrator
IC7	4049	CMOS hex inverter
IC8	74LS00	quad NAND gates
IC9-IC10	8835	BI-directional bus driver
IC11	74175	Quad D F/F
D1	1N5242	12 volt zener
D2	1N5231	5.1 volt zener
K1	1.0 MHZ	crystal
RG1	7805	+5 volt regulator
HSK		Heat sink
J1		3 10 pin female molex connector
P1		34 pin male header



150 Ω ¼W Typical 3 pieces
4.7 K Ω ¼W
+5V
1.5 Ω ¼W



* CS 6
R/W
φ 2

21 A0
20 A1
19 MR
18 CS 6

30 VDS 3
28 -12v
27 +12v
26 Gnd.
25 +5v unregulated

Bringing Up The System

To load a disk operating system proceed as follows:

Using MIKBUG and Mini-Flex

MIKBUG requires a boot that must be typed in each time the system is powered up. A copy of the bootstrap is attached below for those that cannot obtain one.

With the drive connected properly through the flat ribbon cable to the controller, power can be applied to the system and then the drive. With the bootstrap entered, a disk inserted, and the gate on the drive open, the bootstrap can be executed. Once the head on the drive loads (denoted by the drive select LED illuminated) the gate can be closed.

Once booting is underway, the drive will perform a series of reads with the result of the processor responding with:

FLEX 1.0

+++

Using SWTBUG

SWTBUG users have available a bootstrap within the ROM to load FLEX directly after power up. With the gate open on drive type 'D' wait for the drive select LED to light and close the gate.

The response should be:

FLEX 1.0

+++

Note:

Since flex routines assume a dual drive system, FLEX can be awkward to use for those with a single drive. We at Peripheral Technology have implemented patches that can be used for those with a single drive. These patches are for FLEX 1.0

```

00010          NAM      BOOT
00030          * WRITTEN BY R.H. UITERWYK

00050      8014      DRVREG EQU      $8014
00060      8018      COMREG EQU      $8018
00070      801B      DATREG EQU      $801B
00080      801A      SECREG EQU      $801A

00100 0100          ORG      $0100
00110 0100 4F          START  CLR  A
00120 0101 B7 8014      STA  A  DRVREG
00130 0104 CE FFFF      LDX   #$FFFF
00140 0107 08          STARTO INX
00150 0108 09          DEX
00160 0109 09          DEX
00170 010A 26 FB          BNE   STARTO
00180 010C C6 0B          LDA  B  #$0B      RESTORE W/LOAD
00190 010E F7 8018      STA  B  COMREG
00200 0111 8D 2A          BSR   RETURN
00210 0113 F6 8018 LOOP1 LDA  B  COMREG
00220 0116 C5 01          BIT  B  #1
00230 0118 26 F9          BNE   LOOP1
00240 011A 7F 801A      CLR   SECREG
00250 011D 8D 1E          BSR   RETURN
00260 011F C6 9C          LDA  B  #$9C
00270 0121 F7 8018      STA  B  COMREG
00280 0124 8D 17          BSR   RETURN
00290 0126 CE 2400      LDX   #$2400
00300 0129 C5 02 LOOP2 BIT  B  #2
00310 012B 27 06          BEQ   LOOP3
00320 012D B6 801B      LDA  A  DATREG
00330 0130 A7 00          STA  A  0,X
00340 0132 08          INX
00350 0133 F6 8018 LOOP3 LDA  B  COMREG
00360 0136 C5 01          BIT  B  #1
00370 0138 26 EF          BNE   LOOP2
00380 013A 7E 2400      JMP   $2400
00390 013D 39          RETURN RTS
00400          END

```

TOTAL ERRORS 00000

NAM FILES

* THIS VERSION FOR FLEX 2.0
 * PERIPHERAL TECHNOLOGY
 *
 * MARIETTA, GA. 30067

 * THIS ROUTINE ALLOWS SINGLE DRIVE FLEX SYSTEMS TO
 * LIST THE CAT ON DISKS THAT DO NO CONTAIN THE
 * CAT COMMAND

 * TO MAKE THIS MODIFICATION FOLLOW THE LISTED STEPS

 * (1) GET CAT.CMD
 * (2) CHANGE MEMORY LOCATIONS A113-A115 FROM FE AC14
 * TO BD A397
 *
 * (3) ENTER THE PROGRAM PATCHES
 * (4) SAVE.LOW FILES.CMD A100 A3B1 A100
 *
 * WHEN THE PROGRAM PROMPTS 'INSERT DISK ?' PLACE
 * A DISK IN THE DRIVE, PRESS ANY KEY AND
 * THE FILES WILL BE LISTED.

 * SYSTEM EQUATES

AD1E		PSTRNG	EQU	\$AD1E	
AD09		INCH	EQU	\$AD09	
A397			ORG	\$A397	
A397	CE A3 A4		LDX	#MSG	GET MESSAGE
A39A	BD AD 1E		JSR	PSTRNG	PRINT MESSAGE
A39D	BD AD 09		JSR	INCH	WAIT FOR DISK TO BE INSERTED
A3A0	FE AC 14		LDX	\$AC14	REPLACE DELETED INSTRUCTION
A3A3	39		RTS		RETURN FROM PATCH
A3A4	49	MSG	FCC	/INSERT DISK ?/	
A3B1	04		FCB	4	
			END		

NO ERROR(S) DETECTED

+++

NAM SAVE

* THIS VERSION FOR FLEX 2.0
 * PERIPHERAL TECHNOLOGY
 *
 * MARIETTA, GA. 30067
 * THIS ROUTINE ALLOWS SINGLE DRIVE FLEX SYSTEMS TO
 * SAVE PROGRAMS ON DISKS THAT DO NOT CONTAIN THE
 * SAVE COMMAND.
 * TO MAKE THIS MODIFICATION FOLLOW THE STEPS BELOW:
 * (1) GET SAVE.COMD
 * (2) CHANGE MEMORY LOCATIONS A116-A118 FROM 7F A103
 * TO BD A27A
 * (3) ENTER THE PROGRAM PATCHES
 * (4) SAVE.LOW SAV.COMD A100 A294 A100
 *
 * WHEN THE PRPGRAM PROMPTS /INSERT DISK ?/ PLACE
 * ANY INITIALIZED DISK IN THE DRIVE, PRESS ANY KEY
 * AND THE PROGRAM WILL BE SAVED.
 * SYSTEM EQUATES

AD1E	PSTRNG	EQU	\$AD1E	
AD09	INCH	EQU	\$AD09	
A27A		ORG	\$A27A	
A27A CE A2 87		LDX	#MSG	GET MESSAGE
A27D BD AD 1E		JSR	PSTRNG	PRINT MESSAGE
A280 BD AD 09		JSR	INCH	WAIT FOR DISK TO BE INSERTED
A283 7F A1 03		CLR	\$A103	REPLACE DELETED INSTRUCTION
A286 39		RTS		RETURN FROM PATCH
A287 49	MSG	FCC	/INSERT DISK ?/	
A294 04		FCB	4	
		END		

NO ERROR(S) DETECTED