INTERFACING GUIDE

FOR

iCOM MODEL FD3700 SERIES FLOPPY DISK SYSTEMS
iCOM FRUGAL FLOPPY model FF37

AND

CONTROLLER/FORMATTER MODEL CF3700



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Marketing Headquarters

Pertec Computer Corporation Microsystems Division 20630 Nordhoff Street Chatsworth, CA 91311 Phone (213) 998-1800 TWX (910) 494-2788

International Marketing Headquarters

Pertec Computer Corporation Business Systems Division 17112 Armstrong Avenue Irvine, CA 92714, USA Phone (714) 540-8340 TWX (910) 595-1912

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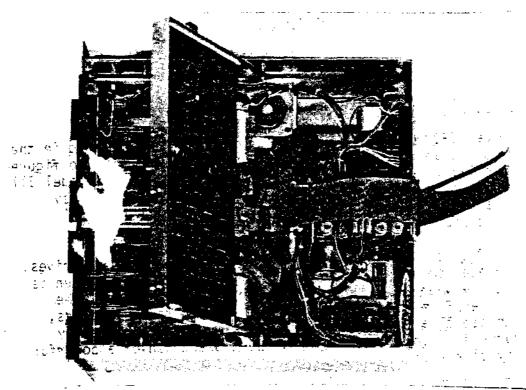


Figure 1-1. Top View, FD3712 Dual Drive (cover removed and card cage elevated)

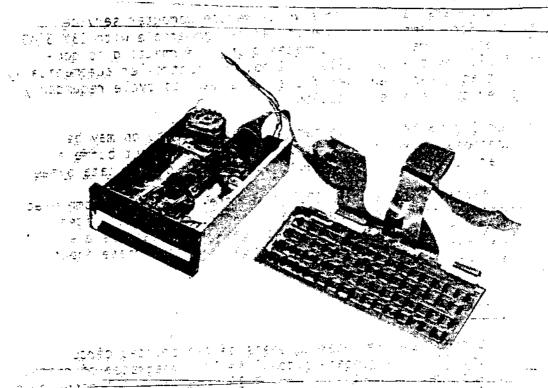


Figure 1=2: FF37=1, Single Drive Frugal Floppy tm

SECTION I

GENERAL DESCRIPTION

1-1 INTRODUCTION

The Model CF3700 Floppy Disk Cont blier Formatta is and in the iCOM FD3700 and FF37 series floppy disk systems is to figures 1-1 and 1-2). These floppy disk systems employ B. Ladel 511 AC driven disk drives. The controller is designed as integration into commercial, industrial and devel applications.

The CF3700 is capable of driving up to four flops. It is within the controller is a general purpose ritter as the compatible with most minicomputers and micrompose in the controller/Formatter consists of two printed circuit and ds, designated Z1 and Z2. Together, they provide the new flow features for successful and convenient operation of a powerful floppy disk system.

1-2 FEATURES

The CF3700 offers many features which reduce computer service overhead. For example, the controller is compatible with IBM 3540 and 3740 data formats. All formatting and deformatting is done automatically by the controller. Also, the controller automatically performs track, seek, and verification as well as cycle redundancy check generation and verification.

Programmed I/O or DMA (direct memory access) menation may be easily accommodated by the independent input and of put buffers. Each buffer can hold one full sector cansisting of light data bytes.

Interface signals between the CF3700 and the CPU/MPV are pmprised of independent input and output data lines as well as an eight bit parallel control port. Controller status indications are routed onto the CPU input data lines when the appropriate input command is received from the CPU.

1-3 PHYSICAL DESCRIPTION

The CF3700 Controller/Formatter consists of two printed circuit boards, Z1 and Z2, that contain a total of 127 integrated circuits. The boards each measure 184 X 381 mm (7.25 X 15 in). All connectors are along one edge of the boards, making the need for card cages or back plane wiring unnecessary. The controller and its optional cables are detailed in figure 1-3.

2-3 OUTPUT DATA

The CF3700 output data to the CPU are DIØ thru DI7, present on connector P4 of Z2. When command bit six (CPU6*) is a one, these data lines contain status information.

2-4 OPERATIONAL SEQUENCE

The following command sequence may be used as guide in developing disk system application software. Numbers within parenthesis are in hex notation. ...erugi Aest systmateressen till en en ette

2-5 SEEK

To perform a Seek operation:

- Set up CDOØ thru CDO7 with Unit and Sector.
- 2. Execute Load Unit/Sector (21). If track is different, set Track Address on DCOØ thru CDO7.
- Execute Load Track Address (11).
 - Execute Seek (09).
 - 5. Loop-on-busy by:

Executing Examine Status Input data, check Busy (Ø when completed) and CRC

1 (25 A)

2-6

SEEK TRACK 0.

To perform Seek Track 0 operation:

Use in power-up.

Track address not necessary.

- 1. Execute Seek Track Ø (00).
- Loop-on busy as in Seek operation.

2-7 READ

To perform a Read operation:

- 1. Seek to correct unit, track, and sector.
- 2. Execute Read (03).
 3. Check CRC. Re-read, if DI number is a one.
 - Execute Examine Read Buffer (40).
 - 5. Enter input character.
 - 6. Shift Read Buffer (41).

NOTE

Continue the entering of characters and the incrementing of the Shift Read Buffer, until 128 characters have been entered.

Busy
UNØ, Unit Select Code Bit Ø

UN1, Unit Select Code Bit 1

Mediation CRC Error 1 100 of the despitant (190 added Q80 bees)

Media or CRC Error
Selected Unit Write Protect

Drive Fail and a Address Mark and a second a second and a

3-20 BUSY

A one indicates that an operation is in process, zero, no operation in process. Busy is cleared by Clear, Clear Error Flags, or head unloading.

ា ខេត្តក្រុមប្រជុំ ប្រទទ្ធមិន ១០០ បុគ្គាតិ ភេឌ្ឍប្រជុំង ១៩ សេស្ស

UND AND UNIT SELECT CORE 3-21

The code for selecting the desired disk drive unit is:

<u>VN1</u> <u>VN</u>	<u>Ø</u> Uni	t Selected	្រាទ្ធការ៉េស្តី គោលមកស្រី ទីស	บ้างฮ์ หา้อ วิย เการีย วิยยาก	n p[e ^{le} i Nietotoj
Ø 1		Ø		ู่ เพลาะ (อลิลัก)	೧೮೯ ಕ್ಷಮ್ ತ ಕರ್ಮಾನಿಶ್
Ø 1 1 7 7 9		1 2			
1 1		3	P⊈+Î		SK JESS SS

3-22 MEDIA OR CRC ERROR

These signals indicate a data error in Seek or Read (CRE) operation. Clear Error Flags, clears line before beginning a Read or Write operation.

3-23 SELECTED UNIT WRITE PROTECT FOR SEVEN SELECTION AND ALLERS IN SECURITION OF SEVEN SELECTION OF SELECTION O

The disk is write protected when this line is low (logical one).

3-24 DRIVE FAIL

Activates to a logical one when drive is not ready or when drive is not fully operable. This may be due to drive not being up to speed, its door is open, diskette not installed, or drive is not properly connected.

3-25 FOUND DELETED ADDRESS MARK

This bit goes fow if DBAM preceeds a Read command. It is reset by the Clear Error Flags command.

 $\frac{1}{2}$ in the second constant of the const

SECTION III

INTERFACING REQUIREMENTS

3-1 SIGNAL LEVELS

All signals pertaining to the Controller/Formatter are standard TTL-compatible negative true. Positive true is available as an option for an additional cost.

3-2 CF3700 INPUT SIGNALS

Logic "0": +2.0V min to +5V max Logic "1": +0.0V min to +0.8V max

Standard load is a TTL gate (7404 plus 680 ohms to ±5V). The other two input load variations shown, are extra cost options designed to accomodate special system requirements.

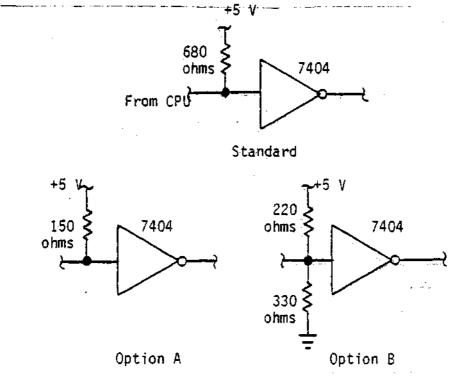


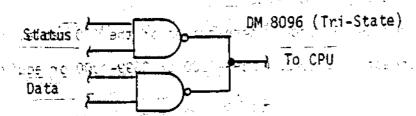
Figure 3-1. Input Receivers

3-3 CF3700 OUTPUT SIGNALS

Logic "0": +2.49 min

Logic "1": +0.0V min to +0.4V max 5 200 f2 902 74 / 6 4 4 42 7

Current stak at logic "1" is 32 ma



Ffguré 3-2. Output Drivers

CABLE INSTALLATION

Four 3M flat cables interconnect the floppy disk system: -

P/N

<u>Description</u>

360-27

I/O Cable, connects Controller/Formatter to computer interface.

370-22 (Dual Drive) Disk Drive Cable, connects drives in a 370-24 (Four Drive) daily chain fashion to Controller/Forms daisy chain fashion to Controller/Formatter.

360-26 and 360-25 .. ≥ 1 52

F OW LOAD WITH

Z1 and Z2 Interconnection Cables.

tick cosmic I/O CABLE 3-5

> The I/O Gable, a 50 conductor ribbon cable, has a 50 pin connector at one end (P9) and a 20 pin connector (P4) plus a 26 pin connector (P5) at the other end.

3-6: P9 Connector

The 50 pin connector is designated P9 and connects to the interface or CPU of the computer.

The Cable connector is 3M P/N 3433-2002 (solder tail) or 3M P/N 3233-4005 (wire wrap) or equivalent.

The key for this connector is pin 29.

3-7 P5 Connector

P5, the 26 pin connector, mates with P5 of the Z1 board. The output signals from the CPU are routed to P5, the Controller/ Formatter input signal connector.

Table 3-1 shows the P9 and P5 connections of the 1/0 scattle.

The cable connector is 3M P/N 3399-0000 or 3399-1000 or equivalent.

NOTE

Reference index of P5 board, connector begins at ping 15.

Table 3-1. I/O Cable, P5 Connector -

P5 Cable End	P5 on Z1 Board	P9 (CPU end	1) Signalor 25	ice Derfinition	7.
1-5	15-19	•	Not used	11.5	1
2 Key 5 Key	er Kajari Gran		18 95 12 18 85 20 20 12	VS-83.	
6	20.	29 Key 30	° ± 115°	on Command Strobe	
7	21	_ 31	CPUT*	Commanda Word	
8	22	32	CPU2*	Commadn: Word	
9	23	33	CPU3*	Command Word	İ
10	24	34	CPU4*	Command Word	
11	25	35 .	CPU5*	Command Word	È
12	26	36	- uzis - C₽U6* as €	. Command Word	
13	27 🔭 🔪 🐫	37	CPU7***	Command Word	
15	29	39	CPUØ*	Data out bit 0	
16	30	40	CDU1 *	Data out bit 1	
17	31	41	CDU2*	Data out bit 2	þ
18	32 (** ਨਿਲ ਹੈ)	. = 42	- :52 CDU3* : 5 */*	Data out hit 3	
19	33	43	CDU4*	ਸ਼ੀ ਹ ਉਨ੍ਹਾਂ ਬਣ ਹੋਈ ਸ਼ਿਲ੍ਹ Data out bit 4	
20	34	- 44	2-04 CDU5* 2000	Data out bit 5	
21	35	45	CDU6*	Data out bit 6	
22	36	46.	úi ir cpu7* ™ ™	Data out bit 7	
23-26	37-40	47-50	Signal Grou		

3-8 P4 Connector

The Connector P4, which has 20 pins, mates with P4 of Z2. The controller/formatter controller

The P4 and P9 connectors of the I/O cable are detailed in table 3-2.

1200 231

The cable connector to P4 of Z2 is 3M P/N 3421-0000 or equivalent.

	i r	A TOP & LOVE TO	\$ 58	i
	Table	e 3-2. P4 Connector	* 1.	i.
P4	P9 ((CPU)	Signatia - 2 - 44 - 15	© 40°Defi	nition
1-7	1-70	Not Used	- * *	
6 Key	. 5	CHECK COLEMP PER CO	*** **	ü
8	8 3	F DONE* To . Set To .	Done	·· - ·· · · · · ·
9	9 0	DIØ/Busy 🔧 😕	Data	Input Ø
10	10 0	DIT/UNØ Unit Select	. Data	Input 1
11	11 :	DI2/UN1 2	🦸 🦰 Data	Input 2
12	12	DI3/CRC Errors	Data	Input 3
13	13 :	014/Write Protected	Data	Input 4
14	14	DI5/Drive Fail	Ta - Data	Input 5
15	15	DI6 thal bear	"Data	Input 6
16	16	DI7/Deleted Data@Address@Mark	Data :	Input 7
17 Key	A CONTRACTOR OF THE PARTY OF TH	garaga - Jakan Pagarang ang angganggan ay is inang sa sangganggang nangganggan menganggan melali isang ay inan	ar 9, 9+an	edia Assentant (m. 1. s. pří podří s
18-20	18-20	GRD 2.2.2.7	1_000105_F	Z* <u>\$</u> \$ €

หาวสาขาวง ค.ศ. พิพ.ศ. (วิธีเลย โดยการ์ เอา จะตาม ระทั่ง (การ์ เอา ตามหาวาทการ เกษาวง เกษาวัน (การ์ เอา ตามหาวง (การ์

្សារី ការស្វារៈ នៅ ស្រុស្សារៈ ដែល បាន បាន សាយាយាល់ អាចប្រជាជាធិប្រជាជាធិប្រជាជាធិប្បធិប្បធិប្បធិប្បធិប្បធិប្ប បាន ស្រុស្សារៈ ស្រុសស្ថិតិសេស និងសមាន បានស្វាស់ក្រើសារ បាន បានការបង្គិតិស្សារៈ ស្ថិតិស្វារៈ ស្វាក្សារៈ បានប្រ

3-9 DISK DRIVE CABLE

The Disk Drive Cable connects the CF3700 to the floppy disk drive the Controller/Formatter connector is designated Planand connects to its respective connector on Z2.

୍ରା ଓ ବିୟୁଷ୍ଟ ମଧ୍ୟର ପ୍ରତ୍ୟୁଷ୍ଟ ପ୍ରାମ୍ୟ ପ୍ରତ୍ୟୁଷ୍ଟ ଅନ୍ତର୍ଶ ହେଇ <mark>ନବି ଅନ୍ତର କବି ଇଟ</mark>ି

valoria (n. 1888) a Table 3-3: Disk Prive Cable nospennos eídeo en l

			Not the second s		•
	Pin"	Signal	Definition	0\1	
	1	SELØ*	Drive Select Ø	0	
	2	SEL1*	Drive Select 1 5-3 5 6	, Q	
	3	SEL2*		· 0	-
	. 5	SEL3*	Drive Select 3		į .
	6	PHLOD*	Head Load	0 5	
	11	WRENA*	Write Enable : %] - 7 0	
	15	THIGH*	High Head Current	0	V#1 5
	17 - 44	- IWDATA	Write Data (1907)	0 - β	:
	1,9%	1STIN	Step In 1802 \$25	0 🖹	į
	21.	1STOUT	Step Out DA. 110	0 ØF	Ž.
	31	DRFAL	Orive Fail 10 012	IH	:
	32-	TRO*	Track Zero R 1800	1 3	1.1
٠.	33	WP	_Write Protect -::	$\mathbf{I}^{-}\boldsymbol{\xi}^{(i)}$	
	45	INDEX	Index=0 exch20210	1 5	-
	46 ₃ ~ - 25-3	'RD0'*	Read Data	I 3"	Ĉ
	tuan. D		Pin 43 /is/skeyed	Ö,	, , , , , , , , , , , , , , , , , , ,

3-10 Z1 AND Z2 INTERCONNECTING CABLES

These cables connect the two printed circuit boards, Z1 and Z2, of the Controller/Formatter, CF3700. The P2 cable has 40 conductors, while the P3 cable has 50 conductors.

These interconnecting cables provide for signal transfer between the two sections of the Controller/Formatter.

3-11 P8 CONNECTOR

The printed circuit board edge connector, P8, provides for DC power inputs as well as routing the write protect and the status features to the Z2 board. Table 3-4 furnishes the pin and assigned signal information for P8.

. [Din	Cianal	Dogguistics	7.00
-	<u>Pin</u>	<u>Signal</u>	Description	1/0
ł	1	WP3*	Drive 3 Write Protect	I
	77 . A	WP2*	Drive 2 Write Protect	I.
ું જ ∳	· , 2	WP]≠⇒.	Drive I Write Protect	I
1	— В ₁	WPØ*	Drive Ø Write Protect	[
٠. <u> </u>	3	LDRFAL	Ready	0
	c 🕮	LBUSY	Busy.	0
	4	LCRC	CRC Error	_0
	D ~ 1	LWRPR	Write Protect	<u>,</u> 0
- 1	5	TUNI.	Unit Select Bit 1	
	Ε	LUNØ	Unit Select Bit Ø	0
.	б [}] F	:+5V		
į		-12V return	• •	,
	7 H	<pre><+5V </pre> <pre> <pre> <pre> </pre> <pre> </pre> <pre> <th>vet - ma</th><th></th></pre></pre></pre></pre></pre></pre>	vet - ma	
		+5V	The adjustmental temps of a 11 described different agents. E	A SECTION AND ADMINISTRATION OF THE PARTY OF
ĺ		-12V return	fea u a ri	
	9 K	+57		
		-12V return		
	10 L	-12V -12 return		
1		<u> </u>		

raphilipe (I) in the thick section

3-12 INTERCONNECTION DIAGRAM

A typical floppy disk system interconnection diagram is given by figure 3-3. Take special note of the fact that the very is at the terminus of the disk drive cables that the second sec

≠].Ø p/ 75 TV CPU 1/0 CMLE - 360-27 INTERFACE * 89K 167531 MBURN 急がた。 DRIVE DIEK ONTAK CYĞI 1 170-24 FOUR DELVE POWER CA3712 SUPPLY PS1010

.... Figure 3-3. Interconnection Diagram

3-13 SIGNAL FLOW DIAGRAM

Figure 3-4 presents the signal flow of a disk drive system, and the CF3700 in particular. Signal flow is from left to right. Thus, an item may appear more than once to illustrate input and output signals. The outputs of Z2 are referenced back to Z1 as inputs.

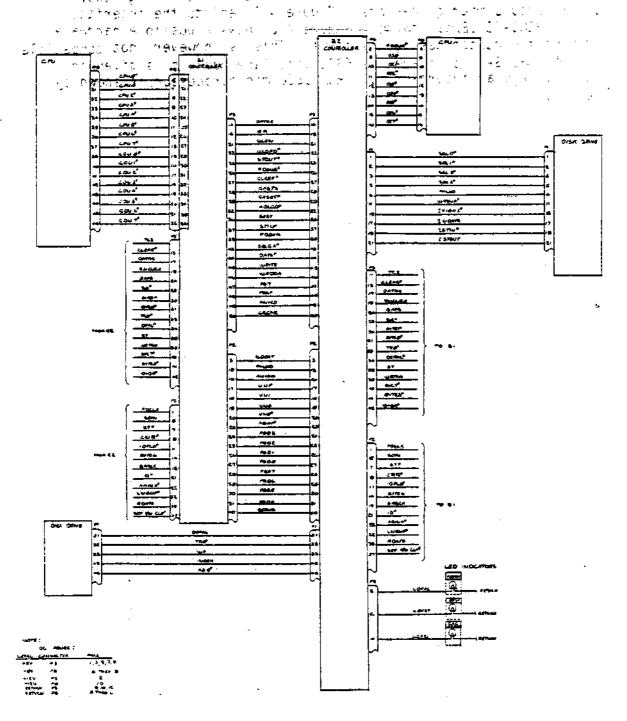


Figure 3-4. Signal Flow Diagram

SECTION IV

The state of the s

This section offers typical diagrams for the interfacing requirements for various microprocessors. Figure 4-1 depicts the interface for iCOM's FDOS-II OEM software. Figure 4-2 shows a possible hardware arrangement for custom designed systems. This is, however, not compatible with iCOM's FDOS-II software. A 6800 interface hook-up is given in figure 4-3. And an interface to a RCA 1800 microprocessor is shown by

figure 4-4.

neng ini ing talah 18 mga ke 19 mga P

5 10-

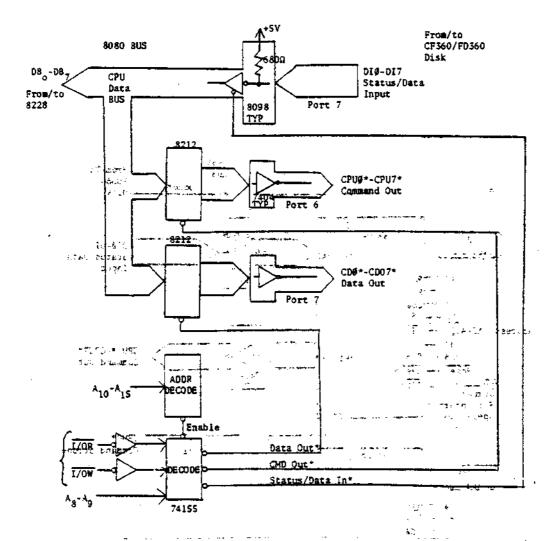


Figure 4-1. 8080 Interfacing Diagram (1980)

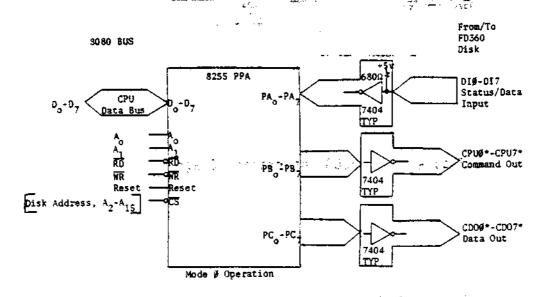


Figure 4-2. Alternate 8080 Interfacing Diagram

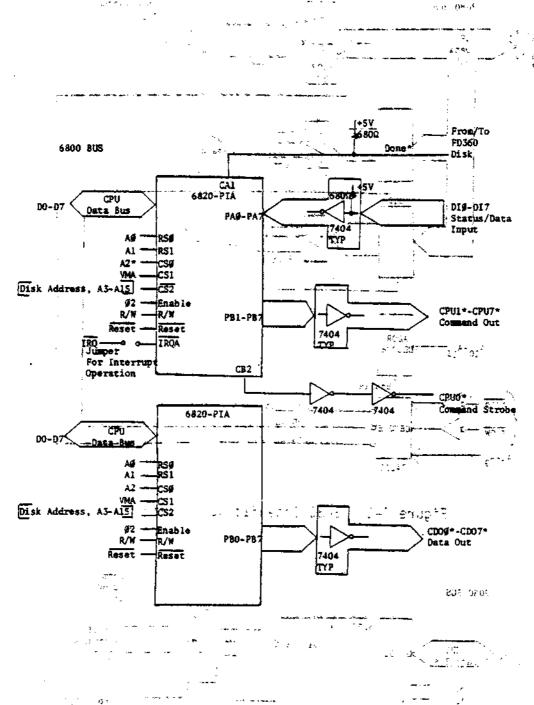


Figure 4-3. 6800 Interfacing Diagram

Tringue To the sense of Color Helphase 🚅 - 12-1 groups

1.10mb . L .

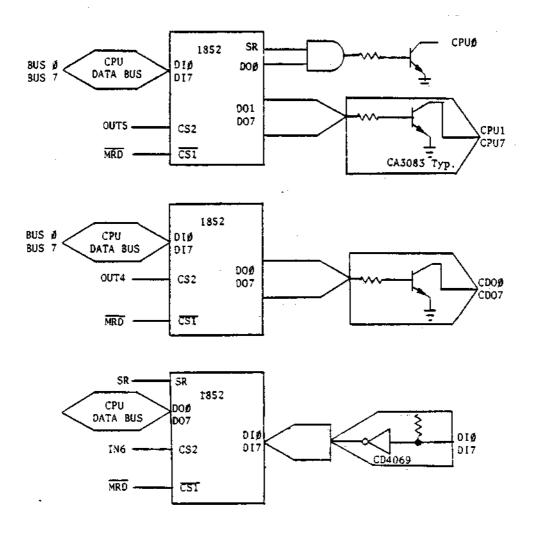


Figure 4-4. RCA 1800 Interfacing Diagram