

# SFF Committee

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Page 1 of Document X3T9.2/92-170

To: X3T9.2 Members  
 Subject: Small Form Factor  
 Date: August 15, 1992

The Small Form Factor Committee has defined a set of pinouts for ATA and SCSI drives in form factors of  $\leq 2 \frac{1}{2}$ ". The restricted area, and the connection of drives directly to a motherboard has caused industry to assign pinouts that are not presently defined by SPI or ATA.

Power is provided to the drives on the connectors, and addresses are set by the receptacle into which the drives are plugged.

We propose the following pinouts to be included as Information Annexes to the next revision of the SPI document:

- 50-pin A-cable on a low density 2mm connector
- 68-pin P-cable on a high density .050" connector
- Mixed voltage description
- Circuit suitable for VU use of address pins

We propose the following pinouts to be included in the next revision of the ATA draft standard.

- 50-pin on a low-density 2mm connector

Thank you for your consideration.



I. Dal Allan  
 Chairman  
 Small Form Factor Committee

365

## Signal Assignments for A-Cable

Signal Name	Connector Contact	Cable Conductor	Connector Contact	Signal Name
GROUND	1	1	2	-DB(0)
GROUND	2	3	4	-DB(1)
GROUND	3	5	6	-DB(2)
GROUND	4	7	8	-DB(3)
GROUND	5	9	10	-DB(4)
GROUND	6	11	12	-DB(5)
GROUND	7	13	14	-DB(6)
GROUND	8 -	15	16	-DB(7)
GROUND	9	17	18	-DB(P)
GROUND	10	19	20	GROUND
5V/3.3V GROUND	11	21	22	5V/3.3V (Motor)
12V/5V GROUND	12	23	24	12V/5V
TERMPWR	13	25	26	TERMPWR
12V/5V	14	27	28	12V/5V GROUND
5V/3.3V (Logic)	15	29	30	5V/3.3V (Return)
-ADDR #1/GROUND	16	31	32	-ATN
GROUND	17	33	34	SYNC
GROUND	18	35	36	-BSY
GROUND	19	37	38	-ACK
GROUND	20	39	40	-RST
-ADDR #2/GROUND	21	41	42	-MSG
GROUND	22	43	44	-SEL
-ADDR #3/GROUND	23	45	46	-C/D
GROUND	24	47	48	-REQ
VU/GROUND	25	49	50	-I/O

- NOTES: (1) The -ADDR #n/GROUND signals shall be externally grounded.  
 (2) If more than one VU signal is required, the -ADDR #n/GROUND signals shall be used. See the recommended circuit to convert a -ADDR #n/GROUND signal to a VU Mode signal.  
 (3) If the drive does not support on-board terminators, the TERMPWR signals shall not be connected to the drive.  
 (4) Drives may be built for either 3.3V or 5V Logic.

## Signal Assignments for P-Cable

Signal Name	Connector Contact	Cable Conductor	Connector Contact	Signal Name
GROUND	1	1	2	-DB(12)
GROUND	2	3	4	-DB(13)
GROUND	3	5	6	-DB(14)
GROUND	4	7	8	-DB(15)
GROUND	5	9	10	-DB(P1)
GROUND	6	11	12	-DB(0)
GROUND	7	13	14	-DB(1)
GROUND	8-	15	16	-DB(2)
GROUND	9	17	18	-DB(3)
GROUND	10	19	20	-DB(4)
GROUND	11	21	22	-DB(5)
GROUND	12	23	24	-DB(6)
GROUND	13	25	26	-DB(7)
GROUND	14	27	28	-DB(P)
5V/3.3V GROUND	15	29	30	5V/3.3V (Motor)
12V/5V GROUND	16	31	32	12V/5V
TERMPWR	17	33	34	TERMPWR
TERMPWR	18	35	36	TERMPWR
12V/5V	19	37	38	12V/5V GROUND
5V/3.3V (Logic)	20	39	40	5V/3.3V (Return)
-ADDR #1/GROUND	21	41	42	-ATN
GROUND	22	43	44	SYNC
GROUND	23	45	46	-BSY
GROUND	24	47	48	-ACK
GROUND	25	49	50	-RST
-ADDR #2/GROUND	26	51	52	-MSG
GROUND	27	53	54	-SEL
-ADDR #3/GROUND	28	55	56	-C/D
GROUND	29	57	58	-REQ
-ADDR #4/GROUND	30	59	60	-I/O
GROUND	31	61	62	-DB(8)
GROUND	32	63	64	-DB(9)
GROUND	33	65	66	-DB(10)
GROUND	34	67	68	-DB(11)

- NOTES:
- (1) The -ADDR #n/GROUND signals shall be externally grounded.
  - (2) If VU signals are required, the -ADDR #n/GROUND signals shall be used. See the recommended circuit to convert a -ADDR #n/GROUND signal to a VU Mode signal.
  - (3) If the drive does not support on-board terminators, the TERMPWR signals shall not be connected to the drive.
  - (4) Drives may be built for either 3.3V or 5V Logic.
  - (5) 8 bit drives which are connected to the P-cable shall leave the following signals open: -DB(P1) and -DB(8) through -DB(15). All other signals shall be connected as defined.

### Mixed Voltages

A drive designed for 3.3V applications may be plugged into a receptacle designed to accept a drive designed for 5V applications, with 12V lines for additional power. It is not required that the drive operate, but it is recommended that precautions be taken to prevent damage to the drive.

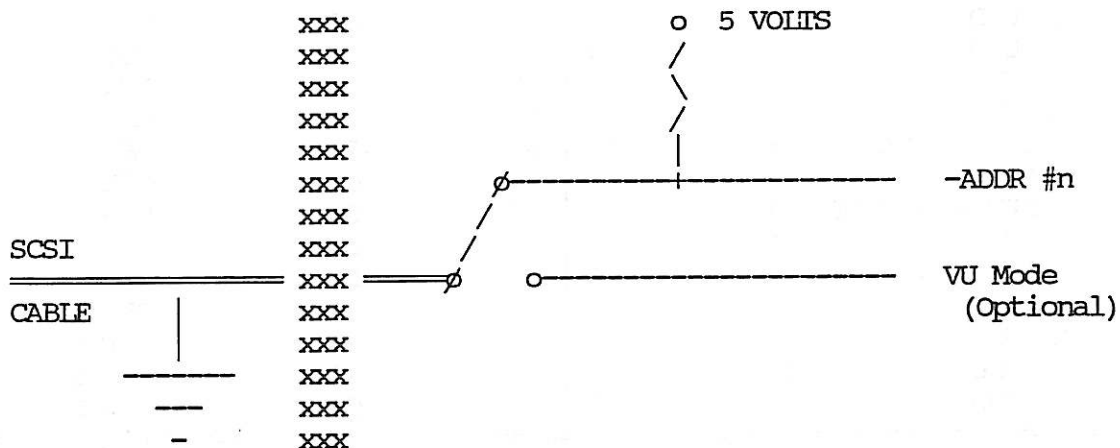
A drive designed for 5V applications may be plugged into a receptacle designed to accept a drive designed for 3.3V applications, with 5V lines for additional power. It is not anticipated that damage could occur to the drive, but it is likely to fail in an undetermined manner.

### -ADDR #n/GROUND and VU Mode Operation

When tests are being run, the address functions are not in use. In VU Mode a vendor can use the signals for any test or diagnostic purpose wished.

The circuit illustrated below is an example of how to:

- Allow mixing of drives which support address recognition via the receptacle into which it is inserted with those that do not. The setting of the switch determines whether the drive responds to the local address in the receptacle or by some other means such as jumper addresses on the drive.
- Permit the VU Mode capability (which is optional) to be compatible with addressing uses. If VU Mode is supported a 2-way switch is required.



NOTE: The -ADDR #n/GROUND signal shall be grounded externally from the drive.

FIGURE: SUPPORT OF VU MODE BY -ADDR#n/GROUND SIGNAL

## Signal Assignments for ATA

The first four pins of the connector plug located on the drive are not to be connected to the host, as they are reserved for manufacturer's use. Pins E, F and K are keys, and are removed.

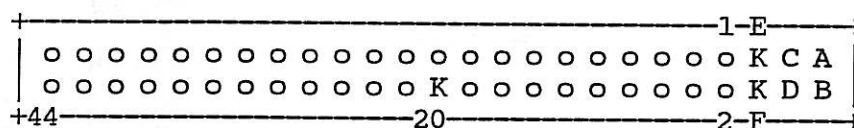
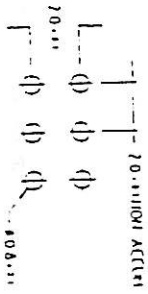
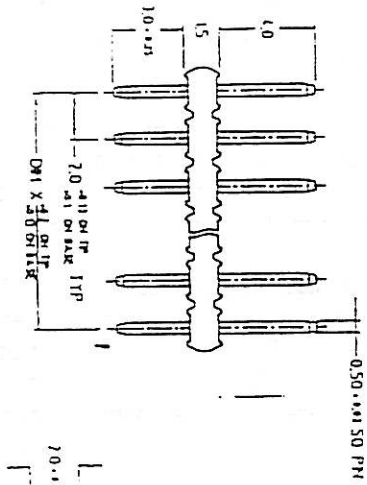
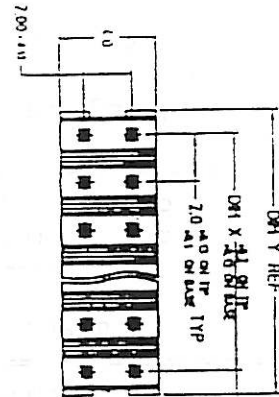


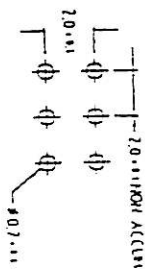
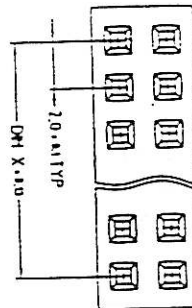
TABLE 7-1 SIGNAL ASSIGNMENTS FOR ATA

Signal Name	Connector Contact	Cable Conductor	Connector Contact	Signal Name
Vendor Unique	A		B	Vendor Unique
Vendor Unique	C		D	Vendor Unique
(keypin)	E		F	(keypin)
RESET-	1	1 2	2	Ground
DD7	3	3 4	4	DD8
DD6	5	5 6	6	DD9
DD5	7	7 8	8	DD10
DD4	9	9 10	10	DD11
DD3	11	11 12	12	DD12
DD2	13	13 14	14	DD13
DD1	15	15 16	16	DD14
DD0	17	17 18	18	DD15
Ground	19	19 20	20	(keypin)
DMARQ	21	21 22	22	Ground
DIOW-	23	23 24	24	Ground
DIOR-	25	25 26	26	Ground
IORDY	27	27 28	28	PSYNC:CSEL
DMACK-	29	29 30	30	Ground
INTRQ	31	31 32	32	IOCS16-
DA1	33	33 34	34	PDIAG-
DAO	35	35 36	36	DA2
CS1FX-	37	37 38	38	CS3FX-
DASP-	39	39 40	40	Ground
+5V (Logic)	41	41 42	42	+5V (Motor)
Ground (Return)	43	43 44	44	TYPE- (0=ATA)

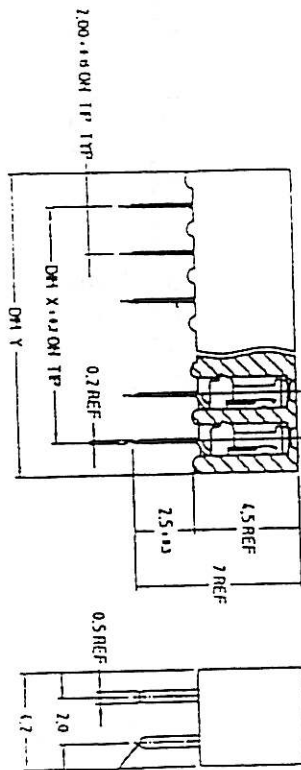


RECOMMENDED HOUSING HOLE LAYOUT

SIGNALS LOW DENSITY PLUG

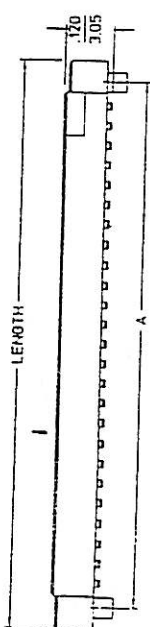
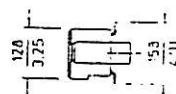


RECOMMENDED HOUSING HOLE LAYOUT

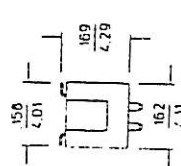


SIGNALS LOW DENSITY RECEPTACLE

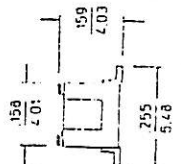
	LENGTH	A
50 P/N	1300	1320
50 P/N	35.31	33.53
60 P/N	1640	1776
60 P/N	40.74	44.96



SURFACE MOUNT



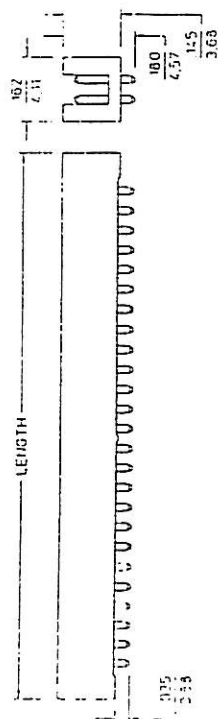
THRU HOLE HEADER  
SURFACE MOUNT SOCKET  
STACK HEIGHT



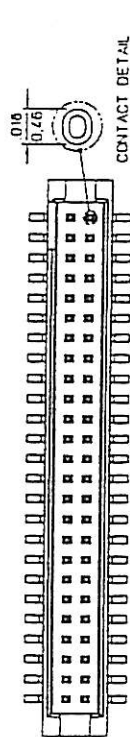
SURFACE MOUNT HEADER  
SURFACE MOUNT SOCKET  
STACK HEIGHT

SIGNALS HIGH DENSITY RECEPTACLE

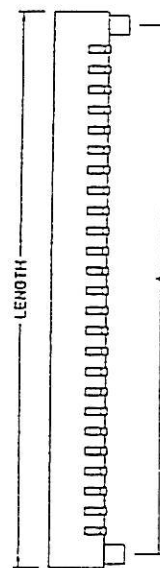
	LENGTH	A
50 P/N	1300	1320
50 P/N	35.31	33.53
60 P/N	1640	1776
60 P/N	40.74	44.96



THRU HOLE



CONTACT DETAIL



SURFACE MOUNT

SIGNALS HIGH DENSITY PLUG

	LENGTH	A
50 P/N	1300	1320
50 P/N	35.31	33.53
60 P/N	1640	1776
60 P/N	40.74	44.96