FDD - Bus Interface

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5.25" DRIVES

Are You READY (or DISK CHANGE)?

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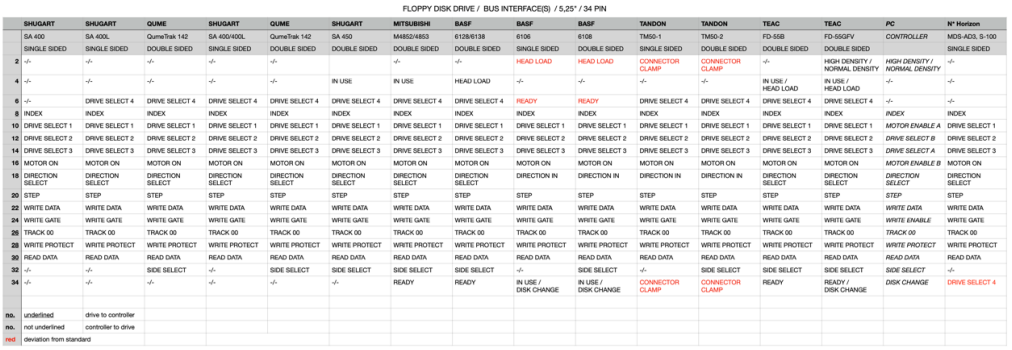
In the following figure you can see the BUS signals for the even PINs (2 to 34) for a number of 5.25" drives. For the most part they are identical, but only almost. The differences lie in PINs 2, 4, 6 and 34. All drives use the so-called Shugart interface with 34 signals or lines. On the far right I have listed the interface for the IBM compatible controllers. This supports only two drives, not four! The motor control is also different. Take a close look at the PINs 10 to 16.



FLOPPY DISK DRIVE / BUS INTERFACE(S) / 5,25" / 34 PIN

	SHUGART	SHUGART	QUME	SHUGART	QUME	SHUGART	MITSUBISHI	BASF	BASF	BASF	TANDON	TANDON	TEAC	TEAC	PC	N° Horizon
	SA 400	SA 400L	QumeTrak 142	SA 400/400L	QumeTrak 142	SA 450	M4852/4853	6128/6138	6106	6108	TM50-1	TM50-2	FD-55B	FD-55GFV	CONTROLLER	MDS-AD3, S-100
	SINGLE SIDED	SINGLE SIDED	DOUBLE SIDED	SINGLE SIDED	DOUBLE SIDED	DOUBLE SIDED	DOUBLE SIDED	DOUBLE SIDED	SINGLE SIDED	DOUBLE SIDED	SINGLE SIDED	DOUBLE SIDED	DOUBLE SIDED	DOUBLE SIDED	DOUBLE SIDED	SINGLE SIDED
2	-/-	-/-	-/-	-/-	-/-		-/-	-/-	HEAD LOAD	HEAD LOAD	CONNECTOR CLAMP	CONNECTOR CLAMP	-/-	HIGH DENSITY / NORMAL DENSITY	HIGH DENSITY / NORMAL DENSITY	-/-
4	-/-	-/-	-/-	-/-	-/-	IN USE	IN USE	HEAD LOAD	-/-	-/-	-/-	-/-	IN USE / HEAD LOAD	IN USE / HEAD LOAD	-/-	-/-
6	-/-	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	READY	READY	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	DRIVE SELECT 4	-/-	-/-
8	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX
10	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	DRIVE SELECT 1	MOTOR ENABLE A	DRIVE SELECT 1
12	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT 2	DRIVE SELECT B	DRIVE SELECT 2
14	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT 3	DRIVE SELECT A	DRIVE SELECT 3
16	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ON	MOTOR ENABLE B	MOTOR ON
18	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION IN	DIRECTION IN	DIRECTION IN	DIRECTION IN	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT	DIRECTION SELECT
20	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP	STEP
22	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA	WRITE DATA
24	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE GATE	WRITE ENABLE	WRITE GATE
26	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00	TRACK 00
28	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT	WRITE PROTECT
30	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA	READ DATA
32	-/-	-/-	SIDE SELECT	-/-	SIDE SELECT	SIDE SELECT	SIDE SELECT	SIDE SELECT	-/-	SIDE SELECT	-/-	SIDE SELECT	SIDE SELECT	SIDE SELECT	SIDE SELECT	-/-
34	-/-	-/-	-/-	-/-	-/-	-/-	READY	READY	IN USE / DISK CHANGE	IN USE / DISK CHANGE	CONNECTOR CLAMP	CONNECTOR CLAMP	READY	READY / DISK CHANGE	DISK CHANGE	DRIVE SELECT 4

no.	underlined drive to controller
no.	not underlined controller to drive
red	deviation from standard

Floppy disk drive bus interface(s) / 5,25" / 34 pin
(full size)

About Pin's and Lines

- PIN 2 ... HEAD LOAD - DENSITY SELECT
- PIN 4 ... IN USE - HEAD LOAD
- PIN 6 ... DRIVE SELECT 4 - READY
- PIN 8 ... INDEX/SECTOR
- PIN 10 .. DRIVE SELECT 1

- PIN 12 .. DRIVE SELECT 2
- PIN 14 .. DRIVE SELECT 3
- PIN 16 .. MOTOR ON
- PIN 18 .. DIRECTION SELECT
- PIN 20 .. STEP
- PIN 22 .. WRITE DATE
- PIN 24 .. WRITE GATE
- PIN 26 .. TRACK 0
- PIN 28 .. WRITE PROTECT
- PIN 30 .. READ DATE
- PIN 32 .. SIDE SELECT
- PIN 34 .. READY - IN USE - DISK CHANGE - DRIVE SELECT 4

PIN 2 / HEAD LOAD - DENSITY SELECT

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This line can have two different functions. With the 8" drives, PIN 2 has a very important meaning (TG43), but more about that later.

1. HEAD LOAD / controller >>> disk

With this signal, the read-write HEAD of the drive is LOADed, i.e. pressed onto the disk surface and premagnetised. You can recognise the head loading by the characteristic crackling sound.

2. DENSITY SELECT / controller >>> disk

This signal is used to switch the operating mode of DUAL SPEED drives between normal/double density (DD) and high density (HD). The controller outputs a LOW when double density disks are detected, or a HIGH when high density disks are detected.

PIN 4 / IN USE - HEAD LOAD

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This line can have two different functions.

1. IN USE / controller >>> disk

This signal is used to tell the drive that accesses are coming soon. Often, however, this signal can only be used to switch on the lamp on the front bezel.

2. HEAD LOAD / controller >>> disk

With this signal, the read-write HEAD of the drive is LOADed, i.e. pressed onto the disk surface and premagnetised. You can recognise the head loading by the characteristic crackling sound.

PIN 6 / DRIVE SELECT 4 - READY

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This line can have two different functions:

1. DRIVE SELECT 4 / controller >>> disk

> *I always use the numbers 1 to 4 for the DRIVE SELECT, but in the literature you will sometimes also find the number ordering 0 to 3. So, watch out!*

On the floppy drive, four jumpers can be used to choose which DRIVE SELECT line is to be used to select and activate the drive.

> *Very important: On the North Star Horizon controller the DS4 signal is provided on line 34; not 6!*

2. READY / controller <<< disk

This line is used to indicate the readiness of a drive: a floppy disk is inserted, the motor is running but the HEAD is not yet LOADED. READY is usually required on XT systems.

This signal can also be on PIN 34.

PIN 8 / INDEX / controller <<< disk

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The selected drive applies a pulse to this line each time the index hole on the disk passes the index sensor. The pulse marks the beginning of a track on soft-sectored disks.

PIN 10 / DRIVE SELECT 1 / controller >>> disk
PIN 12 / DRIVE SELECT 2 / controller >>> disk
PIN 14 / DRIVE SELECT 3 / controller >>> disk

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