

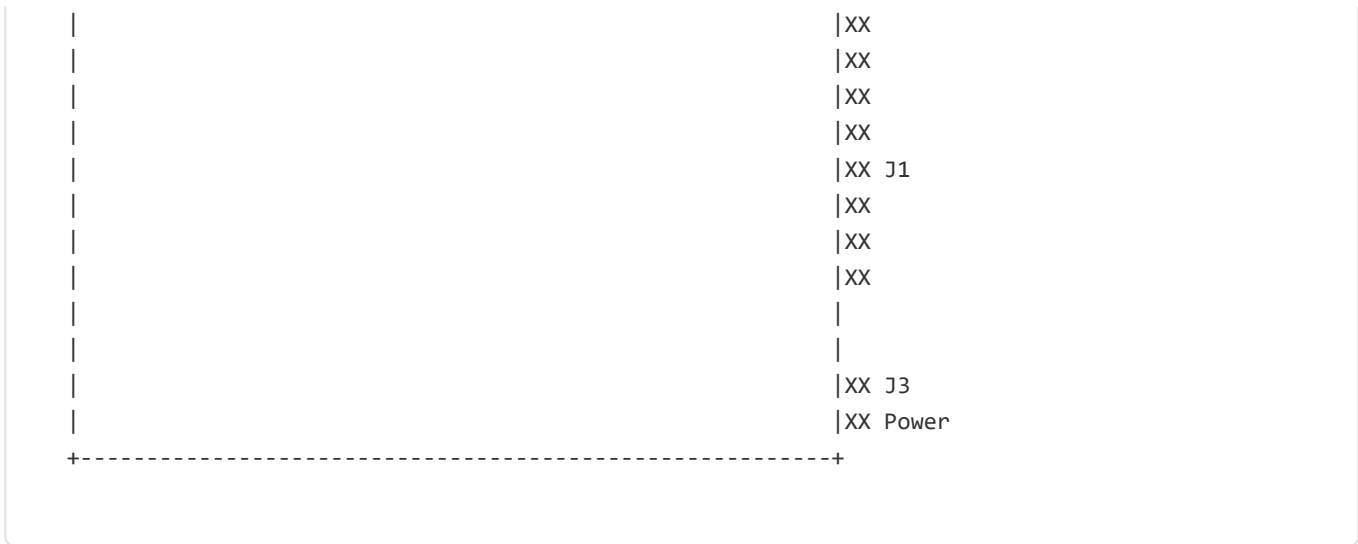
Hard Drive: BASF MAGNETICS: 6188-R3 20MB 5.25"/HH MFM ST412

6 1 8 8 - R 3		BASF MAGNETICS			
NO MORE PRODUCED				Native	Translation
				-----+-----+-----+-----	
Form	5.25"/HH	Cylinders	616		
Capacity form/uniform	20/ 25 MB	Heads	4		
Seek time / track	88.0/18.0 ms	Sector/track	17		
Controller	MFM / ST412	Precompensation	380		
Cache/Buffer	KB	Landing Zone	615		
Data transfer rate	0.625 MB/S int	Bytes/Sector	512		
	0.625 MB/S ext				
Recording method	MFM			operating	non-operating
				-----+-----+-----+-----	
Supply voltage	5/12 V	Temperature *C	10 50		-40 70
Power: sleep	W	Humidity %	15 80		5 95
standby	W	Altitude km	-0.300 3.000		-0.300 14.000
idle	W	Shock g	5		50
seek	W	Rotation RPM	3600		
read/write	17.0 W	Acoustic dBA			
spin-up	W	ECC Bit	-		
		MTBF h	15000		
		Warranty Month			
Lift/Lock/Park	NO	Certificates			

Layout

BASF 6188-R SPECIFICATION 80307-087, REV. 02, 3/1986

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	XX
	XX J2
	XX

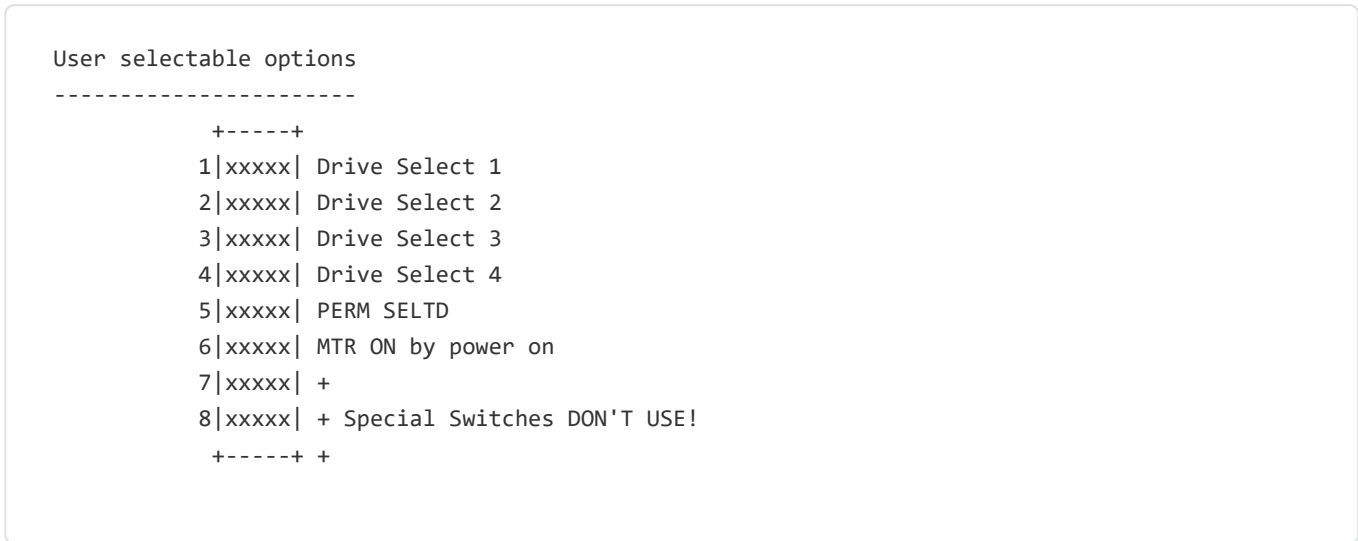


Jumpers

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Jumper Setting

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The BASF 6188-R has 8 switches for user selection of different options:

Drive Address Selection

Switches 1 to 4 are use to set the drive address for drive selection. Only one of the four switches may be set to the ON position. This switch determines which one of the four interface drive select lines selects this particular drive. If for instance, in a given drive, switch 1 is ON (switches 2 to 4 of the drive must be OFF) that drive is selected whenever the signal DR SEL 1 is low active.

The drive address assignment is independent of the drive's position on the daisy-chained "A"-cable.

Switch 5 allows to select a drive permanently and independent of the state of the DR SEL (Drive Select) signals.

Spindle Motor Start Control

Switch 6 controls the condition for the spindle motor start.

If switch 6 is ON the spindle motor is started as soon as power is provided to the drive.

If switch 6 is OFF the spindle motor does NOT start with power on. It starts, however, with the first low active going edge of the drive select signal corresponding to that drive. This feature allows sequencing of the motor start in multiple drive configurations in order to reduce the total load to the power supply caused by the high current during the spindle motor start.

Switch 7: this switch is only used during production for specific tests.

Switch 8: Reserved for future use!

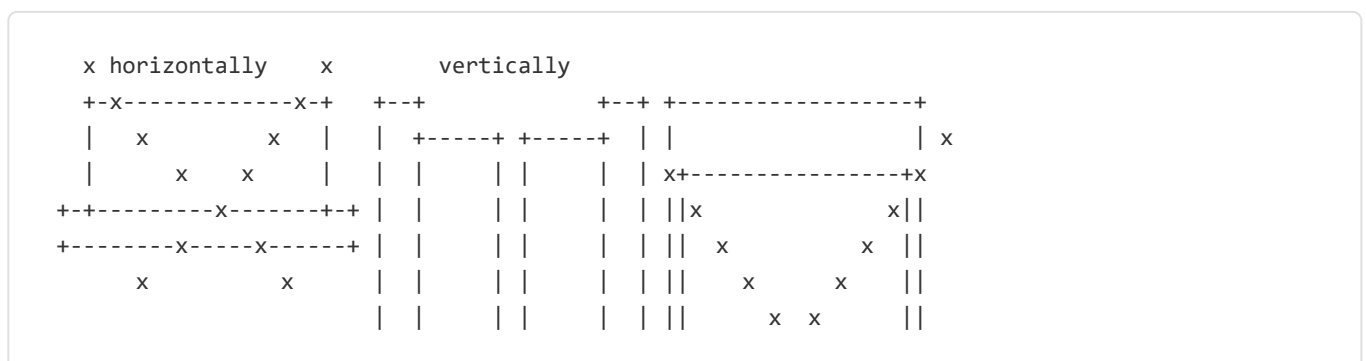
Install

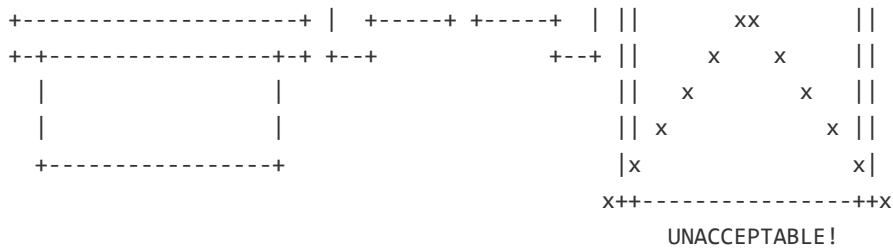
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Notes on Installation

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Drive mounting





The BASF 6188-R may be operated only when the Face Place is in a vertical plane. The maximum deviation is an angle of 13 degrees. From the remaining four possible orientations only three are allowed for operation. These are with the Read-Write-Control PCB either on the left or right side or on top of the drive. Operation with the Read-Write-Control PCB on the top of the drive is not allowed.

Housing

The sealed module consists of an aluminium molded chassis and cover. A closed loop air filtering system inside constantly cleans the air particles which may be generated by head to disk interference. An absolute breather filter for pressure equalization with the ambient air pressure protects against environmental contamination.

Physical Interface

The physical interface between the BASF 6188-R and the controller is done via three or four connectors. One provides the control and status lines through the "A"-cable which may be daisy chained. The second one provides the read/write signals to the star connected "B"-cable. The other connectors are used to supply DC power and for optional frame grounding.

Interface Connector J1, "A"-cable

The "A"-cable is connected to the PC-board via a 34 pin card edge connector. Recommended mating connector is AMP P/N 88 373-3, or equivalent.

The "A"-cable may be daisy-chained if more than one drive is connected to the controller. The cable may be flat ribbon or twisted pair with a maximum total length of 6m (20 ft).

Interface Connector J2, "B"-cable

The "B"-cable is connected to the PC-board via a 20 pin card edge

connector. Recommended mating connector is AMP P/N 88 373-6, or equivalent.

The "B"-cable must be radially connected if more than one drive is connected to the controller. The cable may be flat ribbon or twisted pair with a maximum total length of 6m (20 ft). The cable impedance should be around 105 Ohms.

Power Connector J3

The DC-power connector is a four pin connector. Recommended mating connector is AMP P/N 1-480424-0 with pins 350078-4, or equivalent.

Pin 1	+12 VDC
Pin 2	GND 12V
Pin 3	GND 5V
Pin 4	+ 5 VDC

Drive Mechanism

A "disk pack" consisting of a hub with 2 disks is mounted on a spindle which is directly rotated at 3600 rpm by a brushless 12 VDC motor. The motor current is commutated by Hall Sensors and related control electronics. This circuit also generates the Index pulse.

Positioning

The carriage on which the read/write heads are mounted is driven by a stepper motor via a capstan and a metal band. The carriage itself is precision mounted and guided by ball bearings.

Disks

The disks are "Winchester" type and have an outside diameter of 130mm and an inner hole diameter of 40mm. They are coated with a thin layer of magnetic oxide on an aluminium substrate and are additionally lubricated for head wear protection during incontact start and stop operation.

Brake

For further protection of heads and disks in applications where the system is switched on and off often a mechanical brake is installed

to reduce the stop time to 10 sec.

Read/Write Heads

Heads are "Winchester" type with minor modifications for track width and flying height adjustment with respect to a different relative head to disk velocity.

Single Ended Signals

All control input signals and status output signals are single ended and low active (except OP CBL DET). They must meet the following electrical specifications:

Active:	0.0 to 0.4 VDC	I = 40 mA max.
Inactive:	2.5 to 5.25 VDC	I = 0 mA (open)

Differential Signals

The data lines between drive and controller are differential. The logic state for the two pairs of lines MFM WRT DATA and MFM RD data is defined as follows:

The signal is in an active state if the high active line is more positive than the low active line; and the signal is in an inactive state if the low active line is more positive than the high active line.

Termination must be provided on the receiver in the controller; MFM WRT DATA is terminated in each drive.

Power Sequencing

Power Up and Power Down may be done with any sequence of the supply voltages. Microprocessor control logic prevents any erroneous writing during Power Up or Power Down. The interface signal WRT GATE (Write Gate) must be kept high inactive during any power sequence.

Features

General Description

The BASF 6188-R stores the information on up to 2 non-removable disks and up to 616 cylinders.

The BASF 6188-R uses the industry standard interface ST412 and dimensions to ease system integration. Up to four BASF 6188-R may be connected to one controller. For systems requiring removable media it is recommended to use the BASF 6188-R in combination with BASF Mini Floppy Disk Drives which offer a capacity of up to 1,6 MByte.

The use of proven and highly reliable Winchester-Technology disks and heads together with a closed-loop air filtering system guarantees a maintenance-free operation throughout the drive's lifetime and results in a MTBF of 15,000 working hours.

Reliability and low costs are the result of mechanical simplicity and drive ruggedness, containing such features as a highly increased lifetime of the steel band actuator, and a built in shock absorber system.

Disk Media Defects

Disk drives are allowed to have the following number of media defects when leaving the factory:

BASF 6188-R	not more than 10 per surface
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Cylinder zero is delivered error free.

Fault-Codes

The Select-LED is used to flash error-messages in case certain fault conditions should arise. For FAULT code displacement the red colored front panel LED will be lighted. The information is presented in a sequence by switching the select LED off. This means that the dark Phases of the LED are counted to get the error code according to the following table.

ERROR-CODES

1 DC ERROR

2 Motor Speed outside - 10% and Motor stop

3 STEP received while WRITE GATE is active

4 Motor Speed outside 1%

5 REZERO fails after POWER ON

6 Motor does not rotate inspite of MOTOR ON active

7 WRITE FAULT

Note

In case the unit was not selected by the Controller when an error occurs (Select LED off) the LED will first be switched on and then the above explained sequence takes place.

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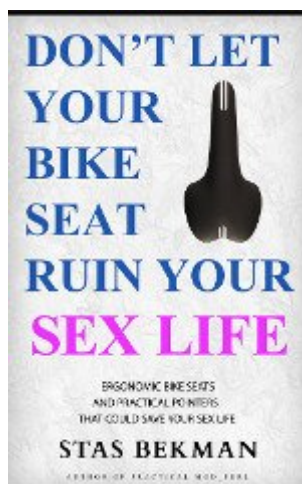
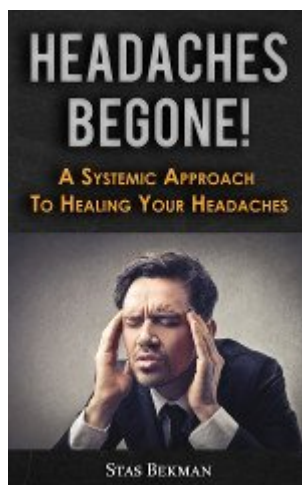
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