4X20 MANUAL

VERSION 1.1

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GENERAL

DESCRIPTION

The 4X20 is a 8,16,32, or 64M byte fixed + removable IDE flash drive in a PC/104 format. A compact flash socket with ejector button provides the removable storage. The low power consumption, good I/O performance and high reliability make the 4X20 suited to many embedded system storage applications.

Since the 4X20 has a built in IDE controller, it is compatible with and bootable by most operating systems without the need for drivers or extension ROMS. The fixed and removable drive can be set for master and slave or vice versa by jumpers. The NAND flash chips used on the 4X20 have a long inherent life span which is enhanced by the controllers built in ECC and wear leveling.

The 4X20 can use the primary (01F0h), secondary (0170h), or tertiery (0150H) IDE address so that it does not interfere with existing IDE drives. Only +5V power is required by the 4X20 and current consumption is less than 100mA operating and 10mA idle. An optional on card 10BaseT/AUI Ethernet interface is also provided by the 4X20. The Ethernet AUI connector requires +12V bus power. An optional adapter (TAU) allows remote panel mount RJ45.

HARDWARE CONFIGURATION

GENERAL

There are a number of jumper selectable options on the 4X20 card. In the following discussions it is assumed that the 4X20 card is oriented with the PC/104 connector towards the person doing the configuration.

DRIVE ADDRESS

The I/O location of on card 4X20 flash drive and the compact flash are selected by a set of 2 jumpers located in the lower right side of the card, W2 and W3. Jumpers W2 and W3 can be in the up or down position. The following table shows the drive base address settings

W2	W3	BASE ADDRESS	NORMAL IRQ
DOWN	DOWN	1F0 (PRIMARY)	14 (W4)
DOWN	UP	170 (SECONDARY)	15 (W5)
UP	DOWN	150 (TERTIARY)	10 (W6)
UP	UP	DISABLED	NONE

DRIVE IRQ

The 4X20's flash drive IRQ can drive IRQ14, IRQ15, or IRQ10. This should be set to correspond with the I/O address selected. A jumper is installed onto jumper blocks W4, W5, or W6 to select the drive interrupt:

W4	W5	W6	IRQ	
IN	OUT	OUT	14	(PRIMARY)
OUT	IN	OUT	15	(SECONDARY)
OUT	OUT	IN	10	(TERTIARY)

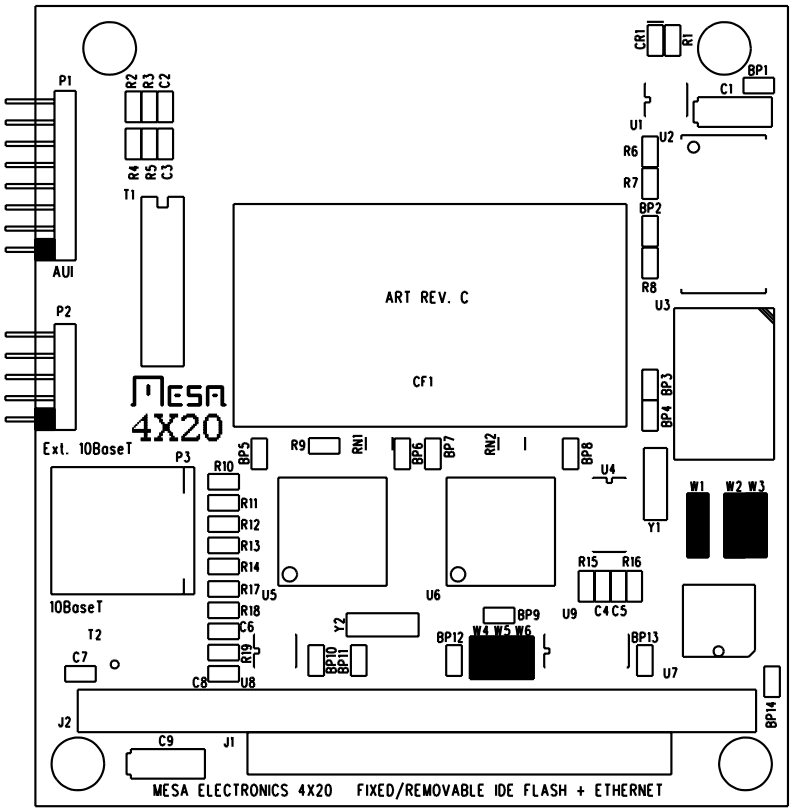
Note that IRQ10 is the same as the default Ethernet interrupt. If the Tertiary drive setting is used, The Ethernet IRQ must be changed in order to avoid a conflict.

MASTER/SLAVE SELECTION

The 4X20's on card flash and compact flash are arranged in a master slave configuration. W1 determines which device is the master. When W1 is in the down position, the on card flash is the master drive and the compact flash is the slave drive. When W1 is in the up position, the compact flash drive is the master drive and the on card flash is the slave drive.

HARDWARE CONFIGURATION

JUMPER AND CONNECTOR LOCATIONS



ETHERNET CONFIGURATION

GENERAL

The 4X20 has an optional 10BaseT/AUI Ethernet interface. This interface uses the CS8900 Ethernet chip. The default settings for the Ethernet interface are I/O location 0x300H, and Interrupt 10.

DRIVERS

The supplied driver disk contains drivers for Netware, Win9X/NT, Lan Manager, Linux, and VxWorks. A packet driver is also supplied.

EEPROM CONFIGURATION

A supplied program SETUP.EXE. Allow you to change the I/O address, physical interface (AUI or 10BaseT) and IRQ setting of the Ethernet interface.

EXTERNAL 10BASET

The 4X20s Ethernet interface allows the use of an external RJ45 paddle board to simplify panel mounting the RJ45 connector. This part is called the TAU and is available from MESA. The TAU has activity and link-good LEDs and may be mounted as far as 12 inches from the 4X20.

FLASH DISK OPERATION

GENERAL

The 4X20 is an PC104 based IDE drive. If the host CPU has on card IDE support, the CPU based IDE hardware must be disabled so that it does not interfere with the 4X20 drive. This is usually done in the BIOS setup. For example if the 4X20 is set for Priimary IDE drive (0x1F0, IRQ 14), these resources must not be used by the host CPU.

WRITE LIFE

The on card flash drive uses NAND flash devices capable of up to 1 million writes. The controller implements wear leveling and ECC to give maximum drive write life. That said, flash drives should not be used with very frequent writes if long life and system reliability are important. Write life also depends on free drive space, the more drive space that is free, the longer the write life. This is because writes and wear leveling are confined to free areas of the flash chip. MTBF is:

(ChipBlocks*CycleLife*FreePart) / (WriteSectorsPerHour).

For example with 32M flash chip (which has 2000 blocks), a ½ full drive, and an average writing rate of 100k bytes per minute, 24 hours a day, MTBF would be:

(2e3 * 1e6 * 0.5) / (1e5 / 512 * 60) = 85333 hours MTBF (a little bit shy of 10 years)

SPECIFICATIONS

	MIN	MAX	COMMENTS
Operating voltage	4.5	5.5	V
Supply current (no Ethernet)	xxx	50	mA (no CF)
Supply current (with Ethernet)	xxx	150	mA (no CF)
Operating temp range -C version	0	70	^{o}C
Operating temp range -I version	-40	85	^{o}C
Flash Write rate	150K	XXX	Bytes/Sec
Flash Read Rate (Both very Host dependent)	1000K	XXX	Bytes/Sec