



FASTLANE Z3

**FAST SCSI-II DMA Controller for the
AMIGA Zorro-III Expansion Bus
Users Manual**

**Advanced Systems & Software International Group
1329 Skiles, Dallas, TX 75204
Phone: 214-239-2000
Fax: 214-821-3464**



1. Introduction

Thank you for choosing our FASTLANE Z3 FAST SCSI-II DMA Controller for the AMIGA 4000. You are now the owner of a high quality, mature product, which has not only been tested in extensive trials prior to being brought onto the market, but which also reflects many years of experience in the development of peripherals for the Amiga, especially hard disk systems. Although the FASTLANE Z3 is the first DMA Controller in the world with a 32 Bit Zorro-3 interface and despite the considerable technical innovation it incorporates, in practice this product has already proved reliable and a worthwhile investment.

A lot of money has been spent on developing and refining this Controller and this has also been the case with the production of the devices as well as the development of the software. This level of expenditure guarantees that the FASTLANE Z3 will meet the highest requirements of quality, security, compatibility and performance. We hope that this product will provide you with countless hours of trouble-free operation.

We would ask you to complete and return the registration card accompanying this product. This will enable us to keep you informed of any future expansions or updates to the FASTLANE Z3 FAST SCSI-II DMA Controller and of other developments for the Amiga. It will also provide us with important feedback allowing us to develop products for the Amiga which you as a user actually want. Please take a few days to complete your assessment and to establish your first impressions of the function of FASTLANE Z3 in your AMIGA. Your opinion as to its performance is very important to us.

phase 5 digital products, Spring 1993

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2. Scope of Supply

The FASTLANE Z3 is supplied with several smaller accessories, documentation and software. Make sure your FASTLANE package contains the following items:

- The FASTLANE Z3 Controller
- A diskette containing the installation software
- A SCSI cable for the internal connection of 2 hard disks, approx. 80 cm long
- A chip marked 74FCT240
- A registration card
- Documentation for the "DynamiCache" software included in the scope of supply
- This User Manual

If any of these items should be missing contact our Support Department and replacements will immediately be despatched.

3. Installation Checklist

This list briefly summarises the points to check when installing the FASTLANE Z3 in certain configurations. If you are not familiar with FASTLANE you should read the chapters indicated.

Complete Installation of FASTLANE with a Hard Disk:

Chapter 4: Hardware Installation

Chapter 5: SCSI-Bus Termination and Setting SCSI-ID's

Complete Installation of FASTLANE with a Hard Disk and Memory:

Chapter 4: Hardware Installation

Chapter 5: SCSI-Bus Termination and Setting SCSI-ID's

Chapter 7: Memory Configuration

Installation of Additional SCSI Devices in an Existing System:

Chapter 5: SCSI-Bus Termination and Setting SCSI-ID's

Installation of Additional External SCSI Devices in an Existing System:

Chapter 4: Hardware Installation

Chapter 5: SCSI-Bus Termination and Setting SCSI-ID's

Installation of Memory in an Existing System:

Chapter 7: Memory Configuration

Installation on Relatively Old Hard Disk Models:

Chapter 6: SCSI Configuration

Linking previously used Hard Disks or SCSI Devices into the System:

Chapter 4: Hardware Installation, "Connecting SCSI-Drives which are already RDB formatted"

Linking Newly Connected Hard Disks or SCSI Devices into the System:

Chapter 8: Software

Analysis of Possible Problems or Error Functions:

Chapter 9: Debugging

Make sure you also read the ReadMe data file located on the diskette supplied, which may contain up-to-date information, which has not yet been incorporated into this user manual.



4. Hardware Installation

The FASTLANE Z3 SCSI Controller fits into a free Zorro-3 slot on the Amiga 4000 or Amiga 3000. It is relatively easy to install the card but, if you prefer, your dealer can install it for you (there may be a small charge). Before you start fitting the card you should always check the bus termination and the SCSI-ID's inside the SCSI devices which are to be connected. See Chapter 5 for the adjustments to be made to the Controller and the disk drive. To ensure trouble-free operation of the card on the Amiga 4000 you must check the versions of the CPU-board and the clock-chip used on the main board. On the Amiga 3000 you will also need to check the Super Buster Chip. The following installation instructions describe how to do this.

Installing the FASTLANE Controller

- 1 Switch your computer off.
- 2 Disconnect all cables from your computer (monitor, mouse, keyboard, interfaces, etc.)
- 3 Undo the screws on the casing cover. On the A3000 these are the two screws at the bottom on the side of the case and a screw at the top centre on the back panel. On the A4000 there are only two screws which secure the case cover; these are on the back panel at the top left and right.
- 4 Remove the cover carefully. On the A4000 the cover lifts off while on the A3000 you simply slide the cover forward. For further information on how to open the Amigas consult your Amiga User Manual.

5.1 This step should only be performed for AMIGA 4000 models with 68040 CPU Boards.

On AMIGA 4000 models with version 3.0 68040 CPU-boards, the clock driver chip 74FCT244 located on the motherboard generally needs to be exchanged for the 74FCT240 driver supplied. This is because the version 3.0 CPU-board inverts a signal, which means that the Zorro-3 card does not function correctly. The FCT240 operates the same as the FCT244, by inverting the signal in question again, so now it has been inverted twice and corresponds with the signal form which was originally required.

The FCT244 is a DIL-module based on the A4000 motherboard. It is relatively easy to remove, if the hard disk and the CPU-board have been removed first. Remove the 4 fixing screws on the internal disk drive (marked in Diagram 4-1) and then lift the disk drive out of its holder. The connection cables are long enough to allow the disk drive to be placed on top of the power supply, without having to disconnect them.

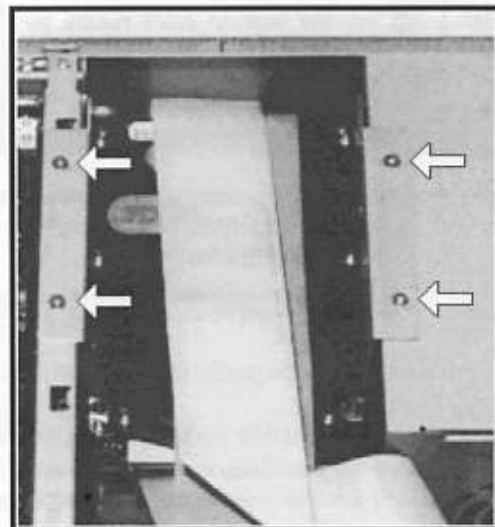
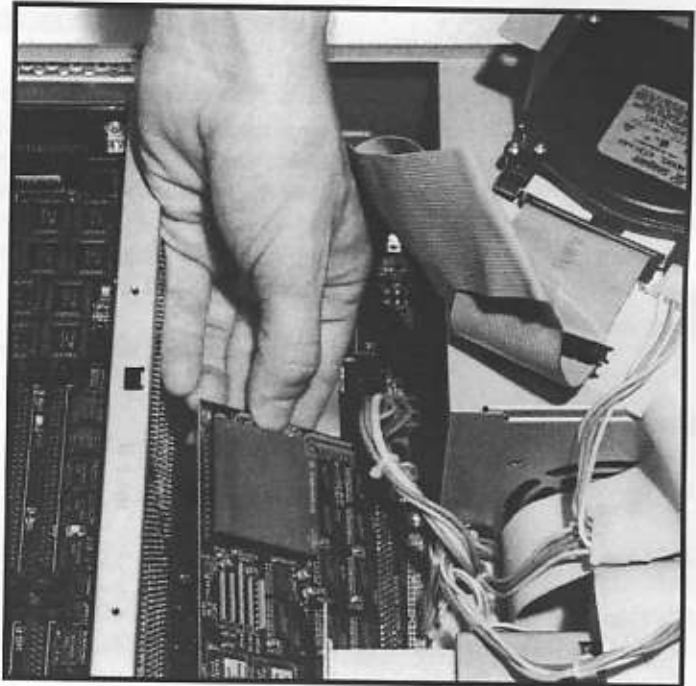


Diagram 4-1: The screws marked must be loosened to allow the removal of the internal disk drive.

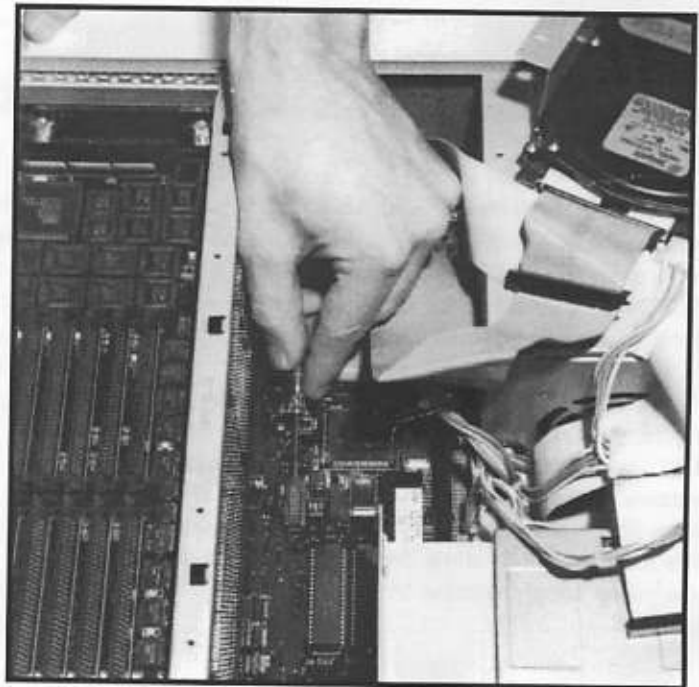
Next take the CPU-board out of the computer, as shown in Diagram 4-2. If it is firmly fixed into the connector then a gentle rocking motion should release it. Tilt the board slightly to remove it from the computer case. Now check which clock driver chip you require dependant on the board version. You should also check the version of chip no. U209 on the CPU-board (if the following combinations do not apply to your CPU-board then please contact our Technical Support Department).

Diagram 4-2: After having removed the CPU-board from the connector, tilt it slightly to remove it from the case.



For board version 3.1, with U209 at version -02 you will need a 74FCT244 clock driver chip. For board version 3.0, with U209 at version -01 you will need a 74FCT240 clock driver chip. The clock driver chip is located under the CPU-board on the main board. It is marked with the number U103. The installed chip can be removed by putting a screwdriver under the chip and rotating it slightly. If necessary move the screwdriver backwards and forwards and then repeat the process. Check when installing the new chip, that the marking (a small semi-circular notch on the narrow side) points towards the back of the case as before.

Diagram 4-3: Removing the 74FCT244 clock driver chip from the motherboard.



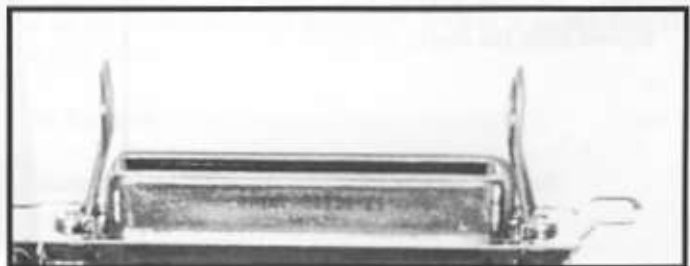
5.2 This step should only be performed for AMIGA 3000 models.

For FASTLANE to function correctly the A3000 must be equipped with a Super Buster version -09 or higher (see also the section on installing new Buster chips). The Super Buster is located on the main board under the drive holder. You will need to remove the drive holder to check the version of the Buster. The Buster is only likely to be sufficiently up-to-date on very new versions of the A3000. If you want to avoid removing the drive holder, you can proceed without checking the version. If the Buster is not of the version required then FASTLANE will not work correctly. The computer will either crash or hang-up and you must then remove FASTLANE and take out the drive holder. For this you will need to remove all plug-in cards from the computer and pull the vertically installed daughter board upwards out of the socket. The daughter board is held with guide rails, so it has to be lifted completely up-

wards. Now remove the three screws on the front of the case. Make sure the disk drive is not connected. Remove the screw on the back, which is on the far left at the top and screwed into the power supply case. Next remove the screw which holds the drive holder on the other side. The last screw is located on the bottom of the drive holder at the back directly next to the power supply. In order to be able to see it you might need to push the SCSI cable slightly to one side. You can now carefully lift the drive holder out of the device. You will not be able to lift it out completely, because the power supply and the drive cables are still connected to the main board. Normally the drive holder can be turned enough to allow you to see the Super Buster on the front part of the board. The chip is marked with U700 and has the imprint Super Buster 390539-XX. It should at least be labelled -09. If it has a version less than -09 then it must be replaced with an up-to-date Super Buster. You can obtain the Super Buster from your dealer. We do not recommend exchanging the chips without the necessary special tool. If you have this special tool then it will not be necessary to explain the installation procedure here as we assume that you are already familiar with it. If the Super Buster version is greater than -09 and FASTLANE still does not work correctly then please contact our Technical Support Department. If you want to have the chip exchange carried out by a dealer then contact him to find out whether you need to completely remove the drive holder from the computer, disconnecting the ribbon cable from the connectors on the main board and disconnecting the power supply connector by pressing on the plastic clips at the sides. Handing all these parts to the dealer (computer, daughter board, drive holder, screws and guide rails) could thereby save them the job of dismantling the computer but could also save you the job of putting it all back together again !

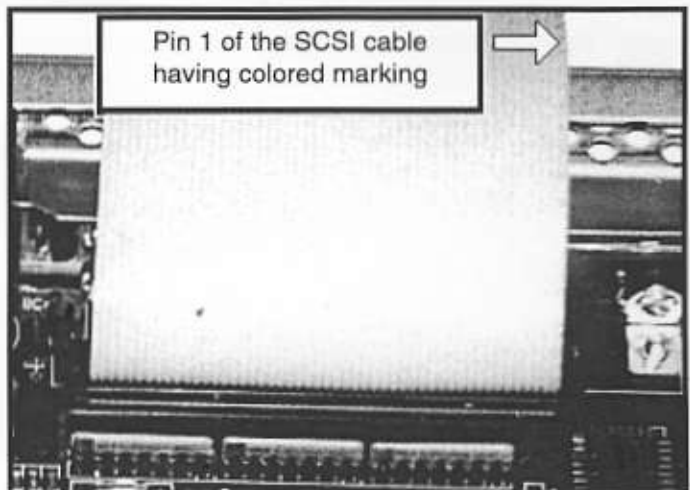
6. Identify a free Zorro-3 slot. In both computers the Zorro-3 slots are on a board which is inserted vertically into the main board. Expansion cards are therefore inserted horizontally from the left. If you have problems identifying the Zorro-3 slots consult your Amiga User Manual.
7. Remove the plate from the chosen slot. The plate is held with one screw. To simplify the later operations remove the screw completely, even if the plate falls away after loosening it only slightly.
8. Discharge any static charge from your body by touching the Amiga case and FASTLANE simultaneously.
9. Remove FASTLANE from the anti-static packaging and push the clip on the external SCSI connector right onto the connector. This is necessary to allow the connector to fit through the cut-out in the case.

Diagram 4-4: To install the Controller the SCSI port clips must be pushed onto the connector.



10. Connect the 50-way cable supplied to the internal SCSI connection on the Controller. Make sure that the coloured marking on the cable points to the board contacts. Diagram 4-5 shows which way the coloured marking on the cable must point. If other boards are fitted we recommend connecting the cable before the board is actually installed in the computer as it might not then be accessible.

Diagram 4-5: When connecting the SCSI cable check the coloured coding.



11. Put the external SCSI connector through the cut-out in the case, as shown in Diagram 4-6, without pushing the other side of the card into the guide rail.
12. Now put the back edge into the guide rail. Slightly tilt the card in position in parallel with the plug-in contact of the Zorro-3 slot.

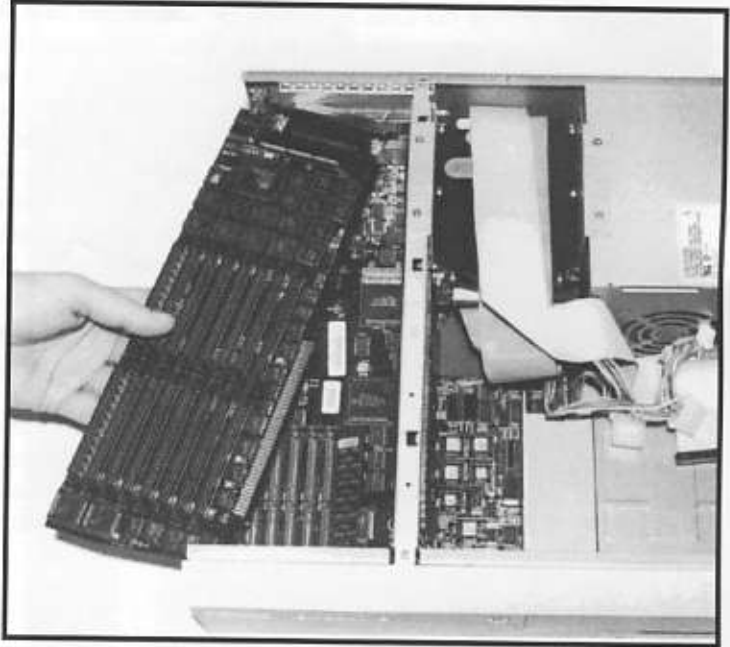


Diagram 4-6: Installing the FASTLANE Z3 Controller in a free Zorro-3 slot in the A4000.

13. Press the card into the slot, by pressing on the upper side of the card with your thumb and supporting your fingers on the metal strip.

If the card is installed correctly then only a small part of the gold plug-in contact should still be visible from the expansion slot, as shown in Diagram 4-7. If the expansion connector has not been used before, then slightly more effort might be required. Do not use excessive force.

14. Fasten the card plate with the screw you removed from the empty cover.

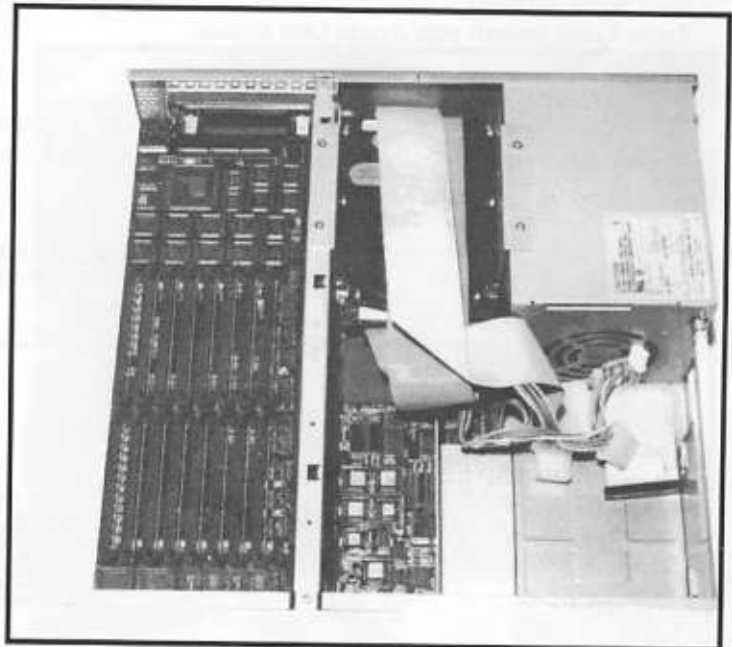


Diagram 4-7: The FASTLANE Z3 Controller installed.



Installing an Internal Disk Drive in the A4000

1. Remove the disk drive support from the computer by unscrewing the four screws on the top.
2. Connect the SCSI cable to the connector on the SCSI disk drive. Pay special attention to the cable and board markings. Normally the side to which the coloured cable marking should point is marked with a point or arrow on the disk drive. Many manufacturers also print details of the SCSI connector's pin numbers on the disk drive. As the coloured marking on the cable identifies pin number 1, it must therefore go on the side of the connector which is marked with 1 or 2. Some disk drives, however, do not identify pins 1 or 2, but pin 50. If there is a number 50 on your disk drive's SCSI connector, then the cable marking must go on the other side of the connector. If there is no marking on your disk drive's board, refer to the instructions for your drive.
3. Screw the SCSI disk drive firmly into the support (the AT-disk drive which is already installed is the best guidance). If you are installing a SCSI hard disk in 3 1/2 inch format with 1 inch overall height, and you still want to drive the AT-disk drive, you can screw your SCSI disk drive into the frame as well. In this case there will be a noticeable increase in the amount of heat generated. If you only want to use the SCSI disk drive, remove the AT-drive. If both slots in the disk drive frame are already occupied, you may be able to install the disk drive into the floppy drive with a frame available from a dealer. This also applies to hard disks or removable drives in the larger 5 1/4 inch format, for which there is a separate slot on the Amiga 4000. Consult the Amiga 4000 user manual with regard to this.
4. Put the disk drive support back into the Amiga and refasten the four screws.

Installing an Internal Disk Drive in the A3000

1. An additional disk drive can be installed on the holder next to the disk drive. However, you will need a mounting plate, which you can obtain from a dealer. Attach this plate to the disk drive.
2. Connect the SCSI cable to the SCSI disk drive connector. Pay special attention to the cable and board markings. Normally the side to which the coloured cable marking should point is marked with a point or arrow on the disk drive. Many manufacturers also print details of the SCSI connector's pin numbers on the disk drive. As the coloured marking on the cable identifies pin number 1, it must therefore go on the side of the connector which is marked with 1 or 2. Some disk drives, however, do not identify pins 1 or 2, but pin 50. If there is a number 50 on your disk drive's SCSI connector then the cable marking must go on the other side of the connector. If there is no marking on your disk drive's board refer to the instructions for your disk drive.
3. Remove the screw at the front of the computer under the free slot.
4. Put the disk drive into the free slot and fasten the mounting plate with the screw you have just removed.
5. Close the computer case and fasten the screws.



Connecting SCSI-Drives which are already RDB formatted

If you connect a hard disk (and possibly any other SCSI device) to FASTLANE Z3, which has previously been operating on a SCSI controller in the AMIGA and which has been formatted with the RDB (Rigid Disk Block) in accordance with the Commodore Standard, then this device can be used immediately. After starting up the computer the partitions on this drive must be automatically recognised and the system can even be booted from them if necessary. If this does not happen then contact your dealer or our Support Service before proceeding further.

ATTENTION !

If you want to connect disk drives which are already operating on another controller and which contain data, then for security reasons, we strongly advise backing-up the hard drive BEFORE removing the old system. Each new connection of a hard disk which is already being used, involves a risk (even if it is very small) of data loss due to errors in the installation or commissioning. If it would take too long to back-up the data onto diskettes because of the large amount of data, then ask your dealer whether he can carry out the back-up (e.g. on a streamer) and new installation for you, or whether you can hire a streamer, at a small charge. We accept no liability for loss of data on hard disks or SCSI devices used prior to being connected to FASTLANE Z3.

Connecting External SCSI Devices

External SCSI devices can be easily connected with the FASTLANE Z3 50-pin Centronics SCSI port. As most external devices use the same connections as FASTLANE Z3 (50-pin Centronics socket), you will generally need a cable with two 50-pin Centronics connectors. Suitable cables in various lengths can be obtained from a dealer or from our Technical Support Department. Make sure you use the correct bus termination when connecting external SCSI devices, especially when using them together with internal devices.

Note: Many SCSI controllers available for older Amiga models use 25-pin D-SUB connectors for the external SCSI port, including the Amiga 3000. These connectors or the cables available for them are not always adequately screened; the 25 signal leads do not have their own grounds, as is the case with the Centronics 50-pin cable. These connectors are therefore not suitable for high-speed SCSI-II use and for data transmission rates above 4 MByte/sec, which is why we decided to use the inexpensive and high-quality Centronics cable. In contrast to the connectors used on FASTLANE, other connector types such as the 50-pin HD connector, for example, require excessively expensive special cables from the workstation area, but they do not offer any technical advantages.

Installing a New Super Buster Custom Chip

At the time of completion of this User Manual (June 1993) Commodore was beginning to supply a new version of the Super Buster Custom Chip. This replaces the previous version -09, which has been fitted on the AMIGA 4000's supplied to date.

As FASTLANE Z3 is equipped with special, expensive circuitry which compensates for certain limitations of version -09 of the Buster chip, FASTLANE Z3 is completely capable of operating with this version. It is therefore not necessary to update this chip to operate FASTLANE Z3.

FASTLANE Z3 has already been successfully tested with the new Buster chip version -11 and can continue to be operated correctly after the chip is updated. If the Buster chip is updated to the new version -11 then, dependant on the speed of the hard disk, a varying increase in the free CPU time (approx. 20 - 40%) is apparent with DMA operation of FASTLANE Z3.

Dependant on the version of the FASTLANE hardware it may be necessary to exchange a programmed chip on FASTLANE to achieve this increased free CPU time. Consult the ReadMe file on the diskette supplied with FASTLANE Z3 to establish whether this needs to be carried out.

5. SCSI Bus Termination and Setting SCSI-ID's

To ensure the SCSI bus system operates correctly, the SCSI bus must be correctly closed electrically (technical term: terminated). If you think of the SCSI bus as an individual cable which must have a terminating resistor on each end then, when the individual devices are connected directly to this cable, it follows that the terminating resistors need only be installed on the first and last devices. The Controller counts as one device. To identify the terminating resistors on the Controller refer to Diagram 5-1.

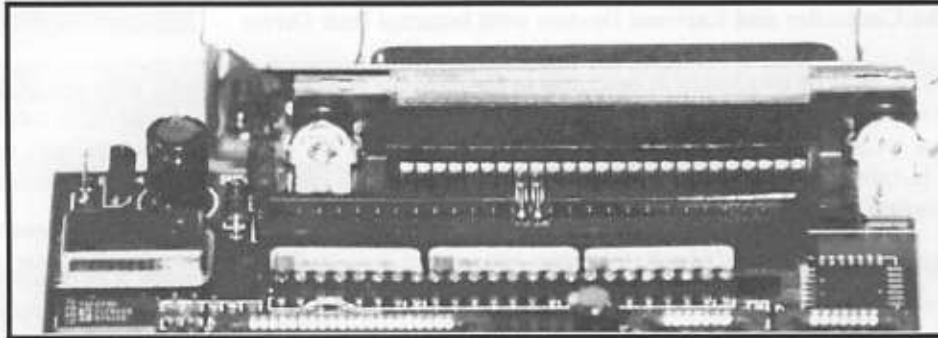


Diagram 5-1: The SCSI terminating resistors with pin 1 marked (left)

Terminating resistors are also installed on the usual SCSI devices such as hard disks, removable drives or streamers. They generally have the same design as the Controller's terminating resistors but they may have different coloured cases. In general the terminating resistors are located near the SCSI connector. If the resistors are in a socket then they can be easily removed if necessary. If the resistors are not in a socket (this is partly the case with new SCSI devices with SMD soldered resistors or so-called active termination on the device), then there is generally a switch or a jumper on the SCSI device which switches them off. To locate these jumpers or switches, or if you have problems identifying the terminating resistors, consult the documentation for the SCSI device concerned. Dependant on the manufacturer or the scope of supply, some external devices such as scanners, or even external drives, may have an external SCSI terminating connector fitted to one of two external SCSI connectors on the device, instead of resistors.

ATTENTION !

Correct termination is necessary for the Controller and the devices connected to operate correctly. Incorrect termination can cause data transmission errors, non-recognition of SCSI devices or, in the worst case, loss of data on the memory media.

If you remove terminating resistors do not forget to note the installation positions, in case you have to install them again. Most of them have a marking on the board which must coincide with the point on the resistor.

The following four connection combinations can be distinguished with termination (everything referring to 'disk drives' in the following, naturally also applies to other SCSI devices):

Installation of the Controller and an Internal Disk Drive

The terminating resistors must be installed both on the Controller and on the disk drive. Use the connector at the end of the internal SCSI cable to connect the disk drive to the Controller.

Installation of the Controller and Several Internal Disk Drives

The terminating resistors must be installed on the Controller and the disk drive at the other end of the internal SCSI cable. The Controller must be connected to the first connector on the SCSI cable and a disk drive must be connected to the last connector. Additional disk drives can be connected to any free connectors on the internal SCSI cable.



Installation of the Controller and External Devices without Internal Disk Drives

The terminating resistors must be installed on the Controller. If you connect more devices via the Controller's external SCSI connector, there can and must only be terminating resistors on the last device. As external devices are mostly equipped with two SCSI connectors to loop through the SCSI bus (i.e. to connect several external SCSI devices to each other in series), the terminating resistors should not be fitted onto the SCSI devices themselves (i.e. hard disks, removable disks, streamers etc.). It is better to use a SCSI terminating connector which is connected to the last device on the free SCSI connector: in this way additional external devices can be looped in to the series at any time, when the terminating connector will need to be connected to the free connector on the last device. SCSI terminating connectors can be obtained from your dealer or direct from our Customer Support Department.

Installation of the Controller and External Devices with Internal Disk Drives

External devices must be terminated as described in the previous paragraph. Internally only one SCSI disk drive can and must be terminated, and this must be connected to the last connector on the internal SCSI cable. The other end of the internal SCSI cable must be connected to the FASTLANE Z3. The terminating resistors on the Controller must not be installed. If you remove the external devices from this configuration, the SCSI terminating connector must be connected directly to the Controller's external SCSI port.

In general, if one (or more) external SCSI devices are occasionally or regularly connected, a SCSI terminating connector should be obtained, so that the terminating resistors on the Controller can be removed and replaced with the SCSI terminating connector which can then be connected to FASTLANE's external SCSI port. This will stop the computer having to be opened up to install terminating resistors on FASTLANE Z3 each time external devices are connected.

Setting the SCSI-ID's on the Devices Connected

To differentiate the various devices which are connected to the SCSI bus, SCSI devices have a so-called SCSI-ID, which can have a value between 0 - 7. FASTLANE has the ID 7. From this it follows that up to 7 SCSI devices can be connected to FASTLANE Z3 with the ID's 0 - 6.

If several SCSI devices are connected to FASTLANE, internally, externally or in combination, then the SCSI-ID's of these devices must be adjusted so that no device has the same ID. In general the SCSI-ID is adjusted with a jumper. Refer to the relevant documentation for the SCSI devices concerned.

ATTENTION !

If two devices with the same SCSI-ID are connected to FASTLANE Z3 then this can cause damage to the SCSI device. Only one of these devices will be recognised by the FASTLANE software in any case. On the other hand, if, after connecting a new hard disk, for example, it is not recognised by the FASTLANE software, it is possible that a SCSI-ID has been selected for this disk drive which is already allocated to another device. The same naturally applies if the new disk drive appears, but suddenly a previously connected device can no longer be addressed. In order to avoid two SCSI devices operating with the same ID's, you should check which SCSI-ID's are already allocated with the FASTLANE software (e.g. the program UnitControl) before connecting a new SCSI device.

In principle the SCSI-ID's need not be allocated in any particular way i.e. SCSI-ID's need not be allocated in order nor do they depend on the position of the device in a sequence of connected disk drives, for example. Nevertheless we recommend assigning the ID 0 to the first device connected and the next ID's to the subsequent connected devices in increasing order, as this will noticeably reduce the system start-up time.

6. SCSI Configuration

FASTLANE Z3 has several possible SCSI configurations available. These are selected with the SCSI Device-Config-Jumper. The SCSI Device-Config-Jumper is located above the large SCSI chip at the back of the FASTLANE board, as shown in the diagram in Appendix A.

The jumpers are numbered from 0 to 4, where jumper 0 is on the right and jumper 4 is on the left. In Diagram 6-1 below, as is pre-selected in the standard configuration, jumper 4 is shown as enabled, whilst jumpers 0 - 3 are not enabled.

ATTENTION !

The jumpers on FASTLANE Z3 must **NEVER** be readjusted whilst the computer is switched on. This can cause damage to the FASTLANE hardware. Always switch the device off before changing the jumpers.

The jumpers have the following individual functions:

Jumper 4: Synchron Auto-Enable

If this jumper is enabled FASTLANE Z3 will analyse information entered in the RDB (Rigid Disk Block) for the SCSI devices connected (especially hard disks or removable disks) to check whether the disk drives should operate in synchronous-mode. It will then automatically activate the synchronous transmission mode. If this jumper is not enabled any synchron-entries will be ignored and the hard disks will operate in standard asynchronous mode.

Jumper 3: Slow Cable Mode

This jumper should only be enabled if transmission problems occur when using extremely long cables, especially for the connection of external SCSI devices (normally only for cable longer than 5M).

Jumper 2: Slow Inquiry Mode

This jumper should be enabled if hard disks are only recognised once the computer has been reset and not immediately after the computer has been switched on (which mostly happens with older models). This is because the hard disk start-up time is too long. The Slow Inquiry Jumper lengthens the time which FASTLANE will wait for the response of the hard disk.

Jumper 1: (reserved)

Jumper 0: Debug Mode

Only for test purposes by authorised service personnel.

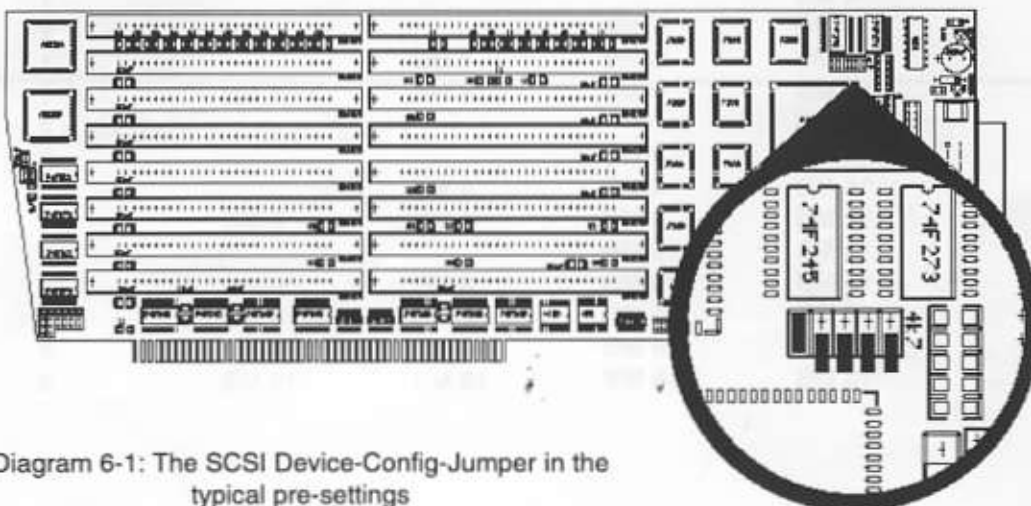


Diagram 6-1: The SCSI Device-Config-Jumper in the typical pre-settings



7. Memory Configuration of FASTLANE Z3

The memory fitted on FASTLANE Z3 are standard SIMMs (Single Inline Memory Modules) in 8 or 9 bit data-bus-width (we speak of '8 bit' or '9 bit' SIMMs), with a capacity of 1.4 or 16 MByte per module (the latter is based on the latest memory chip generation which are currently - May 1993 - very difficult to obtain and very expensive). Only single sided modules should be configured, otherwise they will not physically fit in FASTLANE. The 8 bit modules are especially suitable for installation in Macintosh or AMIGA computers, which work with 8-bit data bus-widths or multiples thereof (in this case 32 bit). The 9 bit modules are especially suitable for IBM compatible PC's which require an additional parity-bit. This additional bit will simply be ignored if they are used with FASTLANE, which is why these modules can be used trouble-free. They are often available cheaply because of the high sales volume.

As the AMIGA 3000 and 4000 work with a 32 bit data-bus, 4 modules must be fitted per upgrade step, which when addressed in parallel produce the necessary data-bus. These four modules form one memory bank; in total FASTLANE Z3 has four such memory banks available. This means that the FASTLANE memory can be fitted in steps of 4, 16 or an optional 64 MByte, dependant on the different module sizes used. In this way modules of two different sizes can be mixed (i.e. either 1 and 4 MByte SIMMs or 4 and 16 MByte SIMMs can be combined). However, each individual memory bank must always be configured with 4 of the same sized modules.

SIMM Types

The following table shows which upgrade stages can be achieved with which bank configurations. After the various combinations, in the section "RAM-Config-Settings", you will find the setting number required for the corresponding configuration. The order of the memory banks on FASTLANE Z3 is described in the section "The Memory Banks".

Configuration of the individual banks:

Bank configuration with 4 MByte: 4 of SIMM 1Mx8 or 1Mx9 single sided, 80ns or faster*
 Bank configuration with 16 MByte: 4 of SIMM 4Mx8 or 4Mx9 single sided, 80ns or faster*
 Bank configuration with 64 MByte: 4 of SIMM 16Mx8 or 16Mx9 single sided, 80ns or faster**

* See also "RAM Speed Settings"

** Configuration of 64MByte per bank is optional, see "Configuration with 16MB Modules"

Total Memory	Memory installed on				RAM-Config-Setting No.
	BANK 1	BANK 2	BANK 3	BANK 4	
4	4 MB				1
8	4 MB	4 MB			1
12	4 MB	4 MB	4 MB		1
16	4 MB	4 MB	4 MB	4 MB	1
16	16 MB				2
20	16 MB	4 MB			2
24	16 MB	4 MB	4 MB		2
28	16 MB	4 MB	4 MB	4 MB	2
32	16 MB	16 MB			3
36	16 MB	16 MB	4 MB		3
40	16 MB	16 MB	4 MB	4 MB	3
48	16 MB	16 MB	16 MB		4
64	16 MB	16 MB	16 MB	16 MB	5



Configuration with 16 MB Modules

As an option the FASTLANE Z3 can be configured with 16 MB modules or a mixed configuration of 4 MB and 16 MB modules. An upgrade kit is required for this, which consists of two new programmable EPLD-chips which must be exchanged on FASTLANE, as well as an additional instruction for the new configuration stages. This can be obtained direct from our Support Department. Note: when using this new chip set 1 MB modules can no longer be used.

The Memory Banks

Diagram 7-1 shows the four memory banks, which consist of 4 SIMM slots each. The configuration of the banks must follow the table on Page 13. The memory banks start from the bottom (from the slot connector) where each pair of SIMM slots in the two rows of SIMMs form one bank.

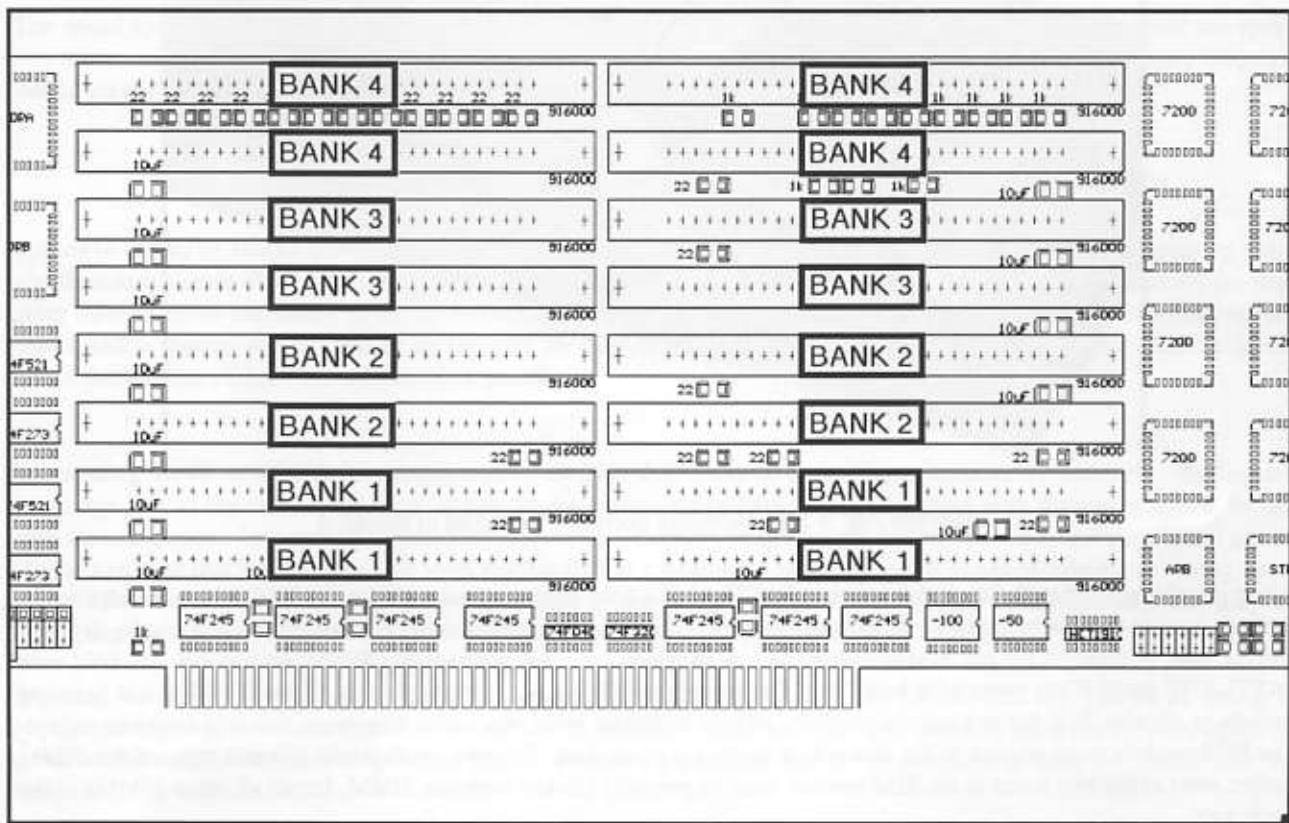


Diagram 7-1: The Positions of the RAM Banks 1-4.

Installing SIM Modules

The SIMMs must be placed in the FASTLANE slots so that the memory chips soldered on the SIMMs point upwards, as shown in Diagram 7-2. The installation is very easy if carried out correctly, as high-quality SIMM slots are installed on FASTLANE Z3.

We recommend removing FASTLANE Z3 from the computer to fit the SIMMs; skillful and experienced users may be able to install the SIMMs while FASTLANE is installed, assuming there is no other board installed above FASTLANE.

Lay FASTLANE Z3 in front of you on a stable, flat surface so that the gold edge-connector points upwards and away from you. Take the first SIM module and hold it in front of you with the 30-pin contact strip downwards and the memory chips upwards, at an approx. 45° angle. From this position the SIMM can be easily placed in the SIMM slot.

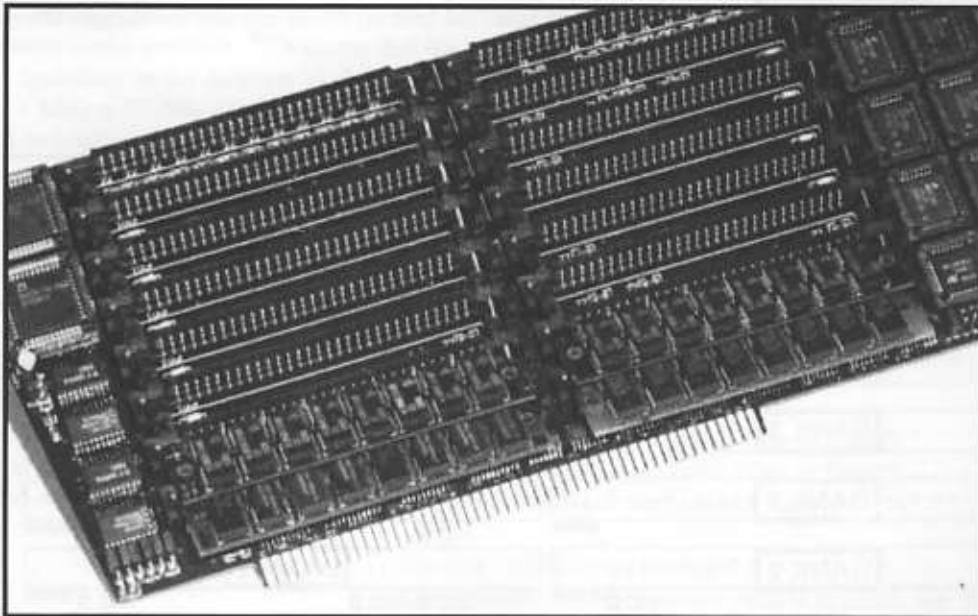


Diagram 7-2: 4 SIM Modules correctly installed in BANK 1

When installing, start with the sockets next to FASTLANE's gold edge-connector. Once the SIMM is in the slot as described, it must then be engaged in the correct position with slight pressure: moving it to an approx. 30° angle. Try supporting your thumbs on the top SIMM slot in the row in which you have inserted the SIMM, so that you can hold onto FASTLANE itself. Then press with both index fingers on the left and right upper corners of the SIMM which is sitting loosely in the slot. If it doesn't engage properly, wiggle it slightly with your index fingers so that it is easier to engage. The SIM module must engage in the slot with a relatively clear click. The two small hooks left and right of the SIMM socket, next to the two holes in the SIM module must be properly clicked over the SIMM. Install all other SIMMs in the same way.

RAM Speed Settings

There are jumpers on FASTLANE Z3 with which to select the maximum RAM speed. The position of the RAM-Size and RAM-Speed jumpers is shown in the jumper positions diagram in Appendix A.

ATTENTION !

The jumpers on FASTLANE Z3 must NEVER be readjusted while the computer is switched on. This can cause damage to the FASTLANE hardware. Always switch the device off before changing the jumpers.

Generally when setting the RAM speed, the slowest SIMM used governs the maximum access time achievable. A memory bank should be configured with SIMMs from the same manufacturer, of the same speed and as much as possible, the same date-code; the same speed types should be used on the whole Controller as much as possible.

The speed specification of memory modules is in nano-seconds (ns), where the smaller the value the greater the speed (i.e. access time) of the memory. In general, the following descriptions are printed on the individual memory chips installed on the SIMMs:

xxx-10	stands for 100 ns-RAMs	xxx-80	stands for 80 ns-RAMs
xxx-70	stands for 70 ns-RAMs	xxx-60	stands for 60 ns-RAMs

Speeds of 60, 80 or 100 ns can be selected on FASTLANE Z3. The 100 ns option is only provided so that existing older and therefore slower SIMMs can still be used. In this setting the FASTLANE RAM performs relatively slowly (as may other faster SIMMs installed). In the 80 ns setting access speed is considerably faster, while in the 60 ns setting the access speed is approx. 95% of that of the memory on the AMIGA 4000 motherboard (the slightly slower speed is due to losses through the various bus transmission protocols).

When using the 70 ns SIMMs it is possible to set FASTLANE to the 60 ns setting, to achieve the fastest possible speed, as a large part of the memory chips available on the market today have larger tolerances with respect to speed. In this case we recommend first testing the memory fully with a memory test program. If there are no errors then it can generally be assumed that the memory will work trouble-free at a minimally faster setting. If errors should occur during operation, especially after a longer time (when the computer warms up) or if the computer crashes inexplicably, this may indicate that the memory chips do not have sufficient tolerance to be operated in faster modes.

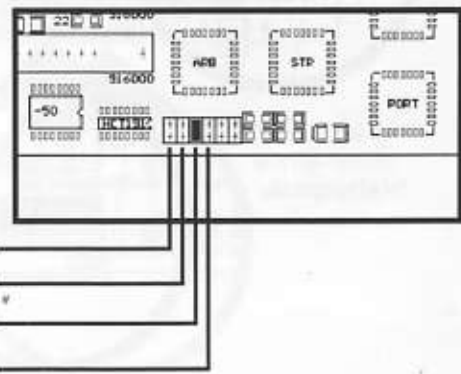
Diagram 7-3 shows the jumper positions for the different speed settings (40, 60, 80 and 100 ns). The 40 ns setting is NOT currently supported and should therefore not be selected (the 40 ns mode will possibly be operable with later versions of the AMIGA custom chip Super Buster, and as a precaution the 40 ns jumper has been integrated into the design).

Diagram 7-3: The four RAM-Speed Jumpers and their functions.

ATTENTION !

To avoid causing damage to FASTLANE Z3
ALWAYS ENABLE ONE, but NEVER
ENABLE MORE THAN ONE of the four speed
selector jumpers.

40 ns setting
60 ns setting
80 ns setting
100 ns setting



The RAM-Config-Settings

The CPS jumpers (Config-Page-Select jumper), the RAM-Size jumpers and the Bank-Size jumpers must be set correctly for different RAM configurations. The locations of the appropriate jumper blocks are indicated in the diagram "Fastlane Z3 jumper Positions" in Appendix A or the following diagrams. The different combinations are treated as individual settings in the following section. The correct setting for the memory configuration level you have chosen is found in the Table on Page 13.

The CPS jumpers are two separate jumpers on the left edge of the FASTLANE board. The RAM-Size jumpers are a larger area of jumpers on the lower edge of the board, directly left of the slot connector, and the Bank-Size jumpers are the two jumpers right of the RAM-Speed jumpers (see previous section) on the lower edge of the FASTLANE board. If the Controller is already installed and is visible in front of you in the opened device, then left corresponds to the front jumper and right corresponds to the back jumper.

ATTENTION !

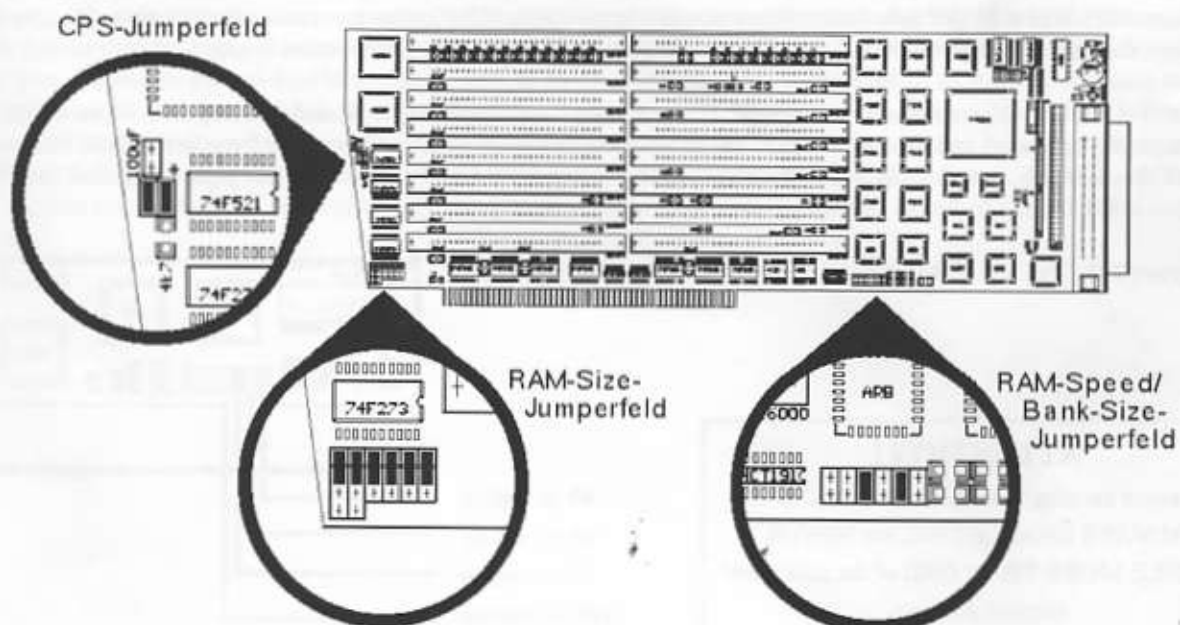
The jumpers on FASTLANE Z3 must NEVER be readjusted while the computer is switched on. This can cause damage to the FASTLANE hardware. Always switch the device off before changing the jumpers.

In each of the different settings shown in the following diagrams, the RAM-Speed jumper is always set at 80 ns. The RAM-Speed jumper must be set by the user, independent of the size of the installed memory, in accordance with the previous instructions.

Setting 0

Switches the Fast-RAM off, or is set if no memory is configured on FASTLANE Z3.

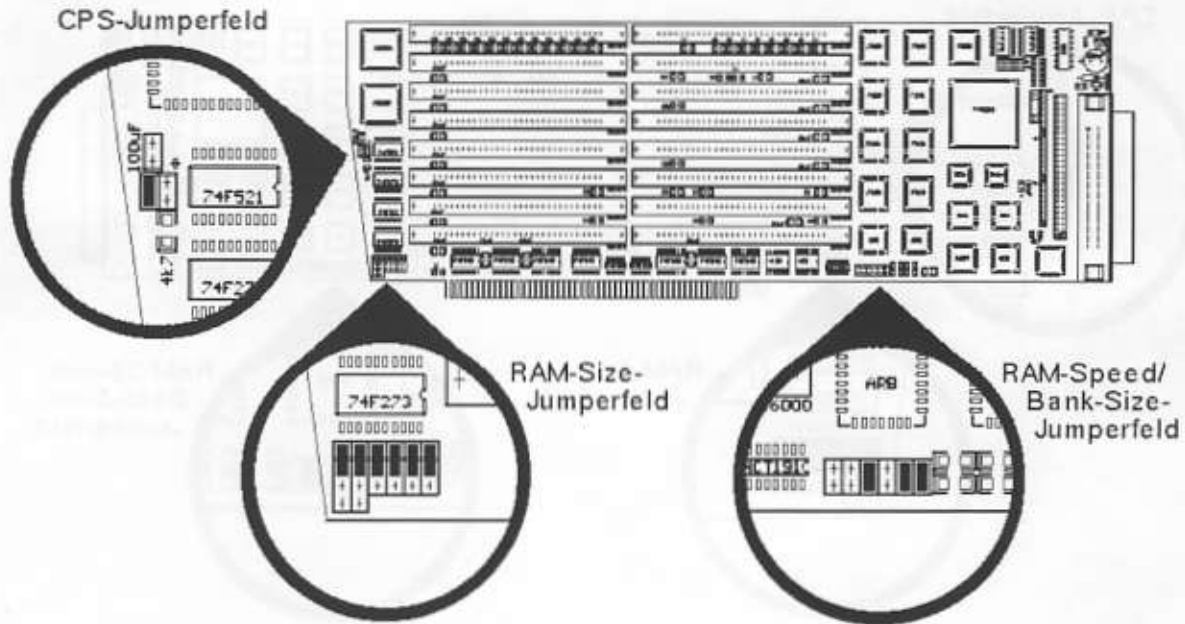
CPS-Jumper: Both are enabled **RAM-Size-Jumper:** All in upper position **Bank-Size-Jumper:** No effect



Setting 1

For RAM sizes 4, 8, 12, 16 MByte when configured exclusively with 1 MByte SIMMs

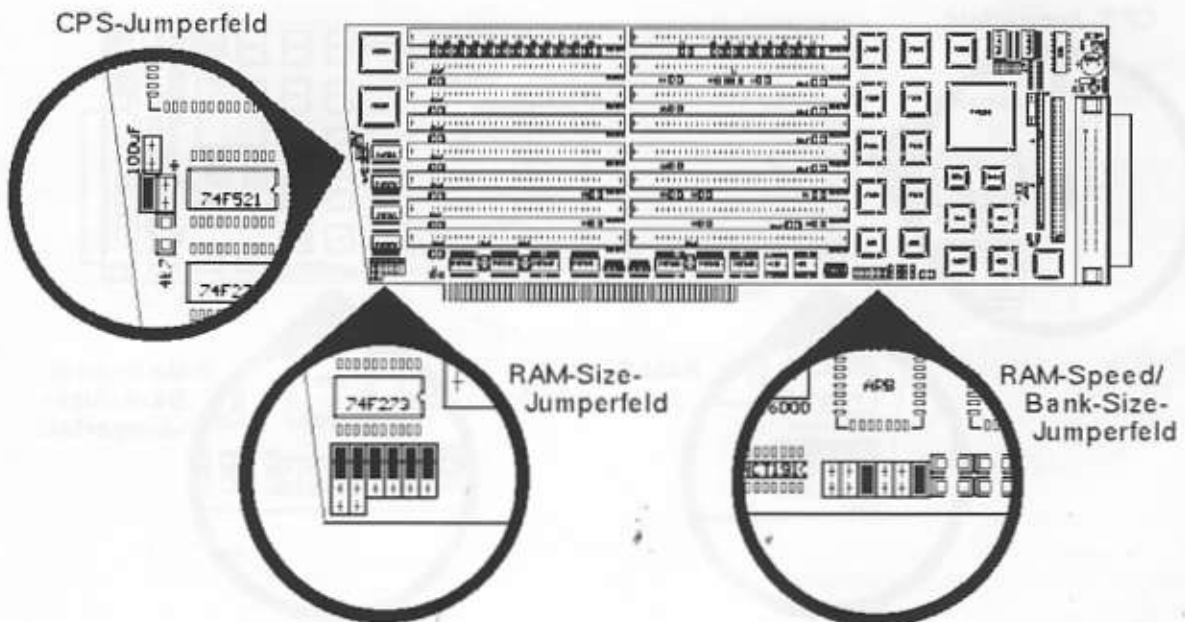
CPS-Jumper: Left enabled **RAM-Size-Jumper:** All in upper position **Bank-Size-Jumper:** Both enabled



Setting 2

For RAM sizes 16, 20, 24, 28 MByte when a bank is configured with 4 MByte SIMMs

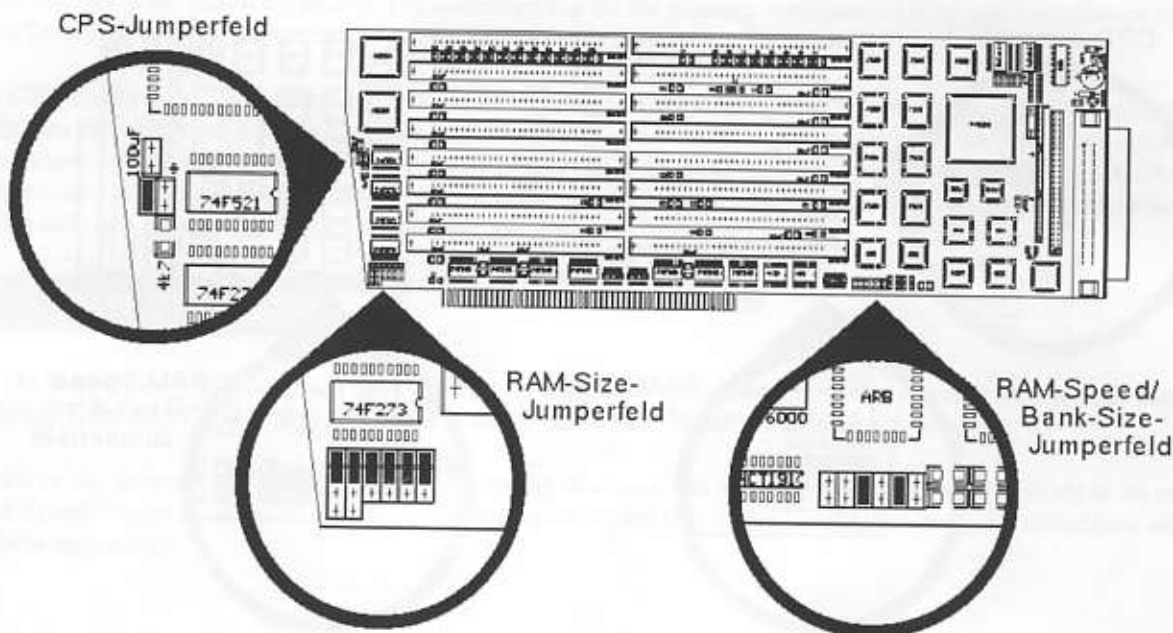
CPS-Jumper: Left enabled **RAM-Size-Jumper:** All in upper position **Bank-Size-Jumper:** Right enabled



Setting 3

For RAM sizes 32, 36, 40 MByte when two banks are configured with 4 MByte SIMMs

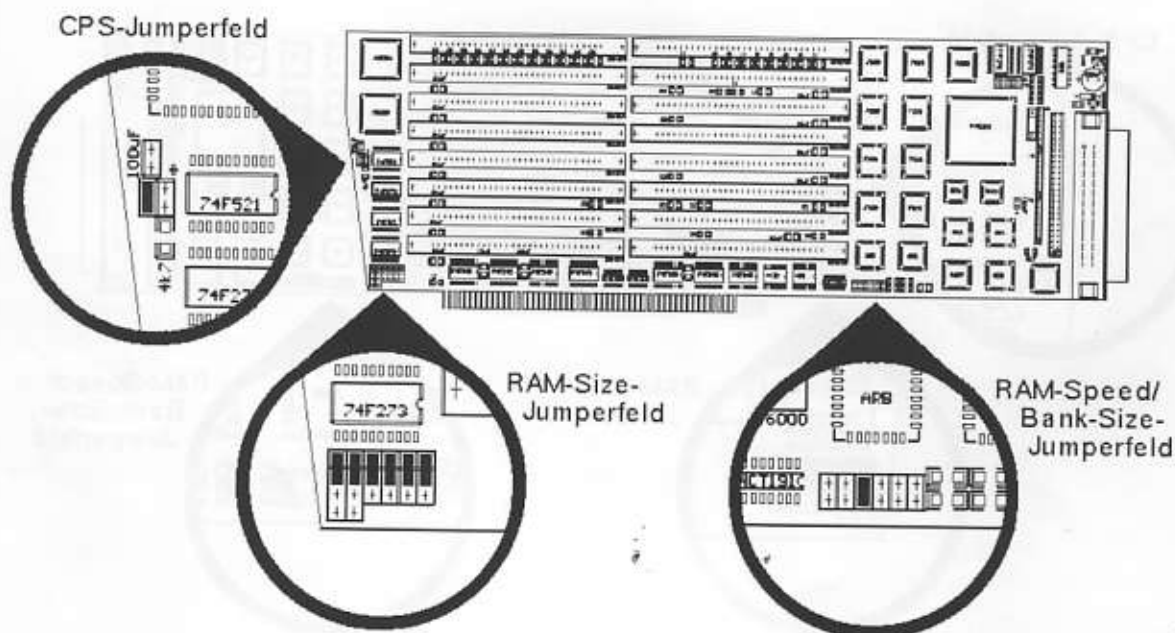
CPS-Jumper: Left enabled **RAM-Size-Jumper:** All in upper position **Bank-Size-Jumper:** Left enabled



Setting 4

For RAM size 48 MByte when three banks are configured with 4 MByte SIMMs

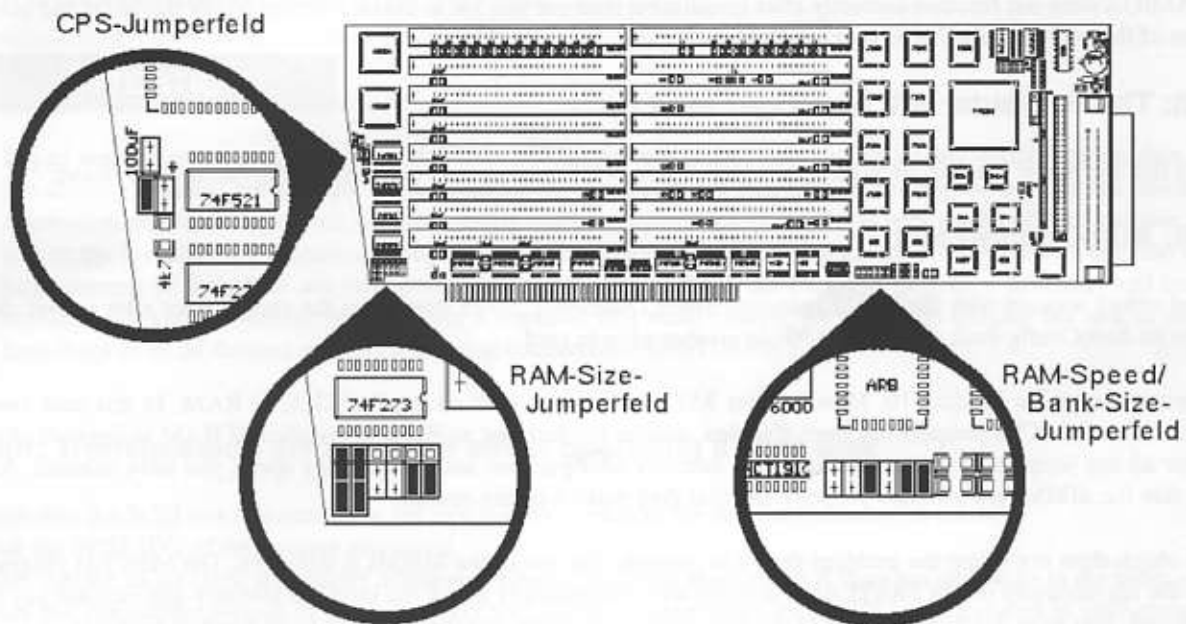
CPS-Jumper: Left enabled **RAM-Size-Jumper:** All in upper position **Bank-Size-Jumper:** None enabled



Setting 5

For RAM size 64 MByte when four banks are configured with 4 MByte SIMMs

CPS-Jumper: Left enabled **RAM-Size-Jumper:** Set as illustrated **Bank-Size-Jumper:** Both enabled





8. Trouble Shooting

In this section you will find a list of typical problems which could occur when installing the FASTLANE Controller (or a new plug-in card or SCSI controller in general) and when commissioning new SCSI devices. If your FASTLANE or your AMIGA does not function correctly after installation then use this list to check whether one of the faults and possibly one of the solutions applies to your problem.

Fault: The computer will no longer start up

Ensure that the power cable is plugged in correctly. If this is OK then contact our Support Service or your dealer.

Fault: AutoConfig-Fault

If a red screen appears with the title "Expansion Board Diagnostic", after starting up the computer or after a reset, then there is an AutoConfig-fault on FASTLANE or another plug-in card.

An error message for Product 10, Manufacturer 8512, indicates a fault on the FASTLANE RAM. In this case check whether one of the CPS jumpers has been disabled, despite the fact that no RAM is installed. If RAM is installed check whether all the jumpers are set according to the memory configuration and the memory speed you have selected. Also check that the SIMMs are installed properly and that they make a secure contact.

If this check does not locate the problem then it is possible that one of the SIMMs is defective. The MemTest programme in the bin-directory on the FASTLANE diskette will automatically check the installed memory and indicate any defects found. You must deactivate the RAM configuration when doing this (both CPS jumpers must be enabled).

If there is an AutoConfig-fault on the controller part (error message for Product 11, Manufacturer 8512) please contact our Support Service.

Fault: No connected SCSI device is recognised

Check whether any memory installed on FASTLANE is recognised (e.g. in the title line of Workbench). If it is not then the controller itself is probably not configured.

You can always check whether FASTLANE is correctly configured with the ShowConfig program in the Tools-directory of Workbench. For the SCSI controller part a board with "Prod=8512/11" must be recognised, and for any activated memory a board with "Prod=8512/10" must be recognised. If this is not the case then check in the AutoConfig output window whether any other expansion cards installed are correctly configured. If one or more other cards are installed and are not recognised then remove these cards and check whether FASTLANE is configured. If it is then remove FASTLANE, reinstall the expansion cards and check whether these are configured. If the cards are not configured then there is probably a fault on one of the cards or the AMIGA itself. If FASTLANE on its own is not configured or if the other cards on their own are configured but they will not function when configured with FASTLANE, then please contact our Support Service.

If FASTLANE is configured correctly then check all the points under the next fault description.

Fault: A new SCSI device is not recognised

Ensure that the device is connected to the internal power supply. For external devices: ensure that the power cable of the external device is connected and that the device is switched on.

Check the SCSI-ID's of the devices connected.

Check the connection of the SCSI cable to FASTLANE and to the SCSI device.

Ensure that the external SCSI cable on external devices is correctly connected.

Check for the correct SCSI bus termination

Change the cable or (with internal devices) connect the SCSI device to another connector on the cable, to establish if there are any faults in the cable.



Fault: The partitions of a previously formatted hard disk are not recognised

First you should check with the UnitControl programme supplied with FASTLANE whether the appropriate hard disk is physically recognised. If it is not recognised then perform the checks under the previous fault description. If the hard disk is recognised then check whether the controller used previously was RDB compatible. If it was then contact your dealer or our Support Service before proceeding further.

ATTENTION !

If you want to connect disk drives which are already operating on another controller and which contain data, then for security reasons, we strongly advise backing-up the hard drive BEFORE removing the old system. Each new connection of a hard disk which is already being used, involves a risk (even if it is very small) of data loss due to errors in the installation or commissioning. If it would take too long to back-up the data onto diskettes because of the large amount of data, then ask your dealer whether he can carry out the back-ups (e.g. on a streamer) and new installation for you, or whether you can hire a streamer, at a small charge. We accept no liability for loss of data on hard disks or SCSI devices used prior to being connected to FASTLANE 3.

Fault: Transmission errors occur when operating a hard disk

Ensure that the SCSI bus termination or the termination of each of the devices connected is correct.

Check the SCSI-ID's of the devices connected.

Ensure that the SCSI cable is correctly connected. Change the cable to establish if there are any faults in the cable.

Ensure that the correct version of the FCT driver chip U209, corresponding to the CPU card installed in your computer, is installed on the AMIGA motherboard.

If you experience any problems which are not described above or which are not resolved by the solutions suggested, then contact your dealer or our Support Service.



9. Software

Preface: This chapter provides some basic information about version 1.0 of the FASTLANE Z3 software. Several details were not available at the time of printing, however, and parts of the documentation are therefore located on text files on the disk supplied. Unfortunately there is also no documentation for the SCSIConfig program to date, but experienced users should be able to use it without any problems. Less experienced users should go back to the HDToolbox program, the instructions for which can be found in the AMIGA HARD DRIVE User Manual.

The system software for the FASTLANE Z3 Controller is located on the disk supplied. It comprises the following:

- Workbench-Utilities
- CD-ROM-Filesystem
- DynamiCache
- CLI-Utilities (in the bin drawer)

The DynamiCache program is fully detailed in a separate manual. The two most important programs are SCSIConfig and UnitControl. The first, as the name implies, is for installing SCSI devices and the second offers various control options. The operation of UnitControl is described in a text file on the disk. This is the same for the programs located in the bin drawer.

SCSIConfig

With SCSIConfig you can format and partition SCSI devices, such as hard drives or removable drives, and then make them available to the system. Double click on the appropriate icon to start up SCSIConfig. As the documentation for SCSIConfig is not yet available we recommend that less experienced users use the HDToolbox program.

ADVICE

The Commodore HDToolbox program, which is supplied with the AMIGA 4000, can be used instead of SCSIConfig. HDToolbox is pre-set to recognize devices connected to the AT-Controller, so to instruct it to address the drives connected to FASTLANE Z3, the program must be started via the CLI by entering:

```
1> hdtoolbox z3scsi.device
```

ATTENTION !

Both SCSIConfig and HDToolbox are programs which format hard drives or other SCSI devices. Formatting means a complete loss of data, which is why you must proceed with caution with these programs and should not carry out any unnecessary experiments. Always check that you have selected the correct SCSI device before you carry out destructive measures such as new formatting or partitioning. If you want to connect disk drives which are already operating on another controller and which contain data, then for security reasons, we strongly advise backing-up the hard drive BEFORE removing the old system. Each new connection of a hard disk which is already being used, involves a risk (even if it is very small) of data loss due to errors in the installation or commissioning. If it would take too long to back-up the data onto diskettes because of the large amount of data, then ask your dealer whether he can carry out the back-up (e.g. on a streamer) and new installation for you, or whether you can hire a streamer, at a small charge. We accept no liability for loss of data on hard disks or SCSI devices used prior to being connected to FASTLANE Z3.



10. Guarantee

Advanced Systems & Software International Group provides the registered user of this FASTLANE Z3 Controller with a 2 year parts and labour guarantee, commencing on the date of purchase. During the period of this guarantee we will remedy all defects either by exchange or repair, at our discretion, which are due to material or manufacturer's defects. Execution of the rights under this guarantee in no way affects the period of the guarantee.

The guarantee specifically excludes claims for damage caused by external influences or improper use, and in particular unauthorised repairs. Modifications to the hardware, of any type, automatically invalidates any rights to claim under this guarantee.

The guarantee also specifically excludes claims for operational defects of FASTLANE Z3 or other devices connected in / to the AMIGA after the system has been altered (such as fitting new expansion cards), if it cannot be proved beyond doubt that a technical defect of FASTLANE is causing the fault. This also expressly includes any changes to the AMIGA hardware which have been carried out by the Commodore company by way of repairs, subsequent improvements or system updates.

Furthermore we accept no liability for defects or damage to devices other than the FASTLANE Z3 Controller, nor for losses of data, which were or seem to have been directly or indirectly linked with the installation of the FASTLANE Z3 Controller. For hard disks, other SCSI devices and memory modules supplied, the guarantee of the respective manufacturer applies exclusively.

11. Guarantee Claims, Returns

Guarantee claims and other technical inquiries, in North America, should be made direct to our Support Service. Please contact:

**Advanced Systems&Software
International Group
1329 Skiles
Dallas, TX 75204
Phone: 214-239-2000
Fax: 214-821-3464**

In all other countries please contact our distributors or your dealer.

Goods may only be returned after prior consultation with and authorisation by our Support Department. You will be given a Return Material Authorisation (RMA) number which must be clearly marked on the goods returned. Returns cannot be accepted for which postage has not been paid.

If no defect is found on an authorised return a processing fee of USD 30.00 will be charged. If a defect is found which is not covered by the guarantee then the processing fee will be charged as well as an additional repair fee, dependant on the defect.

No liability can be accepted for damage during transit due to unsatisfactory packaging when returning devices. Always use the original packaging when returning a FASTLANE Z3 Controller and also a sturdy outer packing (e.g. post office parcel) and if necessary padding (e.g. newspaper).

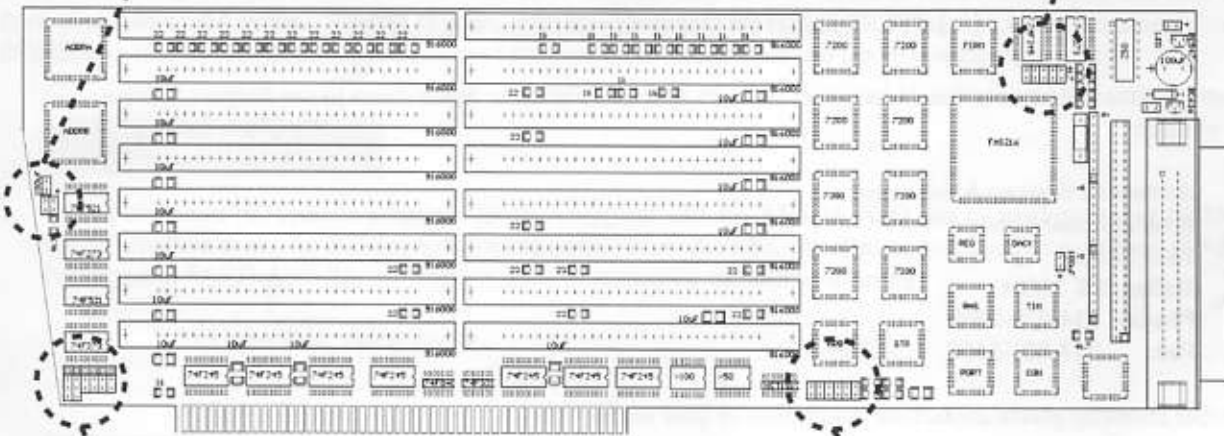
Appendix A: FASTLANE Z3 - Jumper Positions

ATTENTION:

The jumpers on FASTLANE Z3 must NEVER be readjusted while the computer is switched on. This can cause damage to the FASTLANE hardware. Always switch the device off before changing the jumpers.

CPS-(Config Page Select)-Jumper

SCSI-Device Config Jumper



RAM-Size-Jumper

RAM-Speed/Bank-Size-Jumper



Appendix B: Specifications

SCSI Controller:

FAST SCSI-II DMA Controller with Zorro-3 Interface

Autobooting and autoconfiguring according to Zorro-3 standard

Transfer rates on the SCSI bus: maximum 7 MBytes/sec in asynchronous operation, maximum 10 MBytes/sec in synchronous operation

Transfer rates (non-burst) on the Zorro-3 bus: up to 20 MBytes/sec into other Zorro-3 address spaces; transfers to the mainboard depend on the revision of the actually used Super Buster (appx. 10 MBytes/sec with Rev. -09 and -11)

32 MByte autoconfig address space

Device name: z3scsi.device

Bidirectional 32-Bit wide FIFO buffers for optimized bus performance

Compatible with Super Buster Rev. -09, -10, -11

Supports hard drives, removable drives, optical drives, CD-ROMs and tape streamers with SCSI, SCSI-II and FAST SCSI-II interfaces

Extended automatical detection of changes of removable media

Full SCSI direct support

Internal SCSI connector: 50-Pin IDC connector

External SCSI connector: 50-Pin Centronics female type with standard SCSI configuration

Active termination of the SCSI bus with removable termination resistors

Memory Expansion:

32-Bit FAST Ram expansion

Autoconfiguring according to Zorro-3 standard

Upgradable with standard 8-Bit or 9-Bit wide SIMMs of the sizes 1 and 4 MBytes up to 64 MBytes memory, optionally with 16 MBytes SIMMs up to 256 MBytes memory

64/256 MBytes autosizing

Fully DMA compatible memory

User-selectable access times of 100, 80, and 60 ns

General Information:

Zorro-3 autoconfig card in Zorro-3 form factor

Power consumption (without memory) in use appx. 2.5A/5V

Operating temperature 0° - 45° C

Developed and produced in Germany