



**INSTALLATION GUIDE  
PERIPHERALS**

rev. 22 november 1990

(c) Copyright 1990, Tulip Computers International B.V.

Part number : AGE 02-01-221190

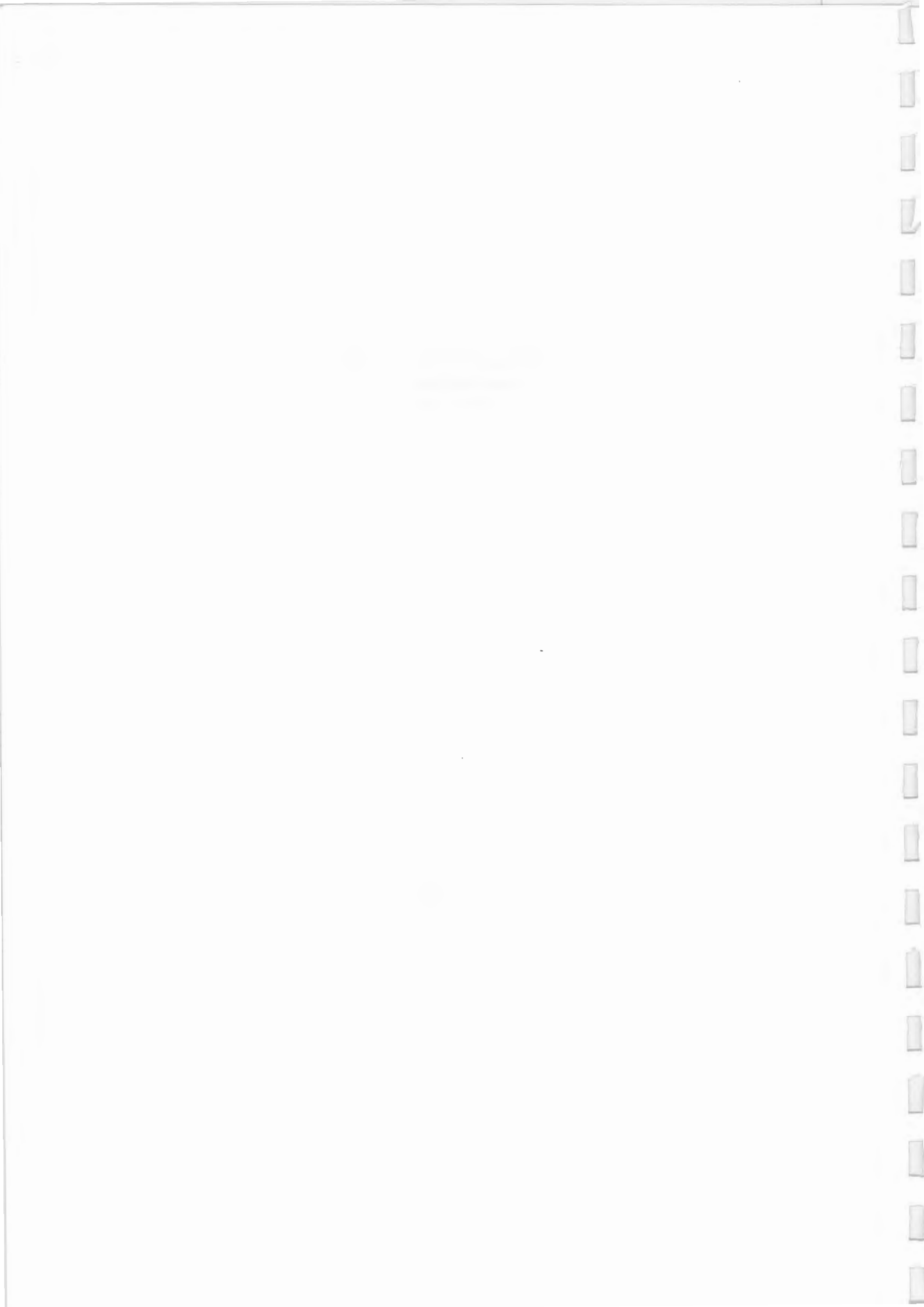
Issue date : November '90

**DISCLAIMER :**

Tulip Computers makes no warranty for the use of this document. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this material.

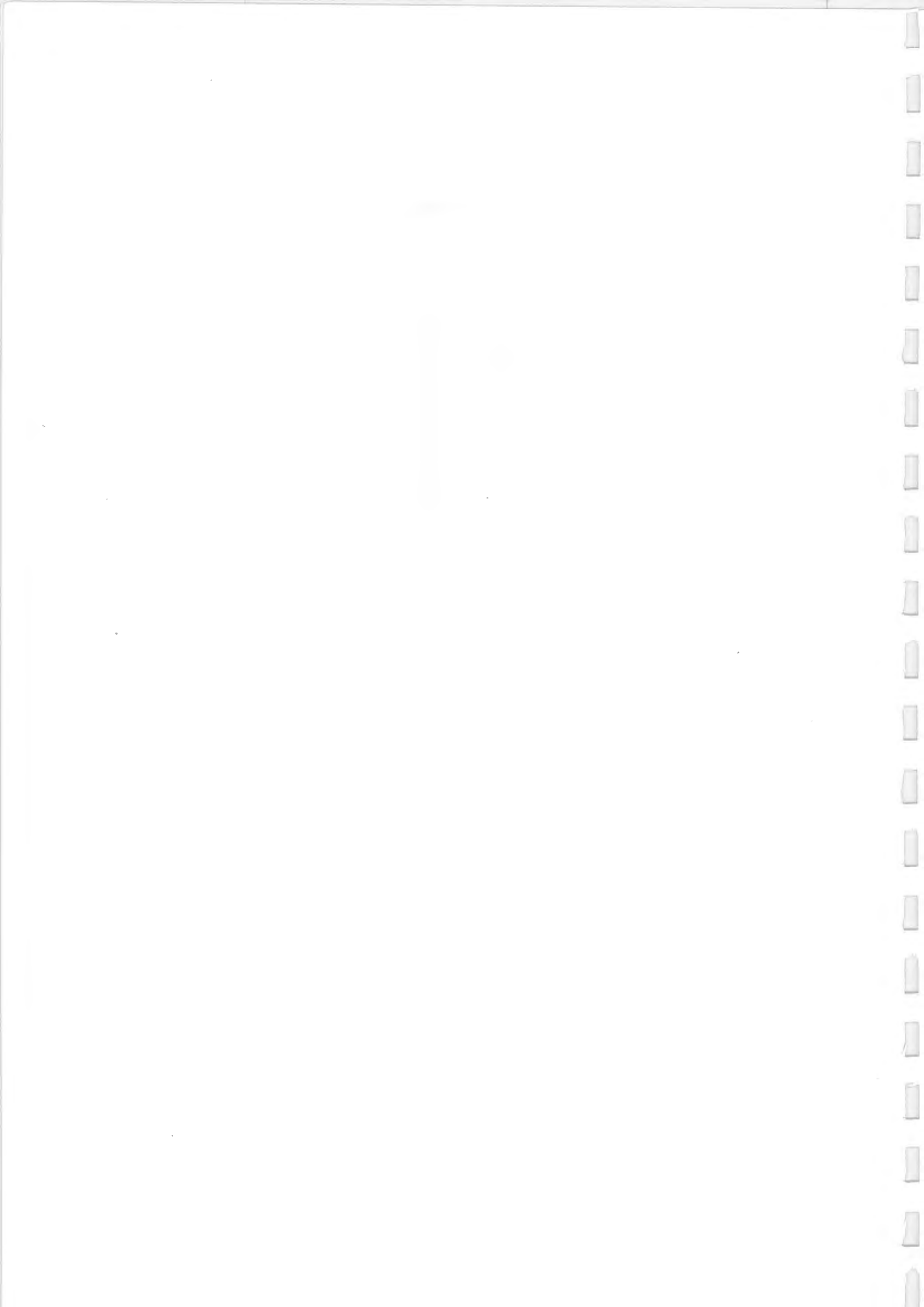
**TRADEMARKS :**

Tulip is a registered trademark of Tulip Computers.



## INSTALLATION GUIDE PERIPHERALS

1. Installation DGA card
2. Installation EDAC card
3. User's guide Expansion box LT286 and NB286
4. Retrofit set floppy disk drives
5. Installation Hard disk 20/40/100 Mb
6. Retrofit set SCSI Hard disk 150/330/660 Mb
7. Installation and use Master Key Chip
8. Installation SCSI card
9. Installation and use Tape streamer
10. Installation and use VGA-16 card
11. Installation and use VGA-8 card



## INSTALLATION OF THE DGA CARD

---

### Description of the DGA card

The DGA card (**D**ual **G**raphics **A**dapter) is a display adapter for Tulip computers. The DGA card is 100% compatible with the CGA color graphics display adapter and with the Hercules monochrome display adapter.

In this manual repeated references are made to the figures, which you will find at the end of this manual. You should consult these figures while installing your DGA card.

**The DGA card offers the following graphics capabilities:**

**CGA mode:**

- 80 x 25 (or 40 x 25) characters (alphanumeric)
- 320 x 200 pixels and 4 colors (graphics)
- 640 x 200 pixels and 2 "colors" (graphics)

**Hercules mode:**

- 80 x 25 characters (alphanumeric)
- 720 x 348 pixels (graphics)

**And as additional options:**

- Parallel printer ports set as LPT1, LPT2, or LPT3. These ports can be enabled or disabled by setting jumpers
- Composite video output

In the table below you will find the graphics capabilities offered by the DGA card when used with several types of monitors:

Monitor	Mode	Switch S1	Diagnostics setting
Monochrome	Hercules	Monochrome	Default display mode
Monochrome	CGA	"Color"	Color emulation *)
RGB (color)	CGA	Color	Default display mode

\*) Color emulation (CGA) on a monochrome display might be necessary if graphic possibilities of specific software are used.

## Jumper setting

Refer to figure 1: DGA card

### Setting printer connector

L3 L2 L1



Port disabled

L3 L2 L1



Enable port LPT3

L3 L2 L1









Enable port LPT2

L3 L2 L1



Enable port LPT1  
(Default factory setting)

## JP1 Setting video connector

Composite		Monochrome/Color (Default factory setting)	
	1		1
	2		2
	3		3

---

## Installing the DGA card

- Refer to your system's *User's guide* for more information on opening your system and on the connection of the red-black cable.
- Remove one of the system expansion slot covers which are located at the back of the system unit by removing its retaining screw and lifting it out. (Save the screw, because you will need the screw when mounting the card.) Press the card firmly into the connector and secure the card with the screw that you removed earlier. Set switch S1 to the appropriate position.

*Refer to figure 2: Installation DGA card*

- The next step is to set the jumpers of the parallel ports, if necessary. The default factory setting is: LPT1 = parallel port on DGA-card, LPT2 = parallel port of your computer.
- Close the main unit. (See your system's *User's guide*.)
- Configure your system again by running the Diagnostics program. See your Diagnostics manual or your system's *User's guide* for more information.

Now the installation of the DGA card is complete. If you still encounter any problem using this card, please contact your local dealer. Refer to paragraph "*Additional notes on the use of the DGA card*" for more information on this subject.

### Attention:

Disconnect your system before setting the S1 switch.



## Connector pinouts for the DGA card

### Monitor connector (J1)

Jumper **JP1** on pins 2 and 3

#### Color

#### Monochrome

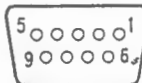
Pin	Signal
1	Ground
2	Ground
3	Red
4	Green
5	Blue
6	Intensity
7	Not used
8	Horizontal drive
9	Vertical drive

Pin	Signal
1	Ground
2	Ground
3	Not used
4	Not used
5	Not used
6	Intensity
7	Video (TTL)
8	Horizontal drive
9	Vertical drive

Jumper **JP1** on pins 1 and 2

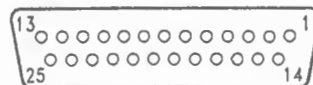
#### Composite

Pin	Signal
1	Ground
7	Composite (Analogue)



### Printer connector (J2)

Pin	Signal
1	-Strobe
2	+Data bit 0
3	+Data bit 1
4	+Data bit 2
5	+Data bit 3
6	+Data bit 4
7	+Data bit 5
8	+Data bit 6
9	+Data bit 7
10	-Acknowledge



Pin	Signal
11	+Busy
12	+P.end (no paper)
13	+Select
14	-Auto feed
15	-Error
16	-Initialize printer
17	-Select input
18-25	Ground

---

## Additional notes on the use of the DGA card

The information in this section on the use of the DGA card applies to all Tulip computers, unless specifically stated otherwise.

### Example 1

*When you want to change from using a monochrome monitor in Hercules mode to using it in CGA mode (for color emulation on a monochrome monitor), please follow these steps:*

- 1 Use the Diagnostics program to select "DGA (CGA-emulation)".
- 2 Turn off the system.
- 3 Set switch S1 of the DGA card to the **color** position. (See figure 1.)
- 4 Turn your computer system on again.

### Attention

The information below **only** applies to the **Tulip pc compact 2!**

After running Diagnostics and selecting "DGA (CGA-emulation)" for the first time, you can always change to "DGA (Hercules-mode)" by simply following these steps:

- 1 Turn off the system.
- 2 Set switch S1 (at the back) of the DGA card to the **monochrome** position. (See figure 1.)
- 3 Turn your computer system on again.

In the same way you can set your monitor back to **color** emulation (without running Diagnostics).

### Example 2

*If you want to change from using a monochrome monitor in CGA mode to using it in Hercules mode, you should follow these steps:*

- 1 Run Diagnostics to select the monochrome adapter. You can do this by choosing the "DGA (Hercules-mode)" (Setup).
- 2 Turn off the system.
- 3 Set switch S1 of the DGA card to the **monochrome** position. (See figure 1.)
- 4 Turn the system on again.

### Example 3

*If you want to exchange your monochrome monitor for a color monitor (RGB), the following steps must be performed:*

- 1 If you are the owner of a **Tulip pc compact 2**, you can skip step 1 and continue with step 2.  
  
If you don't have a **Tulip pc compact 2**, you should run Diagnostics to select the "80 columns CGA".
- 2 Turn off the system.
- 3 Exchange the monochrome monitor for a color monitor.
- 4 Set switch S1 of the DGA card to the **color** position. (See figure 1.)
- 5 Turn the system on again.

### Example 4

*To exchange your color monitor (RGB) for a monochrome monitor to be used in default display mode, you should follow these steps, if you do not wish to have color emulation:*

- 1 If your computer is a **Tulip pc compact 2**, you should skip this first step and read step 2.  
  
If you don't have a **Tulip pc compact 2**, you should run Diagnostics and select "DGA (Hercules-mode)".
- 2 Turn off the system.
- 3 Exchange the color monitor for a monochrome monitor.

- 4 Set switch S1 of the DGA card to the **monochrome** position.  
(See figure 1.)
- 5 Turn the system on again.

### **Example 5**

*To exchange your color monitor for color emulation on a monochrome monitor, you should proceed as follows:*

- 1 Turn off the system.
- 2 Exchange the color monitor (RGB) for a monochrome monitor.
- 3 Set switch S1 of the DGA card to the **monochrome** position.  
(See figure 1.)
- 4 Turn the system on again.
- 5 Now please follow the instructions given in example 1.



## NL INSTALLATIE EDAC-KAART

De EDAC-kaart (Embedded Disk Adapter Card) is bestemd voor de aansluiting van 2 AT-embedded vaste schijven. Raadpleeg de documentatie die bij het inbouwpakket voor uw vaste schijf is geleverd voor meer informatie over het aansluiten van uw type vaste schijf op de EDAC-kaart.

### Installatie

**1** Open de systeemeenheid volgens de instructies in de gebruikershandleiding die bij uw computer werd geleverd.

**2** Verwijder een van de afdekplaatjes op de achterkant van de systeemeenheid (zie A in de afbeelding). Plaats de EDAC-kaart vervolgens stevig in de uitbreidingsconnector en schroef de kaart vast met het schroefje dat u eerder hebt verwijderd (zie B in de afbeelding).

### Connectoren

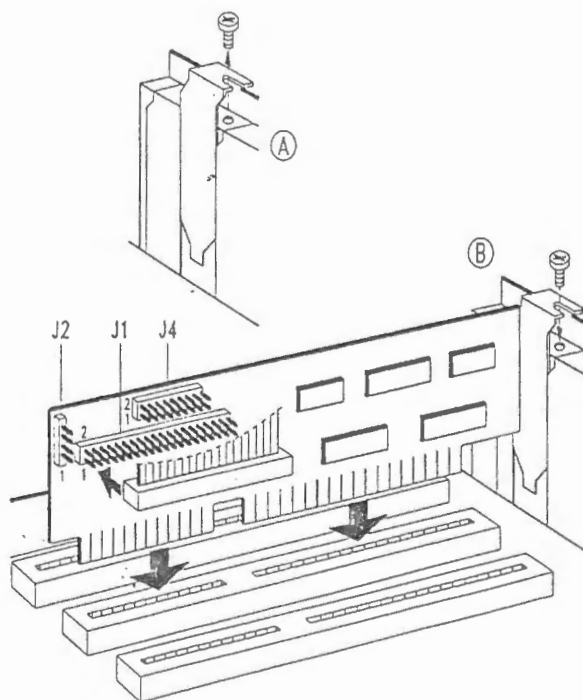
**J1** EDAC-interface  
(voor aansluiting van de bandkabel)

**J2** Connector voor kabel van vaste-schijf-LED

### Jumper-instelling

**J4** jumpers op pin 1-2, 5-6 en 11-12 (standaard-configuratie)

De EDAC-kaart is geïnstalleerd. U kunt nu de vaste schijf (schijven) op de kaart aansluiten.



## UK INSTALLING EDAC BOARD

The EDAC (Embedded Disk Adapter Card) board has been designed to interface up to two AT-embedded hard disks. Refer to the documentation that came with your retrofit hard disk for more information on connecting your particular hard disk to the EDAC board.

### Installation

**1** Open the system unit according to the instructions in the user's guide.

**2** Remove one of the expansion slot covers which are located at the back of the system unit (refer to A in the figure). Then press the EDAC-board firmly into the connector and secure the card with the screw you removed earlier (refer to B in the figure).

### Connectors

**J1** EDAC interface (for connecting flat cable)

**J2** Connector for cable of hard disk LED

### Jumper setting

**J4** pins 1-2, 5-6 and 11-12 (default)

The installation of the EDAC board has been completed. It is now possible to attach the hard disk(s) to the board.

## D INSTALLATION DER EDAC-KARTE

Die EDAC-Karte (EDAC = Embedded Disk Adapter Card) erlaubt den Anschluß von maximal 2 AT-embedded Festplatten. Näheres zum Anschließen Ihrer Festplatte an die EDAC-Karte finden Sie in der beim Einbau-paket der Festplatte mitgelieferten Dokumentation.

### Installation

**1** Öffnen Sie die Systemeinheit nach den Anweisungen im Benutzerhandbuch Ihres Systems.

**2** Entfernen Sie die Schraube, die eine Abdeckung eines Steckplatzes hält, und entfernen Sie diese Abdeckung (sehen Sie A in der Abbildung).

Drücken Sie daraufhin die EDAC-Karte fest in den Steckplatz und

schrauben Sie die Karte mit der Schraube der Abdeckung fest (sehen Sie B in der Abbildung).

### Anschlüsse

**J1** EDAC-Schnittstelle (für den Anschluß des Bandkabels)

**J2** Anschluß für Kabel der Festplattenleuchtdiode (LED)

### Jumper-Einstellung

**J4** Jumper auf Pinnen 1-2, 5-6 und 11-12 (Standardeinstellung)

Die EDAC-Karte ist jetzt völlig betriebsbereit. Sie können jetzt mit dem Anschluß der Festplatte(n) anfangen.

**F**

## INSTALLATION DE LA CARTE EDAC

La carte EDAC (Embedded Disk Adapter Card) permet le raccordement de deux disques durs AT-embedded. Voir la documentation qui accompagnait le kit pour le disque dur pour plus d'informations sur le raccordement de votre disque dur à la carte EDAC.

### Installation

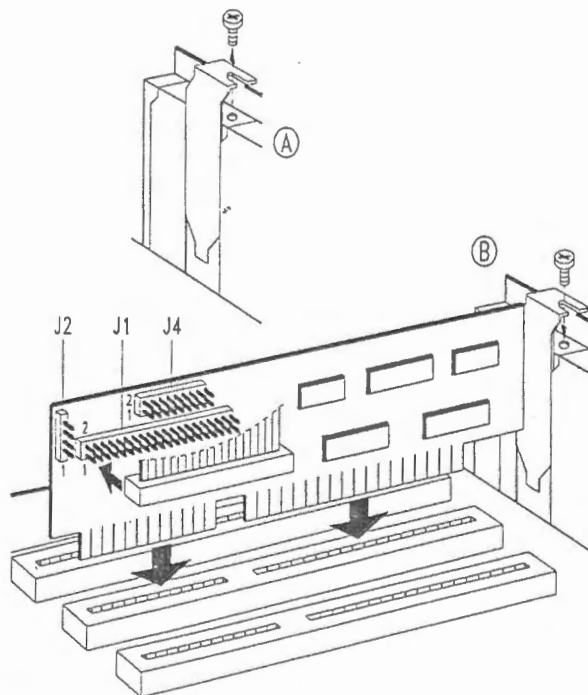
- Ouvrez l'unité centrale selon les instructions fournies dans le manuel d'utilisation qui accompagnait votre ordinateur.
- Enlevez une équerre sur la face arrière de l'ordinateur (voir **A** dans la figure). Puis, insérez la carte EDAC dans le connecteur d'extension en pressant fermement et fixez-la au moyen de la vis que vous avez enlevée plus tôt (voir **B** dans la figure).

### Connecteurs

- J1** Interface EDAC (pour le raccordement du câble plat)  
**J2** Connecteur pour le câble de la diode lumineuse du disque dur

### Positionnement des cavaliers

- J4** Cavalier sur les broches 1-2, 5-6 et 11-12 (configuration standard)  
 La carte EDAC est installée. Maintenant vous pouvez connecter le(s) disque(s) dur(s) à la carte.

**E**

## INSTALACIÓN DE LA TARJETA EDAC

La tarjeta EDAC (Embedded Disk Adapter Card) está destinada para la conexión de dos discos duros AT-embedded. Consulte la documentación que fue suministrada con el paquete de ensamblaje de su disco duro para mayor información sobre la conexión de su disco duro con la tarjeta EDAC.

### Instalación

- Abra la unidad del sistema según las instrucciones dadas en el manual del usuario que fue suministrado con su ordenador.
- Retire una de las cubiertas en la parte trasera de la unidad del sistema (véase **A** en la figura). Coloque luego firmemente la tarjeta

EDAC en el conector de ampliación y atornille la tarjeta utilizando el tornillo que ha retirado antes (véase **B** en la figura).

### Conectores

- J1** Interface EDAC (para conexión del cable plano)  
**J2** Conector del cable del piloto indicador del disco duro

### Configuración de puentes

- J4** Puente sobre los pines 1-2, 5-6 y 11-12 (configuración estándar)

La tarjeta EDAC está instalada. Ahora usted puede conectar el (los) disco(s) duro(s) con la tarjeta EDAC.

**I**

## INSTALLAZIONE DELLA SCHEDA EDAC

La scheda EDAC (Embedded Disk Adapter Card) è stata progettata per consentire l'interfacciamento di due dischi fissi incorporati. Per ulteriori informazioni relativamente al collegamento del disco rigido utilizzato alla scheda EDAC, consultare la documentazione fornita con il disco rigido inserito posteriormente.

### Installazione

- Aprire l'unità di sistema conformemente alle istruzioni contenute nella guida utente.

- Togliere uno dei coperchi dello slot di espansione posti sul retro dell'unità di sistema (fare riferimento a **A** nella figura). Fissare quindi saldamente la scheda EDAC sul connettore e fissarla con le viti tolte in precedenza (fare riferimento a **B** nella figura).

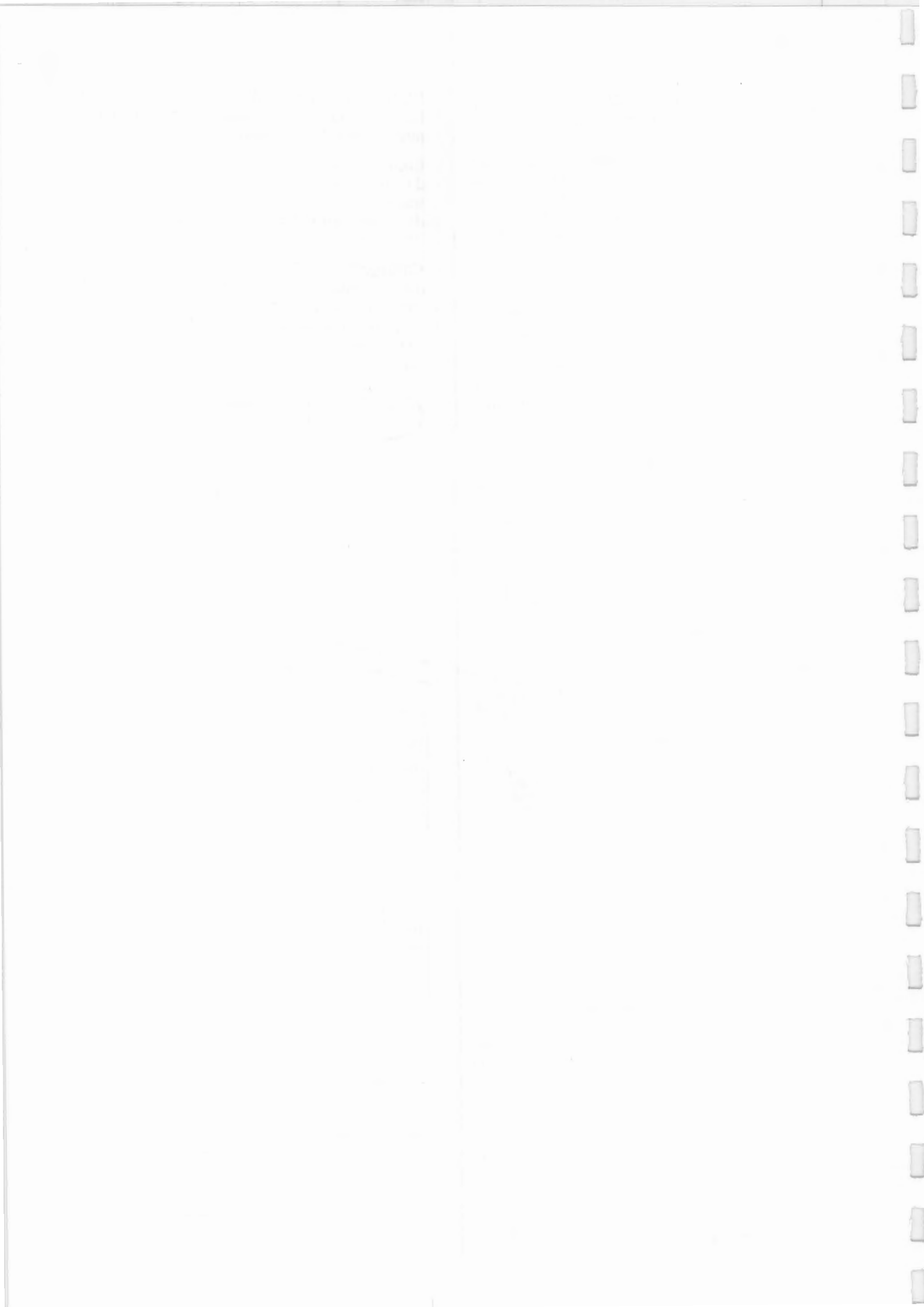
### Connettori

- J1** Interfaccia EDAC (per il collegamento di un cavo piatto)  
**J2** Connettore per cavo di LED di disco rigido

### Impostazione dei jumper (ponticelli)

- J4** Pin 1-2, 5-6 e 11-12 (configurazione di default)

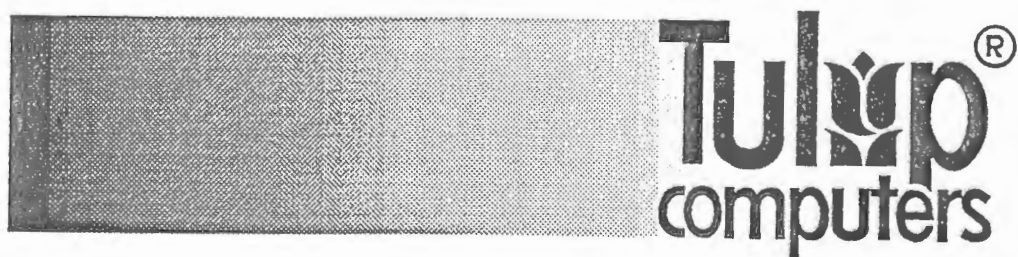
L'installazione della scheda EDAC è completa. I ora possibile collegare alla scheda il disco rigido o i dischi rigidi.





---

USER'S GUIDE EXPANSION BOX  
TULIP LT 286 AND TULIP NB 286



## DISCLAIMER

This manual describes a product of Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind. Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual. If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual. The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for *backup* purposes. Tulip Computers may change or improve the product and this manual at any time without previous warning.

## TRADEMARKS

Product or manufacturer names mentioned herein may be (registered) trademarks of their respective companies.

*No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.*

© Copyright 1990, Tulip Computers.

P/N: 06-230002-00

P.: 618U/100

Issue date: November 1990

Issued by:

Tulip Computers

P.O.Box 3337

5203 DH 's-Hertogenbosch

The Netherlands

# CONTENTS

- Introduction** 5
  
- 1 Instruction to the user** 6
  - FCC notice 6
  
- 2 Getting started** 8
  - Unpacking the expansion box 8
  
- 3 Installation** 10
  - Which expansion card may be installed 10
  - How to open the expansion box 11
  - How to install the expansion cards 12
  - How to close the expansion box and connect the cables 14
  
- 4 Operation** 16
  
- 5 Specifications** 18
  
- Appendix A: Connector pinouts expansion box**
  - Tulip lt 286 19
  
- Appendix B: Connector pinouts expansion box**
  - Tulip nb 286 20

**Figures:**

- Figure 1a: Front view of the expansion box* 9
- Figure 1b: Rear view of the expansion box* 9
- Figure 1c: Inner view of the expansion box* 9
- Figure 2: Removing the top cover* 11
- Figure 3: Removing the expansion slot cover* 12
- Figure 4: Inserting the expansion card* 13
- Figure 5: Innerside of the front panel* 13
- Figure 6a: Connecting the expansion bus connection cable  
and the AC power adapter for the Tulip lt 286* 14
- Figure 6b: Connecting the expansion bus connection cable  
and the AC power adapter for the Tulip nb 286* 15
- Figure 7: Disconnecting the expansion bus connector* 17
- Figure 8: Connector of the expansion box for the  
Tulip lt 286* 19
- Figure 9: Connector of the expansion box for the  
Tulip nb 286* 20

## INTRODUCTION

Please read this manual carefully before starting the installation procedure.

The expansion box has been designed to operate within a stationary environment, it is not intend to be operated when carried around with the **Tulip lt 286** or the **Tulip nb 286**. It should *never* be exposed to humid, grease or extreme shocks.

### CAUTION

The expansion box for the **Tulip lt 286** can **NOT** be used for the **Tulip nb 286**. The same applies to the expansion box for the **nb 286**, which can **NOT** be used for the **lt 286**, because the connector pinouts and the in/output voltages are different.

Ignoring this message would result in permanent damage to your computer.

For the connector pinouts of the expansion box of the **Tulip lt 286** refer to appendix A; for the connector pinouts of the expansion box of the **Tulip nb 286** refer to appendix B.

Be aware that there are certain limitations on the type of expansion cards that can be inserted into the expansion box. Some cards may interfere with the normal operation of the computer. Refer to chapter 3 for more information on this subject.

The expansion bus connection cable, which is to be connected between your computer and the expansion box, extends the electrical signals from the main board into the expansion box. One AC power adapter is delivered to provide electric power to this expansion box.

## 1 INSTRUCTION TO THE USER

Your expansion box has been exclusively designed to support your **Tulip It 286** or **Tulip nb 286** for further expansion capacity by offering connections and supplying electric power to accommodate your expansion circuits.

The primary function of the box is to accommodate XT and AT compatible expansion cards on either of the two I/O channel connectors to enhance the computing and networking ability of your computer.

---

### FCC notice

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy. When not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment *off* and *on*, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer for help.

**Warning**

This equipment has been certified to comply with the limits of a Class B computing device, pursuant to FCC rules. Only peripherals (computer input/output devices, terminals, printers etc.) certified to comply with the class B limits may be attached to this device. The user must use only shielded cables with ferrite clamp. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

**Caution**

Changes or modifications to the system by the user himself may terminate guarantee of the machine.

**Note**

Peripherals used in conjunction with this equipment must have shielded interface cables only. A shielded power cable must also be used to connect this equipment to 220 VAC. Using non-shielded cables may result in interference to TV and radio reception, and may terminate guarantee of the machine.

## 2 GETTING STARTED

Before you start be sure to:

- Follow all directions when unpacking, setting up and operating this device.
- Install your computer and the expansion box away from sources of heat.

---

### Unpacking the expansion box

Carefully unpack the packing carton and lift out its contents. The complete set of your expansion box should contain the following items:

- the expansion box
- one expansion bus connection cable
- one AC power adapter
- one AC power cable.

Be sure that you have received all of the components. If it appears that anything listed above has been damaged during shipment; notify your dealer immediately for their service.



Figure 1a: Front view of the expansion box

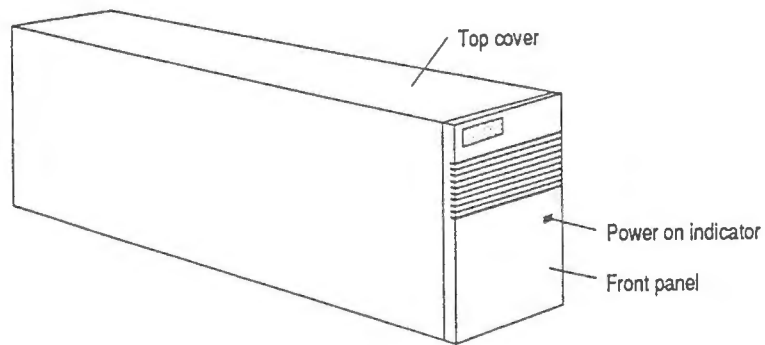


Figure 1b: Rear view of the expansion box

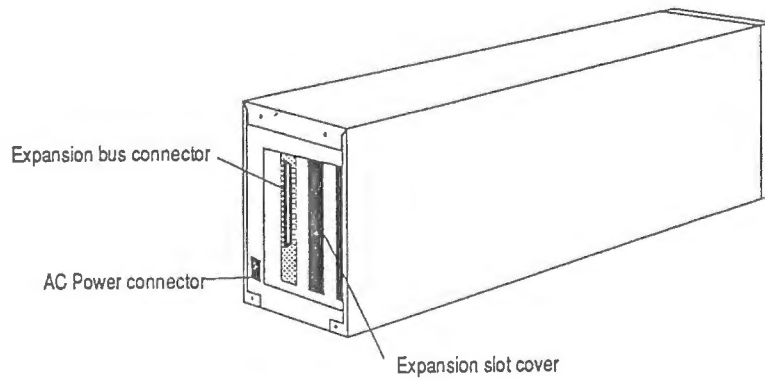
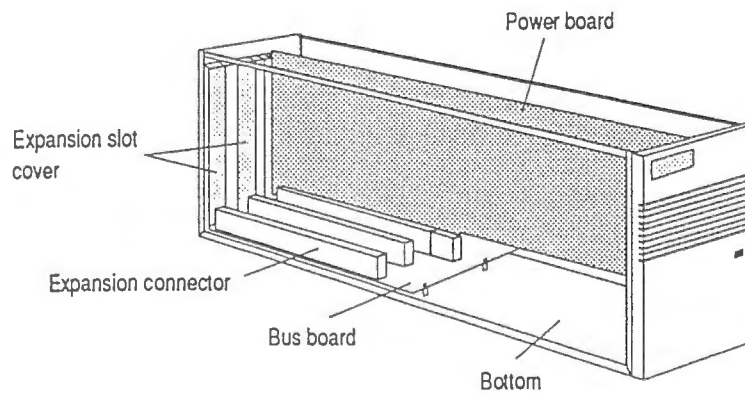


Figure 1c: Inner view of the expansion box



## 3 INSTALLATION

---

### Which expansion card may be installed

Before you setup your expansion box, you must be sure the functions of the expansion card you are installing may coexist with the **Tulip lt 286** or **Tulip nb 286** itself. That is because the **lt 286** and the **nb 286** have already built in nearly every major circuit function that conventional expansion cards can provide. You may be duplicating these circuit blocks by inserting other cards with the same function into the expansion box. In that case the computer would have difficulties in determining which circuit it should access, and faults would arise. In other words: although the card might fit physically, this is no guarantee that it will fit electrically as well.

The expansion cards listed below should not be installed in the expansion box since these cards would interfere with the existing circuits in your computer, and therefore can cause unpredictable malfunction of the computer:

- hard disk controller cards
- floppy disk controller cards
- color display cards (including VGA, EGA, CGA cards)
- parallel printer controller cards whose printer port I/O location are designated as port LPT1
- serial communication cards whose serial port is designated as port COM1 and/or COM2.

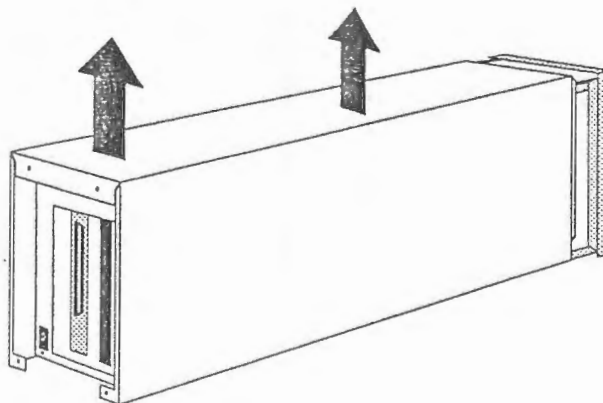
A rule of thumb is to avoid installing cards which have the same function as those already available in the computer itself, because they often occupy or access the same I/O location and/or memory address. Conflicts within the electric circuit will be the result. In case you have any trouble in determining which boards may be installed in the expansion box, consult an experienced person or call your dealer for their suggestions.

---

## How to open the expansion box

- 1 First power off your computer and disconnect the AC power cable.
- 2 Remove the four screws at the rear side of the box and slide the top cover backwards.
- 3 Then lift the top cover from the box (see figure 2).

*Figure 2: Removing the top cover*



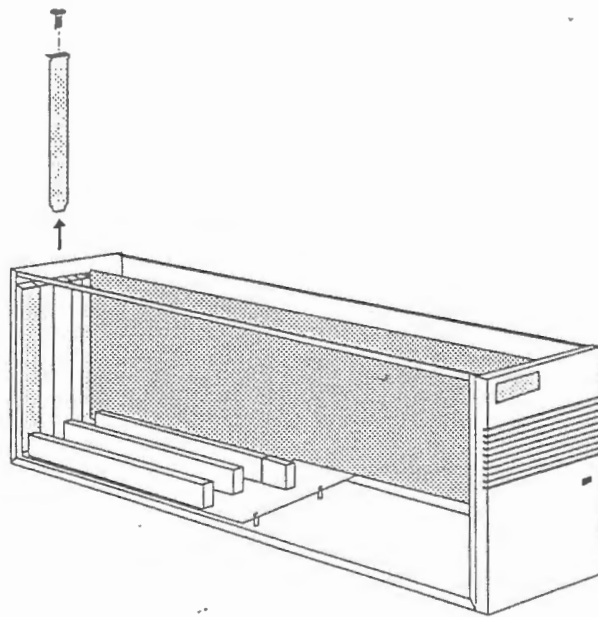
---

## How to install the expansion cards

Be sure that the expansion card you want to install will not conflict with your computer.

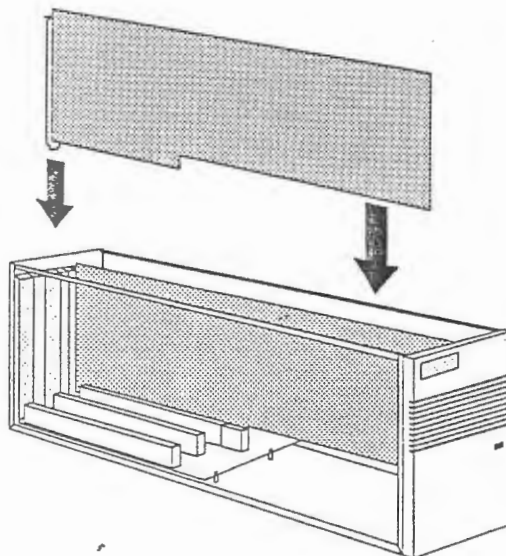
- 1 Power off the computer and the expansion box (if already powered on) and open the box according to the instructions given in the paragraph *"How to open the expansion box"*.
- 2 Remove the cover of the expansion slot which is located at the back of the expansion box as shown in figure 3 (save the screw, because you will need it when mounting the new card, see step 4).

*Figure 3: Removing the expansion slot cover*



- 3 Take your expansion card vertically with the row of golden contacts pointing downwards and insert the card into the connector as shown in figure 4.

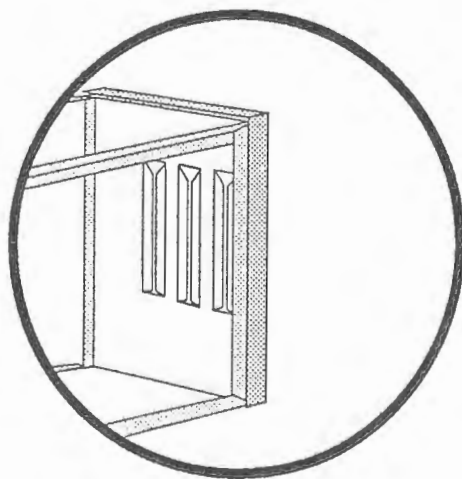
*Figure 4: Inserting the expansion card*



**Note**

Attention should be paid when installing a full-size expansion card. The edge of the expansion card must fit into the groove at the inner side of the front panel (see figure 5).

*Figure 5: Innerside of the front panel*



- 4 Use the screw you removed in step 2 to secure the card.

---

## How to close the expansion box and connect the cables

- 1 Replace the top cover to the box and use the screws at the rear side to secure the top cover.
- 2 The final step is to connect the expansion bus connection cable, and the AC power adapter.

### Note

Before connecting to an earthed AC outlet mains:

- disconnect the AC adapter from the expansion box
- disconnect the AC adapter from the computer
- turn off the computer.

Failing to do so would result in permanent damage to your computer.

- 3 Connect the expansion bus connection cable and plug in the AC power adapter as shown in figure 6a (for **Tulip lt 286**) and 6b (for **Tulip nb 286**).

*Figure 6a: Connecting the expansion bus connection cable and the AC power adapter for the Tulip lt 286*

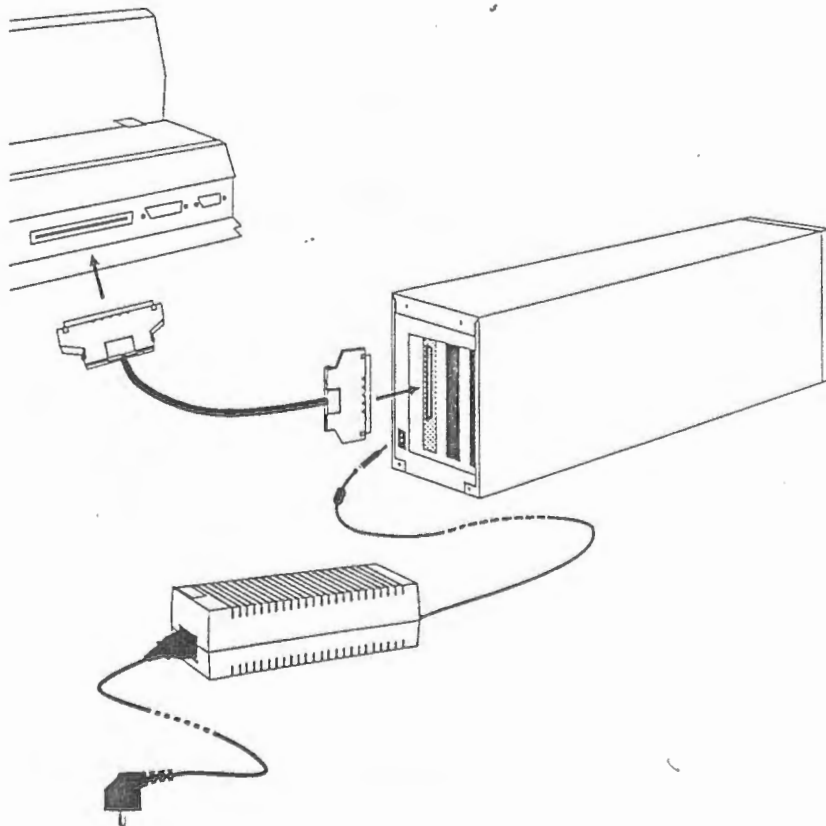
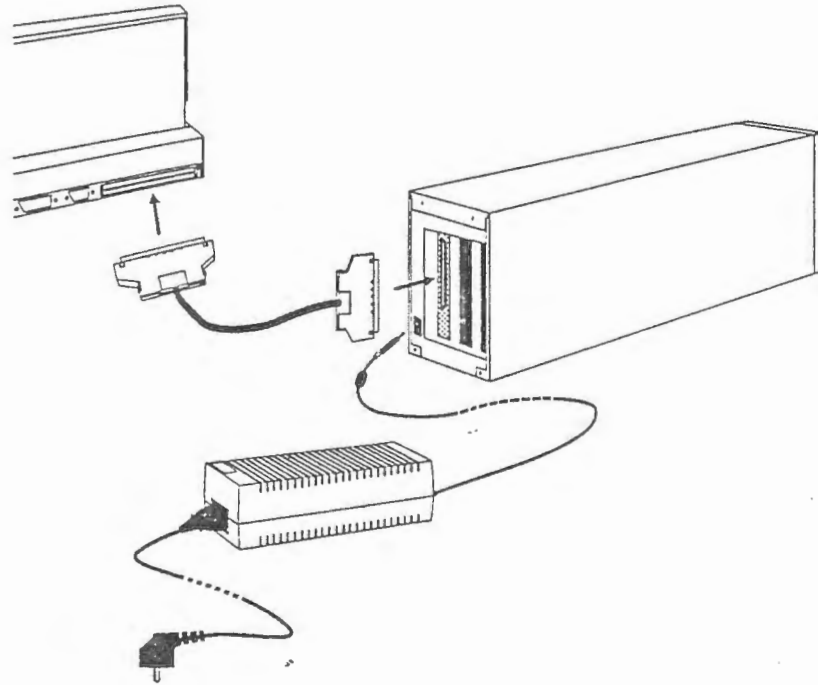


Figure 6b: Connecting the expansion bus connection cable and the AC power adapter for the Tulip nb 286



Now you have completed the installation procedure of the expansion box. Please proceed to the next chapter for the operation of the expansion box connected to your computer.

## 4 OPERATION

To put the expansion box in use simply switch on your computer, the power-on indicator in front of the expansion box will illuminate. Since the power on/off operation is remote controlled by the computer, no on/off control is required for the expansion box itself.

In case the power-on indicator doesn't illuminate, switch off the computer and go back to the setup procedures to verify if you followed all the installation instructions. If the indicator still doesn't light up after switching on, contact your local dealer.

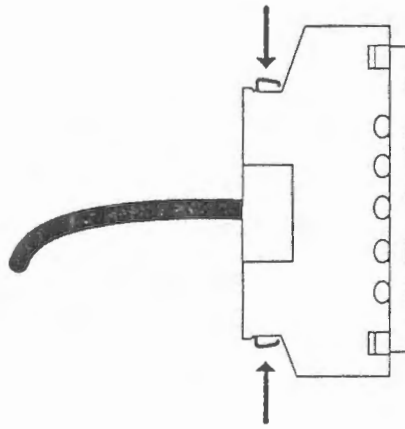
For the operation of the expansion cards installed in your expansion box, please refer to the operating manuals shipped with these cards.

When connecting or disconnecting the expansion bus connector, always make sure that both AC power adapters are disconnected. Also the power on/off switch on the computer must be in the "off" position.

To disconnect the expansion bus connection cable simply hold the header on the cable and push the knobs as shown in figure 7. Then gently pull the header to release the cable.



Figure 7: Disconnecting the expansion bus connector



**CAUTION**

Keep the expansion box out of heat, direct exposure to sun light, dust, grease and vibration. This expansion box should also be properly ventilated. Installing the box in an enclosed environment or blocking the ventilation holes on the box may result in fire hazard, due to the accumulated heat generated within the expansion box.

## 5 SPECIFICATIONS

<b>Dimensions:</b>	
Length	376 mm
Height	155 mm
Width	95 mm

<b>Expansion bus connection cable:</b>	
Length	193 mm
Circuit counts	96

<b>Input voltage:</b>
+16.5V, DC

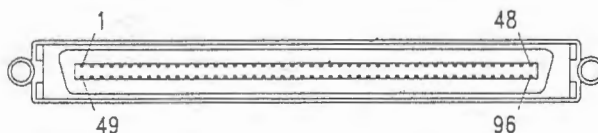
<b>Output voltage:</b>
+5V, DC
+12V, DC
-5V, DC
-12V, DC

<b>Current capacity:</b>	
+5V	2 A
+12V	700 mA
-5V	50mA
-12V	50 mA

## APPENDIX A

### Connector pinouts expansion box Tulip It 286

Figure 8: Connector of the expansion box for the Tulip It 286

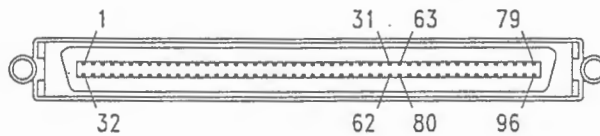


Expansion bus connector pin assignment					
1	GND	33	SD7	65	IRQ10
2	RESETDRV	34	SD6	66	IRQ11
3	+5V	35	SD5	67	IRQ12
4	IRQ9	36	SD4	68	IRQ15
5	N.C.	37	SD3	69	IRQ14
6	DREQ2	38	SD2	70	-DACK0
7	N.C.	39	SD1	71	DREQ0
8	-OWS	40	SD0	72	-DACK5
9	N.C.	41	BIOCH	73	DREQ5
10	GND	42	AEN	74	-DACK6
11	-SMEMW	43	SA19	75	DREQ6
12	-SMEMR	44	SA18	76	-DACK7
13	-IOW	45	SA17	77	DREQ7
14	-IOR	46	SA16	78	-MASTER
15	-DACK3	47	SA15	79	-SBHE
16	DREQ3	48	SA14	80	LA23
17	-DACK1	49	SA13	81	LA22
18	DREQ1	50	SA12	82	LA21
19	-REF	51	SA11	83	LA20
20	SYSCLK	52	SA10	84	LA19
21	IRQ7	53	SA9	85	LA18
22	IRQ6	54	SA8	86	LA17
23	IRQ5	55	SA7	87	-MEMR
24	IRQ4	56	SA6	88	-MEMW
25	IRQ3	57	SA5	89	SD8
26	-DACK2	58	SA4	90	SD9
27	TC	59	SA3	91	SD10
28	BALE	60	SA2	92	SD11
29	N.C.	61	SA1	93	SD12
30	BOSC	62	SA0	94	SD13
31	GND	63	-MEMCS16	95	SD14
32	-IOCHCK	64	-IOCS16	96	SD15

## APPENDIX B

### Connector pinouts expansion box Tulip nb 286

Figure 9: Connector of the expansion box for the Tulip nb 286

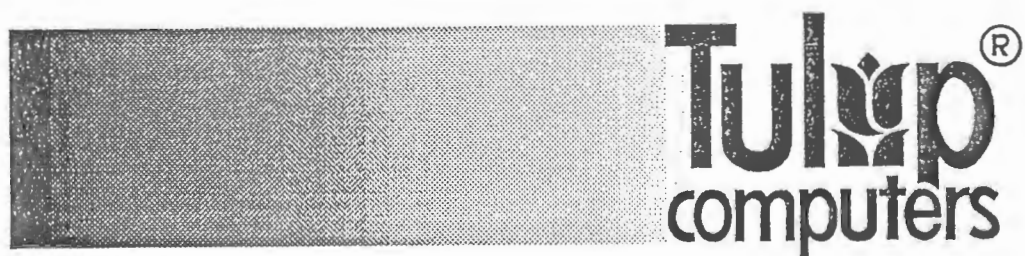


Expansion bus connector pin assignment			
1	GND	33	SD7
2	RESETDRV	34	SD6
3	+5V	35	SD5
4	IRQ9	36	SD4
5	N.C.	37	SD3
6	DREQ2	38	SD2
7	+5V	39	SD1
8	-OWS	40	SD0
9	+5V	41	BIOCH
10	GND	42	AEN
11	-SMEMW	43	SA19
12	-SMEMR	44	SA18
13	-IOW	45	SA17
14	-IOR	46	SA16
15	-DACK3	47	SA15
16	DREQ3	48	SA14
17	-DACK1	49	SA13
18	DREQ1	50	SA12
19	-REF	51	SA11
20	SYSCLK	52	SA10
21	IRQ7	53	SA9
22	IRQ6	54	SA8
23	IRQ5	55	SA7
24	IRQ4	56	SA6
25	IRQ3	57	SA5
26	-DACK2	58	SA4
27	TC	59	SA3
28	BALE	60	SA2
29	+5V	61	SA1
30	BOSC	62	SA0
31	GND	63	-MEMCS16
32	-IOCHCK	64	-IOCS16
		65	IRQ10
		66	IRQ11
		67	IRQ12
		68	IRQ15
		69	IRQ14
		70	-DACK0
		71	DREQ0
		72	-DACK5
		73	DREQ5
		74	-DACK6
		75	DREQ6
		76	-DACK7
		77	DREQ7
		78	-MASTER
		79	-SBHE
		80	LA23
		81	LA22
		82	LA21
		83	LA20
		84	LA19
		85	LA18
		86	LA17
		87	-MEMR
		88	-MEMW
		89	SD8
		90	SD9
		91	SD10
		92	SD11
		93	SD12
		94	SD13
		95	SD14
		96	SD15



---

RETROFIT SET FLOPPY DISK DRIVES  
(3.5" / 5.25")



Tulip® is a registered trademark of Tulip Computers.  
MS-DOS® is a registered trademark of Microsoft Corporation.

© Copyright 1990, Tulip Computers.

P/N: 07-212509-01

P: 509Z/200

Issue date/Uitgiftedatum/Erscheinungsdatum/Date d'édition/Fecha de edición/ Data di pubblicazione:  
April/Avril/Abril/Aprile 1990

*No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.*

*Niets uit deze uitgave mag worden verveelvoudigd, opgeslagen in een geautomatiseerd gegevensbestand, of openbaar gemaakt, in enige vorm of op enige wijze, hetzij elektronisch, mechanisch, door fotokopieën, opnamen, of op enige andere manier, zonder voorafgaande schriftelijke toestemming van de uitgever.*

*Vervielfältigung, Aufbewahrung und Weitergabe von Informationen aus diesem Handbuch durch Druck, Fotosatz, Mikrofilm, oder auf irgendeine andere Weise, bedürfen der vorherigen schriftlichen Zustimmung von Tulip Computers.*

*Toute reproduction, même partielle, de cet ouvrage est interdite. Une copie ou reproduction par quelque procédé que ce soit, photographie, photocopie, microfilm, bande magnétique, disque ou autre, constitue une contrefaçon passible des peines prévues par la loi du 11 mars 1957 sur la protection des droits d'auteur.*

*Ninguna parte de este manual debe ser reproducida, almacenada en un sistema de recuperación, o transmitida, en alguna forma o por cualquier medio, electrónico, mecánico, de fotocopiado, de grabación, o de otro modo, sin la previa autorización escrita del editor.*

*Nessuna parte del presente manuale può venir riprodotta, copiata su sistemi di registrazione o trasmessa, sia in maniera elettronica, meccanica, fotografica, magnetica sia in qualsiasi altra forma, senza il previo permesso per iscritto dell'editore.*

Issued by/Uitgegeven door/Ausgegeben von/Édité par/Editado por/Editore:

Tulip Computers  
P.O. Box 3337  
5203 DH 's-Hertogenbosch  
The Netherlands

## DISCLAIMER

This manual describes a product of Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind.

Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual.

If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual.

The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for backup purposes.

Tulip Computers may change or improve the product and this manual at any time without previous warning.

## AANSPRAKELIJKHEID

In deze handleiding wordt een produkt beschreven van Tulip Computers te 's-Hertogenbosch, Nederland. Uit de levering van deze handleiding door Tulip Computers vloeit geen enkele garantie voort.

De informatie is met grote zorgvuldigheid samengesteld. Er zouden echter typfouten, of technische onvolkomenheden in voor kunnen komen. Tulip Computers aanvaardt geen verantwoordelijkheid voor schade die, direct of indirect, voortspuit uit het gebruik van deze handleiding. De informatie in deze handleiding is alleen bedoeld voor gebruik bij het beschreven produkt.

Als het produkt dat in deze handleiding beschreven wordt, software van Tulip Computers omvat, dan is de koper van het produkt eigenaar van de media waarop de software werd geleverd. Alle rechten voor wat betreft de naam en het eigendom van de software, berusten echter bij Tulip Computers. De software mag alleen in Tulip produkten, zoals beschreven in deze handleiding, worden gebruikt.

Het copyright op de hardware, software, en de documentatie van het produkt rust bij Tulip Computers. Het kopiëren ervan is niet toegestaan. Van de software mag door de koper 1 (een) kopie worden gemaakt, uitsluitend als backup, voor eigen gebruik.

Tulip Computers behoudt zich het recht voor om het produkt en deze handleiding te wijzigen of te verbeteren, zonder voorafgaande waarschuwing.

## HAFTUNGS AUSSCHLUß

Diese Anleitung beschreibt ein Produkt von Tulip Computers, 's-Hertogenbosch, Holland. Diese Anleitung dient nur dazu, dem Anwender bei der Benutzung des Produktes zu helfen. Die Firma Tulip Computers geht mit dieser Anleitung jedoch keine Verpflichtung ein.

Es wurde viele Mühe darauf verwandt, diese Anleitung so genau und verlässlich wie nur möglich zu gestalten. Tipfehler und technische Unzulänglichkeiten sind jedoch nicht auszuschließen. Die Firma Tulip Computers übernimmt keine Verantwortung für irgendwelche Schäden, die durch die Anwendung dieser Anleitung entstanden sind. Informationen aus dieser Anleitung sollten nur für die Bedienung und Instandhaltung des Produktes benutzt werden.

Wird in dieser Anleitung Software beschrieben, dann ist der Käufer dieses Produktes Besitzer der Diskette (oder des Magnetbandes), auf der die Software geliefert wird. Alle Rechte hinsichtlich des Namen und des Eigentums der Software beruhen jedoch bei Tulip Computers. Die Software dürfen Sie nur mit den Tulip Produkten verwenden, die in dieser Anleitung beschrieben werden.

Das Copyright auf der Hardware, Software und auf dieser Anleitung beruht bei Tulip Computers. Kopieren ist nicht erlaubt. Von der Software darf der Käufer, ausschließlich als "Backup", für den eigenen Gebrauch eine (1) Kopie machen.

Die Angaben in dieser Anleitung und das in dieser Anleitung beschriebene Produkt können ohne vorherige Mitteilung geändert werden.

## GB

## RESPONSABILITE

## F

Le présent manuel décrit un produit de Tulip Computers, 's-Hertogenbosch, Pays-Bas. Aucune garantie ne résulte de la livraison du présent manuel par Tulip Computers.

Le plus grand soin a été apporté à la compilation des informations. Des fautes de frappe ou des imperfections techniques, demeurent toutefois possible. Tulip Computers décline toute responsabilité pour tout dommage découlant de l'utilisation du manuel ou des informations qu'il contient, qu'elles soient correctes ou incorrectes. Les informations contenues dans le présent manuel sont exclusivement destinées à l'utilisation de ce produit.

L'acheteur est le propriétaire des disquettes du logiciel; tous les droits du nom et de la propriété du logiciel sont en la possession de Tulip Computers. Ce logiciel ne peut qu'être utilisé sur un produit de Tulip Computers, comme décrit dans ce manuel.

Le copyright du logiciel et de ce manuel est en la possession de Tulip Computers. Il est donc interdit de les copier et de les diffuser. L'acheteur ne peut copier le logiciel qu'une seule fois pour la sauvegarde, et pour sa propre utilisation.

Tulip Computers se réserve le droit d'introduire des modifications ou des améliorations dans le présent manuel à tout moment sans préavis.

## NL

## ADVERTENCIA

## E

Este manual describe un producto de Tulip Computers, 's-Hertogenbosch, Países Bajos. Tulip Computers provee este manual "así como está" sin garantía de ninguna clase.

Se acredita que la información en el manual es correcta y fiable. Sin embargo, ésta puede incluir errores de tipografía o inexactitudes técnicas. Tulip Computers no será responsable por cualquier daño directo o indirecto surgido por el uso de este manual. La información deberá emplearse solamente para operar y/o mantener el producto descrito en el manual.

Si el producto descrito en este manual supone el software desarrollado por Tulip Computers, usted, como comprador del producto, es dueño de los medios donde el software se encuentra grabado o almacenado. Sin embargo, Tulip Computers retiene el título y la propiedad del software. Usted puede emplear el software solamente con productos Tulip, como se describe en este manual.

El hardware, software y la parte textual de este producto están sujetos a derechos de autor. Está terminantemente prohibida la copia o reproducción no autorizada de cualquiera de sus partes. Usted puede hacer 1 (una) copia del software para propósito de backup.

Tulip Computers puede cambiar o mejorar el producto y este manual en todo momento y sin previo aviso.

## D

## RINUNCIA

## I

Il presente manuale describe un prodotto della ditta Tulip Computers, 's-Hertogenbosch, Paesi Bassi. La ditta Tulip Computers consegna il manuale "com'è", senza alcuna garanzia.

Le informazioni contenute dal manuale vengono ritenute corrette ed attendibili. Ciononostante errori tipografici ed inaccurately tecniche possono essere presenti. La Tulip Computers non assume alcuna responsabilità in caso di danni che, direttamente o indirettamente, possano insorgere in seguito all'uso del presente manuale. Le informazioni offerte dal manuale possono venir applicate solo per il funzionamento e/o manutenzione del prodotto descritto nel manuale stesso.

Qualora il prodotto descritto dal manuale richieda l'impiego di software di produzione della Tulip Computers, l'acquirente è in possesso dei mezzi dove tale software è registrato o fissato. In ogni caso, tale software rimane a titolo e di proprietà della Tulip Computers. Il software può venir impiegato solamente con prodotti Tulip, come descritto nel presente manuale.

Hardware, software e materiale stampato o comunque scritto, inerente il prodotto in questione, sottostanno alle leggi sui diritti d'autore. Copia o riproduzione non autorizzate (di qualsiasi parte) di tale materiale sono strettamente vietate. All'acquirente viene consentita una (1) copia a scopo di sicurezza.

La Tulip Computers si riserva, in qualsiasi momento e senza previo avviso, di modificare e migliorare sia il prodotto sia il presente manuale.



<p><b>CONTENTS</b> <b>INHOUDSOPGAVE</b> <b>INHALTSVERZEICHNIS</b> <b>TABLE DES MATIÈRES</b> <b>CONTENIDO</b> <b>INDICE DELLE MATERIE</b></p>
--

<b>GB</b>	- Installing a floppy disk drive _____	5
<b>NL</b>	- Montage van een diskette-station _____	15
<b>D</b>	- Das Einbauen eines Diskettenlaufwerkes _____	25
<b>F</b>	- Installation d'une unité de disquette _____	35
<b>E</b>	- Instalación de la unidad de disco _____	45
<b>I</b>	- Installazione di un'unità dischetto _____	55
	<b>Figures/afbeeldingen/Abbildungen/figuras/figure</b> _____	65

**CONTENTS**

<b>Installing a floppy disk drive</b> _____	6
Built-in assembly kit _____	6
Configurations _____	7
Assigning drive letters _____	8
Installing a 5.25" floppy disk drive _____	8
Installing a 3.5" floppy disk drive _____	11
Creating a new Diagnostics diskette _____	13

## INSTALLING A FLOPPY DISK DRIVE

This manual describes the installation of a floppy disk drive in a Tulip personal computer. As the installation of a floppy disk drive requires utmost precision, it is advisable to have it realized by experienced persons only.

Throughout this manual repeated references are made to various figures. You can find these figures at the end of this manual. Also refer to the user's guide of your system for more detailed information on how to open and close your system and on the location of the connectors needed for the installation procedure.

---

### Built-in assembly kit

The built-in assembly kit should contain:

- A floppy disk drive (3.5" or 5.25")
- A flat cable for a 3.5" and a 5.25" drive
- Mounting screws
- This manual
- Two mounting brackets (Only in 3.5" package)
- An adapter cable (Only in 3.5" package)
- A cover plate (Only in 3.5" package).

Before you start the installation procedure, check the assembly kit for any missing items.

## Configurations

Before you start installing the floppy disk drive, you should determine whether the drive should be installed in the upper position (drive A) or in the lower position (drive B) of your computer. This depends on the number of the drives already installed and on the type of the drives.

Check the following tables to find out which configuration applies to your system. The information in the tables is based on the configurations after the installation of the new floppy disk drive. It might be necessary to reinstall a floppy disk drive already available into another mounting position.

Table 1.1: Installation of floppy disk drives of different formats

Configurations with floppy disk drives of different formats		
After installation	1 x 5.25" 1 x 3.5"	
Of which	1 x 5.25"/1.2 Mb 1 x 3.5"	1 x 5.25"/360 Kb 1 x 3.5"
Drive A Drive B	Free choice	3.5" 5.25"
Flat cable	Connector 5.25"/3.5" (included in package)	Connector 5.25"/3.5" (included in package)

Table 1.2: Installation of floppy disk drives with the same format

Configurations with floppy disk drives of the same format			
After installation	2 x 5.25"		2 x 3.5"
Of which	2 x 1.2 Mb or 2 x 360 Kb	1 x 1.2 Mb 1 x 360 Kb	
Drive A Drive B	Free choice	1,2 Mb 360 Kb	Free choice
Flat cable	2 x 5.25" connector (standard)	2 x 5.25" connector (standard)	2 x 3.5" connector (standard)

### **Important**

Before installing the new floppy disk drive, you should inform the system about the **new** configuration by running the Diagnostics program. When leaving Diagnostics you should store the new configuration and subsequently remove the Diagnostics diskette from the floppy disk drive. Then you should power off your computer.

---

## **Assigning drive letters**

You should assign a drive letter to each drive by setting a jumper (connecting unit). The jumper is located on the floppy disk drive. The drive letter should be assigned before you start installing the floppy disk drive.

In figures 1a and 1b, and 2a, 2b, 2c and 2d you will find the jumper setting for all floppy disk drives. For each floppy disk drive to be (re)installed make sure the jumper is set in the right position (position **A** for drive name A and position **B** for drive name B).

---

## **Installing a 5.25" floppy disk drive**

- 1 Turn off the computer and all peripherals connected to it. Also disconnect the AC power cable at the rear side of the system unit.
- 2 Open the system unit according to the instructions given in the user's guide of your system. In the user's guide you will also find information on how to unscrew and lift up the mounting plate, with power supply and floppy disk drive(s), and put it aside.
- 3 Disconnect the wide flat cable and the power supply cable (red, black, yellow) at the back of each drive to be removed or reinstalled.
- 4 Unscrew the floppy disk drive (figure 3: a) and push it forward through the hole in the front cover. If necessary, repeat the same procedure for the other floppy disk drive.
- 5 The cover plate situated at the lower mounting position (for systems with one floppy disk drive) can be removed by pushing it out of the system unit from within.

If your system does not include a 3.5" floppy disk drive, continue reading at step 10.

- 6 Disconnect the flat cable from the main board.  
(Only for compact models:)  
If necessary, carefully lift up the mounting plate. The cable can be removed after its connector has been guided through the opening in the mounting plate. Also refer to the user's guide of your system.
- 7 (Only for compact models:)  
Guide the new flat cable through the opening in the mounting plate. If the front of the computer faces you, the colored side of the flat cable should be at the right.
- 8 Connect the new flat cable to the main board in your system. Make sure that the colored side of the flat cable faces pin 1 of the connector on the main board.
- 9 (Only for compact models:)  
Reinstall the mounting plate into its former position. If any cables have been disconnected while removing the mounting plate, make sure that they are properly reconnected again. If your system also contains a hard disk, you should tighten the hard disk by using the two mounting screws again.
- 10 Check the jumper setting used to assign the drive letter for each single floppy disk drive which has to be (re)installed. (Also refer to the paragraph "Assigning drive letters" in this manual.)
- 11 First slide floppy disk drive B into the lower position (if applicable) and tighten it by using the four screws.
- 12 Attach a power supply cable (red, black, yellow) to the connector at the back of the floppy disk drive (refer to **A** in figure 5, 6 or 7). Note that the connector of the cable can be attached in only one direction.
- 13 Attach the appropriate connector of the flat cable (see the following table and **D** and **E** in figure 5, 6 or 7) to the connector at the back of the drive (see **B** in figure 5, 6 or 7). Make sure the colored side of the flat cable faces pin 1 (refer to **C** in figure 5, 6 or 7).

Standard flat cable (system with: 2 x 5.25" drive)	New flat cable (system with: 1 x 5.25" and 1 x 3.5" drive)	
	drive A: 3.5" drive B: 5.25"	drive A: 5.25" drive B: 3.5"
Figure 5	Figure 6	Figure 7

**10** *Installing a floppy disk drive*

- 14** Install floppy disk drive A into the upper position (if applicable) by using the four screws.
- 15** Attach the power supply cable to the connector at the rear side of the floppy disk drive (see **A** in figure 5, 6 or 7).
- 16** Attach the appropriate connector of the flat cable (refer to the previous table and to **D** and **E** in figure 5, 6 or 7) to the connector at the back of the floppy disk drive (refer to **B** in figure 5, 6 or 7). Make sure the colored side of the flat cable faces pin 1 (refer to **C** in figure 5, 6 or 7).

**ATTENTION:**

As pin 1 might be located at the *left* of a 3.5" floppy disk drive, it may be necessary to give the flat cable a **half turn**. This will make sure that the colored side of the cable faces pin 1. Figures 6 and 7 show you how the flat cable should be folded. Figures 1a and 1b, and 2a, 2b, 2c and 2d indicate the location of pin 1 on the different types of floppy disk drives.

- 17** Close the system unit again according to the instructions given in the user's guide of your system.

---

## Installing a 3.5" floppy disk drive

- 1 Turn off the computer and all peripherals connected to it. Also disconnect the AC power cable at the rear side of the system unit.
- 2 Open the system unit according to the instructions given in the user's guide of your system. In the user's guide you will also find information on how to unscrew and lift up the mounting plate with power supply and floppy disk drive(s), and put it aside.
- 3 Disconnect the wide flat cable and the power supply cable (red, black, yellow) at the back of each drive to be removed or reinstalled.
- 4 Unscrew the floppy disk drive (figure 4: **b**) and push it forward through the hole in the front cover. If necessary, repeat the same procedure for the other floppy disk drive.
- 5 The cover plate situated at the lower mounting position (for systems with one floppy disk drive) can be removed by pushing it out of the system unit from within.

*If your system does not include a 5.25" floppy disk drive, continue reading at step 10.*

- 6 Disconnect the flat cable from the main board.  
*(Only for compact models:)*  
If necessary, carefully lift up the mounting plate. The cable can be removed after its connector has been guided through the opening in the mounting plate. Also refer to the user's guide of your system.
- 7 *(Only for compact models:)*  
Guide the new flat cable through the opening in the mounting plate. If the front of the computer faces you, the colored side of the flat cable should be at the right.
- 8 Connect the new flat cable to the main board in your system. Make sure that the colored side of the flat cable faces pin 1 of the connector on the main board.
- 9 *(Only for compact models:)*  
Reinstall the mounting plate into its former position. If any cables have been disconnected while removing the mounting plate, make sure that they are properly reconnected again. If your system also contains a hard disk, you should tighten the hard disk by using the two mounting screws again.



**12** *Installing a floppy disk drive*

- 10** Check the jumper setting used to assign the drive letter for each single floppy disk drive which has to be (re)installed. (Also refer to the paragraph "Assigning drive letters" in this manual.)
- 11** First slide floppy disk drive B into the lower position (if applicable) and tighten it by using the four screws. (If the new 3.5" floppy disk drive becomes drive B, you should continue reading at step 15.)
- 12** Attach a power supply cable (red, black yellow) to the connector at the back of the floppy disk drive (refer to **A** in figure 6, 7 or 8). Note that the connector of the cable can be attached in only one direction.
- 13** Attach the appropriate connector of the flat cable (see the following table and **D** and **E** in figure 6, 7 or 8) to the connector at the back of the drive (see **B** in figure 6, 7 or 8). Make sure the colored side of the flat cable faces pin 1 (refer to **C** in figure 6, 7 or 8).

Standard flat cable (system with: 2 x 3.5" drive)	New flat cable (system with: 1 x 5.25" and 1 x 3.5" drive)	
	drive A: 3.5" drive B: 5.25"	drive A: 5.25" drive B: 3.5"
Figure 8	Figure 6	Figure 7

- 14** Install floppy disk drive A into the upper position (if applicable) as described below. (If you install a 5.25" floppy disk drive into the upper mounting position, go back to step 11.)
- 15** *Figure 4 - Step 1:*  
Use the four screws (figure 4: **a**) to tighten the mounting brackets to the new 3.5" floppy disk drive (figure 4: **A**).
- 16** *Figure 4 - Step 2:*  
Use the four screws (figure 4: **b**) to tighten the mounting brackets (with floppy disk drive) to the vertical plates (figure 4: **B**)
- 17** *Figure 4 - Step 3:*  
Push the cover plate into the appropriate position.
- 18** Attach the connector at the end of the flat cable to the appropriate connector at the back of the floppy disk drive (see **B** in figure 6, 7 or 8).

**ATTENTION:**

As pin 1 might be located at the *left* of a 3.5" floppy disk drive, it may be necessary to give the flat cable a **half turn**. This will make sure that the colored side of the cable faces pin 1. Figures 6 and 7 show you the flat cable should be folded. Figures 1a and 1b, and 2a, 2b, 2c and 2d indicate the location of pin 1 on the different types of floppy disk drives.

- 19 Attach the power supply cable (red, black, yellow) to the adapter cable shipped with the retrofit package (see figure 9) and subsequently attach the adapter cable to the connector at the back of the floppy disk drive (see **A** in figure 6, 7 or 8).

---

## Creating a new Diagnostics diskette

If you have installed a new floppy disk drive you should have a Diagnostics diskette which is suitable for floppy disk drive A (the drive from which you can start the computer). If drive A is a 3.5" floppy disk drive, you will need a 3.5" Diagnostics diskette; if drive A is a 5.25" floppy disk drive you will need a 5.25" Diagnostics diskette.

If the format of your current Diagnostics diskette does not match with the format of floppy disk drive A, take the following steps to create a new Diagnostics diskette:

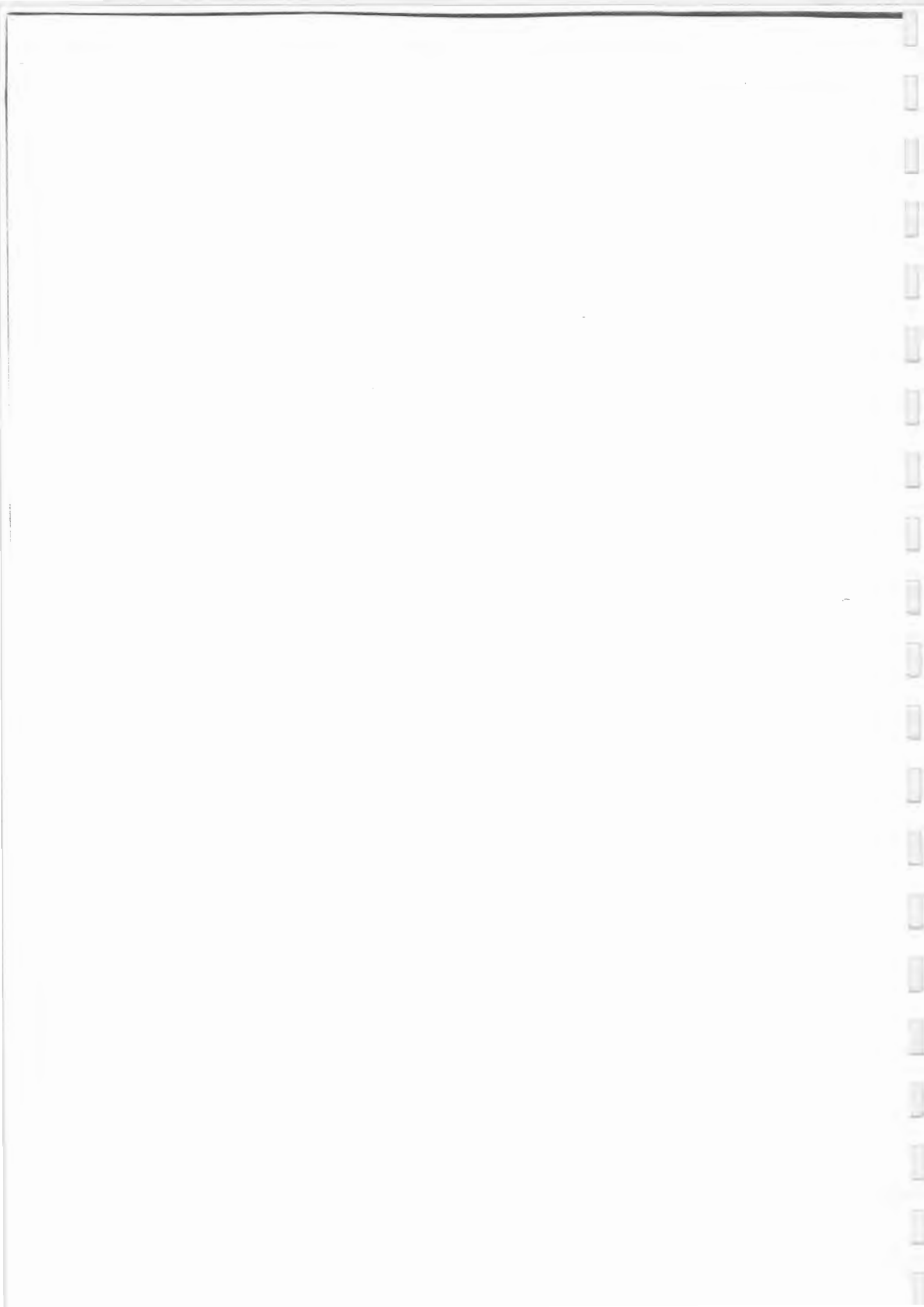
- 1 Use the **format** command (without options) to format a new diskette.
- 2 Use the **sys** command to copy the MS-DOS system files to the new diskette.
- 3 Use the **copy** command to copy the files on the current Diagnostics diskette to the new diskette.

You will find more detailed information on the above commands in the *MS-DOS guide* shipped with your computer.

**Note**

If you have a 360 Kb Diagnostics diskette, you can also use it for a 1.2 Mb floppy disk drive.





**CONTENTS**

<b>Installing hard disks in a Tulip computer</b> .....	6
Important preparations .....	7
Configurations .....	7
Checking built-in assembly kit .....	8
Checking jumper settings .....	8
Hardware installation .....	10
If you have a Tulip compact system .....	10
If you have another Tulip desktop system .....	14
If you have a Tulip floor system .....	16
Software installation .....	18

## INSTALLING HARD DISKS IN A TULIP COMPUTER

This manual describes the installation of AT-embedded hard disks with a capacity of 20, 40 and 100 Mb in a **Tulip** computer. These hard disks are suitable for the following **Tulip** systems:

Desktop model		Floor model
Compact	Other	
at compact 2 at compact 3 sx compact 2	at 386 <sup>sx</sup> at 386/25	tr 386 <sup>sx</sup> tr 386/25 tr 486

### Important

As the installation of a hard disk requires utmost precision, it is advisable to have it realized by experienced persons only.

Throughout this manual several references to various figures are made. You can find these figures at the end of this manual. Also refer to the user's guide of your system. In the user's guide you will find detailed information on how to open your system.

## Important preparations

Before you can start the actual installation procedure there are some important preparations to do, in order to guarantee proper operation of the hard disk and of your system in general. Be aware that accuracy is required during these preparations.

### Configurations

In each system a maximum number of 2 AT-embedded hard disks can be installed. Combinations of 20, 40 and 100 Mb hard disks are possible.

Note that there is a limit in the number of combinations of controllers (hardware connected to a hard disk that controls how data is written and retrieved from this disk) which can be used together in one system. Check the following table for the possible combinations.

Controllers	ST506	EDAC	SCSI-Plus	DCB
ST506	O	O	X	X
EDAC*	O	O	X	X
SCSI-Plus	X	X	X	X
DCB	X	X	X	X

O = Can NOT be combined

X = Can be combined

\* Your system should either contain an EDAC (Embedded Disk Adapter Card) interface embedded on the main board (only applies to the **Tulip sx** compact 2 and the **Tulip at** compact 3) or an EDAC board, which should be installed into one of the expansion slots. The EDAC interface allows the main board and the hard disk to communicate with each other.

The table above shows that a combination of a ST506 interface and an EDAC interface is not possible. If your system standard contains a ST506 controller, make sure this controller and the hard disk attached are removed first before you start installing the new hard disk.

## Checking built-in assembly kit

You should now check the assembly kit carefully for any missing items. Your built-in assembly kit includes:

- a 20, 40 or 100 Mb AT-embedded hard disk (3.5")
- two flat cables
- an adapter cable
- four mounting brackets
- four washers (*only included in 40 Mb package; see figure 3*)
- screws
- a cover plate
- this manual.

## Checking jumper settings

Check the correct jumper settings of the new hard disk. If it is the only hard disk connected to the controller ("**single**" drive) - note that up to two hard disks can be attached to one EDAC controller - you will not need to change the jumper setting. If your system already contains a factory-installed hard disk, the jumper setting of this hard disk ("**master**" drive) has to be changed as well as the jumper setting of the new hard disk to be installed ("**slave**" drive). In order to be able to change the jumper setting of the factory-installed hard disk, you may have to remove this hard disk from the mounting position. Be aware that once the hard disk drive has been installed, you will not be able anymore to reach the jumpers. Therefore, accuracy is required when checking the jumper setting.

In the following tables you will find the correct jumper settings for the hard disks which can be - or already have been - installed in your system. Refer to your particular type of hard disk in figure 1 at the end of this manual for the exact location of the jumpers.



**20 Mb\*/40 Mb (ST125A/ST157A)**

Hard disk used as:	Jumper J2
Single drive	jumper on pins 1-2 and 5-6
"Master" drive	jumper on pins 1-2 and 3-4
"Slave" drive	jumper on pin 3-4

\* The 20 Mb type is not suited for the installation in a Tulip 25 MHz system.

**40 Mb (8051A)**

Hard disk used as:	Jumper J4
Single drive	jumper on pin 1-3 *
"Master" drive	jumper on pin 5-6
"Slave" drive	jumper on pin 1-2

\* The hard disk may be shipped with a jumper on pin 1-3. This jumper has the same effect as if no jumpers were installed.

**40 Mb/100 Mb (CP344/CP3104)**

Hard disk used as:	Jumper DSP,C/D,HSP,ACT
Single drive	jumper on ACT and C/D
"Master" drive	jumper on ACT, C/D and DSP
"Slave" drive	jumper on ACT

## Hardware installation

After having done the necessary preparations, you may now start the actual installation procedure. Read the section that applies to your system. The figures referred to, you will find at the end of this manual.

### If you have a Tulip compact system

- 1 Turn off the computer and disconnect the AC power cable. Also switch off the peripherals.
- 2 Open the system unit according to the instructions given in the user's guide of your system.
- 3 Choose the mounting position for the new hard disk according to the following order of preference:
  - a) on top of the power supply in the rear part of the system unit (used as "single" or "master" drive).
  - b) below the floppy disk drive in the front part of the system unit (used as "slave" drive).
- 4 Disconnect the flat cable and the power supply cable (red, black, yellow) from any hard disk already installed.
- 5 To be able to reach the jumpers on any hard disk already installed, you should remove this hard disk from the mounting position. You should proceed according to the following instructions:

*For removing hard disk on top of power supply:*

Remove the four screws (two on either side) connecting the brackets to the top of the power supply. You can now lift up the hard disk with brackets attached.

*For removing hard disk below floppy disk drive:*

Remove the four screws (two on either side) connecting the hard disk to both sides of the package. You can now remove the hard disk from the package.
- 6 Check the jumper settings on the new hard disk and the hard disk to be reinstalled and make sure that they correspond to the new configuration. Refer to the tables in the section "Checking jumper settings" earlier in this manual for the correct jumper settings. For the location of the jumpers refer to your particular type of hard disk in figure 1 at the end of this manual.

- 7 Install the EDAC board (if not yet available) into one of the expansion slots according to the steps described in the instruction sheet that came with the EDAC package. If your system already contains an EDAC interface embedded on the main board, you will not need a separate EDAC board. Please remember that if your system standard has been equipped with a ST506 controller, this controller and the hard disk attached should be removed first.
- 8 Install the new hard disk into the appropriate position as described below:

*Installing on top of power supply:*

- 1) Choose the right pair of brackets to be tightened to your particular hard disk (refer to figure 4a or 4b).
- 2) Tighten the brackets to the hard disk (step 1 in figure 4a or 4b).
- 3) Use the other four screws to tighten the brackets, with hard disk attached, to the top of the power supply (step 2 in figure 4a or 4b).

*Installing below floppy disk drive:*

- 1) Choose the right pair of brackets to be tightened to your particular hard disk (refer to figure 5).
- 2) Tighten the brackets to the hard disk (step 1 in figure 5).
- 3) Slide the hard disk into the appropriate position and screw it to both sides of the package (step 2 in figure 5).

**Note**

If the floppy disk drive is being replaced by a new hard disk drive, you will need the cover plate that came with the assembly-kit.

- 9 Reinstall the hard disk you removed earlier.

- 10 Connect the hard disk(s) to the EDAC interface. Read the part that applies to your configuration.

*If your system has only one hard disk*

*(If you have installed an EDAC board)*

Attach the small flat cable to the 40-pin connector J1 (figure 8a) on the EDAC board and to the 40-pin connector (J1 or J2) on the hard disk (see **A** and **B** in figure 9a). Make sure that the colored side of the cable faces pin 1 of both connectors (see figure 9a). Also make sure that the cable for the hard disk LED is connected to J2 (figure 8a) on the EDAC board. Finally, check the jumper settings for J4 (figure 8a) on the EDAC board. The jumper should be set to pins 7-8 and 11-12, which is the factory-installed setting. Continue reading at step 11.

*(If the EDAC interface has been embedded on the main board)*

Attach the small flat cable to the 40-pin connector J25 (figure 8b) on the main board and to the 40-pin connector (J1 or J2) on the hard disk (see **A** and **B** in figure 9b). Make sure that the colored side of the flat cable faces pin 1 of both connectors (see figure 9b). If you have a **Tulip sx compact 2** also check the jumper setting of J18 (figure 8b); standard a jumper should be set to pin 29-30, which means that the embedded hard disk interface is enabled. Continue reading at step 11.

*If your system has two hard disks*

*(If you have installed an EDAC board)*

Attach the long flat cable to the 40-pin connector J1 (figure 8a) on the EDAC board and to the 40-pin connector (J1 or J2) on the hard disk (see **A** and **B** in figure 9c). To make sure that the colored side of the cable faces pin 1 of both connectors, you should fold the cable as shown in figure 9c). Also make sure that the cable for the hard disk LED is connected to J2 (figure 8a) on the EDAC board. Finally, check the jumper settings for J4 (figure 8a) on the EDAC board. The jumper should be set to pins 7-8 and 11-12, which is the factory-installed setting. Continue reading at step 11.

*(If the EDAC interface has been embedded on the main board)*

Attach the long flat cable to the 40-pin connector J25 (figure 8b) on the main board and to the 40-pin connector (J1 or J2) on the hard disk (see **A** and **B** in figure 9d). To make sure that the colored side of the cable faces pin 1 of both connectors, you should fold the cable as shown in figure 9d). If you have a **Tulip sx compact 2** also check the jumper setting of J18 (figure 8b); standard a jumper should be set to pin 29-30, which means that the embedded hard disk interface is enabled.

- 11 Attach the power supply cable (red, black, yellow) to connector J3 on the hard disk (you might have to use the adapter cable shipped with the retrofit package). Also reconnect the flat cable and power supply cable to the drive you have just reinstalled.
- 12 Close the system unit again according to the instructions given in the user's guide of your system.
- 13 Reconnect the AC power cable.

Continue reading the paragraph "*Software installation*".

## **If you have another Tulip desktop system**

- 1 Turn off the computer and disconnect the AC power cable. Also switch off the peripherals.
- 2 Open the system unit according to the instructions given in the user's guide of your system. To remove the front panel refer to figure 2. You will now have access to the package of the disk drive(s).
- 3 Choose the mounting position for the new hard disk according to the following order of preference:
  - a) lower front position beneath floppy disk drive (used as "single" or "master" drive).
  - b) upper front position beneath floppy disk drive (used as "slave" drive).
- 4 Disconnect the power supply cable (red, black, yellow) and flat cable from any drive in the package.
- 5 Follow the steps 1-4 illustrated in figure 7 to remove the clamping strap (you may need to use a screwdriver). After removing the clamping strap you can remove the package from the system unit.
- 6 Check the jumper settings of any hard disk already installed in the package. Refer to the tables in the section "*Checking jumper settings*" earlier in this manual for the correct jumper settings. To reach the jumpers, you can turn the package the other way around, provided that the hard disk has been installed in the lower front position; if not, you will have to remove the hard disk from the package.
- 7 Make sure the jumper settings on the new hard disk correspond to the new configuration. Refer to the tables in the section "*Checking jumper settings*" earlier in this manual for the correct jumper settings. For the location of the jumpers refer to your particular type of hard disk in figure 1 at the end of this manual.
- 8 Make sure the EDAC board has been installed into one of the expansion slots on the main board. If not, you should now install the EDAC board according to the steps described in the instruction sheet shipped with the EDAC package.
- 9 Choose the right pair of brackets to be tightened to your particular hard disk (refer to figure 6). Tighten the brackets to the hard disk by screwing them at both sides (step 1 in figure 6).
- 10 Slide the hard disk into the appropriate position and screw it to both sides of the package (step 2 in figure 6).

**Note**

If the floppy disk drive is being replaced by the new hard disk drive, you will need to attach the cover plate that came with the assembly-kit.

**11** Reinstall any hard disk you removed earlier into the package.

**12** Connect the hard disk(s) to the EDAC interface.

Attach the long flat cable to the 40-pin connector J1 (figure 8a) on the EDAC board and to the 40-pin connector (J1 or J2) on the hard disk (see **A** and **B** in figure 9e). To make sure that the colored side of the cable faces pin 1 of both connectors, you should fold the cable as shown in figure 9e). Also make sure that the cable for the hard disk LED is connected to J2 (figure 8a) on the EDAC board. Finally, check the jumper settings for J4 (figure 8a) on the EDAC board. The jumper should be set to pins 7-8 and 11-12, which is the factory-installed setting.

**13** Attach the power supply cable (red, black, yellow) to connector J3 on the hard disk (you might have to use the adapter cable shipped with the retrofit package). Also reconnect the flat cable and power supply cable to the drive(s) you removed earlier.

**14** Replace the package into the system unit.

**15** Replace the clamping strap.

**16** Replace the front panel and close the system unit again according to the instructions given in the user's guide of your system.

**17** Reconnect the AC power cable.

Continue reading the paragraph "*Software installation*".

## If you have a Tulip floor system

- 1 Turn off the computer and disconnect the AC power cable. Also switch off the peripherals
- 2 Make sure the system unit is positioned horizontally.
- 3 Open the system unit according to the instructions given in the user's guide of your system. To remove the front panel refer to figure 2. You will now have access to the package of the disk drive(s).
- 4 Choose the mounting position for the new hard disk according to the following order of preference:

*If you are installing in the right part of the system unit:*

- a) lower front position beneath floppy disk drive (used as "single" or "master" drive).
- b) upper front position beneath floppy disk drive (used as "slave" drive).

*If you are installing in the left part of the system unit\*:*

- a) lower back position (used as "single" or "master" drive).
  - b) upper back position (used as "slave" drive).
  - c) lower front position (used as "single" or "master" drive).
  - d) upper front position (used as "slave" drive).
- 5 Disconnect - if you are installing in the left part - the AC power cable(s) from the package(s). Also disconnect the power supply cable (red, black, yellow) and flat cable of any drive already installed in the package.
  - 6 If you intend to install the hard disk in the left part of the system unit, refer to the instructions in your user's guide to remove the clamping strap(s). If, however, you are installing in the right front part, follow the steps 1-4 in figure 7 to remove the clamping strap (you may need to use a screwdriver). After removing the clamping strap you can remove the package from the system unit.
  - 7 Check the jumper setting of any hard disk already installed in the package. Refer to the tables in the section "*Checking jumper settings*" earlier in this manual for the correct jumper settings. To reach the jumpers, you can turn the package the other way around, provided that the hard disk has been installed in the lower front position; if not, you should remove the hard disk to reach the jumpers.

\* *It is advisable to use the mounting positions in the left part of your system **only** in case the positions at the right are not available any more.*



- 8 Make sure the jumper settings on the new hard disk correspond to the new configuration. Refer to the tables in the section "Checking jumper settings" earlier in this manual for the correct jumper settings. For the location of the jumpers refer to your particular type of hard disk in figure 1 at the end of this manual.
- 9 Make sure, the EDAC board has been installed into one of the expansion slots on the main board. If not, you should now install the EDAC board according to the steps described in the instruction sheet shipped with the EDAC package.
- 10 Choose the right pair of brackets to be tightened to your particular hard disk (refer to figure 6). Tighten the brackets to the hard disk by screwing them at both sides (step 1 in figure 6).
- 11 Slide the hard disk into the appropriate position and use the other screws to tighten the hard disk to both sides of the package (step 2 in figure 6).

#### Note

If the floppy disk drive is being replaced by the new hard disk drive, you will need to attach the cover plate that came with the assembly-kit.

- 12 Reinstall any hard disk you removed earlier into the package.
- 13 Connect the hard disk(s) to the EDAC interface.

Attach the long flat cable to the 40-pin connector J1 (figure 8a) on the EDAC board and to the 40-pin connector (J1 or J2) on the hard disk (see A and B in figure 9e or 9f, depending on whether you are installing in the right or in the left part of the system unit). To make sure that the colored side of the cable faces pin 1 of both connectors, you should fold the cable as shown in figure 9e or 9f. Also make sure that the cable for the hard disk LED is connected to J2 (figure 8a) on the EDAC board. Finally, check the jumper settings for J4 (figure 8a) on the EDAC board. The jumper should be set to pins 7-8 and 11-12, which is the factory-installed setting.

- 14 Attach the power supply cable (red, black, yellow) to connector J3 on the hard disk (you might have to use the adapter cable shipped with the retrofit package). Also reconnect the flat cable and power supply cable to the drive(s) you removed earlier.
- 15 Replace the package into the system unit.

- 16 Replace the clamping strap(s).
- 17 Reconnect the AC power cable(s) of the package(s).
- 18 Replace the front panel and close the system unit again according to the instructions given in the user's guide of your system.
- 19 Reconnect the AC power cable.

---

## Software installation

The installation of your hard disk has now been completed. You should run the Diagnostics program to indicate the new system configuration to your computer. When running Diagnostics you are asked to enter the type number of hard disk drive C (master drive) and drive D (slave drive). The table below contains the type number of all AT-embedded hard disks which can be installed into your **Tulip** computer.

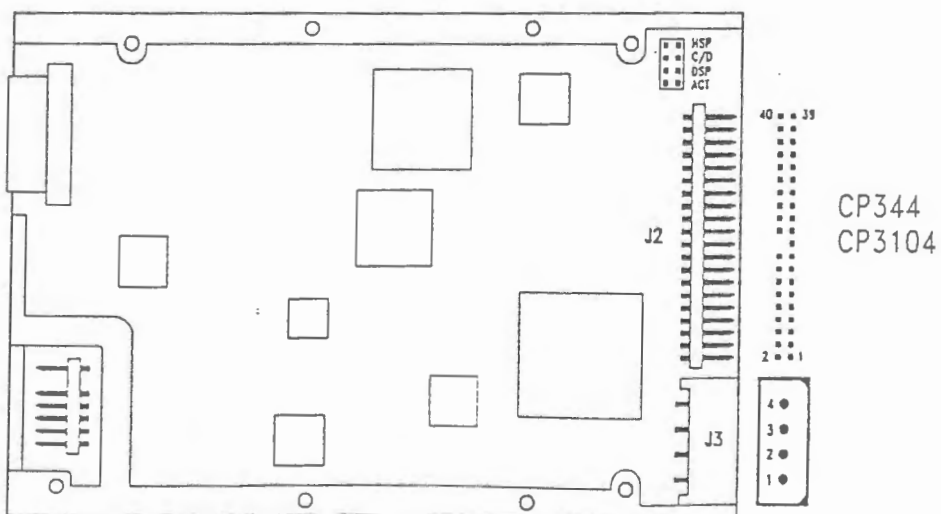
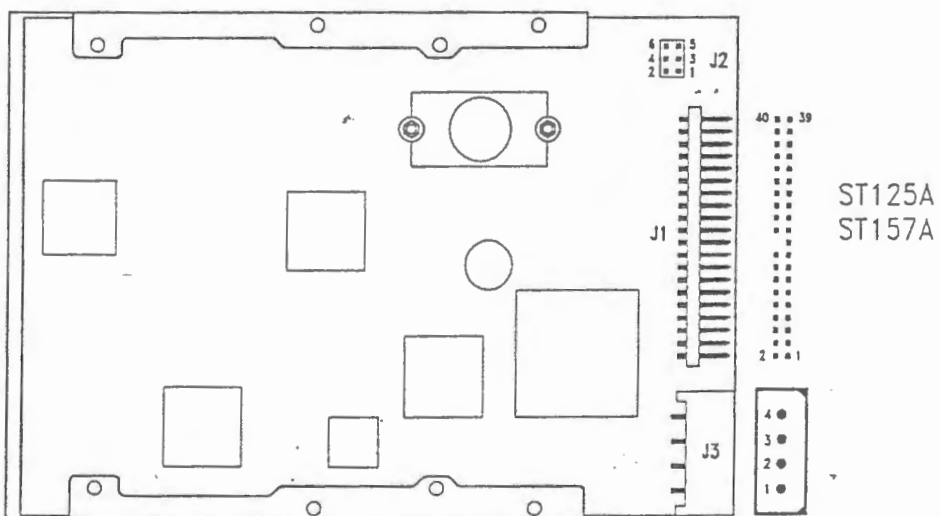
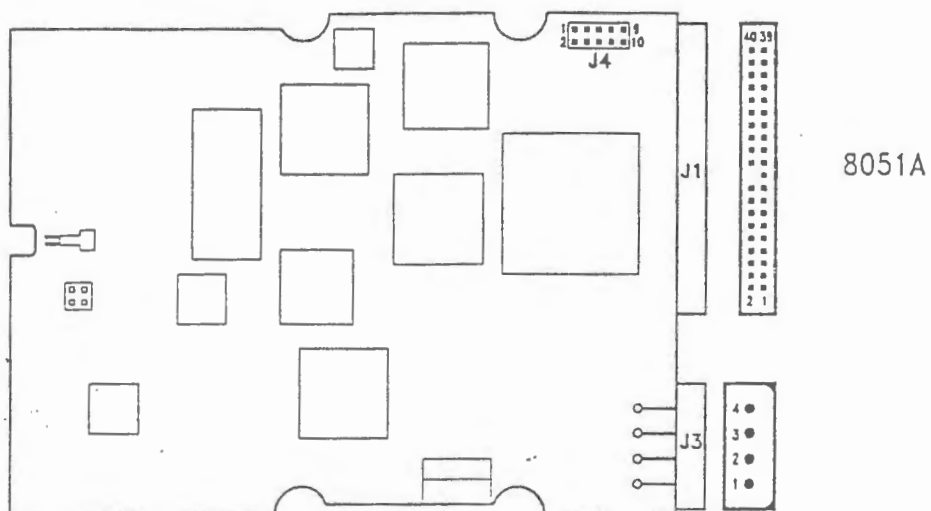
Hard disk	Type number
20 Mb	2
40 Mb	17
100 Mb	34*/43

- \* Preferably type 34.  
If you have a system where type 34 is not a valid option (reserved), you can try type 48 to choose for: 1002 Cyl, 12 Heads, 17 sec/tr. If this is an invalid option as well, you will have to choose type 43 (94 Mb).

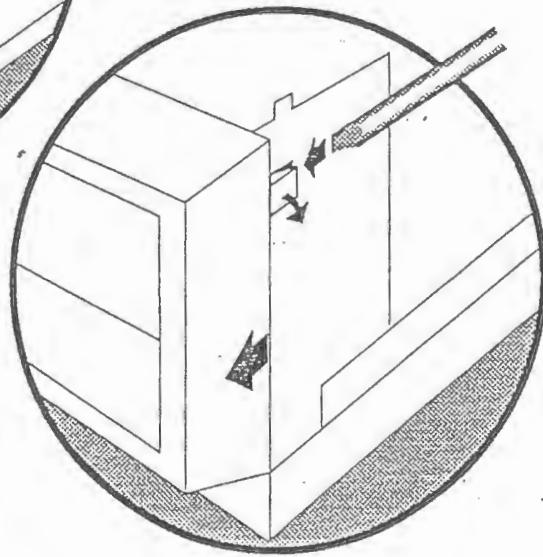
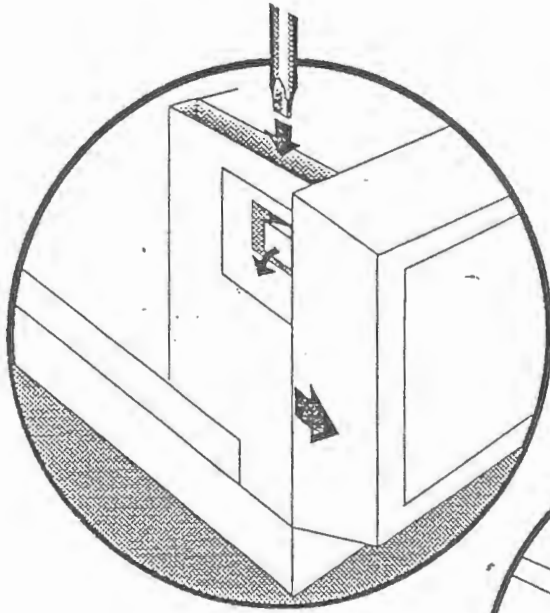
### Note

If you have a **Tulip at compact 3** you should also enable the "System Hard Disk Controller" option in Diagnostics.

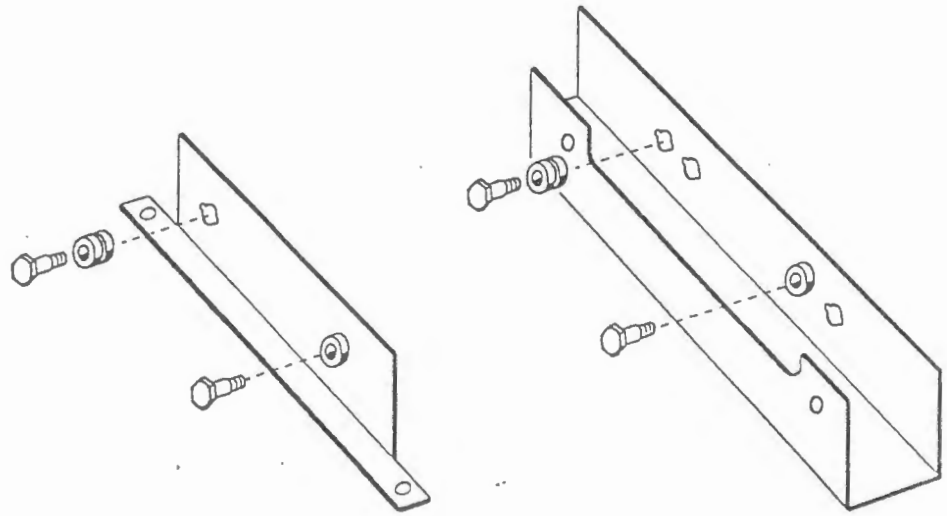
1



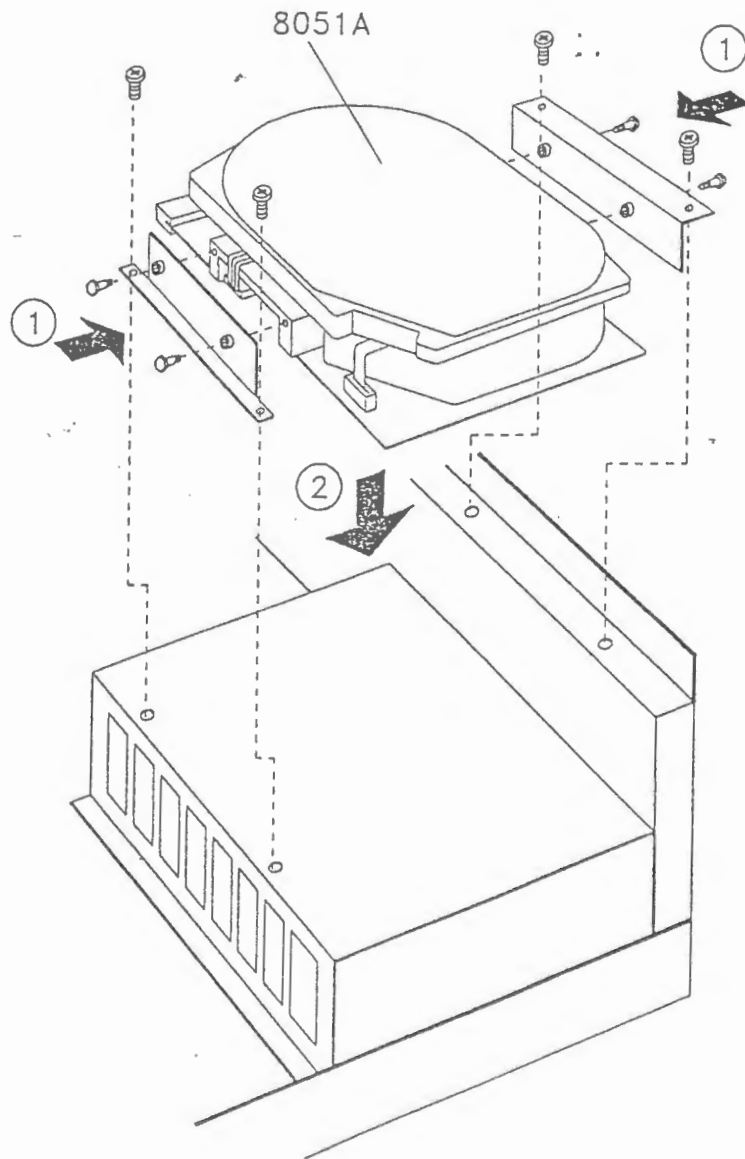
2、



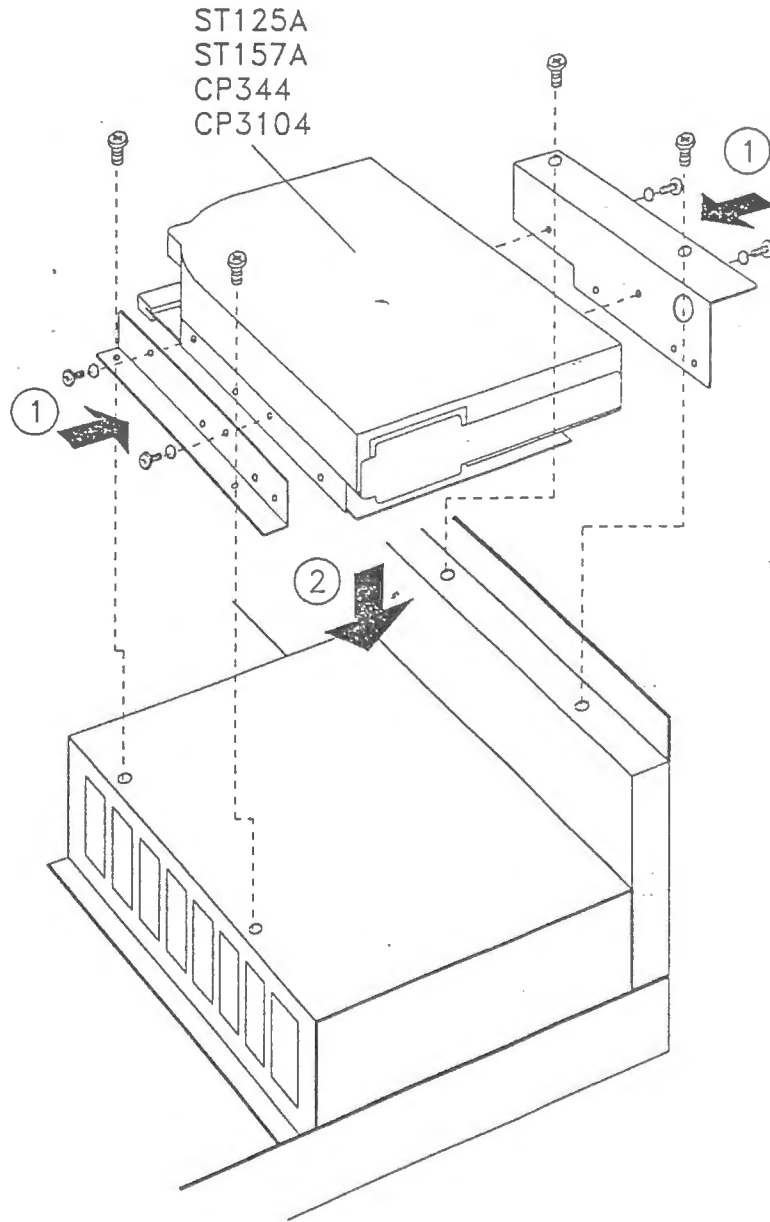
3



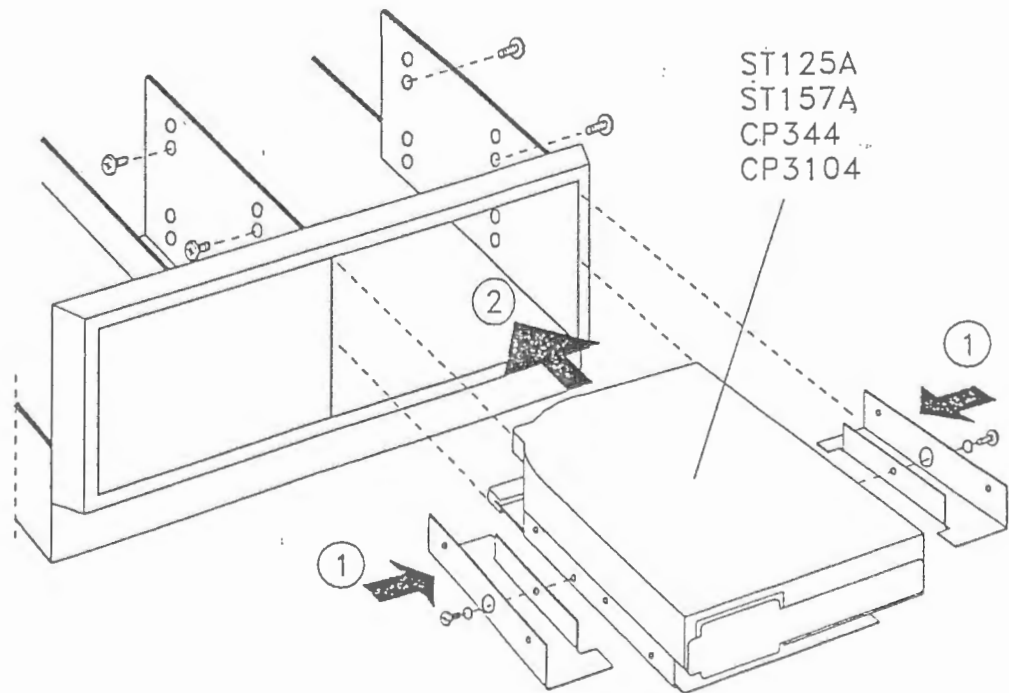
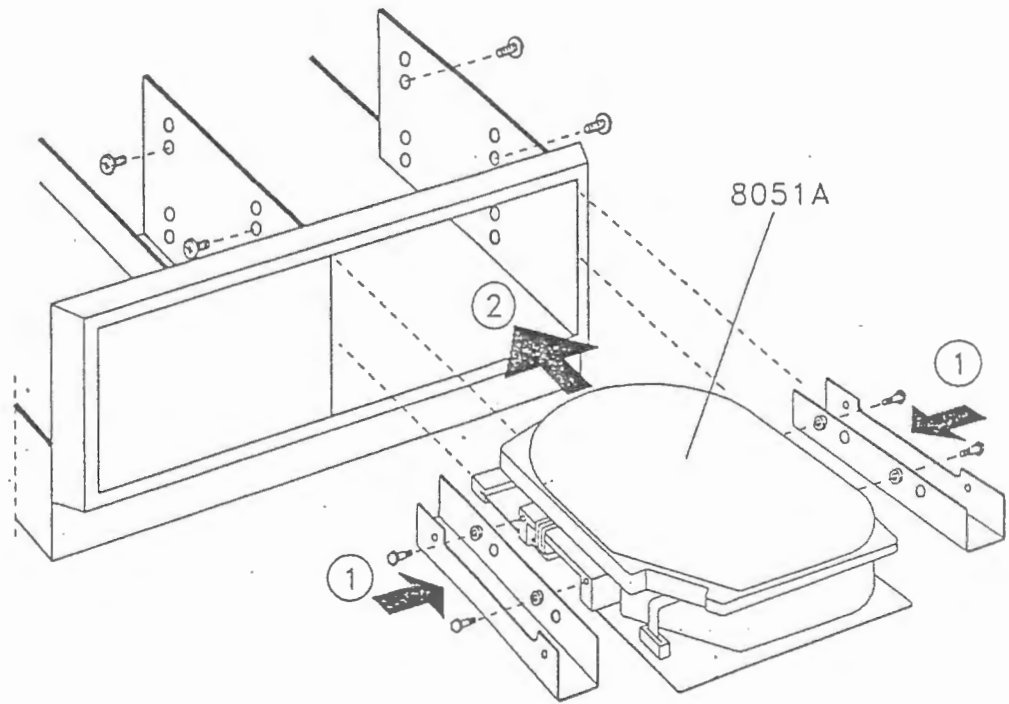
4a



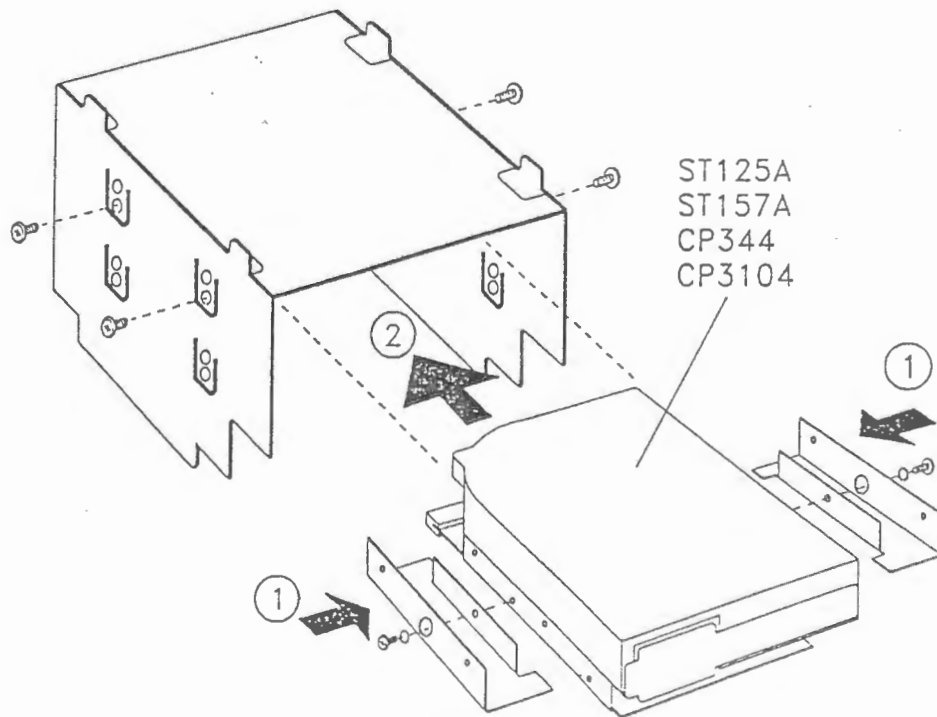
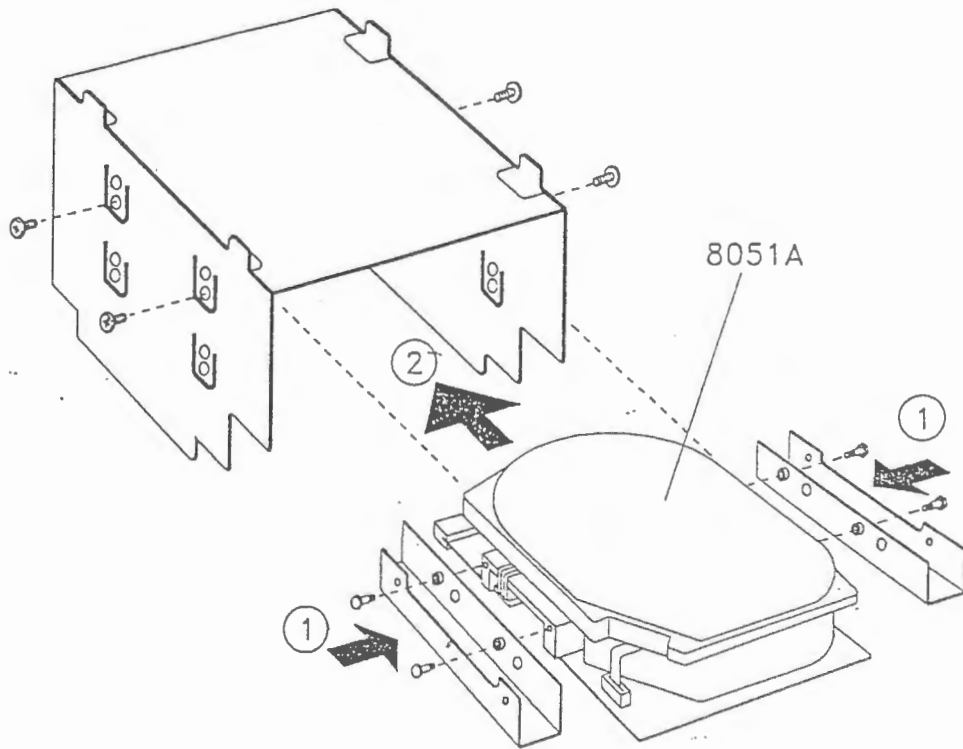
4b



5

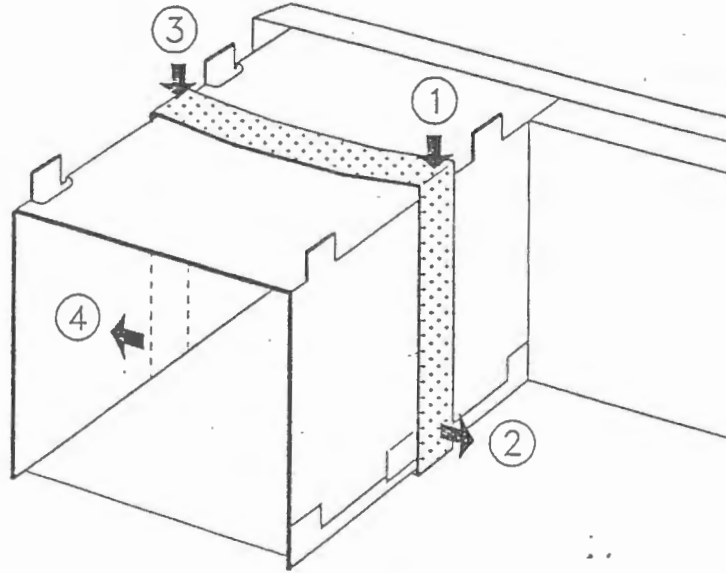


6

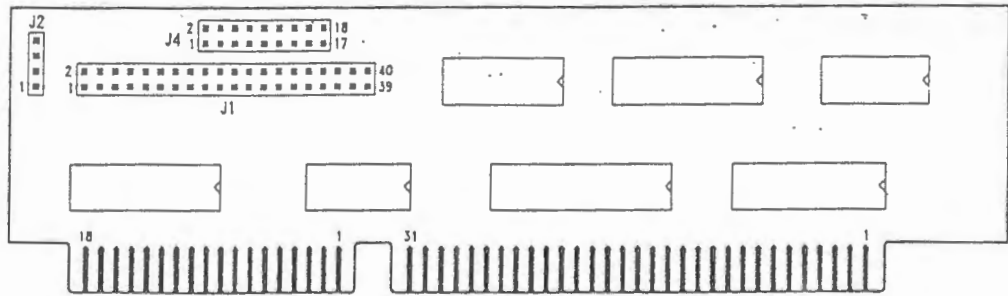




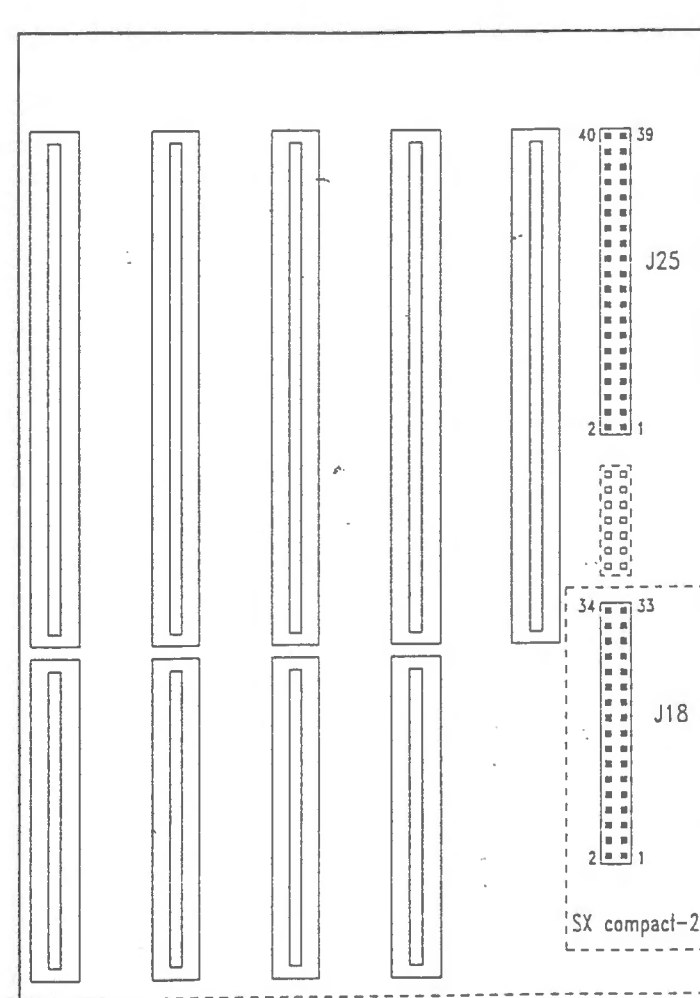
7



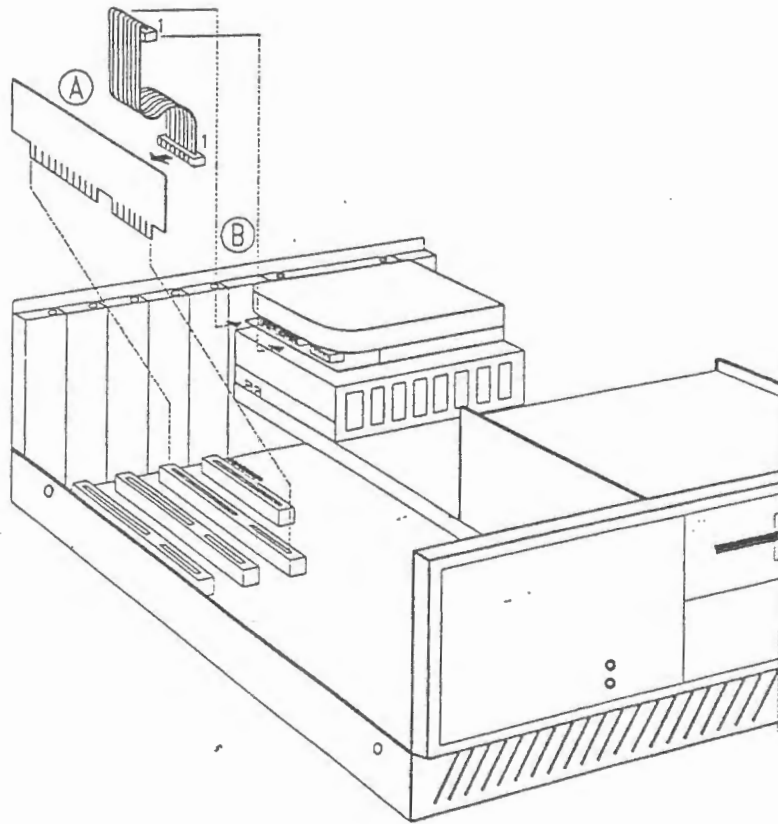
8a



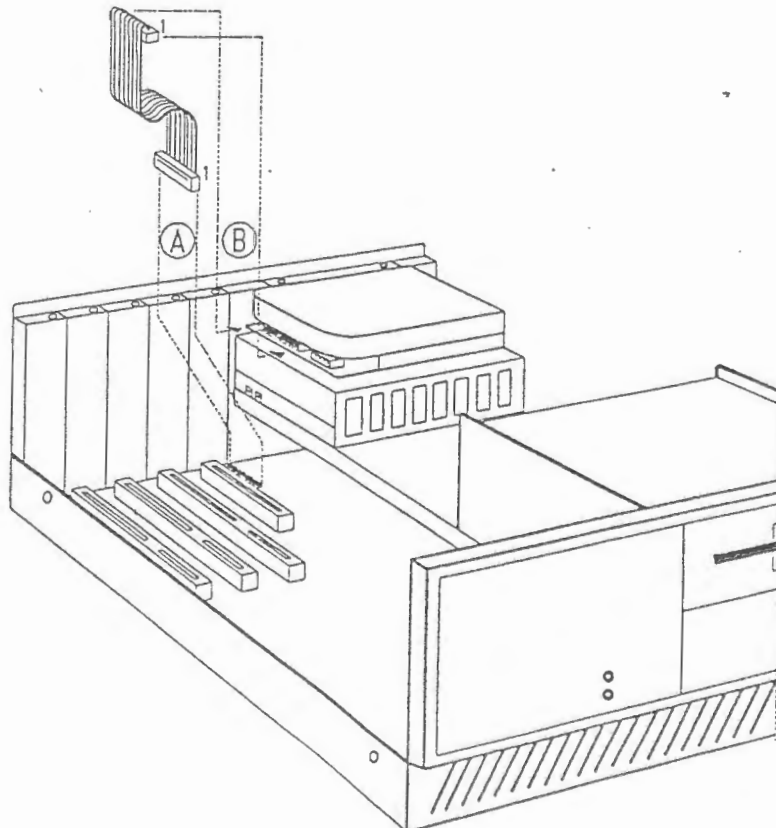
8b



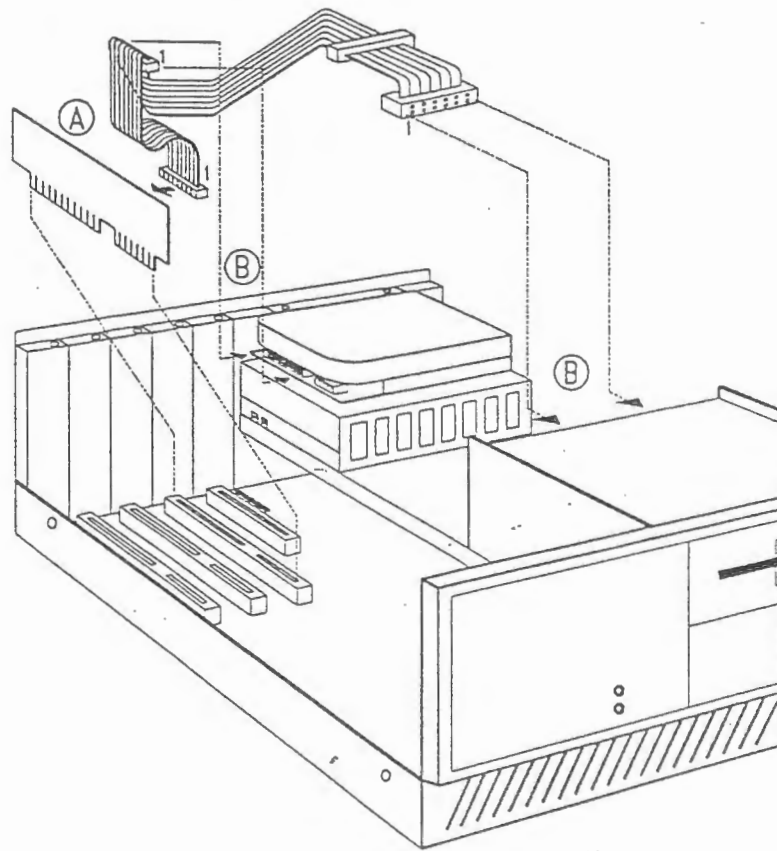
9a



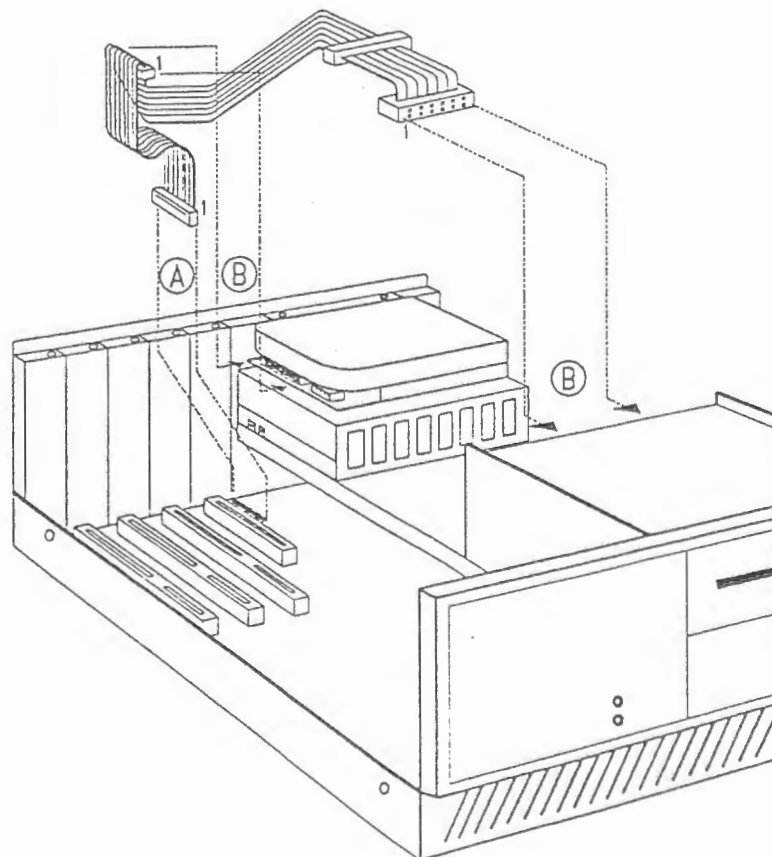
9b



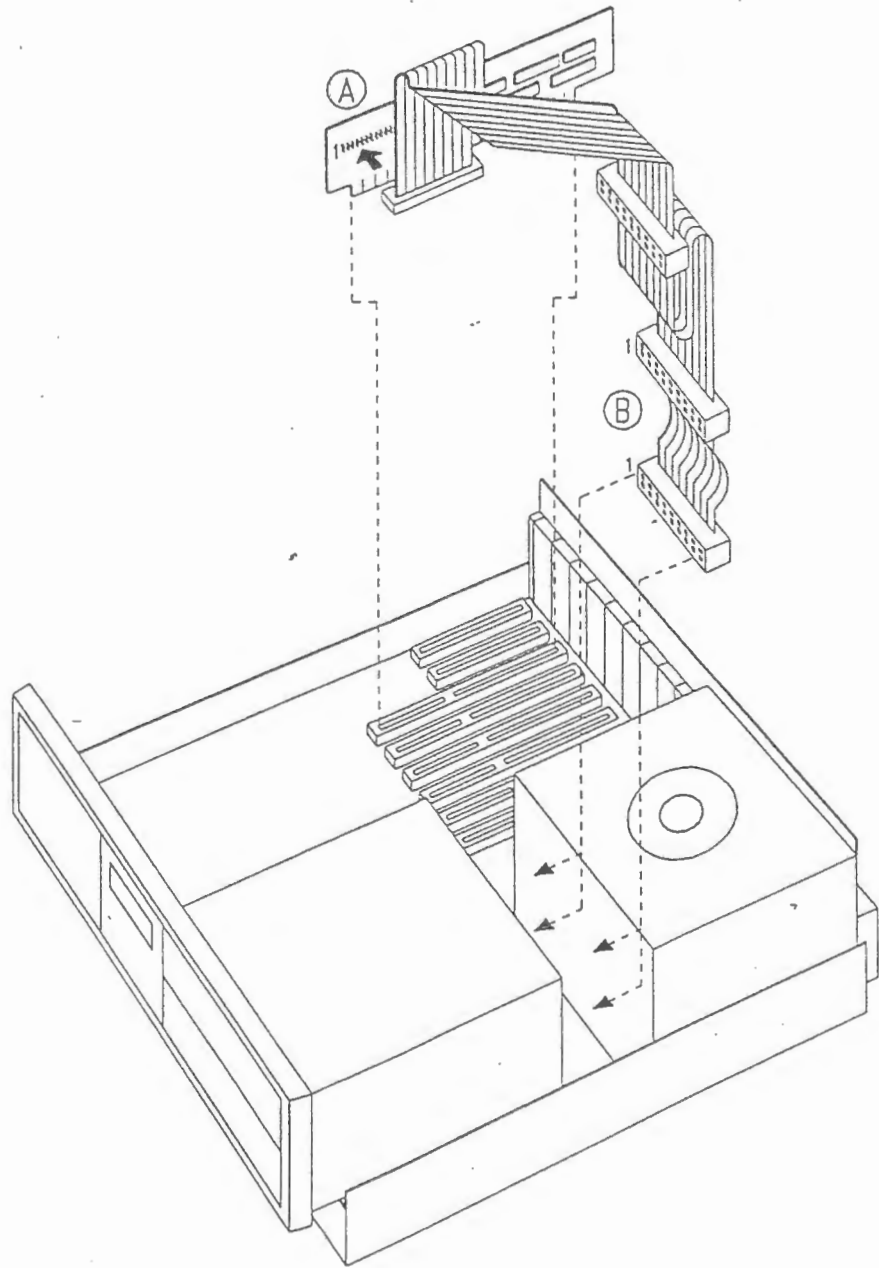
9c



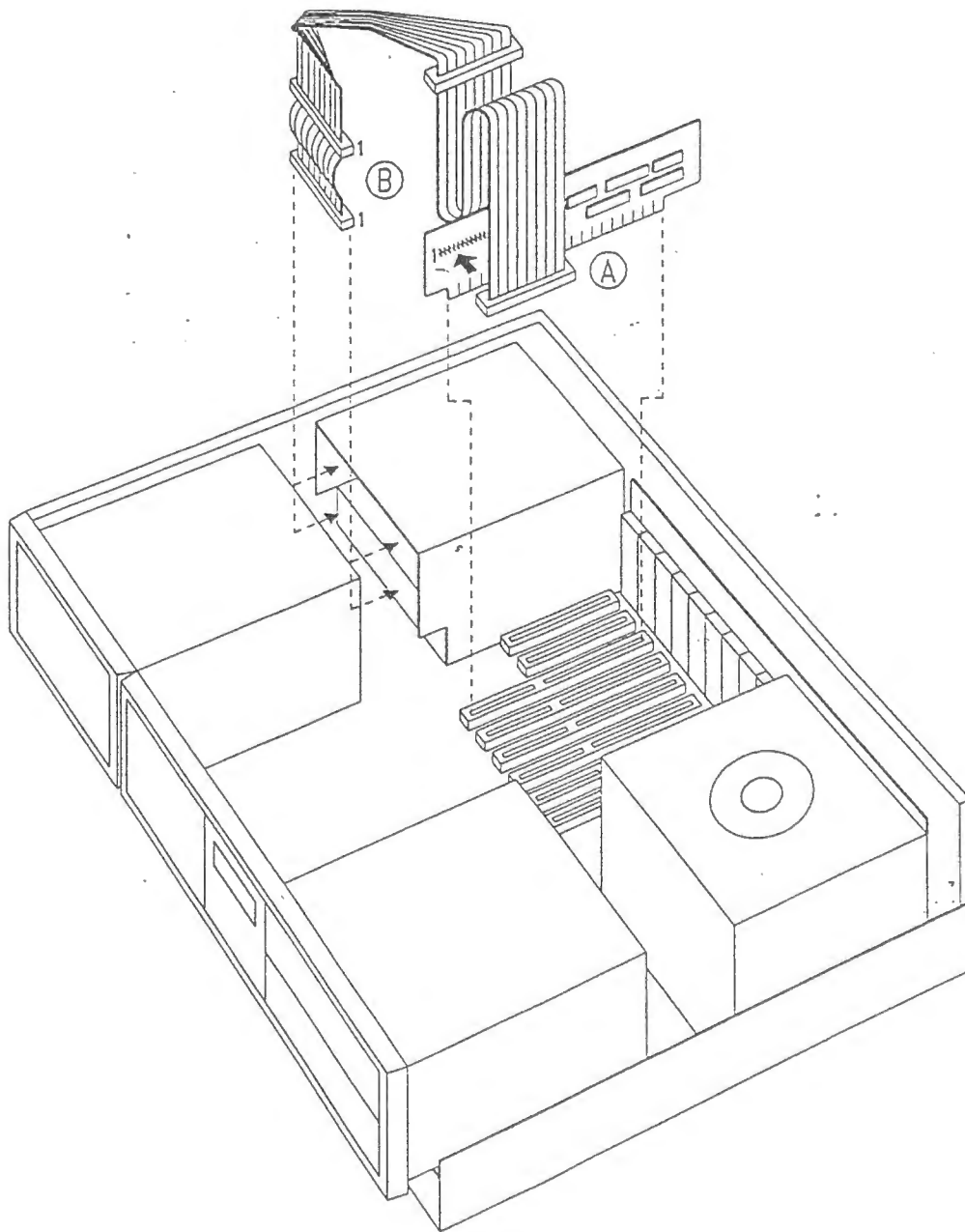
9d



9e



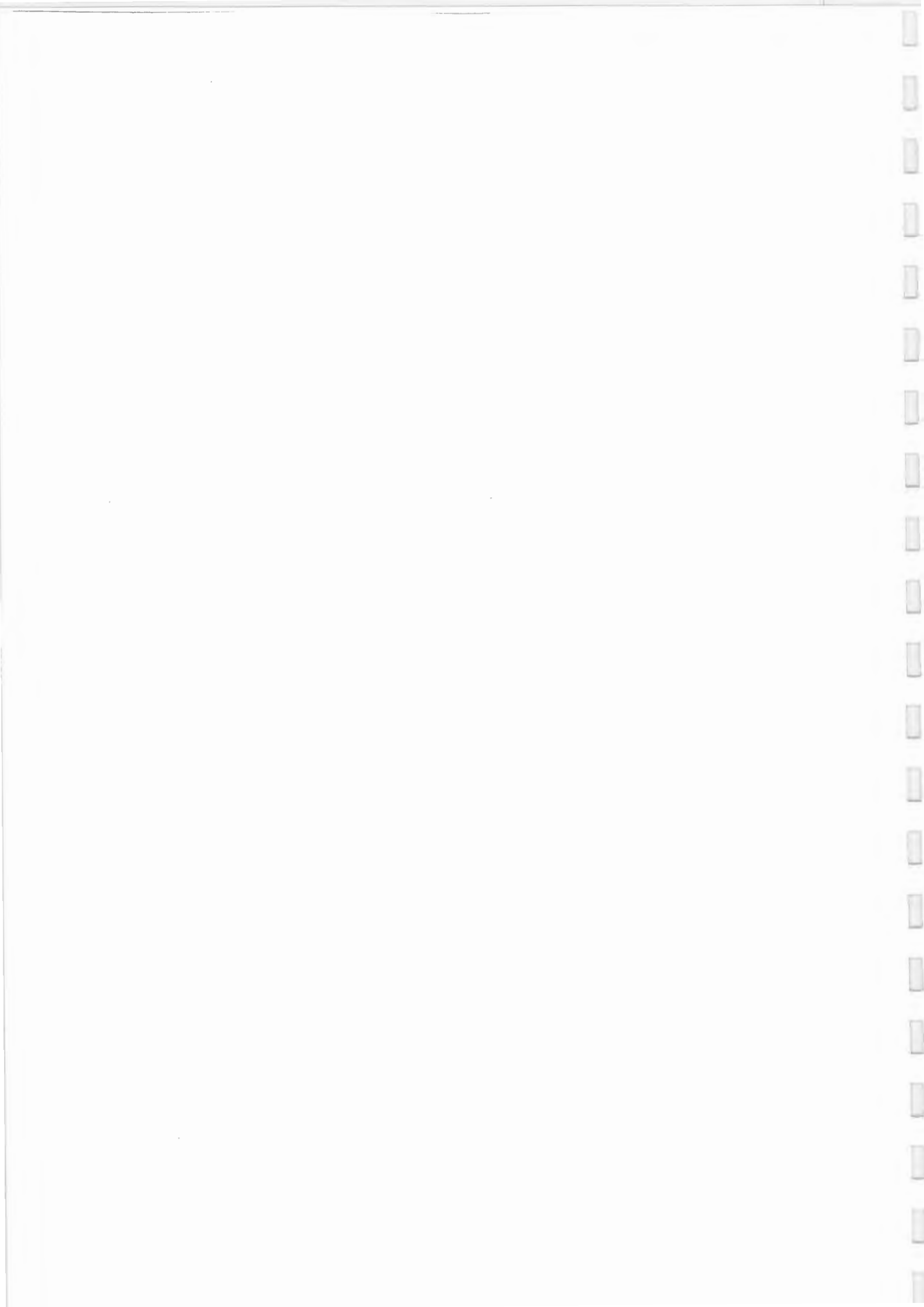
9f



INSTALLEREN TWEDE HARDDISK

COMPUTER	HARDDISK	TYPE	INTERLEAVE	ACCESSTIME	HARDDISKCONTROLLER	2 HDISK INSTALLEREN
LAPTOP 286	CONNER 20 MB	2	1-1	27 MS	EMBEDDED HDISK	N.V.T
	CONNER 40 MB	17	1-1	27 MS	EMBEDDED HDISK	
PC-COMPACT2	MINISCRIBE 8425 20 MB 3.5"	2	6	68 MS	WESTERN DIGITAL WD 1002 WX1 ( 8 BITS ) WD 1004 A-WX1 F003	MASTER J7 15-16 SLAVE 13-14
	SEAGATE ST 125 20 MB 3.5"	2	4/3 +	35 MS		
AT-COMPACT2	SEAGATE ST 125 20 MB 3.5"	6	2	35 MS	WESTERN DIGITAL WD 1003 WAH EMBEDDED HDISK	MASTER 1-2 / 3-4 SLAVE 3-4
	SEAGATE ST 125A 20 MB 3.5"	2	1-1	28 MS		
	TOSHIBA MK134FA 40 MB 3.5"	21	2	25 MS	WD 1003 WAH WD 1003 V-MM1 F001 EMBEDDED HDISK	MASTER DS1 SLAVE DS2 MASTER J4 5-6 / 1-2 SLAVE J4 1-2
	MINISCRIBE 8051A 40 MB 3.5"	17	1-1	28 MS		
	CONNER CP 344 40 MB 3.5"	17	1-1	29 MS	EMBEDDED HDISK	MASTER ACT/CD/DSP SLAVE HSP
	SEAGATE ST157A 40 MB 3.5"	17	1-1	28 MS	EMBEDDED HDISK	MASTER 1-2 / 3-4 SLAVE 3-4
	SX-COMPACT2	SEAGATE ST-125 20 MB 3.5"	6	2	35 MS	WESTERN DIGITAL WD 1003 WAH WD 1003 V-MM1 F001 EMBEDDED HDISK
SEAGATE ST125A 20 MB 3.5"		2	1-1	28 MS		
TOSHIBA MK134FA 40 MB 3.5"		21	2	25 MS	WD 1003 WAH WD 1003 V-MM1 F001 EMBEDDED HDISK	MASTER DS1 SLAVE DS2 MASTER J4 5-6/ 1-2 SLAVE J4 1-2
MINISCRIBE 8051A 40 MB 3.5"		17	1-1	28 MS		
CONNER CP-344 40 MB 3.5"		17	1-1	29 MS	EMBEDDED HDISK	MASTER ACT/CD/DSP SLAVE HSP
SEAGATE ST157A 40 MB 3.5"	17	1-1	28 MS	EMBEDDED HDISK	MASTER 1-2/ 3-4 SLAVE 3-4	
1	MICROSCIENCE 80 MB 5.25"	37*	2	28 MS	WD 1003 WAH WD 1003 V-MM1 F001 EMBEDDED HDISK	MASTER SW1: 1=ON SLAVE SW1: 2=ON MASTER ACT/CD/DSP SLAVE HSP
	CONNER CP-3104 100 MB 3.5"	34** 48	1-1	25 MS		
AT 386sx	TOSHIBA MK134FA 40 MB 3.5"	21	2	25 MS	WESTERN DIGITAL WD 1003 WAH WD 1003 V-MM1 F001 EMBEDDED HDISK	MASTER DS1 SLAVE DS2
	SEAGATE ST157A 40 MB 3.5"	17	1-1	28 MS		
	MICROSCIENCE 80 MB 5.25"	37*	2	28 MS	WD 1003 WAH WD 1003 V-MM1 F001 EMBEDDED HDISK	MASTER SW1: 1=ON SLAVE SW1: 1=ON MASTER ACT/CD/DSP SLAVE HSP
	CONNER CP 3104 100 MB 3.5"	34** 48	1-1	25 MS		
	MICROPOLIS 150 MB 5.25"		1-1	16 MS	DCB	ZIE TI
AT 386/25	SEAGATE ST157A 40 MB 3.5"	17	1-1	28 MS	EMBEDDED HDISK	MASTER 1-2/ 3-4 SLAVE 3-4
	MICROSCIENCE 80 MB 5.25"	37*	2	28 MS	WD 1003 V-MM1 F001	
	CONNER CP 3104 100 MB 3.5"	34** 48	1-1	25 MS	EMBEDDED HDISK	MASTER SW1: 1=ON SLAVE SW1: 2=ON MASTER ACT/CD/DSP SLAVE HSP
	MICROPOLIS 150 MB 5.25"		1-1	16 MS	DCB	ZIE TI
	TR 386/25	MICROSCIENCE 80 MB 5.25"	37*	2	28 MS	WD 1003 V-MM1 F001
CONNER CP 3104 100 MB 3.5"		34** 48	1-1	25 MS	EMBEDDED HDISK	
MICROPOLIS 330 MB 5.25"			1-1	18 MS	DCB	MASTER ACT/CD/DSP SLAVE HSP ZIE TI

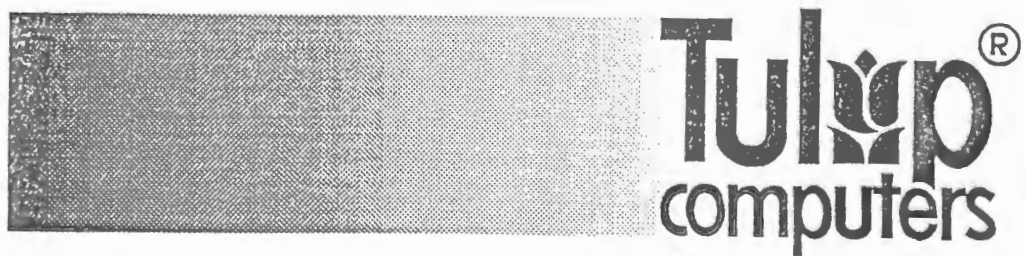
\* MICROSCIENCE TYPE 37 ONDER DOS EN MET NOVELL DRIVER, ONDER ELS 1 EN 2 KIEZEN VOOR TYPE 42 (62 MB)  
 \*\* CONNER 100 MB TYPE 34 MET JUNI 89 BIOS, 1 ALS OPTIE MOGELIJK, + AFHANKELIJK TYPE HDISK CONTROLLER





---

RETROFIT SET SCSI HARD DISKS



## DISCLAIMER

This manual describes a product of Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind. Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual. If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual. The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for *backup* purposes. Tulip Computers may change or improve the product and this manual at any time without previous warning.

## TRADEMARKS

Product or manufacturer names mentioned herein may be (registered) trademarks of their respective companies.

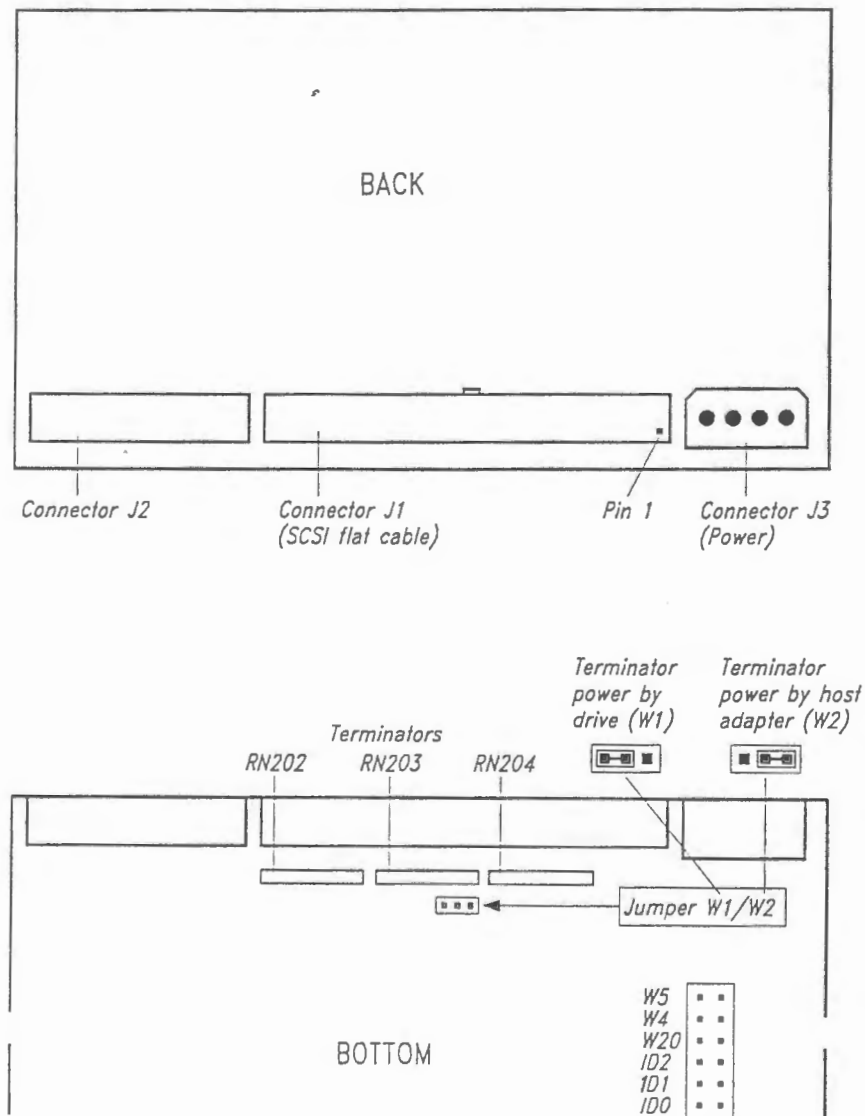
*No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, recording, photocopying, or otherwise, without the prior written permission of the publisher.*

© Copyright 1990, Tulip Computers.  
Part number: 07-212503-01  
Paper: 503U/200  
Issue date: August 1990

Issued by:  
Tulip Computers  
P.O.Box 3337  
5203 DH 's-Hertogenbosch  
The Netherlands

## 330 Mb HARD DISK

In chapter 2 of the manual "Retrofit set SCSI hard disks", shipped with your hard disk, you will find information on how to install a 330 Mb hard disk. The figure of the 330 Mb hard disk in the manual corresponds to only one of the two 330 Mb hard disk types available. The figure below shows the other type. Check which figure corresponds to your type of hard disk. For further information on the installation procedure refer to chapter 2 of the manual mentioned above.



# CONTENTS

<b>Introduction</b>	7
What you need	8
Configurations	8
<b>1 Installing a 150 Mb hard disk</b>	10
Preparations	10
Jumper settings W1/W2 and W9	10
Jumper settings SCSI device ID	11
Interface termination (RN9)	11
Installing the hard disk	13
Installation procedure for floor models	14
Installation procedure for desktop models	16
<b>2 Installing a 330 Mb hard disk</b>	19
Preparations	19
Jumper settings W1/W2 and W4	19
Jumper settings SCSI device ID	20
Interface termination (RN202+RN203+RN204 or RN9)	20
Installing the hard disk	24

<b>3 Installing a 660 Mb hard disk</b> _____	25
Preparations _____	25
Jumper settings W1/W2 and W4 _____	25
Jumper settings SCSI device ID _____	26
Interface termination (RN9) _____	26
Installing the hard disk _____	28

## Illustrations

<i>Figure 1: SCSI hard disk 150 Mb</i> _____	12
<i>Figure 2: Removing tr-front panel</i> _____	14-15
<i>Figure 3: Removing at-front panel</i> _____	16-17
<i>Figure 4: Removing the clamping strap</i> _____	18
<i>Figure 5A: SCSI hard disk 330 Mb (Full Height Model A)</i> _____	21
<i>Figure 5B: SCSI hard disk 330 Mb (Full Height Model B)</i> _____	22
<i>Figure 5C: SCSI hard disk 330 Mb (Half Height Model)</i> _____	23
<i>Figure 6: SCSI hard disk 660 Mb</i> _____	27

## INTRODUCTION

This manual describes the installation of SCSI hard disks with a capacity of 150 Mb, 330 Mb or 660 Mb.

*As the installation of the hard disks requires utmost precision, it is advisable to have it realized by experienced persons only.*

These drives can be installed in Tulip desktop (**at**) models or floor (**tr**) models. (**Not** in *compact 2* models)

Examples of Tulip computer models in which these hard disks can be installed, are:

**Tulip at 386<sup>sx</sup>**  
**Tulip at 386/25**  
**Tulip tr 386<sup>sx</sup>**  
**Tulip tr 386/25**  
**Tulip tr 486.**  
**Tulip tr 486<sup>e</sup>**

Two different SCSI hard disk controller cards which can be used for these high capacity hard disks, are available:

- SCSI-plus controller
- DCB (Disk Coprocessor Board). (For use in Novell NetWare environment only.)

For the installation of the controllers mentioned above refer to the manuals delivered with the controller board.

Note that there is a limit in the number of combinations of controllers which can be used together in one system. Check the following table for the possible combinations.

Controllers	ST506	EDAC*	SCSI-Plus	DCB
ST506	O	O	X	X
EDAC	O	O	X	X
SCSI-Plus	X	X	X	X
DCB	X	X	X	X

O = Can NOT be combined

X = Can be combined

\* = Controller for embedded AT-hard disk

---

## What you need

To install one of the hard disks mentioned, you will need:

- controller + flat cable (3 connectors for desktop model; 5 connectors for floor model)
- the hard disks
- 4 screws (per hard disk)
- cover plate for hard disk <sup>1)</sup>

---

## Configurations

Before you start installing the hard disk, you should determine the right mounting position (upper or lower position in the system unit), which of course depends on both the type of your computer model and the number and the type of drives already installed in your computer.

<sup>1)</sup> The cover plate will only be required if the front of the hard disk juts out of the front of the machine.

The following table lists the possible configurations for several types of Tulip computer systems.

Model	Possible configurations
at 386 <sup>sx</sup> , at 386/25	1 x full-height (330 or 660 Mb) or 2 x half-height (150 Mb)
tr 386 <sup>sx</sup> , tr 386/25, tr 486, tr 486 <sup>e</sup>	Several combinations (maximum of 4 half-height drives connected to one flat cable)

### Important

Do not start with the installation procedure until you have checked the correct jumper settings on the hard disk. It is impossible to reach the jumpers once the drive has been installed.

If you are installing a 150 Mb hard disk you should read chapter 1. For installation instructions of 330 Mb or 660 Mb hard disks, please refer to chapter 2 and 3 respectively.



# 1 INSTALLING A 150 Mb HARD DISK

## Preparations

Before you actually start the installation procedure, some preparations to the hard disk have to be carried out. Please check:

- the setting of jumper W1/W2 (Termination power)
- the setting of jumper W9 (Parity check)
- the setting of jumpers ID0, ID1 and ID2 (SCSI ID)
- the presence/absence of RN9 (terminator)

### Jumper settings W1/W2 and W9

First of all you should check the setting of the jumpers located at the back and at the bottom of the drive (refer to figure 1 for the exact locations of the jumpers). Incorrect jumper settings may cause improper operation of the drive. In the table below you will find the settings for the jumpers W1/W2 and W9 both for systems with DCB and for systems with SCSI-plus adapter.

Jumper	DCB	SCSI-plus
W1/W2	position W1 <sup>2)</sup>	position W2 <sup>1)</sup>
W9	installed <sup>3)</sup>	not installed <sup>4)</sup>

- 1) Termination power provided by host adapter
- 2) Termination power provided by drive
- 3) Bus parity check disabled
- 4) Bus parity check enabled (Also check jumper setting on SCSI-plus adapter.)

**CAUTION**

If terminator power is to be supplied by host adapter (SCSI-plus), first check fuse on SCSI-plus board. If, for any reason the fuse has blown, no terminator power will be provided. In that case make sure that terminator power is supplied by drive only. This also means that jumper W1/W2 has to be set to position W1.

Be aware that once the hard disk drive has been installed, you will not be able anymore to reach the jumpers. Therefore accuracy is required when checking the jumper settings.

**Jumper settings SCSI device ID**

Connector J2 contains three ID jumper positions, which are used to assign one of the eight SCSI ID's (0-7) to the drive. In multiple-device systems, each drive must have its own unique ID bit. Default the drives are configured as SCSI ID 0 (no jumper installed). Depending on the ID setting of the drives already installed, please choose one of the settings listed in the following table:

SCSI ID	position ID0	position ID1	position ID2
0	-	-	-
1	in	-	-
2	-	in	-
3	in	in	-
4	-	-	in
5	in	-	in
6	-	in	in
7 *	in	in	in

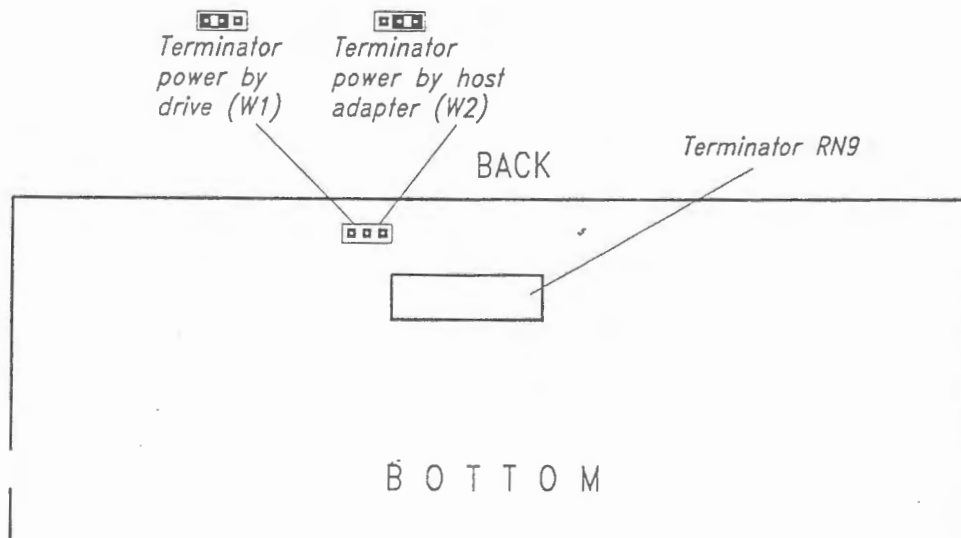
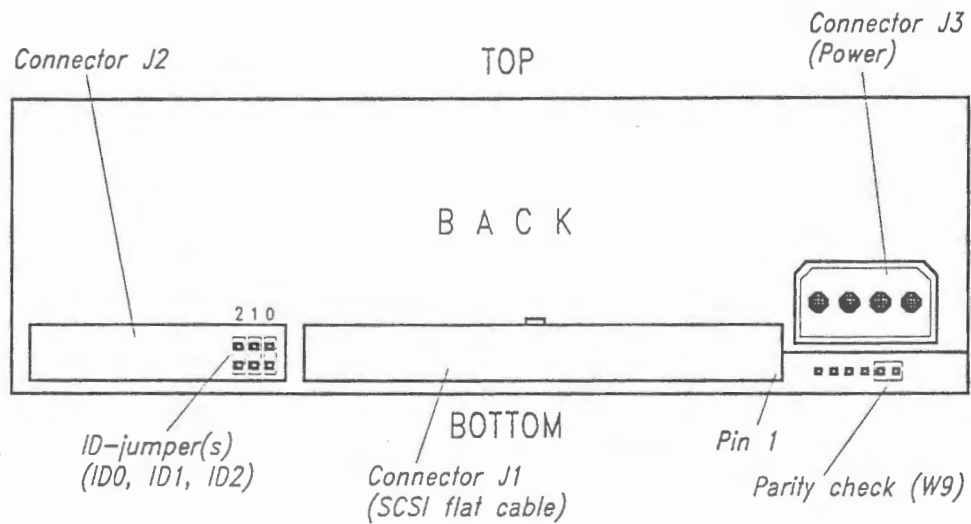
\* Default setting host adapter

**Interface termination (RN9)**

If the 150 Mb hard disk will **NOT** be installed as the **last** disk connected to the SCSI flat cable, (i.e. when you have more than one drive connected) you have to remove the interface terminator RN9. (Please refer to figure 1 for the location of RN9.) Only if the hard disk is the **last** disk connected to the flat cable, terminator RN9 must be installed.

The interface terminator provides proper termination for the SCSI-bus.

Figure 1: SCSI hard disk 150 Mb



On the following pages the installation of the 150 Mb hard disk in a Tulip desktop model and in a floor model will be described separately.

---

## Installing the hard disk

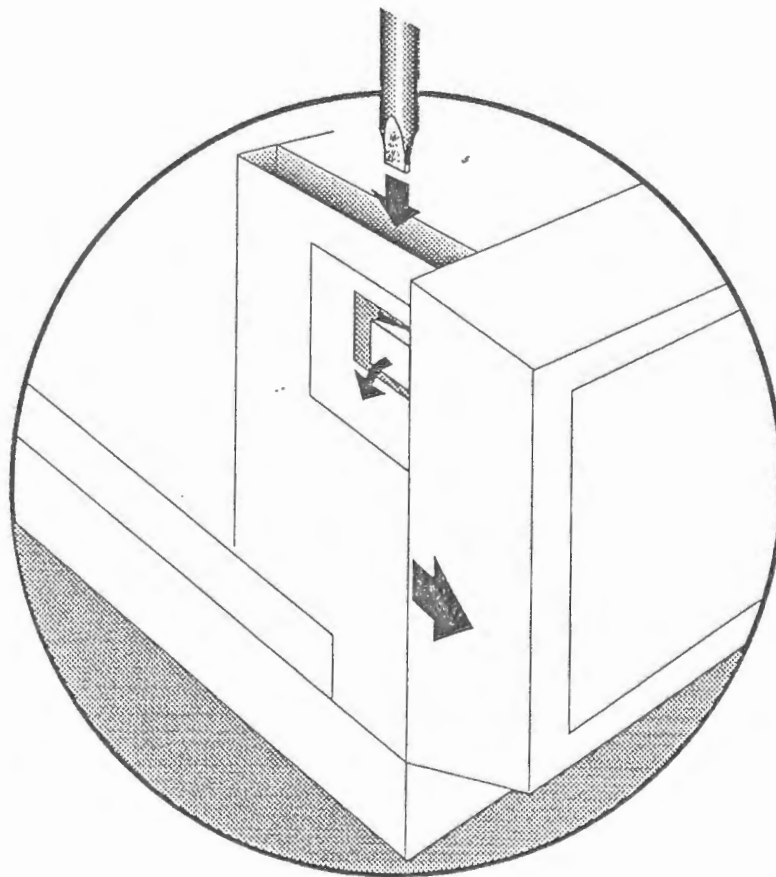
After having checked and set the jumpers (also consult figure 1) you can start the actual installation procedure. There is a slight difference between the installation in a desktop (**at**) model and in a floor (**tr**) model. Both ways will be described separately. For those having a Tulip desktop (**at**) system skip the section "*Installation procedure for floor models*" and start reading at "*Installation procedure for desktop models*". Refer to figure 1 during the installation procedure. Figure 1 shows you the back and bottom side of your SCSI hard disk.

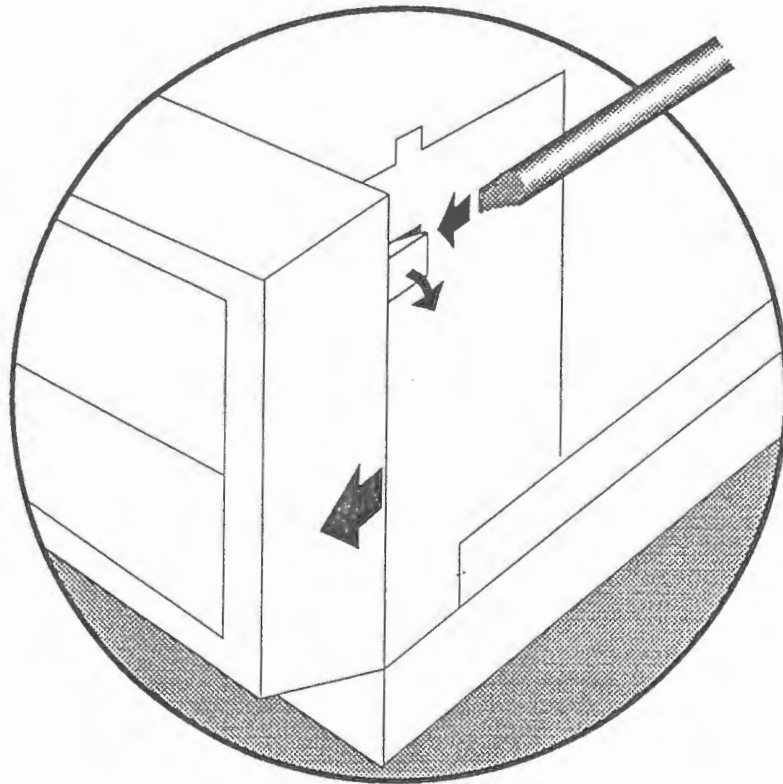
## Installation procedure for floor models

Follow the steps described below:

- 1 Choose the right mounting position. Proceed according to following order of preference:
  - 1 lower back position
  - 2 upper back position
  - 3 lower front position
  - 4 upper front position
  - 5 upper front position beneath floppy disk drive
  - 6 lower front position beneath floppy disk drive
- 2 Make sure the system unit is positioned horizontally.
- 3 Refer to the instructions in the user's guide of your computer on how to open the system unit and how to remove the package of the disk drive(s). Note that the front panel should only be removed, if you intend to use the last preferred position (6) as mounting position. The following figure shows how to remove the front panel.

Figure 2: Removing tr-front panel





You will now have access to the package of the disk drives.

- 4 Install the hard disk into the package and screw it on both sides.
- 5 Attach the power supply cable to connector J3 and the flat cable to connector J1 of the hard disk <sup>1)</sup>. Please refer to the figure of your hard disk to see how the flat cable should be connected (**attend the cam**). If the cable is improperly connected, this may cause the fuse on the host adapter being blown.
- 6 Replace the package into the system unit.
- 7 Replace the clamping strap(s).
- 8 Replace the front panel.
- 9 Reconnect the AC power cable(s) you removed earlier.
- 10 Close the system unit according to the instructions given in the user's guide.

<sup>1)</sup> The last connector of the flat cable should always be attached to a device.

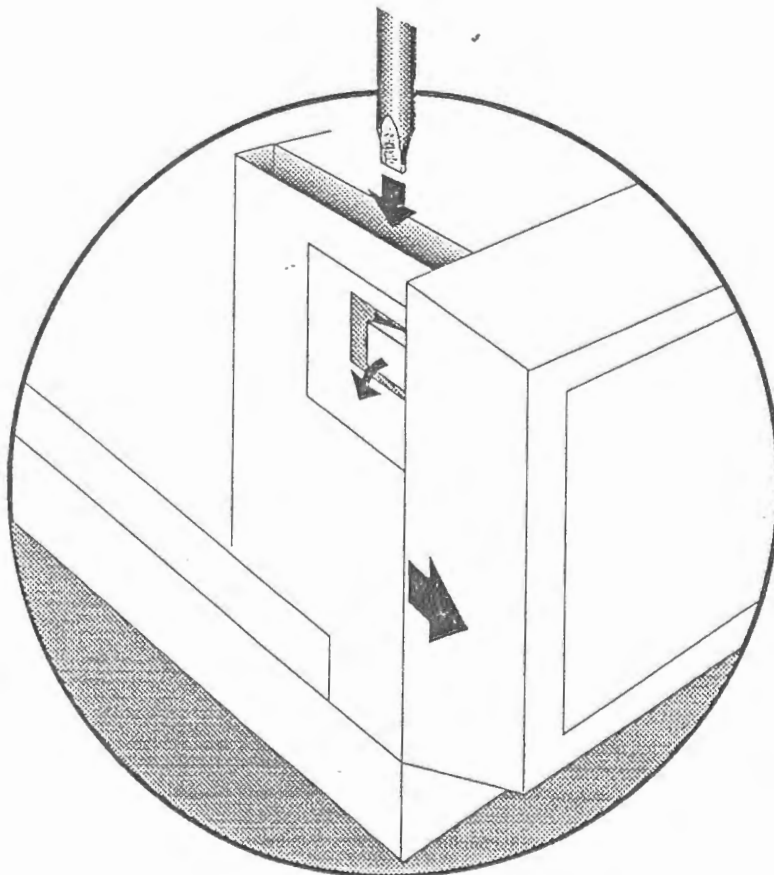
The hardware installation of the retrofit set has now been completed. If the hard disk which was factory-installed is being replaced by the retrofit hard disk, you should check the type number of the retrofit hard disk in Diagnostics. The type number should be defined as 0.

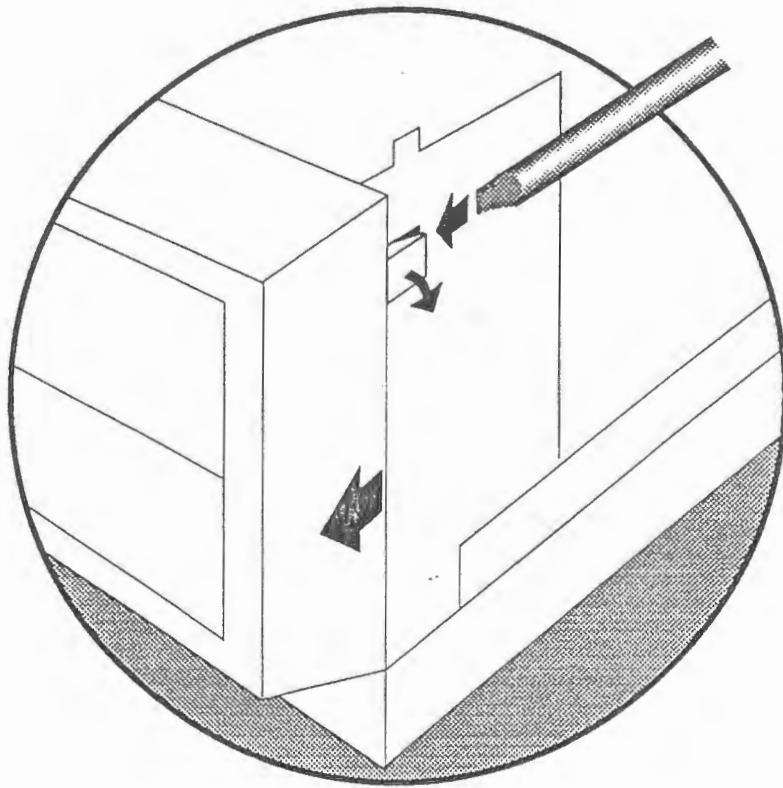
### Installation procedure for desktop models

Follow the steps described below:

- 1 Make sure that the system is positioned horizontally.
- 2 Choose the right mounting position. Proceed according to following order of preference:
  - 1 upper front position beneath floppy disk drive
  - 2 lower front position beneath floppy disk drive
- 3 Open the system unit according to the instructions in the user's guide that was delivered with your computer. Note that the front panel should only be removed, if you intend to use the lower front position beneath the floppy disk drive as mounting position. The following figure shows how to remove the front panel.

Figure 3: Removing at-front panel



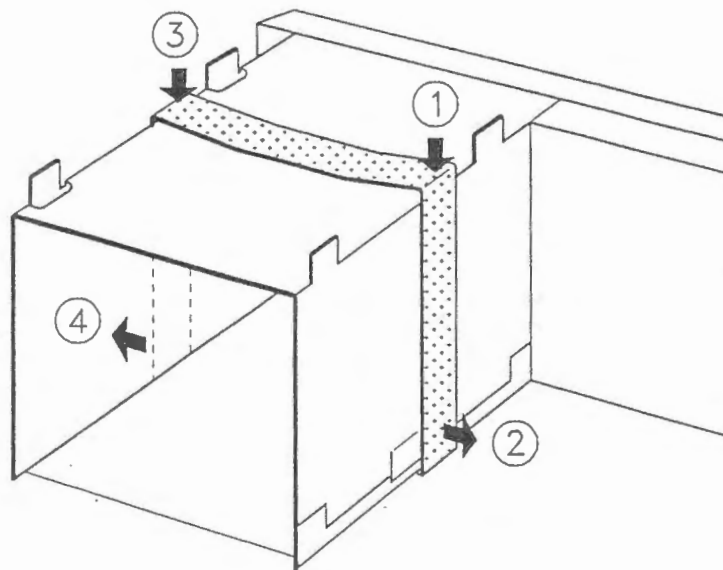


You will now have access to the package of the drive.

- 4 Disconnect the AC power cable. Also remove the power supply cable(s) and flat cable(s) from the package.
- 5 Follow the steps 1-4 in the following figure to remove the clamping strap. (you may need to use a screwdriver). After removing the clamping strap you can remove the package.



Figure 4: Removing the clamping strap



- 6 Install the hard disk into the appropriate mounting position and screw it on both sides.
- 7 Reconnect the power supply cable(s) and flat cable(s) for the floppy disk drive(s) you removed earlier.
- 8 Now connect the power supply cable to connector J3 and the flat cable to connector J1 of the hard disk <sup>1)</sup>. Please refer to the figure of your hard disk to see how the flat cable should be connected (**attend the cam**). If the cable is improperly connected, this may cause the fuse on the host adapter being blown.
- 9 Replace the package into the system unit.
- 10 Replace the clamping strap(s).
- 11 Reconnect the AC power cable you removed earlier.
- 12 Replace the front panel and close the system unit according to the instructions given in your user's guide.

1) The last connector of the flat cable should always be attached to a device.

The hardware installation of the retrofit set has now been completed. If the hard disk which was factory-installed is being replaced by the retrofit hard disk, you should check the type number of the retrofit hard disk in Diagnostics. The type number should be defined as 0.

## 2 INSTALLING A 330 Mb HARD DISK

### Preparations

Before you actually start the installation procedure, some preparations to the hard disk have to be carried out. Please check:

- the setting of jumper W1/W2 (Termination power)
- the setting of jumper W4 (Parity check)
- the setting of jumpers ID0, ID1 and ID2 (SCSI ID)
- the presence/absence of RN202+RN203+RN204 or RN9 (Terminators of Full- or Half Height models)

### Jumper settings W1/W2 and W4

First of all you should check the setting of the jumpers located at the back and at the bottom of the drive (refer to figure 5A, B and C for the exact locations of the jumpers). Incorrect jumper settings may cause improper operation of the drive. In the table below you will find the settings for the jumpers W1/W2 and W4 both for systems with DCB and for systems with SCSI-plus adapter.

Jumper	DCB	SCSI-plus
W1/W2	position W1 <sup>2)</sup>	position W2 <sup>1)</sup>
W4	installed <sup>3)</sup>	not installed <sup>4)</sup>

1) Termination power provided by host adapter

2) Termination power provided by drive

3) Bus parity check disabled

4) Bus parity check enabled (Also check jumper setting on SCSI-plus adapter.)

**CAUTION**

If terminator power is supplied by host adapter (SCSI-plus), first check fuse on SCSI-plus board. If, for any reason the fuse has blown, no terminator power will be provided. In that case make sure that terminator power is supplied by drive only. This also means that jumper W1/W2 has to be set to position W1.

Be aware that once the hard disk drive has been installed, you will not be able anymore to reach the jumpers. Therefore accuracy is required when checking the jumper settings.

**Jumper settings SCSI device ID**

Connector J2 contains three ID jumper positions, which are used to assign one of the eight SCSI ID's (0-7) to the drive. In multiple-device systems, each drive must have its own unique ID bit. Default the drives are configured as SCSI ID 0 (no jumper installed). Depending on the ID setting of the drives already installed, you can choose one of the settings listed in the following table:

SCSI ID	position ID0	position ID1	position ID2
0	-	-	-
1	in	-	-
2	-	in	-
3	in	in	-
4	-	-	in
5	in	-	in
6	-	in	in
7 *	in	in	in

\* Default setting host adapter

**Interface termination (RN202+RN203+RN204 or RN9)**

If the 330 Mb hard disk will **NOT** be installed as the **last** disk connected to the SCSI flat cable, (i.e. when you have more than one drive connected) you have to remove the interface terminators RN202+RN203+RN204 or RN9 (please refer to figure 5A, B or C for the location of the terminators) from each drive except the last physical one connected to the cable. Only if the hard disk is the **last** disk connected to the flat cable, terminators RN202+RN203+RN204 or RN9 must be installed.

The interface terminator provides proper termination for the SCSI-bus.

Figure 5A: SCSI hard disk 330 Mb  
Full Height Model A

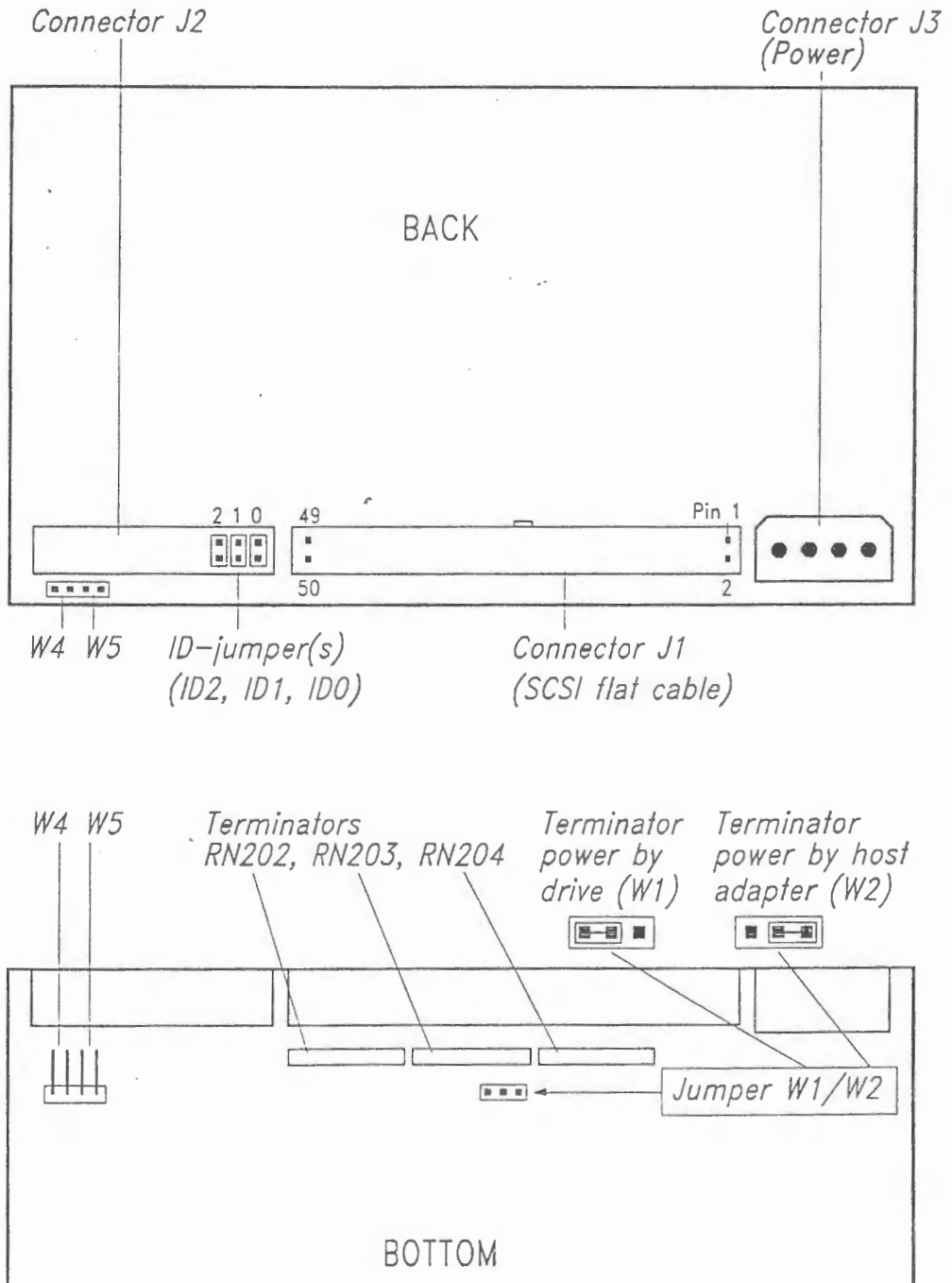


Figure 5B: SCSI hard disk 330 Mb  
Full Height Model B

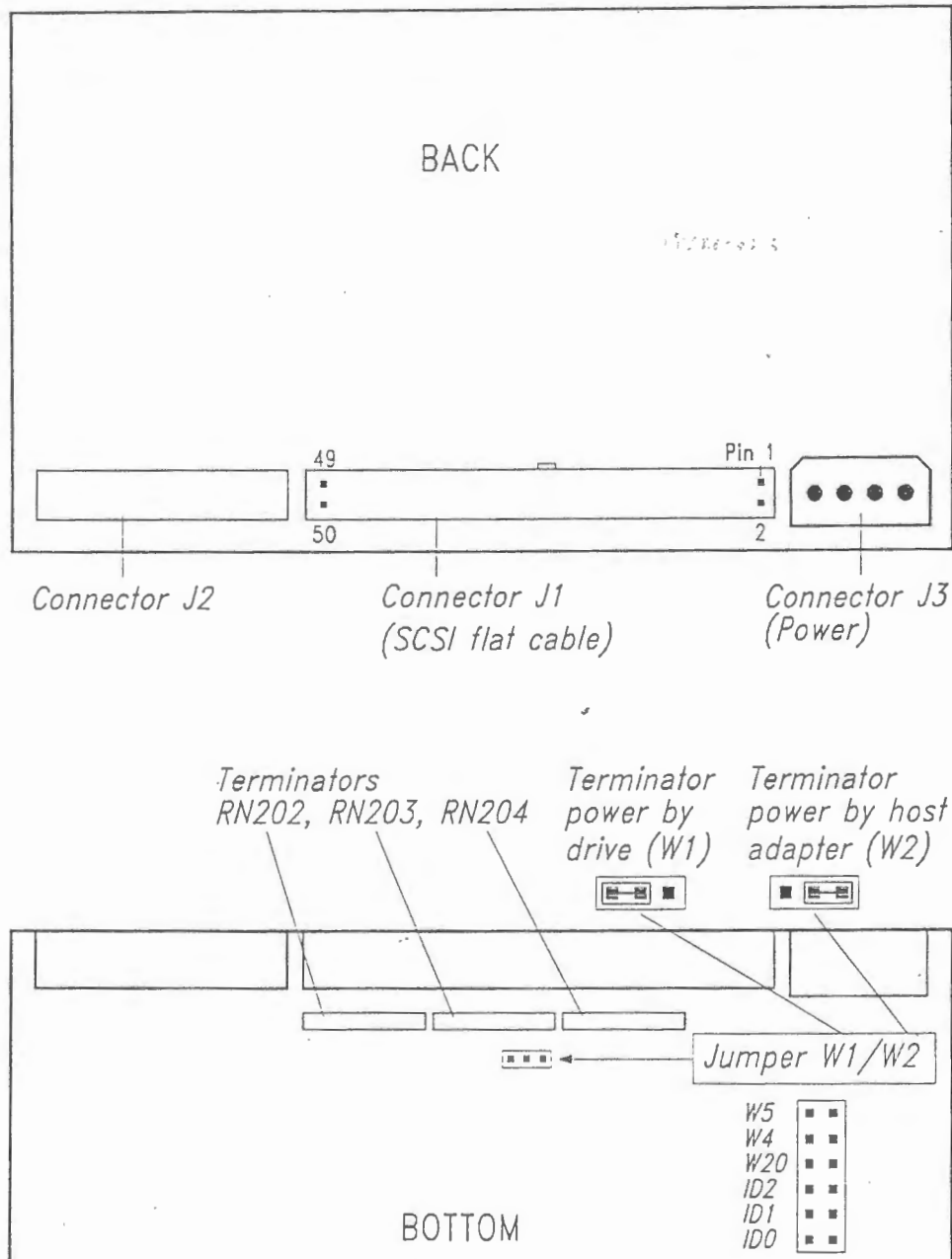
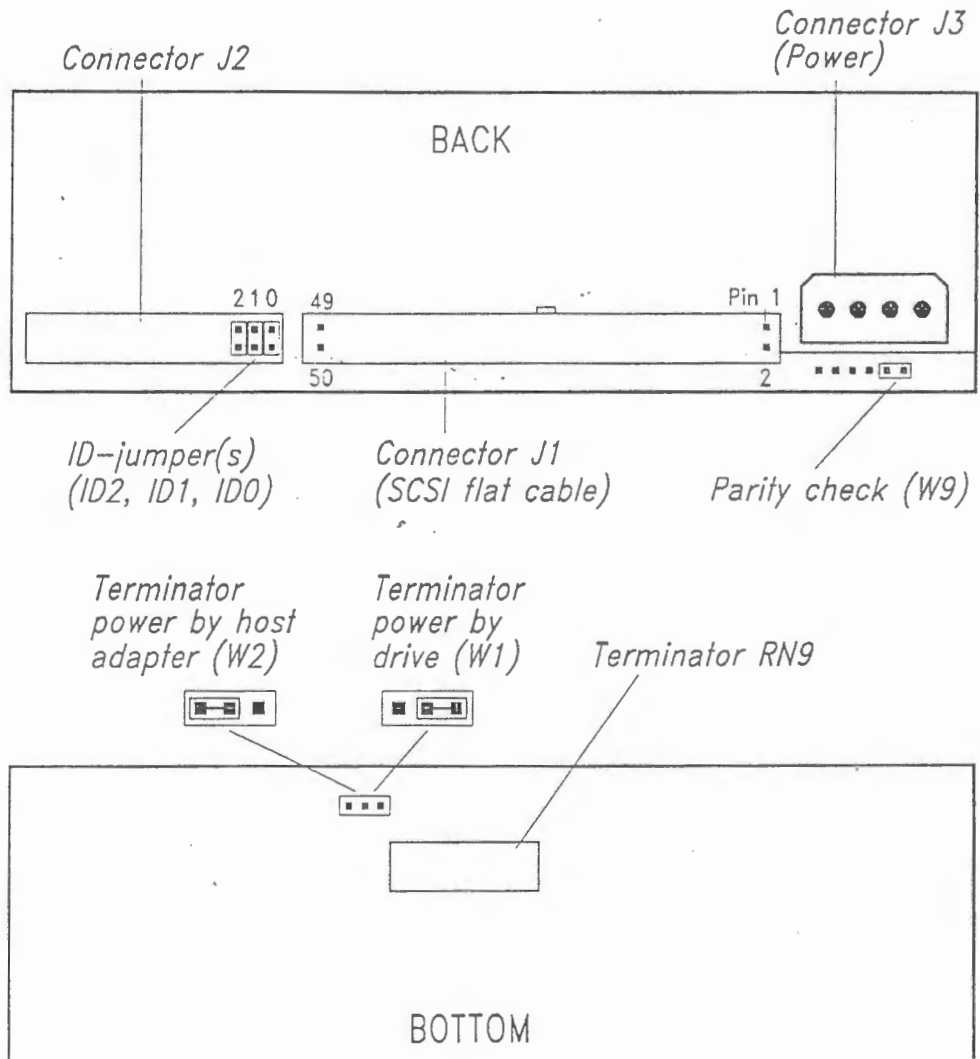


Figure 5C: SCSI hard disk 330 Mb  
Half Height Model



## Installing the hard disk

After having checked and set the jumpers (also consult figure 5A, B and C) you can start the actual installation procedure. There is a slight difference between the installation in a desktop (**at**) model and in a (**tr**) floor model. Both ways are described separately in chapter 1 of this manual. For those having a Tulip desktop model refer to the section "*Installation procedure for desktop models*". For instructions on the installation procedure for Tulip floor models read the section "*Installation procedure for floor models*". Refer to figure 5 during the installation procedure. Figure 5 shows you the back and bottom side of your SCSI hard disk.

## 3 INSTALLING A 660 Mb HARD DISK

### Preparations

Before you actually start the installation procedure, some preparations to the hard disk have to be carried out. Please check:

- the setting of jumper W1/W2 (Termination power)
- the setting of jumper W4 (Parity check)
- the setting of jumpers ID0, ID1 and ID2 (SCSI ID)
- the presence/absence of RN9 (terminator)

### Jumper settings W1/W2 and W4

First of all you should check the setting of the jumpers located at the back and at the bottom of the drive (refer to figure 6 for the exact locations of the jumpers). Incorrect jumper settings may cause improper operation of the drive. In the table below you will find the settings for the jumpers W1/W2 and W4 both for systems with DCB and for systems with SCSI-plus adapter.

Jumper	DCB	SCSI-plus
W1/W2	position W1 <sup>2)</sup>	position W2 <sup>1)</sup>
W4	installed <sup>3)</sup>	not installed <sup>4)</sup>

- 1) Termination power provided by host adapter
- 2) Termination power provided by drive
- 3) Bus parity check disabled
- 4) Bus parity check enabled (Also check jumper setting on SCSI-plus adapter.)



**CAUTION**

If terminator power is supplied by host adapter (SCSI-plus), first check fuse on SCSI-plus board. If, for any reason the fuse has blown, no terminator power will be provided. In that case make sure that terminator power is supplied by drive only. This also means that jumper W1/W2 has to be set to position W1.

Be aware that once the hard disk drive has been installed, you will not be able anymore to reach the jumpers. Therefore accuracy is required when checking the jumper settings.

**Jumper settings SCSI device ID**

Connector J2 contains three ID jumper positions, which are used to assign one of the eight SCSI ID's (0-7) to the drive. In multiple-device systems, each drive must have its own unique ID bit. Default the drives are configured as SCSI ID 0 (no jumper installed). Depending on the ID setting of the drives already installed, you can choose one of the settings listed in the following table:

SCSI ID	position ID0	position ID1	position ID2
0	-	-	-
1	in	-	-
2	-	in	-
3	in	in	-
4	-	-	in
5	in	-	in
6	-	in	in
7 *	in	in	in

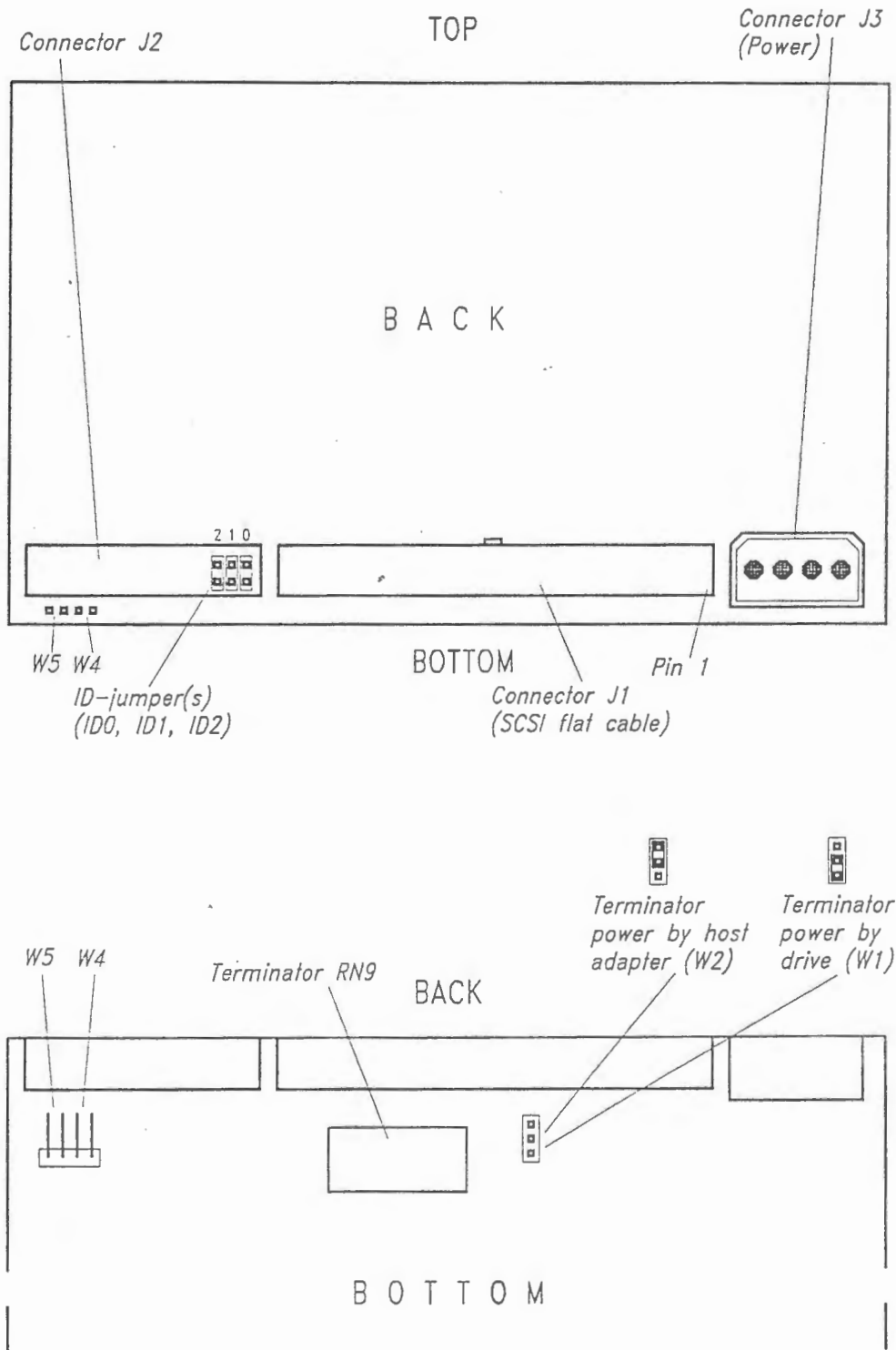
\* Default setting host adapter

**Interface termination (RN9)**

If the 660 Mb hard disk will **NOT** be installed as the **last** disk connected to the SCSI flat cable, (i.e. when you have more than one drive connected) you have to remove the interface terminator RN9 (please refer to figure 6 for the location of the terminator) from each drive except the last physical one connected to the cable. Only if the hard disk is the **last** disk connected to the flat cable, terminator RN9 must be installed.

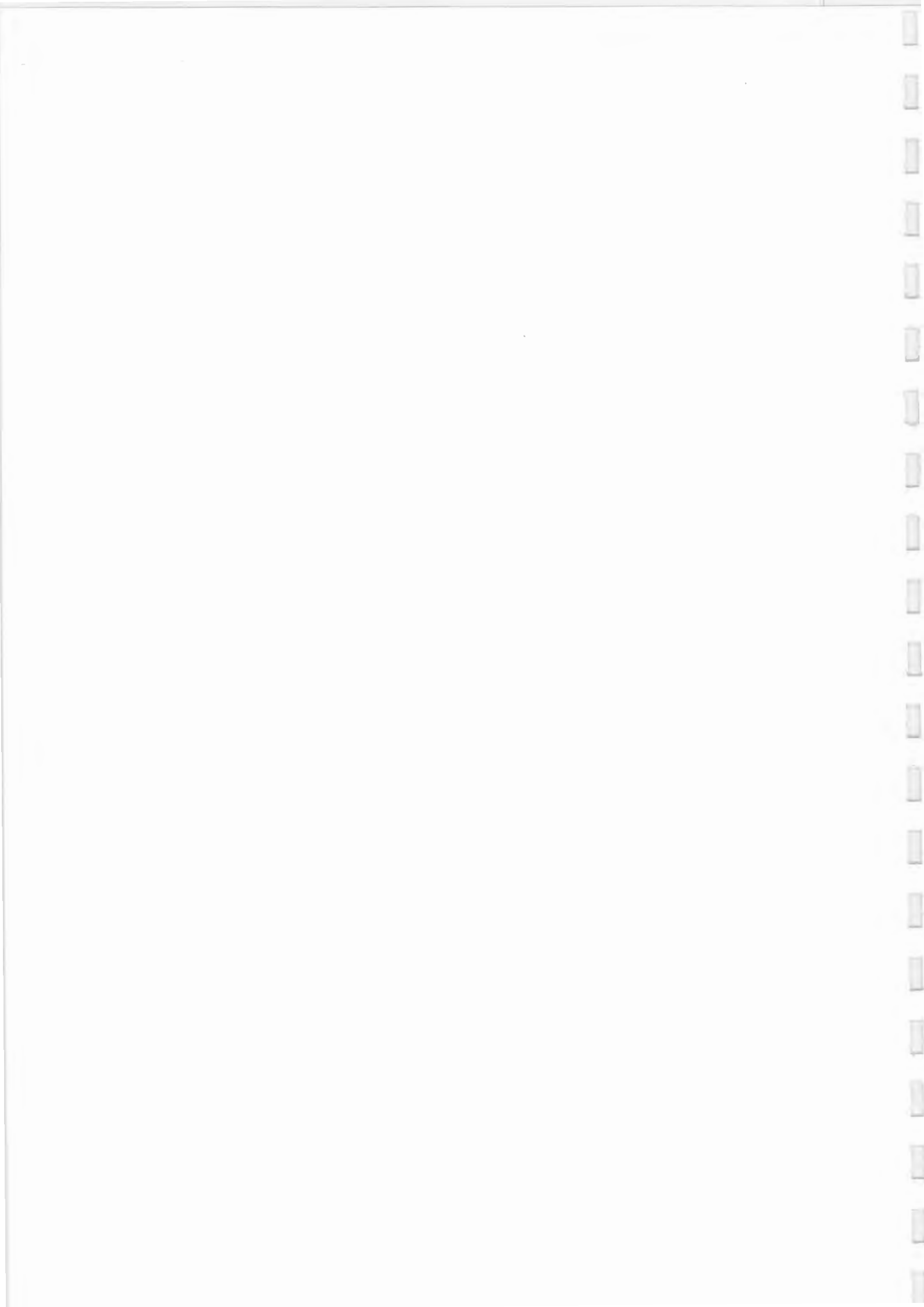
The interface terminator provides proper termination for the SCSI-bus.

Figure 6: SCSI hard disk 660 Mb



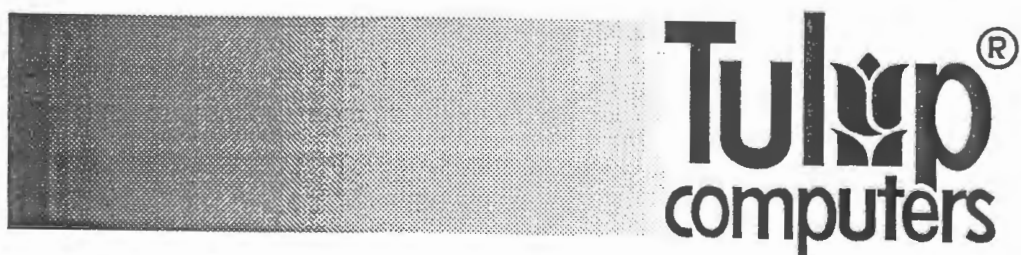
## Installing the hard disk

After having checked and set the jumpers (also consult figure 6) you can start the actual installation procedure. There is a slight difference between the installation in a desktop (**at**) model and in a (**tr**) floor model. Both ways are described separately in chapter 1 of this manual. For those having a Tulip desktop model refer to the section "*Installation procedure for desktop models*". For instructions on the installation procedure for Tulip tr models read the section "*Installation procedure for floor models*". Refer to figure 6 during the installation procedure. Figure 6 shows you the back and bottom side of your SCSI hard disk.



---

INSTALLATION AND USE  
OF THE MASTER KEY CHIP (MKC)



---

# INSTALLATION AND USE OF THE MASTER KEY CHIP

---

## Introduction

The Master Key Chip (below referred to as MKC) is a special chip, which can be used to remove a forgotten SCM (= System Control Manager) password. To delete the forgotten password and install a new one, the keyboard controller of the Tulip at 386<sup>SX</sup> has to be replaced by the MKC. As the MKC directly interferes with the System Control Manager security system (through which all vital system control functions are protected), it is obvious that distribution and use of this chip have to be controlled by Tulip Computers. To prevent misuse of the MKC, the following precautionary measures have been taken:

- The MKC is available for selected service organizations. Tulip Computers will only decide on supplying the MKC after careful consideration.
- After obtaining the MKC, both the service organization and the customer will have to complete the *System Control Manager Service Form*. This form, which contains all essential information on the service call (i.e. serial numbers of the main unit and Master Key Chip, reason for service call, etc.), protects service organizations against false accusations of MKC misuse made by customers. The form, which can also be used by Tulip Computers for future product development, should be returned by mail or fax to:

**TULIP COMPUTERS INTERNATIONAL B.V.**  
**INFO MANAGEMENT DEPARTMENT**  
**P.O. BOX 3333**  
**5203 DH 's-HERTOGENBOSCH**  
**The NETHERLANDS**  
**Fax: (0)73-421915**

- Service organizations have to sign a non-disclosure agreement before they receive the MKC.
- All MKC's are copy-protected.
- When used, the Master Key Chip does not display the currently installed and forgotten SCM password, but it replaces it by the factory-installed password ("1234"). A service engineer can only delete a forgotten SCM password and install the new default one, if he "tells" the SCM that he is authorized to do so, i.e. if he enters the **unique** MKC password, which has been proposed by the service organization and accepted by Tulip Computers International's Info Management Department. An MKC password will not be accepted by this Department, if it bears a resemblance to the customer's company name or any other item commonly known in the customer's company. During MKC password entering, an asterisk (\*) will be displayed on the LCD screen for each entered character.
- When used, each MKC leaves a unique "fingerprint" (i.e. two characters) in the SCM. The old fingerprint is displayed on the LCD before every new MKC password entering. It should be registered by the service engineer on the *System Control Manager Service Form*, as it enables Tulip Computers and the service organization to trace persons who misuse the MKC.

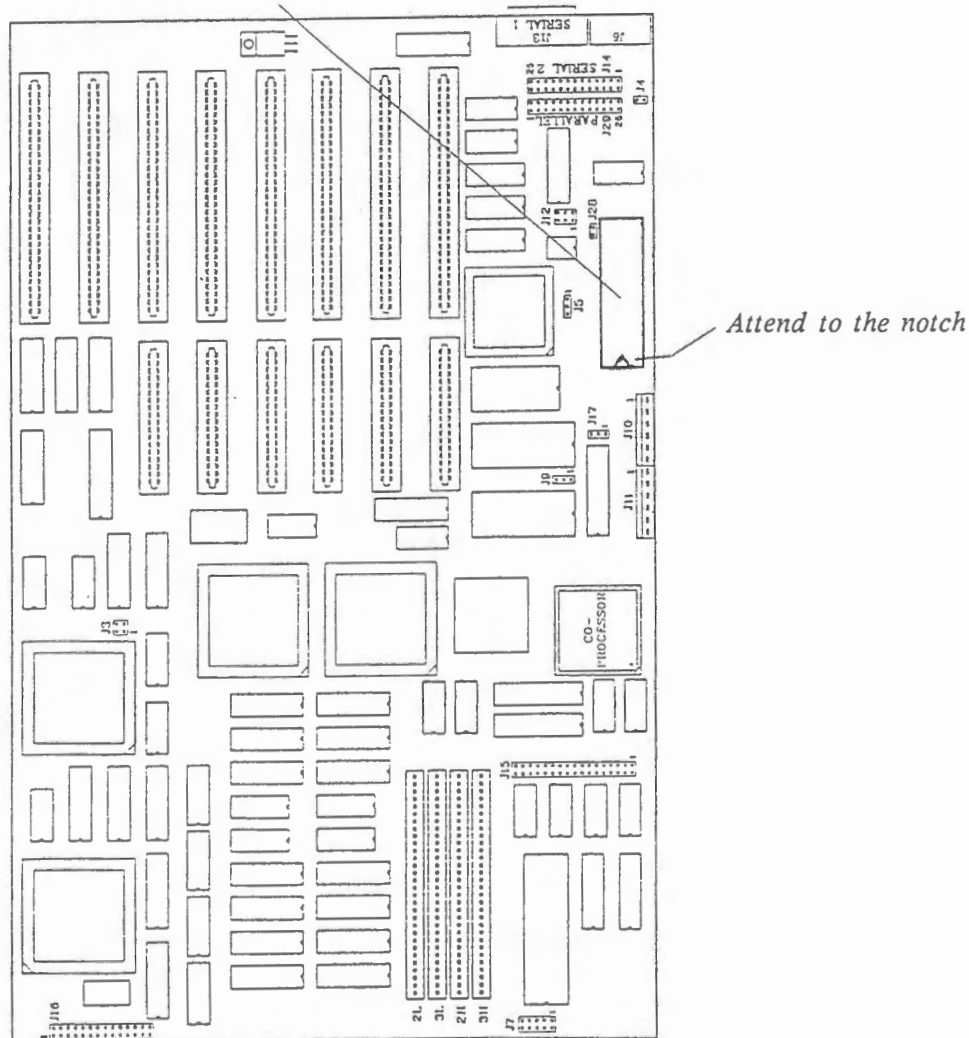
## How to install the Master Key Chip

Below you will find a detailed description of the Master Key Chip installation procedure. The following steps should be executed by a service engineer:

- 1 First ensure that the customer is authorized to decide on the SCM password deletion. If he is, complete the *System Control Manager Service Form* and make sure that the customer signs it.
- 2 Switch the Tulip at 386<sup>SX</sup> OFF. (This might be a problem, if the power-off inhibitor is used and the power cord is secured firmly to the AC mains outlet. In that case the system unit's top cover should first be unlocked and removed. Then the power-off inhibitor can be taken out of the system unit and the power can be switched off.)
- 3 Unlock and open the system unit's top cover. Please refer to the *User's Guide Tulip at 386<sup>SX</sup>* for more detailed information on opening the computer.
- 4 Carefully replace the standard Tulip at 386<sup>SX</sup> keyboard controller by the MKC. Please make sure that the notch is in the indicated position. If the MKC is not installed correctly, this might cause permanent damage to the MKC. Also consult the figure below for the correct location of the keyboard controller.

*Figure: Installation of Master Key Chip*

keyboard controller  
(to be replaced by Master Key Chip)



- 5 Turn the computer ON. The system will not boot, but the SCM LCD screen will display the following message:

FINGERPRINT= ##

The fingerprint displayed should be entered on the *System Control Manager Service Form*, as it constitutes information essential for tracing persons who misuse the MKC.

- 6 Press the ENTER key. The LCD screen will display:

MKC PASSWORD:

Now the unique MKC password has to be entered. (Please consult the previous section, "Introduction", for more details on the MKC password.) After entering the complete password and again pressing the ENTER key, the two following situations can occur:

- If an invalid password has been entered, the system will "lock up". The only way to re-enter the MKC password is to switch the system off and on. You can then start the installation procedure again at step 5.
- If a valid password has been entered, the procedure will continue at step 7.

- 7 The SCM hardware will now be tested. If no errors are detected, the following default values for the SCM functions will be stored in the SCM:

* Installed password:	1234
* Power-down delay:	0 minutes
* SCM power switch:	On
* Keyboard lock:	Unlocked

When the MKC is used to install the above default values, the fingerprint of the used MKC will also be written into the SCM. In future this fingerprint will be displayed on the LCD, whenever an MKC is used (also see step 5).

If an error is found during the SCM hardware test, the LCD will display the following message:

EEPROM IS DEFECT

This means that the Tulip at 386<sup>SX</sup> will have to be repaired.

- 8 Switch the Tulip at 386<sup>SX</sup> OFF and replace the MKC by the original Tulip at 386<sup>SX</sup> keyboard controller. If necessary, return the power-off inhibitor (also refer to step 2). Now close and lock the system unit's top cover.
- 9 Send the *System Control Manager Service Form* by mail or fax to the address mentioned in the previous section, "Introduction".

**Note:**

After the procedure described above has been completed, the customer is, of course, free to replace the default password ("1234") by a new password. To do this, he should follow the instructions included in chapter 2, "System Control Manager", of the *User's guide Tulip at 386<sup>SX</sup>*.



## UPS MONITORING WITH THE SCM

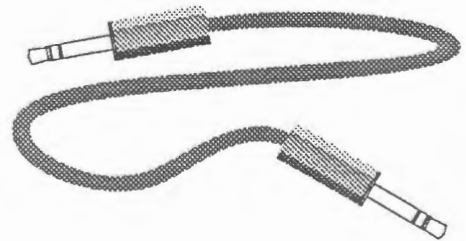
The Tulip 386sx and 386-25 systems (desktops as well as floor models) have the System Control Manager (SCM) as a standard feature. A complete description of the SCM is given in the user's guide of these Tulip computer systems. The Power Down option of the SCM can be used in combination with the Novell UPS monitoring function. Network users can thus receive a message on their workstation about the powering down of the server. This way one can close all files and log out in time.

### UPS hardware requirements:

- Disk coprocessor board (DCB), or:  
SS Keycard or APC UPS monitoring card.
- Keyboard processor: COP 1.1 or higher.

### Cables:

- **Internal:** Red and black cable. Connect to J28 in a 386sx system or to J14 in a 386-25 system. (Red wire to pin 1). For detailed installation instructions: See the user's guide of your Tulip 386 computer system.
- **External:** Cable to connect the UPS hardware to the connector of the internal cable at the back of your computer system. (See figure).



### Jumper and switch settings

<b>DCB:</b>	S17/S18:	Jumper at S17
	S19/S20:	Jumper at S19
<b>SS keycard:</b>	S1/S2:	Jumper at S2
	S9/S10:	Jumper at S10
	(other settings: S4, S5, S8.)	
<b>APC UPS monitoring card:</b>	SW1 to SW4:	Set to position OFF

### Configuration file (must be in directory SYS:SYSTEM):

NetWare v.2.10: *CONFIG.UPS*  
 NetWare v.2.12: *CONFIG.UPS*  
 NetWare v.2.15: *SERVER.CFG*

The configuration files have to contain parameters specifying the type of UPS hardware, the hardware I/O address, down time, and wait time. The **down time** is the time between the message "AUXILIARY POWER" and the server shutdown moment. Default: 3 minutes. (Specifying a default time is not necessary). Minimum is 1 minute, maximum 30 minutes.

The **wait time** is the time between the power down signal and the message to the network users. Default is 15 seconds, maximum is 300 seconds. For NetWare version 2.15 the minimum time is 15 seconds. The wait time must be shorter than the down time.

## Specifying the SCM delay time in Diagnostics:

For a proper functioning of the UPS monitoring, the **delay time** must be 1 minute longer (rounded) than **wait time plus down time**.

## Notes

- The I/O address of the DCB depends on the channel.  
(Channel 1 -> IO=346).
- You can NOT undo the Power Down command after it is executed.
- ELS NetWare: UPS monitoring is possible only with ELS level II version 2.15 or higher.
- Options can be abbreviated. (See examples below).
- Parameter lines in SERVER.CFG must start with: "UPS "
- Do not leave spaces out, or add extra spaces.

## Configuration file examples

**Example 1** (SS keycard with ADV 2.10):

### CONFIG.UPS

(specify:)	(or:)
TYPE=3	T=3
IO=230	IO=230
DOWN=4	D=4
WAIT=25	W=25

**Example 2** (APC UPS card with ADV 2.15):

### SERVER.CFG

(specify:)	(or:)
UPS TYPE=1	UPS T=1
UPS IO=231	UPS IO=231
UPS DOWN=25	UPS D=25

**Example 3** (SS keycard with SFT 2.15):

### SERVER.CFG

(specify:)	(or:)
UPS TYPE=3	UPS T=3
UPS IO=230	UPS IO=230

**Example 4** (DCB with ADV 2.12 channel 2):

### CONFIG.UPS

(specify:)	(or:)
TYPE=2	T=2
IO=34E	IO=34E

## Messages

- **On file server console and workstation:**

AUXILIARY POWER: *file server* will go down in x minutes  
This message appears after the Power Down signal.

BATTERY LOW: *file server* will go down in 1 minute  
This message appears at the beginning of the last minute before power down.

- **On file server console:**

Invalid configuration parameters

The parameters are not correct. (For example: a space too much, or a missing space or UPS prefix).

UPS Parameter Out of Range

The specified WAIT time or DOWN time is not correct.

UPS enabled on *file server*

UPS monitoring is functioning.



---

INSTALLATION SCSI CARD

**Tulip<sup>®</sup>**  
**computers**

's-Hertogenbosch The Netherlands

(c) Copyright 1988, Tulip Computers.

Part number: 72-10334-01/100

Issue date: October 1988

*No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.*

Issued by:

Tulip Computers  
P.O.Box 3337  
5203 DH 's-Hertogenbosch  
The Netherlands

---

## DISCLAIMER

This manual describes a product manufactured by Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind.

Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual.

If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual.

The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for *backup* purposes.

Tulip Computers may change or improve the product and this manual at any time without previous warning.

---

## Trademarks

Tulip is a registered trademark of Tulip Computers.

---

## INSTALLATION OF THE SCSI CARD

---

---

### Description of the SCSI card

SCSI (Small Computer System Interface) is a standard "interface" for personal computers. Among other things, you need such an interface to operate the Tulip Tape streamer which is used to make backup copies of the files on your hard disk to magnetic tapes.

In the default configuration of both the Tulip at *compact* and the Tulip at 386 you will find an SCSI card on the USCA card (USCA = Universal Storage Control Adapter). If necessary, you can install an SCSI card into Tulip microcomputers which do not have a USCA card, such as the Tulip pc *compact 2*, Tulip at *compact 2*, Tulip sx *compact 2* and the Tulip at 386<sup>sx</sup>.

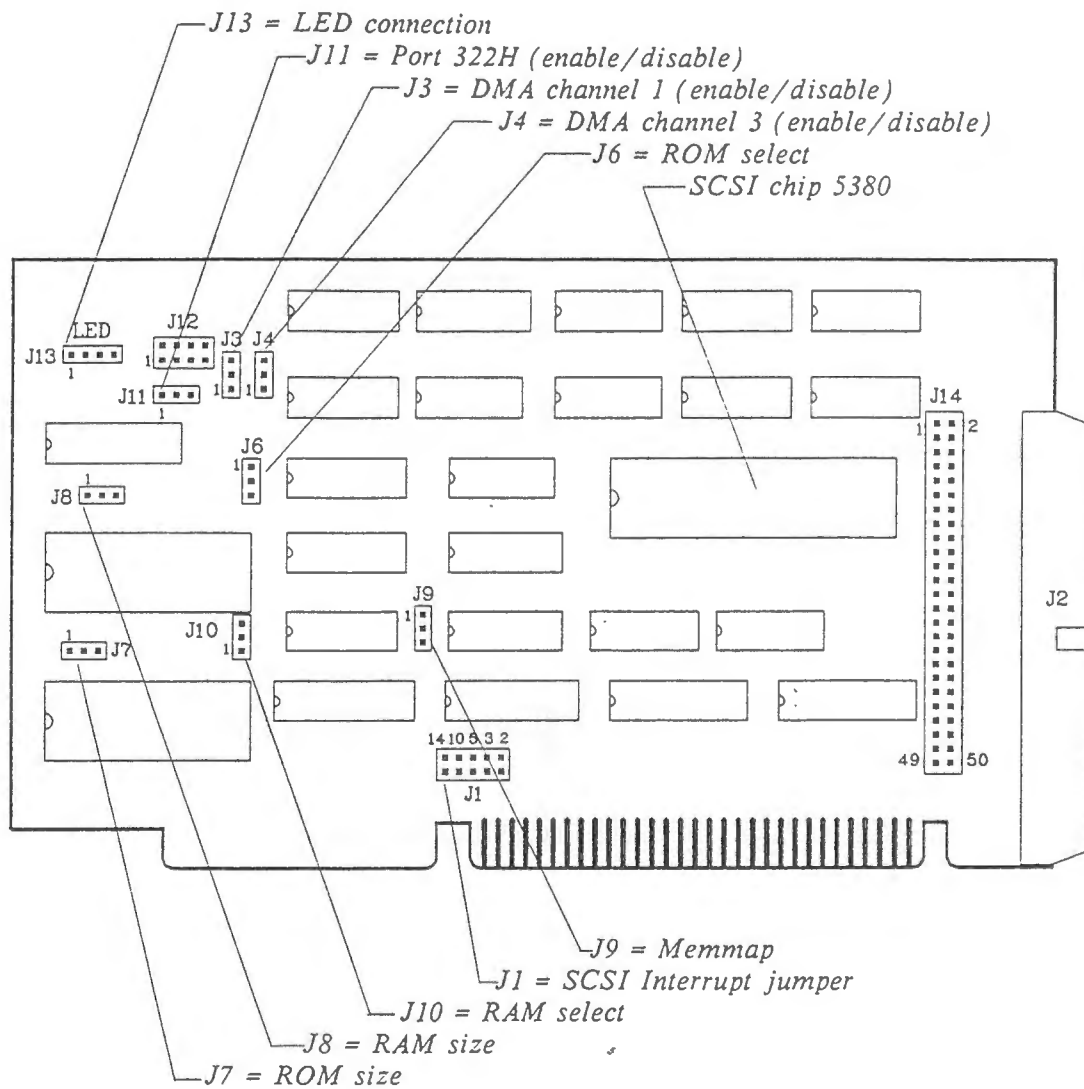
In this manual you will find detailed information on the SCSI card and its installation into your computer.

### DETAILS

You may find it useful to know the following details:

- the SCSI Interface chip 5380 is USCA-compatible
- the cable connector for the HD led is compatible with ST506
- the EPROM size (8Kb or 16 Kb) is determined by the jumper setting (optional)
- the "On board"-RAM size (2 Kb or 8 Kb) is determined by the jumper setting (optional)

SCSI card:



## Jumper settings

Below you will find the default jumper settings.

### J1 SCSI-INTERRUPT (Default setting: Interrupt level 2)



### J3 DMA CHANNEL 1 (Default setting: disabled)



Jumper on pin 1-2: DMA channel 1 enabled.  
 Jumper on pin 2-3: DMA channel 1 disabled.



**J4 DMA CHANNEL 3** (*Default setting: disabled*)

3 ■  
2 ■  
1 ■

Jumper on pin 1-2: DMA channel 3 enabled.  
Jumper on pin 2-3: DMA channel 3 disabled.

**J6 ROM SELECT** (*Default setting: ROM disabled*)

1 ■  
2 ■  
3 ■

No jumper: ROM disabled.  
Jumper on pin 1-2: ROM size 8Kb (2764) (Also enable J7!).  
Jumper on pin 2-3: ROM size 16Kb (27128) (Also enable J7!).

**J7 ROM SIZE** (*Default setting: ROM size 8Kb (2764)*)

■-■ ■  
1 2 3

Jumper on pin 1-2: ROM size 8Kb (2764) (J6 on pin 1-2).  
Jumper on pin 2-3: ROM size 16Kb (27128) (J6 on pin 2-3).  
(Setting J7 will have no effect, if there is no jumper on J6.)

**J10 RAM SELECT** (*Default setting: RAM disabled*)

3 ■  
2 ■  
1 ■

No jumper: RAM disabled.  
Jumper on pin 1-2: RAM size 2Kb (Also enable J8!).  
Jumper on pin 2-3: RAM size 8Kb (Also enable J8!).

**J8 RAM SIZE** (*Default setting: RAM size 2Kb*)

■-■ ■  
1 2 3

Jumper on pin 1-2: RAM size 2Kb (J10 on pin 1-2).  
Jumper on pin 2-3: RAM size 8Kb (J10 on pin 2-3).  
(Setting J8 will have no effect, if there is no jumper on J10.)

**J9 MEMMAP** (*Default setting: ROM on 0C800H, RAM on 0CC00H*)

1 ■  
2 ■  
3 ■

Jumper on pin 1-2: ROM on 0C800H, RAM on 0CC00H.  
Jumper on pin 2-3: ROM on 0CC00H, RAM on 0D000H.

**J11** DISCNTRL (*Default setting: Port 322H enabled*)

■-■ ■  
1 2 3

Jumper on pin 1-2: Port 322H enabled.  
Jumper on pin 2-3: Port 322H disabled.

---

## Installing the SCSI card

Refer to your system's User's guide for more information on opening your system.

To install the SCSI card, proceed as follows:

- Remove one of the system expansion slot covers which are located at the back of the system unit by removing its retaining screw and lifting it out. (Save the screw, because you will need it when mounting the SCSI card.)
- Press the card firmly into the connector.
- Secure the card with the screw you removed earlier.
- Close the system unit.
- If you are using the SCSI card as a hard disk controller, you should configure your system again by running the DIAGNOSTICS program. (If you are using the SCSI card to connect a tape streamer to your system, you do not need to run the DIAGNOSTICS program.)

Now the SCSI card installation is complete. If you still encounter any problem using this card, please contact your local dealer.

## Connector pinouts

### J2/J14 SCSI INTERFACE CONNECTOR

Earth all odd pins, except for pin 25 (not connected).

*Pin*    *Signal*

2	Dbit 0
4	Dbit 1
6	Dbit 2
8	Dbit 3
10	Dbit 4
12	Dbit 5
14	Dbit 6
16	Dbit 7
18	DBP
26	+5V
32	ATN
36	BSY
38	ACK
40	RST
42	MSG
44	SEL
46	C/D
48	REQ
50	I/O

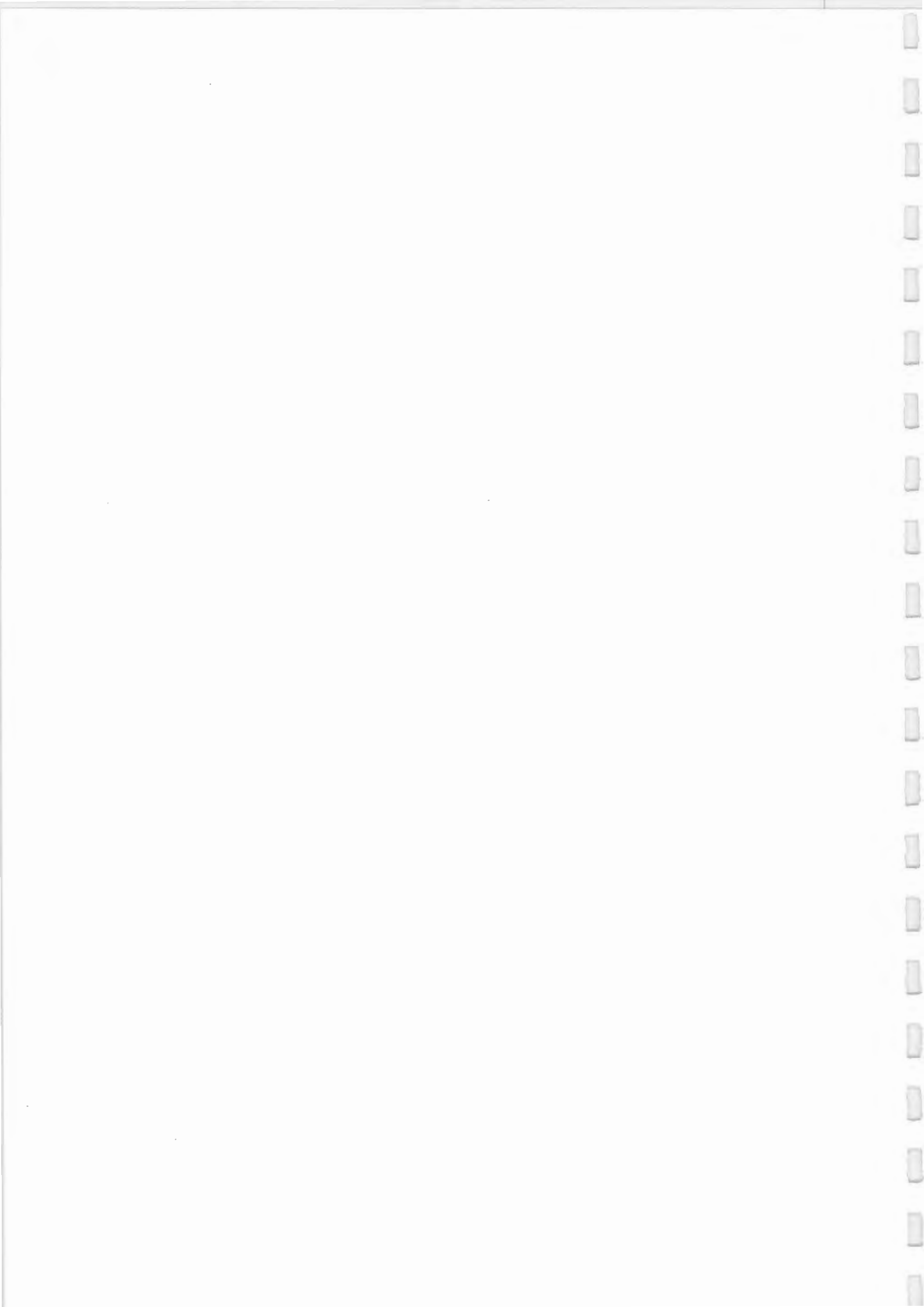


### J13 LED

*Pin*    *Signal*

1	+5V
2	-LED
3	-LED
4	+5V





---

**TAPE STREAMER**

**Tulip<sup>®</sup>**  
**computers**

's-Hertogenbosch The Netherlands

(c) Copyright 1988, Tulip Computers.

Part number: 72-10144-01/300

Issue date: December 1988

*No part of this manual may be reproduced in any form by print, photo-print, micro-film or any other means without written permission from:*

**Tulip Computers**  
P.O.Box 3337  
5203 DH 's-Hertogenbosch  
The Netherlands

---

## DISCLAIMER

This manual describes a product manufactured by Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind.

Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual.

If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual.

The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for *backup* purposes.

Tulip Computers may change or improve the product and this manual at any time without previous warning.

---

## Trademarks

Tulip is a registered trademark of Tulip Computers.

Novell is a registered trademark of Tulip Computers.

---

## CONTENTS

<b>General remarks .....</b>	<b>5</b>
Notational conventions .....	5
<b>1 Tape streamer installation .....</b>	<b>6</b>
Introduction .....	6
Cable identification .....	6
Connections .....	7
SCSI chip .....	8
Jumpers .....	8
Installing the tape streamer .....	10
Installing the software .....	10
<b>2 Tape streamer operation .....</b>	<b>11</b>
Introduction .....	11
Getting started .....	11
Initialize tape .....	13
Retension .....	13
Backup .....	14
Backup parameters .....	14
File specifications .....	15
Remaining function keys .....	16
Restore .....	17
Restore parameters .....	18
Remaining function keys .....	19
Return to DOS .....	19
<b>Appendix: Error messages .....</b>	<b>20</b>



## GENERAL REMARKS

This manual describes the installation and usage of the Tulip Tape Streamer, a device into which tape cassettes can be inserted which provide external memory capacity for your Tulip microcomputer. The manual consists of 2 parts and an appendix:

### Chapter 1: Tape streamer installation

This chapter describes the installation of the Tape streamer hardware and the Tape streamer software. It tells you how to install the Tape streamer in your Tulip system, and how to copy the tape streamer program, *tape.exe*, onto your hard disk.

### Chapter 2: Tape streamer operation

This second chapter deals with operating the Tulip Tape streamer. It gives a detailed description of the software on the tape streamer diskette.

### Appendix: Error messages

The appendix lists all the tape streamer error messages.

### Note

The installation of this tape streamer is rather complex. It should therefore be installed with the utmost precision and - preferably - by an experienced person. The first chapter is a guideline for those who are experienced in installing tape streamers or other hardware. When the installation of the tape streamer causes you problems, please contact your dealer or technical department.

---

## Notational conventions

The file specifications in this manual are partly represented by symbols. The following notation rules apply:

- [ ] Used for optional text, i.e. text which may also be left out.
- bold** Used for text that must appear exactly as shown.
- italic* Used for parameters to be specified by you.

Example:

*Notation:*

C:[*dirname*]\*filename*[ *option*]

*Some examples of valid file specifications:*

C:\\*.doc  
C:\book\\*. \* -L  
C:\book\example.txt

---

# 1 TAPE STREAMER INSTALLATION

---

## Introduction

The Tulip Tape streamer is a device that provides external memory capacity through magnetic tapes. For this tape streamer Tulip recommends CT-500H (50 Mb memory capacity) or CT-600H (60 Mb memory capacity) as the magnetic tape, or tapes conforming to D/CAS-12. This is the standard for magnetic media.

The Tulip Tape streamer, which is used primarily to make backup copies of the hard disk or of your Novell network disk, can be installed in all Tulip personal computers containing the SCSI interface and running the MS-DOS operating system.

When the Tape streamer must be connected to a computer with *no* USCA board (USCA = Universal Storage Control Adapter), an SCSI board must be installed in one of the *expansion slots*. This applies to, for instance, the Tulip pc compact 2, the Tulip at compact 2, the Tulip sx compact 2 and the Tulip at 386<sup>sx</sup>.

We distinguish the following configurations:

- configuration with only USCA board (the USCA board contains tape streamer, floppy drive and hard disk connections.)
- configuration with USCA board and a separate hard disk controller (the USCA board contains tape streamer and floppy drive connections, the hard disk controller contains the hard disk connection.)
- configuration without USCA board, but with an SCSI board (the SCSI board contains the tape streamer connection.)

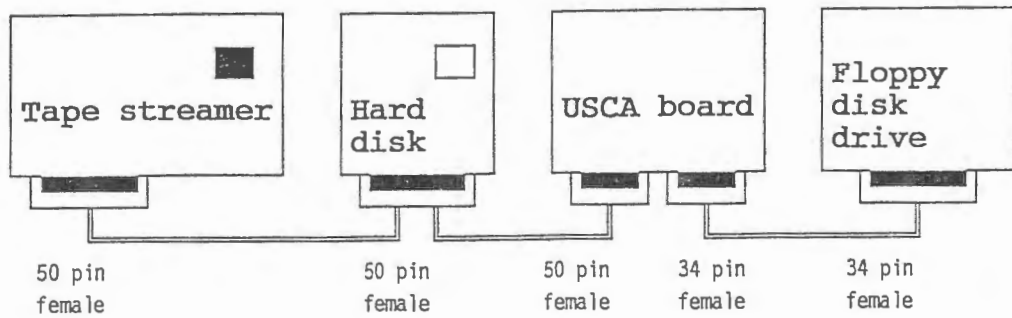
---

## Cable identification

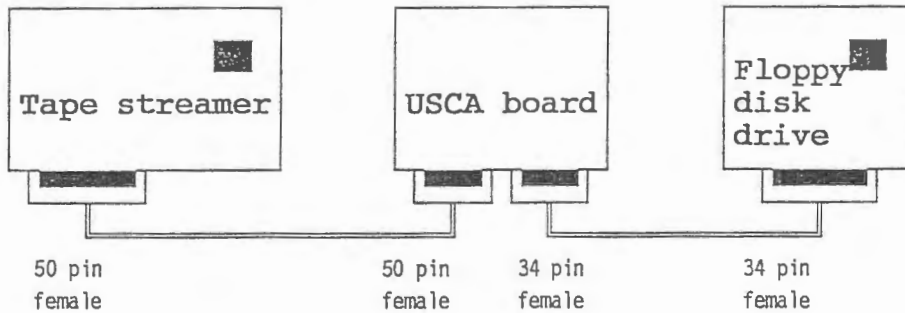
The tape streamer should be installed using a flat cable with 50 pins *female* connectors. The tape streamer can only be installed, if the tape streamer cable is connected to the USCA board or the SCSI board. When installing the tape streamer to a microcomputer with only a USCA board and without a separate hard disk controller, it is connected to the USCA board through the hard disk by means of *daisy chaining*. When installing the tape streamer to a microcomputer with a USCA board as well as a hard disk controller, it is connected directly to the USCA board. If you want to install the tape streamer to a computer with only a SCSI interface, it is connected directly to the SCSI board. The diagrams on the next page show how the tape streamer should be connected.

## Connections

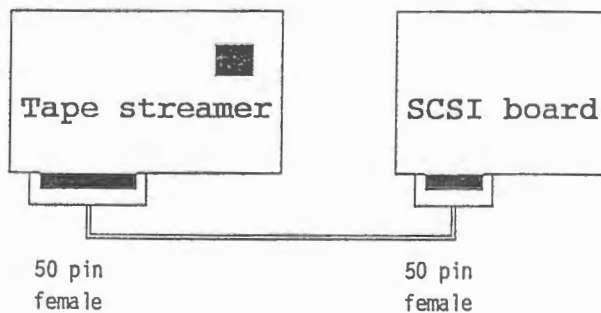
### TULIP MICROCOMPUTER WITH USCA BOARD ONLY




### TULIP MICROCOMPUTER WITH USCA BOARD AND HARD DISK CONTROLLER



### TULIP COMPUTER WITH SCSI BOARD (WITHOUT USCA BOARD)



- Remove terminator pack
- Terminator pack installed
-  Flat cable

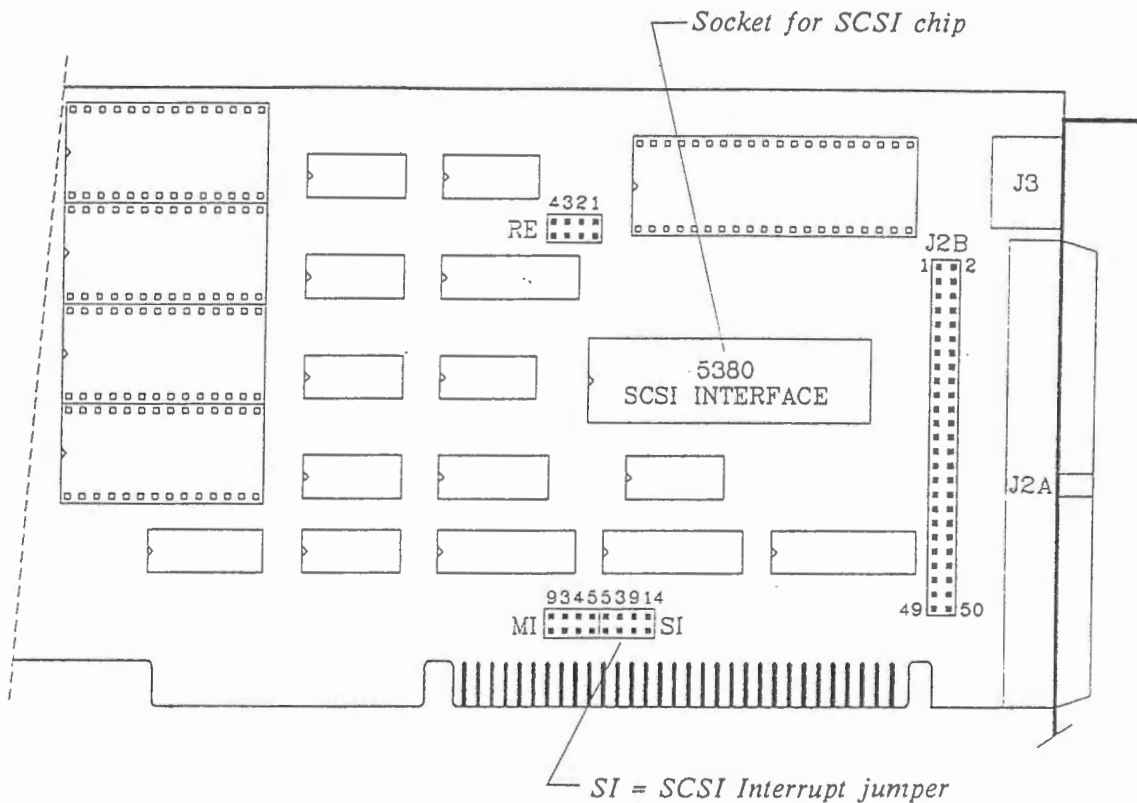
#### Note

Be sure to connect the colored side of the flat cable to pin 1.

## SCSI chip

If you have a Tulip at 386, you must place the SCSI chip into the socket on the USCA board. (See the figure below.)

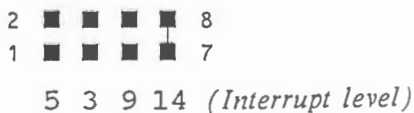
### PART OF THE USCA BOARD



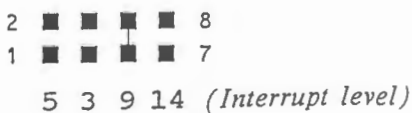
## Jumpers

Installing a tape streamer to your Tulip computer requires the proper setting of the SCSI interrupt jumper on the USCA board or the SCSI board.

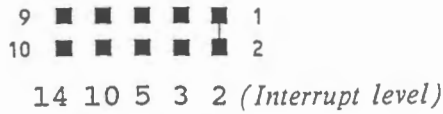
- If you use the Tulip Tape streamer in a configuration with only a USCA board, set the SCSI interrupt jumper (SI) to interrupt level 14 (jumpers on pins 7 and 8):



- If the tape streamer is, however, used in a configuration with a USCA board and a separate hard disk controller, set the SCSI interrupt jumper (SI) to interrupt level 9 (jumpers on pins 5 and 6):



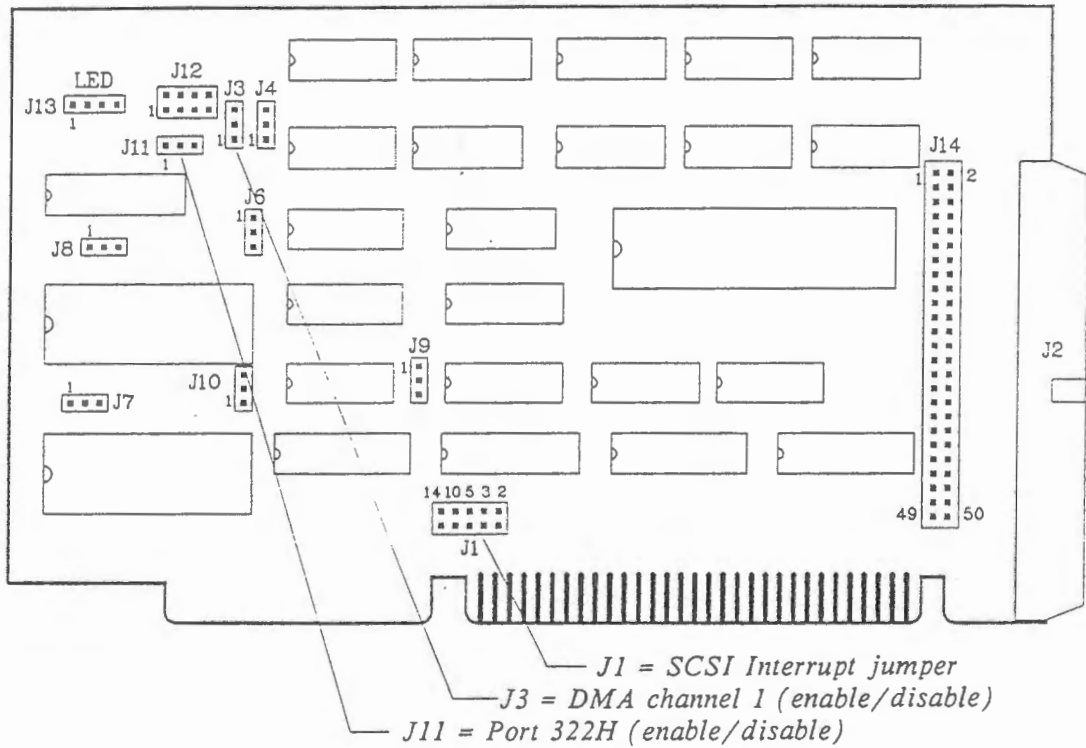
- If the tape streamer is used in a configuration with a SCSI board (but without a USCA board), you should set the SCSI interrupt jumper to interrupt level 2 (jumpers on pins 1 and 2):



**Note**

If the SCSI board is installed in a Tulip pc compact 2, the SCSI interrupt jumper can also be set to interrupt level 3.

**THE SCSI BOARD**



**Attention**

Check to see whether the jumpers J3 and J11 are set correctly.

**J3 (DMA channel 1):**

Tulip at compact 2:  
Tulip sx compact 2:  
Tulip at 386<sup>SX</sup>

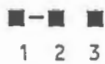


Tulip pc compact 2:



**J11 (Port 322H):**

Tulip at compact 2:  
Tulip sx compact 2:  
Tulip at 386<sup>SX</sup>



Tulip pc compact 2:



---

## Installing the tape streamer

Your Tulip Tape streamer should be installed at the position of a floppy disk drive in your Tulip computer. The tape streamer must be installed and connected by an experienced person. Your official Tulip dealer will provide you with more detailed information on the installation and connection of the tape streamer.

---

## Installing the software

The tape streamer software should be installed as follows:

- Create a directory TAPE in the root directory (e.g. C:\) on your hard disk or on your network disk by typing the following command line:

```
md tape
```

and pressing ENTER.

- Insert the disk which contains the tape streamer software in drive A and copy the tape streamer program, *tape.exe*, to the directory C:\TAPE on your hard disk by typing the following command line:

```
copy a:\uk\tape.exe c:\tape
```

Now the software needed to operate the tape streamer, is installed on your hard disk.

In the next chapter, "Tape streamer operation", you will find information on the software used to operate the Tulip Tape streamer.

---

## 2 TAPE STREAMER OPERATION

---

### Introduction

The tape streamer is used to make backups of your hard disk, as often as you think it is necessary. Regularly backing-up your hard disk prevents the loss of your information after losing files or in case of a crash. There is no need to tell you to keep your tapes in a safe place.

Additionally, the Tulip tape streamer can be used to make backup copies of your Novell network disk. If it is used for this purpose, it is important that you have been granted supervisor rights or comparable rights. If these have not been given to you, not all files will be made backup copies of. It is also important that no files on the network disk are being used by other users, as this would mean that no backup copy will be made of these files. Also, some files might be used by Novell's Queue Management System, of which no backup copy is made.

This chapter will systematically guide you through all the possibilities of the tape streamer. You can work with the tape streamer in an interactive way, using menus, or directly from DOS. Function keys and help information will make it easy to become familiar with the tape streamer in little time.

---

### Getting started

You must start the tape streamer program, called *tape.exe*, from the directory it is placed in, unless this directory (C:\TAPE) is in your "path". (See your DOS manual for information about the path command). If you work with the tape streamer, the program will create a directory TAPE on your hard disk, because that is the directory in which the tape streamer will store (and look for) file specifications you are going to make.

To start the tape streamer, type the command `tape`, and press ENTER.  
Your first screen looks like this:

```
Magnetic Tape Utility Version 2.00
(C)Copyright Tulip(r) Computers 1987-1988
```

MAIN MENU

```
1 ..... Backup
2 ..... Restore
3 ..... Initialize tape
4 ..... Retension
5 ..... Return to DOS
```

Make your choice:

F1 HELP	F2 Tape dir
------------	----------------

You can distinguish the following options:

- |                   |  |
|-------------------|--|
| 1 Backup          | To make a backup of (a part of) the files on your hard disk.   |
| 2 Restore         | To restore the information from your tape onto your hard disk. |
| 3 Initialize tape | To name a new tape.  |
| 4 Retension       | To return the right tension to your tape.                      |
| 5 Return to DOS   | To finish the tape streamer program.                           |

At the bottom you will see the description of two function keys:

The F1 key is the HELP key and gives you information on the topic you are working at.

The F2 key gives you an overview of the contents of your tape. The "Label-list" which appears after pressing F2, lists all *labels* on your tape.

A *label* is the name of a block; a *block* is a file or group of files together, of which you made a backup. You can move from label to label by pressing the direction keys. The highlight arrow in the margin shows which label is selected.

Press the SPACEBAR and you will see an overview of all the files (their names, size, and the date and time they were created or modified) in the block of which you selected the label.

Press ESCAPE to return to the previous screen. Press ESCAPE again to proceed.

Note

Use the F2 key after initializing your tape.



When you use a new initialized tape, the label-list will be empty.

You will see that each screen has the same layout:

- The upper part shows windows with options to choose, or overviews and listings.
- The bottom shows the description of function keys.

By pressing `ESCAPE` you can abort a procedure, as long as no command is being executed.

The following sections describe how to get started the first time you use the tape streamer, how to use the backup option, the restore option and the function keys, and finally how to return to DOS.

---

## Initialize tape

Before you use the tape streamer, you can initialize your tape, to give it a name.

To initialize a tape, press 3 and `ENTER`. In the window which now appears, you have to type the name of the tape ("volume label"). This name can be up to 19 characters. All characters are permitted. Press `ENTER` to execute the command. Press any key to return to the first screen after initializing your tape.

Every time you use a new tape you can initialize it before use.

---

## Retention

When you use a tape that hasn't been used for a long time, or a tape which has been stored at a much colder place, you better prewind it first. To prewind you press 4 and then `ENTER`. The tape will be wind forward and backward once. Press `ESCAPE` after retention to return to the main menu.

## Backup

To backup press 1 and then ENTER, and the next screen will look like this:

Backup parameters	
◆	No append writing
Label: TUE DEC 06 15:29:43	

File specifications	
C:\*.*	-L

Make your choice ...

F1 HELP	F2 Tape dir	F3 Parameter	F4 Files	F5 Load	F6 Save	F7 Del	F10 BACKUP
------------	----------------	-----------------	-------------	------------	------------	-----------	---------------

You see two windows, one called "Backup parameters" and one called "File specifications". At the bottom of your screen you see the description of the function keys.

To place your cursor in one of the windows use F3 ("Backup parameters") or F4 ("File specifications").

Inside a parameter window you can move your cursor from one option to the other with your TAB key. Use the SPACEBAR to select your choice in an option.

### BACKUP PARAMETERS

After pressing F3, the highlighted diamond in the upper left window shows you that the "Backup parameters" window is selected. Now you have the possibility to change the backup parameters. You can switch an option ON or OFF by pressing the SPACEBAR.

With the first option you indicate, whether you want to start at the beginning of the tape ("No append writing") or append the next backup behind the previous one ("APPEND WRITING"). The first time you use the tape streamer, this option indicates "No append writing". Press the SPACEBAR to change this to "APPEND WRITING". The option setting will be saved together with the file specifications. So when you always want to make your backups with the same option settings, you'll only have to set them once. See section "Remaining function keys" (on pages 15 and 16) below for a detailed explanation of the F5 and F6 keys (for loading and saving your option settings).

Use the **TAB** key to move to "Label:". The default label is the day, date and time of your backup with the following syntax:

*day month dd hh:mm:ss*

For example:

TUE SEP 20 15:08:59

You can give your label another, more meaningful, name. This name can have up to 19 characters. All characters are permitted.

After setting your backup parameters, press **ESCAPE** to return to the previous screen to proceed.

## FILE SPECIFICATIONS

The first time you use the tape streamer, the following file specification is set in the "File specifications" window:

C:\\*.\* -L

This indicates all files in the root (C:\\*.\*), as well as the files in all lower directories (-L).

When you want another file specification, press **F4** to select the "File specifications" window. The window returns blank. Now you can tell the tape streamer which files you want to back-up. You can use the **-L** and the **-D** option.

The **-L** option indicates the inclusion of all lower directories. The **-D** option indicates the inclusion of all files created or changed since a date you set. When you don't set a date, but you do use the **-D** option the day of your backup is the date. The syntax is as follows:

**-D**[[d]d-[m]m-[yy]yy]

for example:

**-D**

**-D20-9-88**

**-D20-09-88**

**-D20-9-1988**

are all correct. You can give a pathname with the following syntax:

[Drive:] [\directory-name[...]] \filename [options]

You can use an asterisk (\*) or a question mark (one ? for every character) as wild cards in filenames.

All following examples are correct file specifications:

<code>C:\*.*</code>	refers to all files in the root.
<code>C:\book\*.*???</code>	refers to all files in directory "book"
<code>C:\book\example.txt</code>	refers to file "example.txt" in the directory "book".
<code>C:\book\*.* -D</code>	refers to all files in directory "book", that have been changed or created today.
<code>C:\book\*.* -D20-9-88</code>	refers to all files in directory "book", that have been changed or created since September 20th, 1988.
<code>C:\book\*.* -L -D20-9-88</code>	refers to all files in directory "book" and the directories below "book", that have been changed or created since September 20th, 1988.

#### Note

A space is required in front of the options (-L and/or -D) !  
You can give up to six file specifications.

#### REMAINING FUNCTION KEYS

If you always want to make your backups with the same parameters and file specifications, you only have to set them once. You can then put them into a file which you can name. This name may contain all alphabetical characters (A-Z) and all numerals (0-9). No distinction is made between upper and lower case. No special characters are permitted.

The F5 key loads the previously defined file specifications and backup parameters belonging to the file of which you type the name. Pressing ENTER gives you an overview of all names of such files. Press any key to return to the previous screen and type the desired name. Press ENTER to execute the command. If you type a name that doesn't exist, the overview will appear again. Press any key to return to the previous screen and type the correct name.

The F6 key saves your defined file specifications and backup parameters in a file with a certain name. You will have found more information on naming such files in the first paragraph of this section.

The F7 key deletes your previously defined file specifications and backup parameters.

Pressing the F10 key executes the backup procedure. You will be asked, if you want to make the backup. Press Y to confirm. Press ESCAPE to return to the first screen.

Note

Once you have saved your backup parameters and file specifications in a file with a certain name, there is a shorter way to make your backup.

In DOS, simply type:

tape *name*

where:

*name* refers to the name of the file mentioned above.

Now press ENTER.

When the backup procedure has finished, the following message appears on your screen:

Backup ready

---

## Restore

The command `restore` is used after losing files or after your system's hard disk has been damaged. In the latter case you first have to format a new hard disk by typing the following command line:

`format drive:/s`

where *drive* refers to the letter of the hard disk mentioned above, for instance `format c:/s`

For more information on this topic see your DOS manual.

Note

If your network disk has been damaged, you should refer to your network manual for detailed information on reinitializing your network disk.

When you want to restore the information from your tape onto your hard disk(s), use the `restore` command by pressing **2** and then **ENTER**.

Your screen will look like this:

```

|----- Restore parameters -----|
♦ Backup drive used
♦ FILES ARE CREATED
♦ NO Pause
♦ RESTORE Read Only Files
♦ Date is NOT checked

Label: *

```

Make your choice ...

F1 HELP	F2 Tape Directory	F3 Change Parameter	F4 Select Label	F9 Select & RESTORE	F10 RESTORE
------------	----------------------	------------------------	--------------------	------------------------	----------------

You see the "Restore parameters" window and six function keys.

## RESTORE PARAMETERS

The "Restore parameters" window shows six options.

Press F3 to place the cursor in the "Restore parameters" window.

The first option is selected. You can indicate whether you want your files back onto the drive they came from ("Backup drive used") or, regardless of the drive they came from, onto a drive to be specified by you.

When you press the SPACEBAR, the following message appears: "Backup drive ignored; Drive: C". Pressing the TAB key moves the cursor to "Drive: " and the C disappears. Now you can type the desired drive name. If you type the drive name, the cursor will move to the next option. Pressing the TAB key again, without typing a drive specification, will result in drive: C. The cursor moves to the next option.

You now can indicate, whether you want all the files from your tape back onto your disk(s) ("FILES ARE CREATED") or only those files, you still have on your disk (Files are not created).

### Example

You made a backup of C:\book\\*. After the backup you deleted all the .bak files of this directory. When you set the option "FILES ARE CREATED", all the files including the .bak files will be restored. When you set the option "Files are NOT created", all the files, except the .bak files, will be restored.

Press TAB to move to the next option. This option gives you control over the restore process during restoring. "NO Pause" indicates that you want to go on without being asked, if you really want to restore the file. "PAUSE" indicates that you want to confirm (or cancel) your decision, every time a file will be restored.

Press TAB to move to the next option. You can indicate whether you want to restore read-only files or skip restoring them. If you do not want to restore the read-only files, you should press the SPACEBAR to change this option from "RESTORE Read Only Files" to "SKIP Read Only Files".

Press TAB to move to the next option. With this option it is possible to restore only files "BEFORE" or "AFTER" a certain date (the date they have been created or modified ). Press the SPACEBAR to set the option from "Date is NOT checked" to "DATE IS CHECKED" if you want to. Press the TAB key. Under the option "DATE IS CHECKED" an other option appears; you can set it on "AFTER" or "BEFORE" with the SPACEBAR. Press the TAB key again. Behind "BEFORE" or "AFTER" "Date (dd-mm-yy): " appears. Type the date you want.

### Note

The files created or modified on dd-mm-yy itself will also be restored.

Press the TAB key to "Label: \*". If you leave the default label (\*), your whole tape will be restored. If you don't want the whole tape to be restored, type the label you need or press ESCAPE, and then F4 to get the "Label-list". Move through the labels with the direction keys. Press SPACEBAR to fill out the label in the "Restore parameters" window. Press ESCAPE again to proceed.

## REMAINING FUNCTION KEYS

The F10 key executes the restore command. You will have to confirm; type Y if you want to execute the command.

The F9 key allows you to restore one or more files. Now press F9. The Label-list will appear on your screen. Move the cursor to the desired label and press the SPACEBAR. The Tape directory will appear on your screen. Move the cursor with the direction key to the desired file and press the SPACEBAR to select the file. If you want to select more files, just move the cursor toward them and press the SPACEBAR to select. When all the files you want to restore, are selected, press F10 to restore.

Press ESCAPE to return to the first screen when the restore process is finished.

---

## Return to DOS

When you have finished, press 5, and then ENTER to return to DOS. You can also simply press ESCAPE.

---

## Appendix: ERROR MESSAGES

**Cannot create directory 'TAPE'**

The program cannot create a directory 'TAPE'. Probably you have a file named 'tape' in your root directory. Rename the file and try again.

If this message has appeared after you have tried to create this directory on a network disk, you might not have been assigned enough rights to create this directory.

**Cassette not in place**

No tape has been inserted into the tape streamer.

**Disk full**

The restore command can't be completed because of insufficient space on your disk.

**Duplicate label**

You entered a label that already exists. Choose another label.

**End of tape**

The end of the tape has been reached.

**File could not be restored**

You have not been granted enough rights to restore the file to the network disk or it is not possible to overwrite the read-only file.

**Hardware error**

A hardware error has been detected in either the tape streamer unit or on the USCA board or in the cables.

**Invalid file specification**

Your file specification is invalid.

**Invalid name**

The name includes unpermitted characters like \*, ?, /, or dot (.). Only the alphabetical characters A-Z and the numbers 0-9 are permitted.

**Label not found**

The specified label is not on your tape.

**Medium error**

You can not write data onto this tape or read it, because the tape is probably defective.

**Name already exists**

Choose another name.

**Name does not exist**

Type other name or run the program.

**Name too long**

Enter a shorter name.



**No data**

The tape does not contain data.

**No directory 'TAPE'**

You don't have a directory 'TAPE'. If you use the **tape** command directly from DOS, the tape streamer will not create a directory 'TAPE' itself.

**No files to backup**

No files that meet the file specifications, are found on your disk. Using the **-D** option can result in these messages, when no files have been modified or created since the specified date.

**Not all files restored**

Not all files have been restored due to problems occurring when the tape was read.

**Not enough memory**

There is not enough memory to perform the specified operation.

**Root directory empty**

Your tape is empty.

**Tape has not been changed**

You should have changed the tape.

**Tape is not initialized**

Press **ESCAPE** to go back to the first screen. Press **3** and **ENTER** to initialize your tape.

**Tape unit not present**

No tape unit has been detected.

**Tape unreadable**

The tape streamer can't read your tape. Repeat your command. When the message reappears, initialize your tape again.

**Time out**

Your command cannot be executed. See if your tape has been placed correctly. Try again.

**Too many files specified**

The tape streamer can't handle the specified number of files. You will have to make your backup in parts.

**Too many labels**

Your label list contains too many labels. If you want to keep the information on your tape, use another tape for your backup. If you don't need the information on the tape, make your backup with the "No append writing" option. This will result in a label-list with only one entry.

**Too many open files**

The number of open files exceeds the allowed number, specified in the *config.sys* file. See your DOS manual for more information about this topic.

**Undefined error**

An undefined error has been detected by the tape streamer program.

**Write protect**

The tape you are trying to write on, is write-protected.

**Wrong DMA channel selected**

You have selected an incorrect DMA channel.

**Wrong Interrupt jumper**

You have set the interrupt jumper incorrectly.



---

INSTALLATION AND USE VGA-16 CARD

**Tulip<sup>®</sup>**  
**computers**

's-Hertogenbosch The Netherlands

(c) Copyright 1989, Tulip Computers.

Part number: 72-10354-01/100

Issue date: January 1989

*No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.*

Issued by:

**Tulip Computers**  
P.O.Box 3337  
5203 DH 's-Hertogenbosch  
The Netherlands

---

## DISCLAIMER

This manual describes a product manufactured by Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind.

Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual.

If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual.

The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for *backup* purposes.

Tulip Computers may change or improve the product and this manual at any time without previous warning.

---

## Trademarks

**Tulip** is a registered trademark of Tulip Computers.

**AutoCAD** is a trademark of Autodesk, Inc.

**Hercules** is a registered trademark of Hercules Computer Technology, Inc.

**Lotus 1-2-3** is a registered trademark of Lotus Development Corporation.

# CONTENTS

<b>1</b>	<b>Installation VGA card</b> .....	<b>5</b>
	Description .....	5
	How to set the VGA switches .....	6
	How to install the VGA card .....	7
	Connector pinouts .....	9
	Video port connector pinout .....	9
	Note .....	9
	Rambios.sys .....	9
	Vgaansi.sys .....	10
	Using vgaansi.sys .....	10
<b>2</b>	<b>VGA utilities</b> .....	<b>11</b>
	VGA Utility menu (vga.com) .....	11
	Screen saver .....	11
	Adjusting screen saver with the VGA utility program .....	12
	Adjusting screen saver from the DOS prompt .....	12
	When software does not work with screen saver .....	13
	Important points .....	13
	Emulation modes .....	14
	About monochrome emulation .....	14
	Enabling/disabling emulation modes with the VGA utility program .....	15
	Enabling/disabling emulation modes from the DOS prompt .....	15
	Switch monitor type .....	16
	About 100% compatibility .....	17
	Multiple VGA commands .....	17
	Backwards compatibility .....	17
	EGA compatibility .....	17
	CGA compatibility .....	18
	HGC compatibility .....	18
	Diagnostics program .....	18
<b>3</b>	<b>Application software</b> .....	<b>19</b>
	Introduction .....	19
	AutoCAD .....	19
	AutoCAD release 9 installation .....	20
	AutoCAD ADI configuration .....	20
	Controlling resolution and colors .....	21
	Lotus 1-2-3 .....	22
	Appendix A - Two monitor systems .....	25
	Appendix B - Technical information .....	26
	Standard modes .....	26
	Extended modes .....	27
	Switch settings on the VGA card .....	27
	Appendix C - Troubleshooting the VGA installation .....	29

---

## INSTALLATION VGA CARD

---

### Description

The VGA card (VGA = Video Graphics Array) is a video adapter which can be used with any Tulip pc, at or sx computer, or any other compatible computer. The VGA card will also run most programs written for EGA, CGA and Hercules cards.

The graphics capabilities of the VGA card used in conjunction with a VGA monitor are:

In MDA mode:

- 80 x 25 characters monochrome (alphanumeric)

In Hercules mode:

- 720 x 348 pixels monochrome (graphics)

In CGA mode:

- 40 x 25 characters monochrome and color (alphanumeric)
- 80 x 25 characters monochrome and color (alphanumeric)
- 320 x 200 pixels with 4 colors (graphics)
- 320 x 200 pixels monochrome (graphics)
- 640 x 200 pixels monochrome (graphics)

In EGA mode:

- 320 x 200 pixels with 16 colors (graphics)
- 640 x 200 pixels with 16 colors (graphics)
- 640 x 350 pixels monochrome (graphics)
- 640 x 350 pixels with 16 colors (graphics)

In VGA mode:

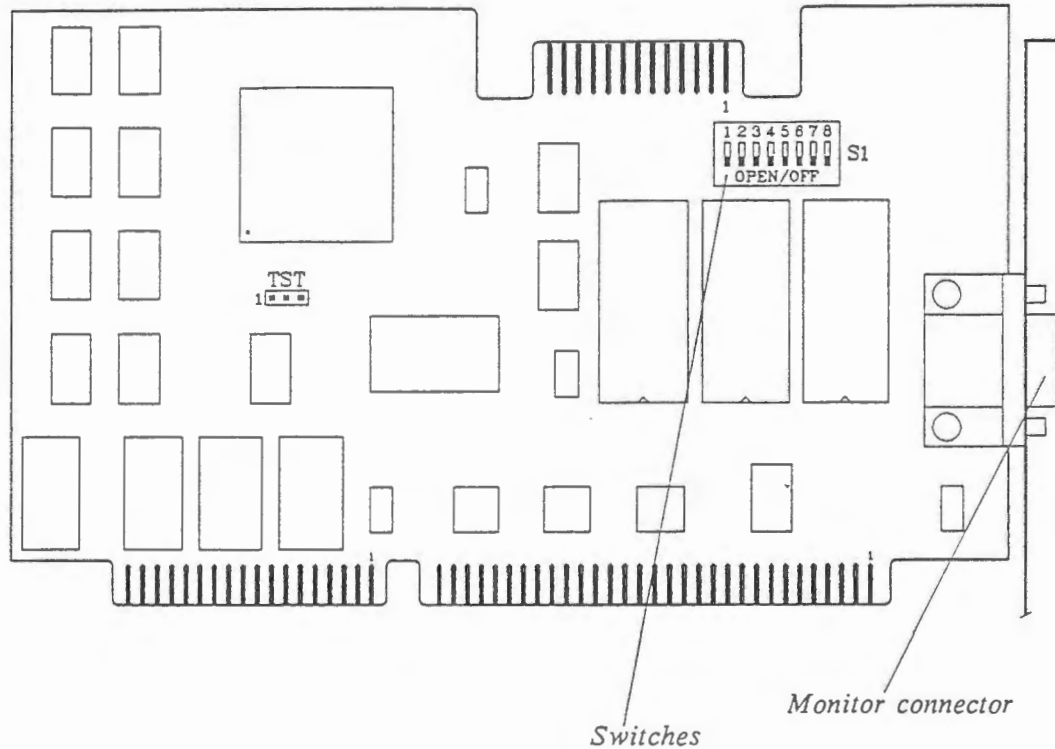
- 640 x 480 pixels with 2 colors (graphics)
- 640 x 480 pixels with 16 colors (graphics)
- 320 x 200 pixels with 256 colors (graphics)

In Appendix B, "Technical Information", you will find a list of additional possibilities the VGA card offers when used in conjunction with a multisync monitor.



## How to set the VGA switches

Figure 1: VGA card



The default setting for switches on your VGA card are generally the best option for most systems. Should you have difficulties, you may want to try some different switch settings. This section gives information about switch settings.

### Settings for Tulip pc computers

Switch	Default setting
1 to 3	OFF
4	OFF
5	ON
6	OFF
7	OFF
8	OFF

### Settings for Tulip at compact 2

Switch	Default setting
1 to 3	OFF
4	OFF
5	ON
6	ON
7	OFF
8	OFF

### Settings for all other Tulip computers

<i>Switch</i>	<i>Default setting</i>
1 to 3	OFF
4	OFF
5	ON
6	ON
7	ON
8	OFF

Consult appendix B, "Technical information", for more detailed information on the functions of the switches.

---

## How to install the VGA card

Check the *readme.doc* file on your VGA utility diskette before you start installing the VGA card. *Readme.doc* contains updated information unavailable in this manual.

- 1 Refer to your system's user's guide for more information on opening the system unit.
- 2 Remove one of the system expansion slot covers which are located at the back of the system unit by removing its retaining screw and lifting it out. (Save the screw, because you will need the screw when mounting the card.) Press the card firmly into the connector and secure the card with the screw you removed earlier.

#### Note:

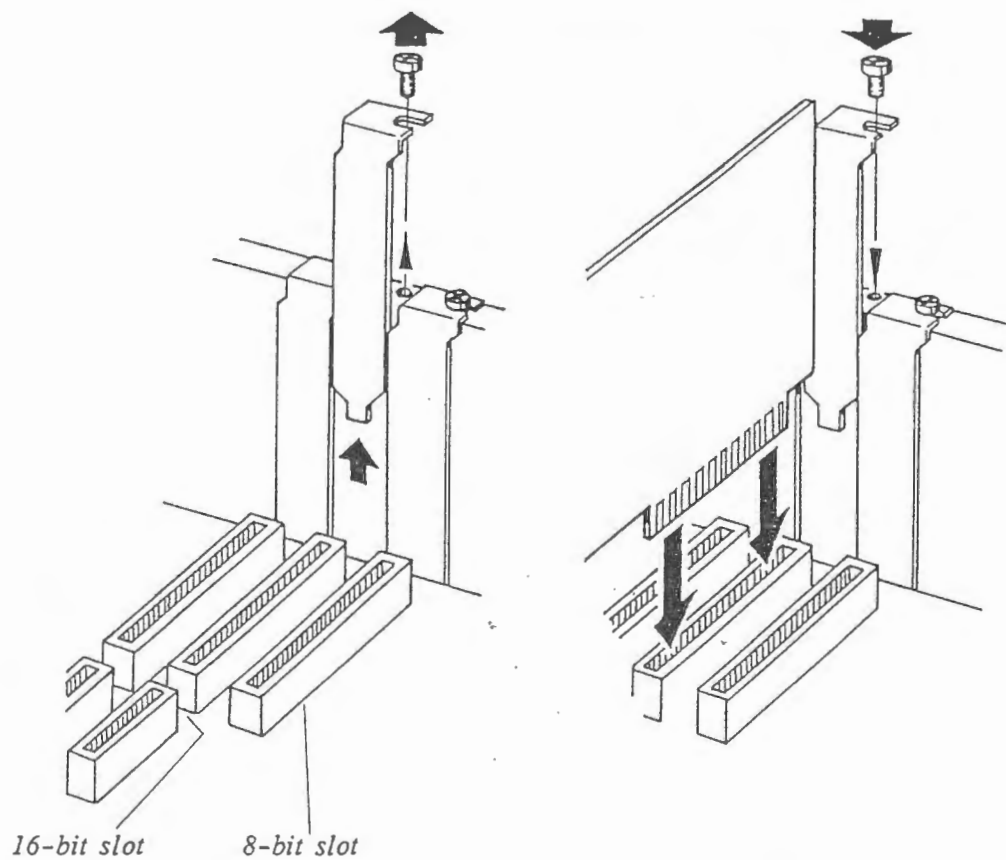
The VGA card can be installed in any full length 8-bit or 16-bit slot. For significantly faster performance, you should install your VGA card in a 16-bit slot rather than an 8-bit slot whenever possible.

- 3 If you want to install your VGA card into a **Tulip pc compact 2**, you should place a jumper on positions 1-2 and 3-4 of J8. Consult your system's user's guide for more information on this subject.



If you want to install your VGA card into a **Tulip at compact**, **Tulip at compact 2**, **Tulip sx compact 2**, **Tulip at 386** or **Tulip at 386<sup>sx</sup>**, you do not need to set a jumper or change a jumper setting for the video card on the main board.

Figure 2: Installation of the VGA card



- 4 See your system's user's guide for more information on closing your system unit.
- 5 Configure your system again by running the Diagnostics program. If the program asks you to specify a video adapter, you have to choose: "Adapter with BIOS (e.g. EGA).

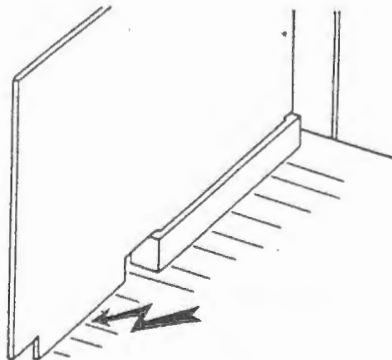
Now the installation of the <sup>VGA</sup>~~DGA~~ card is complete. If you still encounter any problem using this card, please contact your local dealer.

---

#### WARNING

If you install the VGA card into an 8-bit slot, you should avoid contact of the end of the card with the computer's main board, as this could cause a short circuit.

---

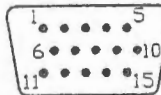


---

## Connector pinouts

### VIDEO PORT CONNECTOR PINOUT

Pin	Signal
1	Red video
2	Green video
3	Blue video
4	Monitor ID Bit 2
5	Not used
6	Red return (ground)
7	Green return (ground)
8	Blue return (ground)
9	Key (no pin)
10	Sync return (ground)
11	Monitor ID Bit 0
12	Monitor ID Bit 1
13	Horizontal sync
14	Vertical sync
15	Not used



### NOTE

#### Use of multisync monitor

The VGA card is equipped to work with analog monitors, such as the Tulip VGA monitor. Digital monitors, such as EGA, CGA and MDA monitors, can not be connected to this card. It is possible to use a multisync monitor in conjunction with the VGA card, if you set this monitor's analog/digital switch for analog operation. As an additional feature a multisync monitor supports the VGA card's extended modes (some VGA monitors do not). In standard modes however, a VGA monitor produces a much more stable image.

---

## Rambios.sys

*Rambios.sys* allows you to install the VGA BIOS in memory to enable some programs to run faster.

You will now find more detailed information on installing *rambios.sys* from the DOS prompt in a system with a hard disk or in a system with two floppy disk drives.

#### Installing *rambios.sys* from DOS prompt in a system with a hard disk

- 1 Copy the file *rambios.sys* from the VGA Utility diskette into the root directory on your hard disk.
- 2 Create/modify your *config.sys* file by adding the following to the first line of the file:

```
device=[drive:][path]rambios.sys
```

Refer to your DOS manual for more detailed instructions for creating and/or editing a *config.sys* file.

**Installing rambios.sys from DOS prompt in a system with two floppy drives**

- 1 Insert the VGA Utility diskette in drive A.
- 2 Insert your DOS boot-up diskette in drive B.
- 3 Copy the *rambios.sys* from the VGA Utility diskette onto your DOS boot-up diskette.
- 4 Create/modify your *config.sys* file by adding the following to the first line of the file:

```
device=[drive:][path]rambios.sys
```

Refer to your DOS manual, if you need instructions for creating/editing a *config.sys* file.

---

**Vgaansi.sys**

The DOS *ansi.sys* device driver will only work with standard text modes (40 x 25 and 80 x 25). Your VGA Utility diskette includes a *vgaansi.sys* device driver that provides support for standard modes as well as all VGA extended text modes.

**USING VGAANSI.SYS**

- If your *config.sys* file includes the command:

```
device=[drive:][path]ansi.sys
```

you must change it when adding the file *vgaansi.sys*.

*Vgaansi.sys* allows use of all VGA modes, if you do the following:

- 1 Copy the file *vgaansi.sys* from the VGA Utility diskette into the root directory on your hard disk.
- 2 Create or modify your *config.sys* file by adding the following to the file:  

```
device=[drive:][path]vgaansi.sys
```

Refer to your DOS manual for more information on creating and editing the *config.sys* file.

- 3 Reboot your computer for the change to take effect.

---

## 2 VGA UTILITIES

---

### VGA Utility menu (*vga.com*)

With the VGA utility menu, you can:

- Set screen saver options.
- Select emulation mode.
- Switch monitor type.

To run the VGA utility menu program:

- 1 Insert the VGA utility diskette in drive A (or make the drive with *vga.com* the current directory).
- 2 At the DOS prompt type:  
VGA  
  
and then press ENTER.
- 3 When the VGA menu appears, select the feature option you want.  
  
Additional menus will appear to guide you through procedures for the configuration you want. More details for each feature option will follow.

---

### Screen saver

VGA screen saver can extend the life of your monitor by preventing images from being "burned" into your screen due to long periods of inactivity, such as when you are away from your computer.

VGA screen saver "shuts off" your screen display if no key is pressed on your keyboard within some period of time (the default setting for time elapsed without activity is five minutes). Generally, your screen display is returned by pressing any key on your keyboard. Pressing the NUMLOCK-key is thought to be one of the best choices because this key usually has little or no effect on a program in progress.

You may not want to activate screen saver, if you will use:

- A mouse and will not be using the keyboard for some time.
- Software that causes the screen to "shut off" even when you are using the keyboard (see next section for more information).

You may want to alter the timeout value (the length of time elapsed before screen saver "shuts off" your screen display), if you use software that combines the use of a pointing device and the keyboard.

You can make adjustments to the screen saver:

- With the VGA utility program.
- By entering a command at the DOS prompt or from within a batch file.

**Note:**

The VGA screen saver feature is designed exclusively for use with the VGA. It will only work when your video output is directed through the VGA. If you have a co-resident adapter and have directed the video output through that board, the VGA screen saver feature will have no effect.

### ADJUSTING SCREEN SAVER WITH THE VGA UTILITY PROGRAM

- 1 Insert the VGA utility diskette in drive A (or make the drive with *vga.com* the current drive/directory).
- 2 At the DOS prompt type:  
VGA  
  
and then press ENTER.
- 3 Choose "Set screen saver options" from the VGA utility program menu.
- 4 Choose the option you want when this menu appears:  
Screen saver options:  
1 Turn screen saver ON  
2 Turn screen saver OFF  
3 Set timeout value  
Enter option number:
- 5 Follow the instructions on the screen to return to the menu.

### ADJUSTING SCREEN SAVER FROM THE DOS PROMPT

These are the screen saver commands and their functions:

- |               |   |
|---------------|---|
| VGA SAVE: ON  | Enables screen saver feature.<br>Turns off the screen when there has been no keyboard activity for 5 minutes.                           |
| VGA SAVE: [n] | Enables you to change the number of minutes before screen saver turns off the display. The letter [n] represents the number of minutes. |
| VGA SAVE: OFF | Disables screen saver.  |
| VGA NOSAVE    | Disables screen saver.  |

- 1 Copy the *vga.com* file from the VGA utility diskette into a directory on your hard disk. Include the directory in the search path, if you place *vga.com* in another directory than the root directory.
- 2 At the DOS prompt:
  - To enable the screen saver feature, type:  
VGA SAVE:ON  
then press ENTER.
  - To change the number of minutes before screen saver turns off the display, type the following command substituting the number of minutes you want for the letter [n]:  
VGA SAVE:[n]  
then press ENTER
  - To disable screen saver, type:  
VGA SAVE:OFF  
  
and press ENTER.  
or  
VGA NOSAVE  
and press ENTER.

#### WHEN SOFTWARE DOES NOT WORK WITH SCREEN SAVER

The VGA screen saver feature will not work correctly with software that doesn't pass on your keystrokes properly, for example when you use Windows. You will know this is a problem, if:

- The screen goes blank while you are using the keyboard.
- Striking a key does not return an image to your screen after it has gone blank.

If either of these symptoms occur, try:

- Restoring the screen by hitting the CTRL, ALT or SHIFT key.
- Exiting your program "blind" by using the normal sequence. This allows you to save the work you have done and return to DOS.
- Rebooting your machine.

After regaining the screen via one of the above options, disable screen saver and resume using your program.

#### IMPORTANT POINTS

- To deactivate screen saver once it is activated during boot up by your *autoexec.bat*, type:  
VGA SAVE:OFF
- To change your setup so that screen saver will not be automatically enabled during startup, delete "VGA SAVE:ON" from your *autoexec.bat* file and reboot your system.



- To automatically disable screen saver whenever you use a program that doesn't work with screen saver, use a batch file to invoke the program and include *one* of the following lines:

```
VGA SAVE:OFF
```

or

```
VGA NOSAVE
```

---

## Emulation modes

The VGA emulation modes are needed for programs that make direct access to the Color Graphics Adapter (CGA) or Hercules Graphics Card (HGC) registers (or ports). You should run your program first, without using the VGA emulation modes.

An emulation mode may be necessary, if:

- A program that works with a CGA or HGC fails to work properly on the VGA.
- A program's documentation specifically states that the program needs a CGA or HGC.

With the exception of HGC compatible software, most programs written since the introduction of EGA do not require the emulation modes because they do not make direct access to the CGA registers.

### Note:

You can only select emulation modes, if switch 5 is turned ON.

You can enable or disable emulation modes:

- With the VGA utility menu program.
- By entering a command at the DOS prompt or from within a batch file.

## ABOUT MONOCHROME EMULATION

The monochrome mode allows you to configure the VGA to emulate the HGC. The HGC has 64K of video graphics memory. Your VGA can run software written to utilize the graphics capabilities of the HGC in two ways:

- FULL mode, configured to use the full amount of memory (two graphics pages or 64K).
- HALF mode, configured to use half that amount (one graphics page of memory or 32K).

The advantage of HALF mode is that it allows an IBM compatible CGA card to co-exist with the VGA (in HGC compatible mode) in another slot. Color output is directed through the co-resident CGA.

## ENABLING/DISABLING EMULATION MODES WITH THE VGA UTILITY PROGRAM

- 1 Insert the VGA utility diskette in drive A (or make the drive with *vga.com* the current drive/directory).
- 2 At the DOS prompt type:  
VGA  
then press ENTER.
- 3 Choose "select emulation mode" from the VGA utility program menu.
- 4 Choose the option you want when this menu appears:  
  
Emulation modes options:  
1 Color display options  
2 Monochrome display options  
Enter option number:
- 5 Follow the instructions on the screen to complete the procedure and to return to the menu.

### Note:

If you want to change the emulation mode, you will have to set another monitor type as well. (You will find more information on this item in the section "Switch monitor type" later in this manual.) Before you can change the monitor type, you must first disable the current emulation mode. If, for example, you want to switch from CGA emulation to Hercules emulation, you should first disable CGA emulation and then switch your monitor to monochrome. After that you should enable Hercules emulation.

## ENABLING/DISABLING EMULATION MODES FROM THE DOS PROMPT

These are the emulation mode commands and their functions:

VGA CGA:ON	Configures the VGA to emulate the CGA.
VGA CGA:OFF	Deactivates CGA emulation
VGA MONO:ON	Configures the VGA to emulate HGC with 64K of memory. This is the same as VGA MONO:FULL.
VGA MONO:OFF	Deactivates HGC emulation
VGA MONO:FULL	Configures the VGA to emulate HGC and use 64K (two graphics pages) of memory. <i>The VGA cannot have a CGA co-resident.</i>
VGA MONO:HALF	Configures the VGA to emulate HGC and use only 32K (one graphics page) of memory. <i>Use this configuration if you have a co-resident CGA in your system.</i>

- 1 Copy the file *vga.com* from the VGA utility diskette into a directory on your hard disk. Include the directory in the search path, if you place *vga.com* in another directory than your root directory.
- 2 At the DOS prompt:
  - To enable CGA emulation, type:  
VGA CGA:ON  
press ENTER.
  - To deactivate CGA emulation, type:  
VGA CGA:OFF  
press ENTER.
  - To enable HGC emulation, type:  
VGA MONO:ON  
press ENTER.
  - To deactivate HGC emulation, type:  
VGA MONO:OFF  
press ENTER.
  - To enable HGC emulation FULL and use the full 64K (two graphics pages) of memory, type:  
VGA MONO:FULL  
press ENTER.
  - To enable HGC emulation HALF and use only 32K (one graphics page) type:  
VGA MONO:HALF  
press ENTER.

---

## Switch monitor type

Your VGA is equipped to work with both color and monochrome analog monitors. While any mode can be run on either kind of monitor, it is necessary to match the monitor type with the emulation mode desired. For example, in order to emulate HGC on a color monitor, you must first switch the monitor type to monochrome. Similarly, in order to emulate CGA on a monochrome monitor, you must first switch the monitor type to color.

You can change the monitor configuration:

- With the VGA utility menu program.
- By entering a command at the DOS prompt or from within a batch file.

(Also refer to the previous section "Enabling/disabling emulation modes from the DOS prompt"; if you enter any of these commands, the monitor type will automatically be switched to the appropriate setting.)

---

## About 100% compatibility

VGA offers extension registers beyond the IBM VGA's standard. Some operating environments are sensitive to the use of these extension registers. In order to prevent the VGA from accessing any extension registers, type:

```
VGA PURE:ON
```

and press ENTER.

This also prevents the VGA from accessing its extended modes. To enable access to these modes (even when switch 8 is ON), type:

```
VGA PURE:OFF
```

and then press ENTER.

---

## Multiple VGA commands

VGA commands can be combined on one line (up to 80 characters). You can save time by combining commands.

For example, if you want to configure your VGA to emulate CGA and, at the same time, set the SAVE feature for a 15 minute delay, you would type:

```
VGA CGA:ON SAVE:15
```

and press ENTER.

---

## Backwards compatibility

The VGA will run most programs written for any of the popular IBM graphics standards: EGA, CGA and HGC.

### EGA COMPATIBILITY

The VGA is fully BIOS compatible with the EGA. Because the EGA and the VGA are very closely related at the hardware level, BIOS-level compatibility enables virtually all EGA software to run without problems. If you experience difficulties, you should contact the software manufacturer to see, if their software package requires an update to work properly on a VGA.

## CGA COMPATIBILITY

In order to run CGA-specific programs, CGA emulation must be turned on with the *vga.com* program. You will know that you are in emulation mode because the VGA uses a different text font when emulating CGA. Running a program which accesses a mode not available on the CGA will automatically switch you back to VGA mode. Before running another CGA program, you must again use the VGA utility program to reenable CGA emulation.

## HGC COMPATIBILITY

While in HGC emulation, the VGA will automatically switch into VGA mode if a mode is accessed which is not available on HGC. Before running another Hercules program you must again use the VGA utility program to reenable HGC emulation.

---

## Diagnostics program

The diagnostics program on the VGA utility diskette will help you spot problems that may occur with your display adapter. The program is run from the DOS prompt by typing:

```
vgadiag
```

and then pressing ENTER.

First, the diagnostics program will display:

- The amount of video memory available on your VGA. This should be 256 KB.
- Primary and secondary graphics adapters.
- Monitor configurations.
- Motherboard ROM date.
- VGA BIOS date/version.
- Switch settings

If the information shown is incorrect, refer to appendix C "Troubleshooting the VGA installation". Then run the diagnostics program again.

If the information shown is correct, continue with the program. You will be shown a series of self-explanatory screens demonstrating various attributes and capabilities of the VGA.

If the diagnostics program indicates a problem, refer to appendix C "Troubleshooting the VGA installation". Run the diagnostics program again.

---

### 3 APPLICATION SOFTWARE

---

#### Introduction

In this chapter the additional capabilities of the VGA card are listed. To take advantage of these enhancements, your VGA is packaged with software support for several popular software programs. This section describes the procedures necessary to configure two of these programs (AutoCAD and Lotus 1-2-3) and/or install special drivers to give you the best performance from your software.

The table below shows various modes with AutoCAD and Lotus 1-2-3:

Program	VGA monitor	Multisync monitor
AutoCAD	320x200x256 *	640x400x256 *
	640x480x16	720x540x16
	752x410x16	800x600x16
	640x350x16	
Lotus 1-2-3	640x480x16	720x540x16
	752x410x16	800x600x16

\* = AutoCAD Release 9

#### Note:

To avoid damage to your monitor and other parts of your computer system, be sure to have correctly installed the VGA before you attempt to configure the software as described in this section.

---

#### AutoCAD

The AutoCAD drivers enable AutoCAD users to use the VGA to produce high resolution graphics. There are two drivers provided on the VGA utility diskette. *vgarel9.com* and *vgaadi2.com* are for AutoCAD release 9 and AutoCAD version 2.18 or above. The *vgarel9.com* driver supports the new ADI version 3 and above interface. It supports fast vector mode and packet modes of the version 3 ADI interface.

The instructions which follow assume that you have copied the files *vgarel9.com*, *vgaadi2.com* and *vgainst.exe* to your hard disk. The following instructions refer explicitly to the *vgarel9.com* driver. The operation of the *vgaadi2.com* driver is identical to *vgarel9.com* and the same instructions should be followed for both.

## AUTOCAD RELEASE 9 INSTALLATION

The release 9 AutoCAD ADI driver comes with one AutoCAD display driver and an installation program. The installation program allows you to change the currently selected resolution of AutoCAD's graphics screen, as well as modify the software interrupt vector used by AutoCAD to communicate with the ADI display driver, and finally to modify the colors used in several areas of the AutoCAD graphics screen.

Before you can begin working with AutoCAD you must load the ADI driver into your computer's memory. This procedure must be done, every time you turn your computer on, or when you perform a warm boot. It is therefore suggested that the command to load the ADI driver be placed in your *autoexec.bat* file. To install the ADI driver type:

```
VGAREL9
```

and press ENTER.

This command will load the ADI driver into the computer's memory. The driver will then display identification information on the screen, and confirm that it has been installed. The driver will also notify you as to which interrupt vector will be used to communicate with AutoCAD.

## AUTOCAD ADI CONFIGURATION

AutoCAD need only be configured for the ADI general display driver once. Even if you turn off your computer or reboot it, AutoCAD will remember that the ADI general display driver has been installed.

Follow the procedure outlined below to configure AutoCAD:

- 1 Start AutoCAD as described in the documentation supplied with that program.
- 2 When AutoCAD's main menu appears, select: "Configure AutoCAD".

This will be done automatically, if AutoCAD senses that it has not yet been configured. If you have not copied the AutoCAD device driver files, AutoCAD will ask you where the display device drivers can be found. Place the VGA utility diskette with the AutoCAD drivers into drive A and respond by typing:

```
A:
```

and then press ENTER.

- 3 After reviewing your current configuration, press the ENTER key.
- 4 Select: "Configure video display".
- 5 Enter: "Y" (to select a different video display).
- 6 Choose "I" (to choose ADI).
- 7 AutoCAD will ask you a series of questions, press the ENTER key for each choice. Consult the *AutoCAD Installation & Performance guide* for more details on these options.
- 8 Enter: "Y" (to save configuration).

## CONTROLLING RESOLUTION AND COLORS

The VGA AutoCAD ADI driver allows you to choose different screen resolutions, colors, and interrupt vectors through the use of the install program (*vgainst.com*).

- 1 At the DOS prompt, type:

```
VGAINST
```

and press ENTER

This command will run the VGA install program. The install program should respond by putting an introductory message on the computer screen. The install program will prompt you for several responses.

- 2 Enter name of driver to be modified [*vgarel9.com*].

The text contained between the brackets will be the default response. To accept the default response simply press the ENTER key. The name of the driver is required because the install program will modify both the memory resident version of the ADI driver and the file on your hard disk. This way any changes you make now will be remembered for all future sessions with AutoCAD. You may wish to create several different versions of the driver to support different resolutions or colors. To do this simply copy the supplied driver to a file with a different name and then modify it to the desired settings.

- 3 You will then be prompted for an interrupt vector number. The only reason you will ever want to modify this interrupt vector is if the default value conflicts with some other software you might have in your system. The supplied default will work correctly under most circumstances. If, however, you need to specify another interrupt vector, you can choose 72, 73, 74, or 77.

- 4 You will see:

```
Resolution data
```

```
Current resolution is (640 X 480)
```

```
Available resolutions are:
```

```
1 640 X 480 by 16 colors
```

```
2 752 X 410 by 16 colors
```

```
3 640 X 350 by 16 colors
```

```
4 720 X 540 by 16 colors (multisync)
```

```
5 800 X 600 by 16 colors (multisync)
```

```
Enter desired resolution [0=current]:
```

If you have AutoCAD release 9, another menu will appear, after you have made a choice from the first menu:

```
Available Resolutions are:
```

```
1: 640 x 480 by 16 colors
```

```
2: 320 x 200 by 256 colors
```

```
3: 640 x 400 by 256 colors (multisync)
```



- 5 The following three choices are for experienced AutoCAD users. We suggest that you use the defaults.

Configuration data

Enter the desired number of status lines [1]:

Enter desired number of screen menu

characters [8]:

Enter desired number of command prompt lines [3]:

- 6 Supply the screen colors as requested. This chart shows the numbers and the colors available:

Number	Color
0	Black
1	Red
2	Yellow
3	Green
4	Cyan
5	Blue
6	Magenta
7	White

For the graphics area background color of the drawing area, you may select either a dark (black) or a light graphics area background. If you select a light graphics area background, then lines drawn in color 7 will be drawn in black instead. This choice most closely resembles a black ink on drawing paper. Graphics area and text area background colors are applicable only to the *vgare19.com* driver.

Some of the colors you will be selecting will not correspond to the table listed above. This is because the color you are selecting will be XOR'd with the color it is overlaying. In particular this is true of the XOR color, the menu highlight color, the grid dot color and the cursor color. With some experimentation you will be able to control these colors easily and selection will not be too difficult.

It is possible to change the screen colors while you are in AutoCAD. Use the AutoCAD Shell command and run *vgainst.com* and then type *exit* to return to AutoCAD:

---

## Lotus 1-2-3

Lotus drivers included on your <sup>VGA</sup>~~EGA~~ utility diskette require Lotus 1-2-3 version 2.0 or later.

- 1 Make a backup copy of the 1-2-3 utility diskette. Use the backup diskette throughout these steps.

**Note:**

You can also copy the files to your system's hard disk. If you do this, you should copy them to the directory, in which you have put the Lotus files. Make this directory the current directory and then type *install*. After you have pressed the ENTER key, you can continue with step 4.

- 2 Copy the following files from the VGA utility diskette to the 1-2-3 backup utility diskette:

<i>gd640v20.drv</i>	<i>vd80x60.drv</i>
<i>gd720v20.drv</i>	<i>vd100x60.drv</i>
<i>gd752v20.drv</i>	<i>vd132x25.drv</i>
<i>gd800v20.drv</i>	<i>vd132x43.drv</i>

**Note:**

The drivers which begin with *gd..* should be used for graphics, whereas the drivers beginning with *vd..* should be used in combination with spreadsheets.

- 3 Place the 1-2-3 utility diskette in drive A and type:

`install`

and press ENTER.

- 4 Follow the screen directions to Main menu, select:

ADVANCED OPTIONS

and press ENTER. Then select:

ADD NEW DRIVERS TO LIBRARY

and press ENTER.

Follow the directions to add drivers.

- 5 Return to the Advanced options menu, select:

MODIFY CURRENT DRIVER SET

and press ENTER. Then select:

GRAPHICS DISPLAY

and press ENTER.

All available drivers will now appear on screen. Choose the driver you want to use.

- 6 Select:

SAVE CHANGES

and press ENTER.

Follow the instructions to name the new driver set or make it the default driver set.

- 7 After changes have been saved, follow instructions to exit the *INSTALL* program.

---

## APPENDIX A

### TWO MONITOR SYSTEMS

You have the option of using another video adapter and monitor in conjunction with the VGA and associated monitor. The VGA will only work with certain combinations of an additional video card/monitor.

**Warning:**

Do not use any EGA or VGA card as a second adapter when using the VGA.

You may use either a HGC card with a monochrome monitor. You may also use a CGA card with either a RGB or EGA color monitor.

**Note:**

The capability of your VGA and primary display is altered by the type of second display adapter/monitor combination.

All display adapters use a portion of a computer's memory for color and monochrome attributes. The simple concept to remember is that in your computer's memory, you cannot have two things occupying the same space:

- If your second display adapter/monitor combination is color, then the color capability of your VGA monitor will not be available.
- If your second display adapter/monitor combination is monochrome, then the monochrome capability of your VGA monitor will not be available.

## APPENDIX B

### TECHNICAL INFORMATION

The VGA supports all the standard graphics and text modes and several proprietary extended modes:

#### STANDARD MODES

Mode	Resolution	Colors	Monitors supported	Emulation
0	40x25	monochrome	VGA monitor	CGA
1	40x25	color	VGA monitor	CGA
2	80x25	monochrome	VGA monitor	CGA
3	80x25	color	VGA monitor	CGA
4	320x200	4 colors	VGA monitor	CGA
5	320x200	monochrome	VGA monitor	CGA
6	640x200	monochrome	VGA monitor	CGA
7	80x25	monochrome	VGA monitor	MDA
D	320x200	16 colors	VGA monitor	EGA
E	640x200	16 colors	VGA monitor	EGA
F	640x350	monochrome	VGA monitor	EGA
10	640x350	16 colors	VGA monitor	EGA
11	640x480	2 colors	VGA monitor	VGA
12	640x480	16 colors	VGA monitor	VGA
13	320x200	256 colors	VGA monitor	VGA

More experienced users may want to know the interface to these modes:

AH = 0

AL = number of mode (see table above)

Interrupt 10h

**EXTENDED MODES****Text modes**

Mode	Resolution	Colors	Monitors supported
40	80x43	16	Multisync and VGA monitor
41	132x25	16	Multisync <del>and VGA</del> monitor
42	132x43	16	Multisync <del>and VGA</del> monitor
43	80x60	16	Multisync and VGA monitor
44	100x60	16	Multisync and VGA monitor
45	132x28	16	Multisync <del>and VGA</del> monitor

**Graphics modes**

Mode	Resolution	Colors	Monitors supported
60	752x410	16	Multisync and VGA monitor
61	720x540	16	Multisync monitor
62	800x600	16	Multisync monitor
66	640x400	256	Multisync monitor

More experienced users may want to know the interface to these modes:

AH = 6Fh  
 AL = 05h  
 BL = number of mode (see table above)  
 Interrupt 10h

---

**Switch settings on the VGA card**

This section gives information about the switch settings on the VGA card.

**Switches 1 to 3:**

Switches 1 through 3 are reserved for future use, and should be left off.

**Switch 4:**

Switch 4 can be used to enable the "fastwrite" ("cache") option.

ON        disable "fastwrite"  
 OFF      enable "fastwrite" (default setting)

Switch 5:

Switch 5 enables/disables your VGA card's capability to provide CGA, EGA or Hercules emulation. To activate this feature, you will run the *vga.com* program included in your VGA diskette.

ON	Allow emulation (default setting)
OFF	Disallow emulation

Switches 6:

At start-up, the VGA card detects whether your computer has 16-bit or 8-bit ROM access. It is possible that some computers will not allow your VGA card's automatic detection system to function properly. In this case, you should try another switch setting.

ON	Allow 16-bit ROM access (default setting).
OFF	Force 8-bit ROM access.

IMPORTANT

If you have installed expansion cards (e.g. expanded memory - EMS - boards and network cards) in your computer system in the area C8000 - DFFFF, you should make sure that they allow your system to function properly. To do this, you should set switch 6 to the OFF position. If problems occur, you should ask your expansion card dealer for more information on how to configure this card, if used in a system that contains a VGA card.

Switch 7:

The setting of switch 7 depends on your computer type.

ON	Other Tulip systems
OFF	Tulip pc systems and Tulip at compact 2

Switch 8:

Switch 8 on your VGA card enables you to use extension registers. Some programs and operating environments do not function properly, when used with extension registers. If switch 8 is on, the VGA bios will not access any extension registers after initialization.

Turning switch 8 on will also prevent the BIOS from accessing extended modes such as 800 X 600 16-color mode. The VGA diskette contains the *vga.com* program which allows you to enable access to these modes even if switch 8 is on. (Also refer to the section "100% VGA compatibility" in this manual for more information on this subject.)

ON	Default VGA mode (no access to extension registers)
OFF	Extended VGA mode (default setting)

---

## APPENDIX C

### TROUBLESHOOTING THE VGA INSTALLATION

- 1 Make sure the VGA is firmly seated in its expansion slot, and that it is not touching other boards in your system.
- 2 Check the monitor cable to ensure that it is properly connected to the VGA, and that it has the proper pinout configuration.
- 3 Make sure your computer is a Tulip *pc compact 2*, Tulip *at compact*, Tulip *at compact 2*, Tulip *sx compact 2*, Tulip *at 386* or Tulip *at 386<sup>sx</sup>*, or 100% compatible.
- 4 Check your computer's switch and jumper settings, and those on the VGA card to ensure that all settings are correct for your computer system.

You should read the section "Switch settings on the VGA card" in Appendix B of this manual again. If any problems occur, you should contact your local dealer.

- 5 Check your software. The VGA can emulate four different display adapters. Be sure you are using the correct software configuration.
- 6 Check your monitor. The VGA can work with a number of different monitor types. Be sure you have the VGA configured for the monitor you are using.

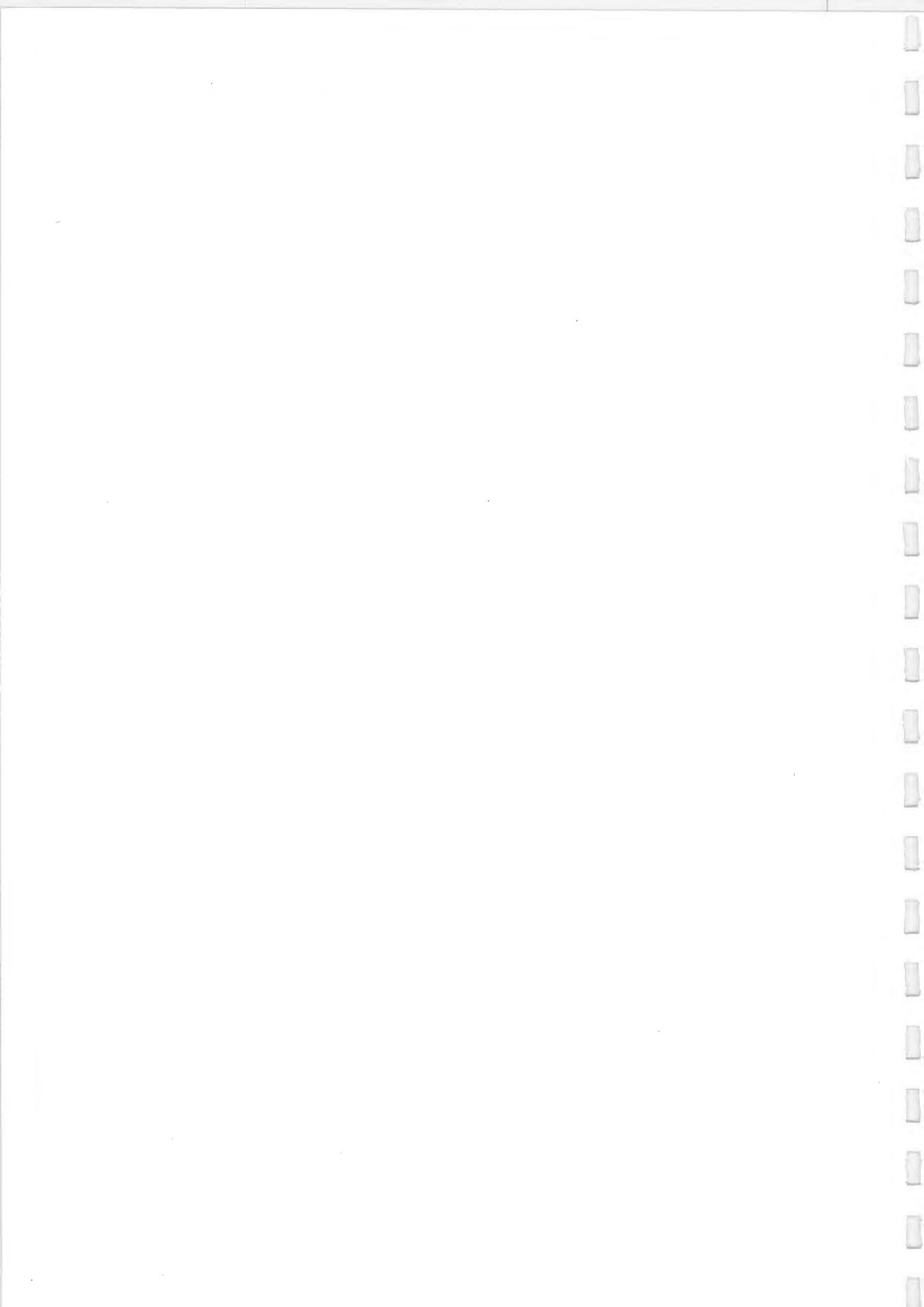
- *The picture shifts when changing modes on your multiple frequency monitor with your VGA card.*

Some multiple frequency monitors don't synchronize properly to the signals coming from the graphics board, so the image seems to shift. To rectify this situation, simply adjust the horizontal and vertical positions to center the image.

- *The image takes a few moments to "settle" on the screen when changing modes or when first turned on.*

It is normal for any monitor to warm up for some time before producing a complete stable image. If the monitor has been on for longer than 30 minutes and still produces a "shaky" image that doesn't settle for a few moments, the reason is that the monitor is not synchronizing properly to the signals coming from the graphics board (see the remark above).

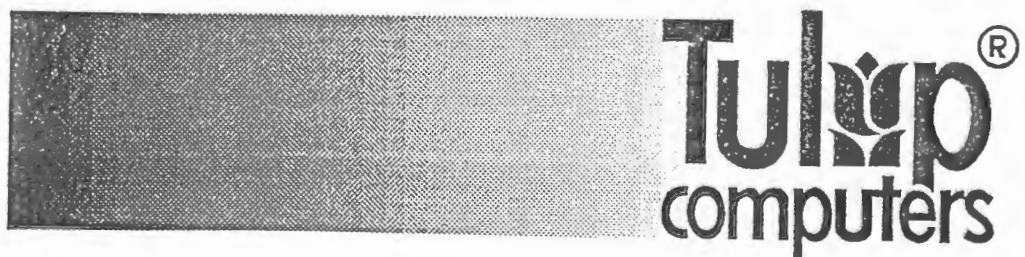
- 7 Make sure you are using the correct *vga.com* commands when in HGC or CGA compatibility modes.
- 8 Run the VGA diagnostics program.





---

VGA VIDEO CARD



Tulip® is a registered trademark of Tulip Computers.  
MS-DOS® is a registered trademark of Microsoft Corporation.  
AutoCAD™ is a trademark of Autodesk, Inc.  
Framework II® is a registered trademark of Ashton Tate.  
Hercules® is a registered trademark of Hercules Computer Technology.  
Lotus 1-2-3® and Symphony® are registered trademarks of Lotus Development Corporation.  
WordStar Professional® is a registered trademark of MicroPro Intl Corp.  
WordPerfect® is a registered trademark of WordPerfect Corp.

© Copyright 1990, Tulip Computers.

P/N: 07-212510-01

P: 510Z/200

Issue date/Uitgiftedatum/Erscheinungsdatum/Date d'édition/Fecha de edición/ Data di pubblicazione:

January/Januari/Januar/Janvier/Enero/Gennaio 1990

*No part of this manual may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.*

*Niets uit deze uitgave mag worden verveelvoudigd, opgeslagen in een geautomatiseerd gegevensbestand, of openbaar gemaakt, in enige vorm of op enige wijze, hetzij elektronisch, mechanisch, door fotokopieën, opnamen, of op enige andere manier, zonder voorafgaande schriftelijke toestemming van de uitgever.*

*Vervielfältigung, Aufbewahrung und Weitergabe von Informationen aus diesem Handbuch durch Druck, Fotosatz, Mikrofilm, oder auf irgendeine andere Weise, bedürfen der vorherigen schriftlichen Zustimmung von Tulip Computers.*

*Toute reproduction, même partielle, de cet ouvrage est interdite. Une copie ou reproduction par quelque procédé que ce soit, photographie, photocopie, microfilm, bande magnétique, disque ou autre, constitue une contrefaçon passible des peines prévues par la loi du 11 mars 1957 sur la protection des droits d'auteur.*

*Ninguna parte de este manual debe ser reproducida, almacenada en un sistema de recuperación, o transmitida, en alguna forma o por cualquier medio, electrónico, mecánico, de fotocopiado, de grabación, o de otro modo, sin la previa autorización escrita del editor.*

*Nessuna parte del presente manuale può venir riprodotta, copiata su sistemi di registrazione o trasmessa, sia in maniera elettronica, meccanica, fotografica, magnetica sia in qualsiasi altra forma, senza il previo permesso per iscritto dell'editore.*

Issued by/Uitgegeven door/Ausgegeben von/Edité par/Editado por/Editore:

Tulip Computers  
P.O. Box 3337  
5203 DH 's-Hertogenbosch  
The Netherlands

This manual describes a product of Tulip Computers, 's-Hertogenbosch, The Netherlands. Tulip Computers provides this manual "as is", without warranty of any kind.

Information in the manual is believed to be accurate and reliable. However, it could include typographical errors or technical inaccuracies. Tulip Computers shall not be liable for any direct or indirect damages arising out of the use of this manual. The information in this manual should only be used to operate and/or maintain the product described in the manual.

If the product, described in this manual, implies software developed by Tulip Computers, you, as purchaser of the product, own the media on which the software is recorded or fixed. However, Tulip Computers retains title and ownership of the software. You may use the software only on Tulip products, as described in this manual.

The hardware, software and written materials of this product are copyrighted. Unauthorized copying or reproducing (any part of) them is expressly forbidden. You may make 1 (one) copy of the software for backup purposes.

Tulip Computers may change or improve the product and this manual at any time without previous warning.

## AANSPRAKELIJKHEID

NL

In deze handleiding wordt een produkt beschreven van Tulip Computers te 's-Hertogenbosch, Nederland. Uit de levering van deze handleiding door Tulip Computers vloeit geen enkele garantie voort.

De informatie is met grote zorgvuldigheid samengesteld. Er zouden echter typfouten, of technische onvolkomenheden in voor kunnen komen. Tulip Computers aanvaardt geen verantwoordelijkheid voor schade die, direct of indirect, voortspuit uit het gebruik van deze handleiding. De informatie in deze handleiding is alleen bedoeld voor gebruik bij het beschreven produkt.

Als het produkt dat in deze handleiding beschreven wordt, software van Tulip Computers omvat, dan is de koper van het produkt eigenaar van de media waarop de software werd geleverd. Alle rechten voor wat betreft de naam en het eigendom van de software, berusten echter bij Tulip Computers. De software mag alleen in Tulip produkten, zoals beschreven in deze handleiding, worden gebruikt.

Het copyright op de hardware, software, en de documentatie van het produkt rust bij Tulip Computers. Het kopiëren ervan is niet toegestaan. Van de software mag door de koper 1 (een) kopie worden gemaakt, uitsluitend als backup, voor eigen gebruik.

Tulip Computers behoudt zich het recht voor om het produkt en deze handleiding te wijzigen of te verbeteren, zonder voorafgaande waarschuwing.

## HAFTUNGS AUSSCHLUß

D

Diese Anleitung beschreibt ein Produkt von Tulip Computers, 's-Hertogenbosch, Holland. Diese Anleitung dient nur dazu, dem Anwender bei der Benutzung des Produktes zu helfen. Die Firma Tulip Computers geht mit dieser Anleitung jedoch keine Verpflichtung ein.

Es wurde viele Mühe darauf verwandt, diese Anleitung so genau und verlässlich wie nur möglich zu gestalten. Tipfehler und technische Unzulänglichkeiten sind jedoch nicht auszuschließen. Die Firma Tulip Computers übernimmt keine Verantwortung für irgendwelche Schäden, die durch die Anwendung dieser Anleitung entstanden sind. Informationen aus dieser Anleitung sollten nur für die Bedienung und Instandhaltung des Produktes benutzt werden.

Wird in dieser Anleitung Software beschrieben, dann ist der Käufer dieses Produktes Besitzer der Diskette (oder des Magnetbandes), auf der die Software geliefert wird. Alle Rechte hinsichtlich des Namen und des Eigentums der Software beruhen jedoch bei Tulip Computers. Die Software dürfen Sie nur mit den Tulip Produkten verwenden, die in dieser Anleitung beschrieben werden.

Das Copyright auf der Hardware, Software und auf dieser Anleitung beruht bei Tulip Computers. Kopieren ist nicht erlaubt. Von der Software darf der Käufer, ausschließlich als "Backup", für den eigenen Gebrauch eine (1) Kopie machen.

Die Angaben in dieser Anleitung und das in dieser Anleitung beschriebene Produkt können ohne vorherige Mitteilung geändert werden.

Le présent manuel décrit un produit de Tulip Computers, 's-Hertogenbosch, Pays-Bas. Aucune garantie ne résulte de la livraison du présent manuel par Tulip Computers.

Le plus grand soin a été apporté à la compilation des informations. Des fautes de frappe ou des imperfections techniques demeurent toutefois possible. Tulip Computers décline toute responsabilité pour tout dommage découlant de l'utilisation du manuel ou des informations qu'il contient, qu'elles soient correctes ou incorrectes. Les informations contenues dans le présent manuel sont exclusivement destinées à l'utilisation de ce produit.

L'acheteur est le propriétaire des disquettes du logiciel; tous les droits du nom et de la propriété du logiciel sont en la possession de Tulip Computers. Ce logiciel ne peut qu'être utilisé sur un produit de Tulip Computers, comme décrit dans ce manuel.

Le copyright du logiciel et de ce manuel est en la possession de Tulip Computers. Il est donc interdit de les copier et de les diffuser. L'acheteur ne peut copier le logiciel qu'une seule fois pour la sauvegarde, et pour sa propre utilisation.

Tulip Computers se réserve le droit d'introduire des modifications ou des améliorations dans le présent manuel à tout moment sans préavis.

## ADVERTENCIA

E

Este manual describe un producto de Tulip Computers, 's-Hertogenbosch, Paises Bajos. Tulip Computers provee este manual "así como está" sin garantía de ninguna clase.

Se acredita que la información en el manual es correcta y fiable. Sin embargo, ésta puede incluir errores de tipografía o inexactitudes técnicas. Tulip Computers no será responsable por cualquier daño directo o indirecto surgido por el uso de este manual. La información deberá emplearse solamente para operar y/o mantener el producto descrito en el manual.

Si el producto descrito en este manual supone el software desarrollado por Tulip Computers, usted, como comprador del producto, es dueño de los medios donde el software se encuentra grabado o almacenado. Sin embargo, Tulip Computers retiene el título y la propiedad del software. Usted puede emplear el software solamente con productos Tulip, como se describe en este manual.

El hardware, software y la parte textual de este producto están sujetos a derechos de autor. Está terminantemente prohibida la copia o reproducción no autorizada de cualquiera de sus partes. Usted puede hacer 1 (una) copia del software para propósito de backup.

Tulip Computers puede cambiar o mejorar el producto y este manual en todo momento y sin previo aviso.

## RINUNCIA.

I

Il presente manuale descrive un prodotto della ditta Tulip Computers, 's-Hertogenbosch, Paesi Bassi. La ditta Tulip Computers consegna il manuale "com'è", senza alcuna garanzia.

Le informazioni contenute dal manuale vengono ritenute corrette ed attendibili. Ciononostante errori tipografici ed inaccuratezze tecniche possono essere presenti. La Tulip Computers non assume alcuna responsabilità in caso di danni che, direttamente o indirettamente, possano insorgere in seguito all'uso del presente manuale. Le informazioni offerte dal manuale possono venir applicate solo per il funzionamento e/o manutenzione del prodotto descritto nel manuale stesso.

Qualora il prodotto descritto dal manuale richieda l'impiego di software di produzione della Tulip Computers, l'acquirente è in possesso dei mezzi dove tale software è registrato o fissato. In ogni caso, tale software rimane a titolo e di proprietà della Tulip Computers. Il software può venir impiegato solamente con prodotti Tulip, come descritto nel presente manuale.

Hardware, software e materiale stampato o comunque scritto, inerente il prodotto in questione, sottostanno alle leggi sui diritti d'autore. Copia o riproduzione non autorizzate (di qualsiasi parte) di tale materiale sono strettamente vietate. All'acquirente viene consentita una (1) copia a scopo di sicurezza.

La Tulip Computers si riserva, in qualsiasi momento e senza previo avviso, di modificare e migliorare sia il prodotto sia il presente manuale.

<p><b>CONTENTS</b> <b>INHOUDSOPGAVE</b> <b>INHALTSVERZEICHNIS</b> <b>TABLE DES MATIERES</b> <b>CONTENIDO</b> <b>INDICE DELLE MATERIE</b></p>
--

<b>GB</b>	- VGA card _____	5
<b>NL</b>	- VGA-kaart _____	37
<b>D</b>	- VGA-Karte _____	69
<b>F</b>	- Carte VGA _____	103
<b>E</b>	- Tarjeta VGA _____	137
<b>I</b>	- Scheda VGA _____	171

# CONTENTS

<b>1</b>	<b>Installation VGA card</b>	6
	Description	6
	Preparing your VGA card	8
	How to install the VGA card	9
	Connector pinouts	11
	Rambios.sys	12
<b>2</b>	<b>VGA utilities</b>	14
	VGA Utility menu (vga.exe)	14
	Emulation modes	14
	VGA card software	17
	About 100% compatibility	18
	Backwards compatibility	18
<b>3</b>	<b>Application software</b>	19
	Introduction	19
	Windows	20
	AutoCAD	21
	Lotus 1-2-3 and Symphony	23
	Framework II	26
	WordStar Professional	28
	WordPerfect	29
	<b>Appendix A - Technical information</b>	30
	<b>Appendix B - Troubleshooting the VGA installation</b>	31
	<b>Glossary</b>	33
	<b>Figures</b>	
	Figure 1: VGA card	7
	Figure 2: Installation of the VGA card	10

## 1 INSTALLATION VGA CARD

This manual describes the installation and use of the VGA card. While reading you may find terms or abbreviations you do not know (yet). Terms followed by the asterisk (\*) will be explained at the end of this manual.

---

### Description

The VGA\* card (VGA = Video Graphics Array) is a video adapter which can be used with any **Tulip** computer, or any other compatible system. The VGA card will also run most programs written for EGA\*, CGA\* and Hercules\* cards.

The text and graphics capabilities of the VGA card used in conjunction with a VGA monitor\* are:

#### **In MDA mode:**

- 80 x 25 characters monochrome (text)

#### **In Hercules mode:**

- 720 x 348 pixels monochrome (graphics)

#### **In CGA mode:**

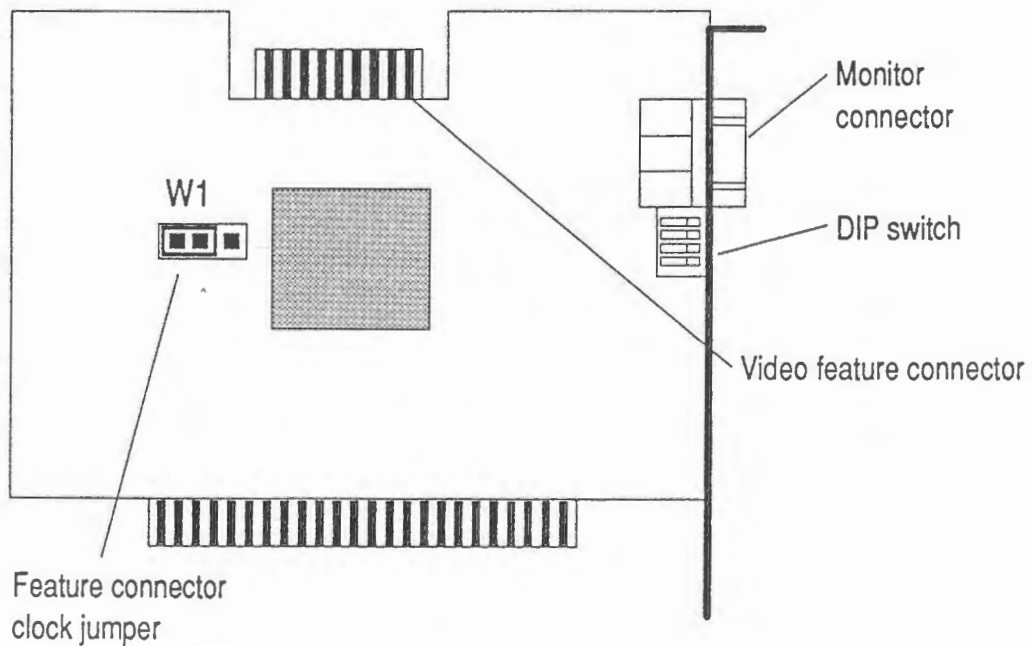
- 40 x 25 characters monochrome and color (text)
- 80 x 25 characters monochrome and color (text)
- 320 x 200 pixels with 4 colors (graphics)
- 320 x 200 pixels monochrome (graphics)
- 640 x 200 pixels monochrome (graphics)

**In EGA mode:**

- 320 x 200 pixels with 16 colors (graphics)
- 640 x 200 pixels with 16 colors (graphics)
- 640 x 350 pixels monochrome (graphics)
- 640 x 350 pixels with 16 colors (graphics)

**In VGA mode:**

- 640 x 480 pixels with 2 colors (graphics)
- 640 x 480 pixels with 16 colors (graphics)
- 320 x 200 pixels with 256 colors (graphics)
- 132 x 25 characters with 4 colors (text)
- 132 x 43 characters with 4 colors (text)

*Figure 1: VGA card*

- **Monitor Connector**

This 15-pin socket is where you connect all monitors supported by the VGA card. Your VGA card supports analog fixed sync monitors\* (VGA standard) as well as compatible analog multi-sync monitors\*.

- **DIP Switch**

Your VGA card is fitted with a four lever DIP switch. These switches are used to tell the VGA card information about your configuration. Refer to the Paragraph "*Preparing your VGA card*" of this manual for information on using these switches.

- **Video Feature Connector**

Its purpose is to allow for possible future connections. Normally you will have no need to use this connector.

- **Feature Connector Clock Jumper**

This jumper is provided to allow your board to use the clock input from the Feature Connector. The factory setting over pins 1 and 2 allows support of 800 by 600 graphics and 132 column text modes. The other position over pins 2 and 3 disables 800 by 600 graphics and 132 column text modes and provides full support for all signals on the Video Feature Connector. The Feature Connector Clock Jumper should be left in the factory setting on pins 1 and 2 for normal operation of the card.

---

## Preparing your VGA card

Your VGA card contains all of the features that are found on the VGA Display Adapter. Your VGA card requires very little configuration. All you need to do is set the DIP switches and check that the jumper on the board has been set for normal operation. (Refer to figure 1.)

### DIP Switch Settings

Your VGA card has a DIP switch to allow you to tell the VGA card what features are available. The first switch (lever 1) is used to indicate whether you will be using a standard fixed sync VGA monitor or a multi-sync monitor.

Lever 1	Type monitor
OFF	VGA (fixed sync) (standard)
ON	Multisync



Switch 2 has the following function:

**OFF:**

The VGA adapter "sees" what type of monitor has been connected (monochrome\* or color) and functions EXCLUSIVELY in the corresponding mode. A monochrome monitor now will not be suitable for running programs that can only run in color modes. In addition, you can use the VGA.EXE program or the MS-DOS command **mode** to switch between monochrome mode and color mode.

**ON:** (default setting)

Regardless of what type of monitor has been connected **BOTH** modes (monochrome **AND** color) will be supported.

Lever 2	Type monitor
OFF	Monochrome <b>OR</b> color
ON	Monochrome <b>AND</b> color (standard)

Levers 3 and 4 are not used and should be set to the OFF position.

**Check the Feature Connector Clock Jumper**

Make sure that the Feature Connector Clock Jumper "W1" is set on pins 1 and 2 as shown in figure 1.

---

## How to install the VGA card

Check the *readme.doc* file on your VGA Utility diskette before you start installing the VGA card. *Readme.doc* contains updated information unavailable in this manual.

- 1 Refer to your system's user's guide for more information on opening the system unit.
- 2 Remove one of the system expansion slot covers which are located at the back of the system unit by removing its retaining screw and lifting it out. (Save the screw, because you will need the screw when mounting the card.) Press the card firmly into the connector and secure the card with the screw you removed earlier.

**Note**

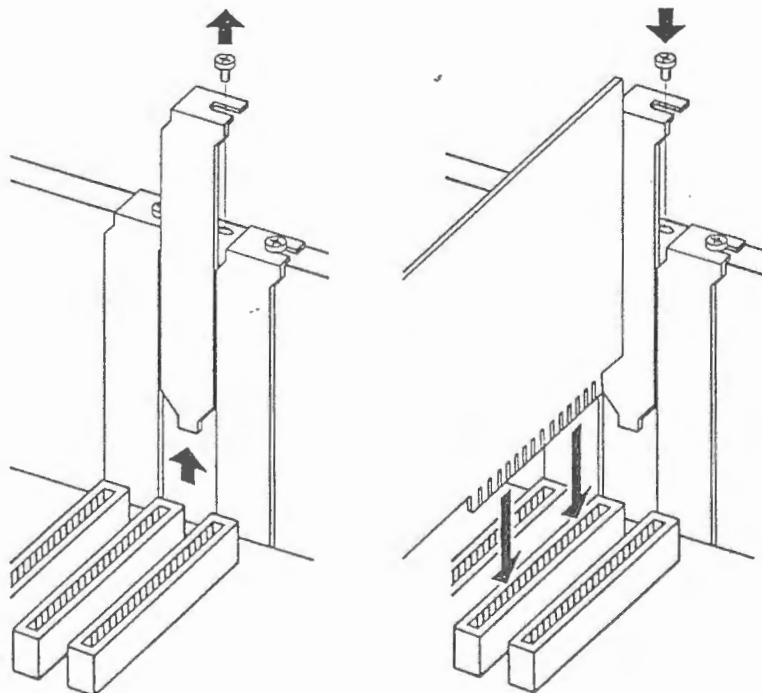
The VGA card can be installed in any 8-bit or 16-bit slot.

- 3 If you want to install your VGA card into a **Tulip pc compact 2**, you should place a jumper on positions 1-2 and 3-4 of J8. Consult your system's user's guide for more information on this subject.



If you want to install your VGA card into another **Tulip** system, you do not need to set a jumper or change a jumper setting for the video card on the main board.

*Figure 2: Installation of the VGA card*



- 4 See your system's user's guide for more information on closing your system unit.

- 5 Configure your system again by running the *DIAGNOSTICS* program. If the program asks you to specify a video adapter, you have to choose: "Adapter with BIOS (eg EGA/VGA)".

Now the installation of the VGA card is complete. If you still encounter any problem using this card, please contact your local dealer.

### If you are using an Expanded Memory (EMS) Board

Your VGA card occupies the same memory locations as a standard EGA card plus an additional 16 Kb for the extended video ROM BIOS\*. You must be sure that your EMS board does not conflict with these memory locations. Check with the manufacturer of your EMS board for information on configuring your EMS board for use with a VGA compatible video board. The computer system memory locations occupied by the VGA card range from 'A000' through 'C7FF'. You may need to exclude these locations from use by your EMS driver. You can usually designate these exclusions when invoking your EMS driver.

---

## Connector pinouts

### Video port connector pinout

Pin	Signal
1	Red video
2	Green video
3	Blue video
4	Monitor ID Bit 2
5	Ground
6	Red return (ground)
7	Green return (ground)
8	Blue return (ground)
9	Key (no pin)
10	Sync return (ground)
11	Monitor ID Bit 0
12	Monitor ID Bit 1
13	Horizontal sync
14	Vertical sync
15	Not used

**Note**

The VGA card is equipped to work with analog monitors\*, such as the Tulip VGA monitor. Digital monitors\*, such as EGA, CGA and MDA monitors, can not be connected to this card. It is possible to use a multi-sync monitor in conjunction with the VGA card, if you set this monitor's analog/digital switch for analog operation. (The first switch on your VGA card in position "ON". Also refer to the paragraph "Preparing your VGA card" in this chapter.)

---

## Rambios.sys

*Rambios.sys* allows you to install the VGA BIOS in memory to enable some programs to run faster.

In this paragraph you will find more detailed information on installing *rambios.sys* from the DOS prompt in a system with a hard disk or in a system with two floppy disk drives.

### Installing rambios.sys from DOS prompt in a system with a hard disk

- 1 Copy the file *rambios.sys* from the VGA Utility diskette into the root directory on your hard disk.
- 2 Create/modify your *config.sys* file by adding the following to the first line of the file:

```
device=[drive:][path]rambios.sys
```

Refer to your DOS manual for more detailed instructions for creating and/or editing a *config.sys* file.

### Installing rambios.sys from DOS prompt in a system with two floppy drives

- 1 Insert the VGA Utility diskette in drive A.
- 2 Insert your DOS boot-up diskette in drive B.
- 3 Copy the *rambios.sys* from the VGA Utility diskette onto your DOS boot-up diskette.
- 4 Create/modify your *config.sys* file by adding the following to the first line of the file:

```
device=[drive:] [path]rambios.sys
```

Refer to your DOS manual, if you need instructions for creating/editing a *config.sys* file.

**Note**

*Rambios.sys* copies the BIOS on the VGA adapter into the DOS memory (memory between 0 and 640 Kb). This means that less memory is available for application programs. If your system is standard equipped with 1 Mb memory on-board, it will be possible to copy the VGA BIOS to the memory between 640 Kb and 1 Mb (Shadow RAM). This implies that 640 Kb internal memory is available. This possibility, however, does not apply to the **Tulip pc compact 2** and the **Tulip at compact 2**. How to install the Shadow RAM memory, you will learn in the paragraph "*Memory expansion in Diagnostics*" in the user's guide of your system.

## 2 VGA UTILITIES

---

### VGA Utility menu (vga.exe)

With the VGA Utility menu, you can:

- select emulation mode
- switch monitor type
- switch text modi
- return to default (standard) VGA mode\*

---

### Emulation modes

The VGA emulation modes are needed for programs that make direct access to the Color Graphics Adapter (CGA) or Hercules Graphics Card (HGC) registers (or ports). You should run your program first, without using the VGA emulation modes.

An emulation mode may be necessary, if:

- a program that works with a CGA or HGC fails to work properly on the VGA;
- a program's documentation specifically states that the program needs a CGA or HGC.

You can enable or disable emulation modes:

- with the VGA Utility menu program;
- by entering a command at the DOS prompt or from within a batch file.

## About monochrome emulation

The monochrome mode allows you to configure the VGA to emulate the HGC. The HGC has 64K of video graphics memory. Your VGA can run software written to utilize the graphics capabilities of the HGC in two ways:

- HERC1 mode (Hercules full mode), configured to use the full amount of memory (two graphics pages or 64K).
- HERC0 mode (Hercules half mode), configured to use half that amount (one graphics page of memory or 32K).

## Enabling/disabling emulation modes

- 1 Insert the VGA Utility diskette in drive A (or make the drive with *vga.exe* the current drive/directory).
- 2 At the DOS prompt type:  
  
VGA  
  
then press ENTER.
- 3 When the VGA menu appears on the screen, use the DIRECTION keys to select a particular setting and press the ENTER key.

Choose "Exit to Operating System" or press the ESC key to quit.

You should keep a backup copy of your VGA Utility diskette in case the information on the hard disk is lost or damaged.

If the *vga.exe* file can be found in a directory on the hard disk, include the directory name in your **path** command in case you want to use the VGA program in other directories as well. (More information on this command you will find in the MS-DOS guide shipped with your computer.)

You may also use *vga.exe* from the DOS prompt line bypassing the menu. This is useful if you wish to incorporate *vga.exe* commands into a batch file.

**The following commands will allow you to use *vga.exe* from the DOS prompt.**

<b>VGA</b>	Brings up the <i>vga.exe</i> menu
<b>VGA VGA</b>	The emulation you have chosen will be disabled and the default configuration of the card will be activated again.
<b>VGA CGA</b>	Configures the VGA card to emulate the CGA.
<b>VGA MDA</b>	Configures the VGA card to emulate the MDA.
<b>VGA HERCO</b>	Configures the VGA card to emulate HGC and use only 32K (one graphics page) of memory. <i>Use this configuration if you have a co-resident CGA in your system.</i>
<b>VGA HERC1</b>	Configures the VGA to emulate HGC and use 64K (two graphics pages) of memory. <i>The VGA cannot have a CGA co-resident.</i>
<b>VGA COLOR</b>	For color display (also refer to the section " <i>DIP-switch settings</i> " earlier in this manual).
<b>VGA MONO</b>	For monochrome display (also refer to the section " <i>DIP-switch settings</i> " earlier in this manual).
<b>VGA 13225</b>	Switches the board to color 25 line 132 column text mode. This mode is only for use with specific application programs that have been designed to take advantage of this mode's extended text capabilities.
<b>VGA 13243</b>	Switches the board to color 43 line 132 column text mode. This mode is only for use with specific application programs that have been designed to take advantage of this mode's extended text capabilities.



**VGA LOCK**

Locks the current video standard so that it will survive a warm boot. Can be used in conjunction with another parameter to lock that particular mode. Example: VGA CGA LOCK will allow the board to survive a reboot with the board configured as a color/graphics adapter.

Any specific video mode command such as VGA CGA will unlock the card unless used with the LOCK parameter. If you make a mistake in typing the VGA command, the program will give you the option of using the VGA menu or returning to DOS.

**Here are a few software installation tips:**

- The best looking display can usually be achieved by installing your application software packages for the highest resolution mode available.
- Some applications automatically detect what type of video card and monitor combination have been installed and configure themselves to take best advantage of the available hardware.
- Install your software for VGA or EGA if possible. This will enable you to run the program without having to install an emulation mode.
- If your software does not provide the possibility to be configured for VGA or EGA, choose one of the possibilities of the VGA Utility, such as CGA or Hercules. A description of the Utility has already been given earlier in this paragraph.
- Some Software may require using the *vga.exe* utility to set the VGA card to color or monochrome text mode as needed. For example, if the VGA card is in "color" VGA text mode and you want to run something that requires "monochrome" text, use the *vga.exe* utility to switch modes.

---

## VGA card software

The enclosed software diskette contains several programs designed to help you get the most out of your VGA card, such as:

- *Vga.exe* (already described earlier in this paragraph).
- Various drivers\* that let popular application software packages take advantage of your VGA card's extended graphics and 132 column text modes are supplied on the enclosed disk.

---

## About 100% compatibility

VGA offers extension registers beyond the VGA's standard. Some operating environments are sensitive to the use of these extension registers. In order to prevent the VGA from accessing any extension registers, type:

VGA PURE:ON

and press ENTER.

This also prevents the VGA from accessing its extended modes. To enable access to these modes, type:

VGA PURE:OFF

and then press ENTER.

---

## Backwards compatibility

The VGA card will run most programs written for any of the popular graphics standards: EGA, CGA and HGC.

### EGA Compatibility

The VGA is fully BIOS compatible with the EGA standard. Because the EGA and the VGA are very closely related at the hardware level, BIOS-level compatibility enables virtually all EGA software to run without problems. If you experience difficulties, you should contact the software manufacturer to see, if their software package requires an update to work properly on a VGA card.

### CGA Compatibility

In order to run CGA-specific programs, CGA emulation must be turned on with the *vga.exe* program. You will know that you are in emulation mode because the VGA standard uses a different text font when emulating CGA.

### HGC Compatibility

Before running a Hercules program you must use the VGA utility program to enable HGC emulation.

## 3 APPLICATION SOFTWARE

---

### Introduction

In this chapter the additional capabilities of the VGA card are listed. To take advantage of these enhancements, your VGA card is packaged with software support for several popular software programs. This chapter describes the procedures necessary to install these programs so that they can take full advantage of your VGA card's enhanced capabilities.

#### Note

If an application program has been provided with a standard VGA driver, you will not need to use the drivers (on the Utility diskette) that came with the Tulip package.

Before you proceed, you should make a backup copy of your VGA Card Utilities diskette if you have not already done so.

The drivers described throughout this manual assume you are using a color VGA configuration. If you are using a monochrome VGA monitor use the *vga.exe* utility to switch from monochrome VGA mapping to color mapping before using the drivers. The command `VGA COLOR` will set your VGA card to color mapping. For more information on monochrome and color mapping and using the *vga.exe* utility refer to chapter 2 of this manual.

#### Note

To avoid damage to your monitor and other parts of your computer system, be sure to have correctly installed the VGA card before you attempt to configure the software as described in this chapter.

## Windows

This paragraph describes how to use the Tulip VGA card in combination with Windows/286 or Windows/386.

### IMPORTANT

The default display adapter is not always correctly installed, which depends on the other options available.

To check the options available you should start the Setup program in Windows and search for the menu in which the default display adapter is indicated.

Select this item and press ENTER. A list with several possible display adapters will appear.

### WINDOWS/286

There are 2 possible versions:

- 1 Selection out of **three** Tulip VGA configurations
- 2 Selection out of **two** Tulip VGA configurations

The first version allows you to choose one of the following standard VGA configurations:

VGA 640x450 with analog/multi-sync display (black and white)  
VGA 640x480 with analog/multi-sync display

The second version allows you to choose one of the following options:

Tulip VGA 640x480 with analog/multi-sync display (color)  
Tulip VGA 640x450 with analog/multi-sync display (black and white)

### WINDOWS/386

You should choose the following option:

Tulip VGA(640x480) with analog/multi-sync display

---

## AutoCAD

Your VGA card includes a driver for AutoCAD that will allow you to use the 640x480 extended resolution graphics capabilities of your VGA card. The driver is in the form of an AutoCAD Device Interface or ADI driver. ADI is a generalized driver format that allows you to load drivers into memory prior to running AutoCAD. To use this ADI driver, you must have AutoCAD between version 2.18 and release 9.

### AutoCAD ADI configuration

AutoCAD needs to be configured for the ADI general display driver only once. Even if you turn off your computer or reboot it, AutoCAD will remember that the ADI general display driver has been installed.

Follow the procedure outlined below to configure AutoCAD:

- 1 Copy the file *ds480.exe* from the supplied VGA Card Utilities diskette to your AutoCAD diskette or subdirectory. This file is a program that loads an ADI driver, which allows AutoCAD to work in your VGA card's extended resolution 640 by 480 mode.
- 2 Run *ds480.exe*. You will get a message that reads:  

```
- AutoCAD ADI Driver -  
VGA!!! 640 x 480
```

This indicates that the AutoCAD driver for the 640x480 mode of your VGA card has been loaded into the system's memory.
- 3 If you are using a mouse or graphics tablet that requires a separate driver, be sure that its driver is loaded at this point.
- 4 Start AutoCAD as described in the documentation supplied with that program.
- 5 When AutoCAD's Main menu appears, select: "Configure AutoCAD".

This will be done automatically, if AutoCAD senses that it has not been configured yet. If you have not copied the AutoCAD device driver file, AutoCAD will ask you where the display device drivers can be found.

Place the VGA Utility diskette with the AutoCAD driver into drive A and respond by typing:

A:

and press ENTER.

- 6 After reviewing your current configuration, press the ENTER key.
- 7 Select: "Configure video display".
- 8 Enter: "Y" (to select a different video display).
- 9 Choose "1" (to choose ADI).
- 10 AutoCAD will ask you a series of questions. Press the ENTER key for each choice. Consult the *AutoCAD Installation & Performance guide* for more details on these options.
- 11 Enter: "Y" (to save configuration).

### **Running AutoCAD in 640 by 480 graphics**

If you have not configured AutoCAD as described above, do so now. If you have done the configuration as described above, you can start AutoCAD by simply loading the "ds480" ADI driver and your mouse or other pointer driver prior to executing the AutoCAD program.

The commands can easily be incorporated into a batch file. Your batch file might look like the following.

**DS480** (Loads the VGA card's 640 by 480 ADI driver.)  
**Mouse** (Loads mouse driver - this would depend on type of pointer or mouse used.)  
**Acad** (Starts AutoCAD program.)

---

## **Lotus 1-2-3 and Symphony**

This paragraph describes how to install the Tulip VGA Drivers for Lotus 1-2-3 and Symphony 640 by 480 Graphics and 132 Column Text. The information in this paragraph only apply to Lotus 1-2-3 Version 2.0 or 2.01 or Lotus Symphony Versions 1.1, 1.2 or 2.0.

The drivers included will allow you to choose between the different options listed in the tables below.

Text Display Drivers	Rows	Columns
Universal Text Display	25	80
VGA (132 x 25)	25	132
VGA (132 x 43)	43	132

Graph Display Driver	Resolution
VGA (640x480)	640x480

The *INSTALL* program that is part of your 1-2-3 or Symphony software will allow you to mix and match these various options for the choice of drivers that will best suit your needs.

Before you start: Be sure you are familiar with the procedure for installing drivers for 1-2-3 or Symphony. Please read the 1-2-3 or Symphony Getting Started manual, which describes how to use the *INSTALL* program.

- 1 Make a backup copy of the 1-2-3 or the Symphony Utility diskette. Use the backup diskette throughout these steps.

#### Note

You can also copy the files to your system's hard disk. If you do this, you should copy them to the directory, in which you have put the Lotus or the Symphony files. Make this directory the current directory and then type *install*. After you have pressed the ENTER key, you can continue with step 4.

- 2 Copy the following files from the VGA Utility diskette to the 1-2-3 or the Symphony backup Utility diskette:

*spo\_25s.drv*  
*spo\_43s.drv*  
*spo\_480s.drv*

#### Note

The driver *spo\_480s.drv* should be used for graphics, the drivers *spo\_25s.drv* and *spo\_43s.drv* should be used in combination with spreadsheets.

**24** 3 - *Application software*

- 3** Place the 1-2-3 or the Symphony Utility diskette in drive A and type:

`install`

and press ENTER.

- 4** Follow the screen directions to Main menu, select:

`ADVANCED OPTIONS`

and press ENTER.

Then select:

`ADD NEW DRIVERS TO LIBRARY`

and press ENTER.

Follow the directions to add drivers.

- 5** Return to the Advanced options menu, select:

`MODIFY CURRENT DRIVER SET`

and press ENTER.

There are two types of drivers you can install for 1-2-3 and Symphony that pertain to use of the Tulip VGA card. These are the text display driver and the graph display driver.

### **Text Display Drivers**

The text display driver's purpose is to display text for spreadsheets and documents. The drivers included with your Tulip VGA card will allow you to display text in several new formats that take advantage of the Tulip VGA card's extended graphics resolution and/or 132 column capabilities. In addition to the standard VGA text format of 25 rows of 80 columns, the Tulip VGA card can display text in 25 rows of 132 columns or 43 rows of 132 columns.

Choose **Text Display**, and choose the appropriate text display driver for your configuration from the list of text drivers.



## Graph Display Drivers

The graph display driver's purpose is to display Lotus graphs on the monitor.

In addition to different resolutions and formats, Lotus drivers support different configuration modes. The supplied drivers support only separate or toggle mode. This configuration mode allows text and graphics to be displayed on the same monitor but not at the same time. Choose the "separate" graph drivers to work in this configuration mode.

Choose **Graph Display** and choose the appropriate graph display driver for your configuration

- 6 Select **Return to Menu** from the "Current Drivers" menu to return to the "Advanced Options" menu.

Select:

**SAVE CHANGES**

and press **ENTER**.

*INSTALL* will ask you to verify the name of the driver set that you wish to save. Enter the name of the driver set you wish to change if it is different from the default.

- 7 After changes have been saved, follow instructions to exit the *INSTALL* program.

If you save your driver set as *123.set* for 1-2-3 or as *lotus.set* for Symphony, it will be used automatically when you next start your Lotus software.

### Note

You may make many different driver sets with different names for different configurations. When you start 1-2-3 or Symphony, you can choose the driver set you want to use by including the name of the driver as a parameter after name of the program.

### Example

Save the following drivers as *132col.set*  
Text display driver: Tulip VGA (132x25) - Separate  
Graph display driver: Tulip VGA 640x480 - Separate

You could then start 1-2-3 with the following command:

```
123 132col
```

and press ENTER

### Note

The supplied drivers do not work in Lotus View or Tutorial. You must use the standard drivers supplied with your Lotus product to use these programs.

---

## Framework II

Your VGA card includes drivers for Framework II to support many different configurations with your VGA card in its extended capabilities. There are drivers that support 132 columns by 25 or 43 lines of text for the "desktop" and 640 by 480 graphics mode for the "zoom" [F9] function.

Screen Format		Driver Name
"Desktop" screen	"Zoom" screen	
132 column x 25 line text	640x480 graphics	PVGA1.SC
132 column x 43 line text	640x480 graphics	PVGA2.SC

### Installing Framework II drivers for your VGA card

Before you try to install Framework II for any of these new drivers you should first install Framework II with a screen driver chosen from the standard display drivers according to the instructions in the Framework II Getting Started manual. You should then make sure that Framework is functioning properly before proceeding with the installation of the extended mode drivers.

- 1 To install the new Framework II drivers, run the *SETUP* program on the Framework II Setup diskette or from your Framework II directory if you have Framework II installed on your hard disk. Type:

```
setup
```

and press ENTER

- 2 At the "Welcome to Framework II's Setup program" menu, choose option 2,

All other uses of the Setup program

- 3 You will then need to tell the *SETUP* Program the location of the *fwsetup* file that stores the current configuration.

If you are using a floppy system, insert your System Disk 2 in drive B: and press 1.

If you are using a hard disk system, choose option 2 since *fwsetup* should be in the current default directory.

- 4 At the Main menu choose option 2 to change individual configuration settings.
- 5 From the "Change Configuration" menu choose 1 to change primary hardware configurations which include the screen driver.
- 6 Choose 1 to change the Screen driver. Then choose option 7,

I want to enter my own driver file name

and press ENTER

Enter the name of the driver you wish to use

and press ENTER.

For example, to choose the driver for 132 column by 43 line format for the "desktop" and 640x480 graphics for the "zoom" function type:

**pvga2.sc**

and press ENTER.

Be sure to type the complete driver name including the .sc extension.

- 7 Type M to return to the Main menu.
- 8 At the Main menu type 7 to
 

**Save All New Settings**
- 9 You will then be prompted to insert your Setup Diskette in drive A:. You must insert your VGA Card Utilities diskette at this point since this is where the new drivers are located. Press the space bar when you have the VGA Card Utilities disk in drive A:.
- 10 Again the *SETUP* program will want to know where to store the *fwsetup* configuration file. You should do as you did in step 3 and choose the option for your setup (1: for floppy systems; 2: for hard disk systems). Then strike a key.

You have now installed Framework II for the new drivers. You can now start Framework II in the normal manner, and Framework II will use the selected capabilities of your VGA card.

---

## WordStar Professional

WordStar Professional Release 4.00 can make use of 132 column text modes without special modification to the software. All you need to do is tell the software the screen size in number of rows and columns of text and the software will be able to take advantage of the new configuration.

You have to run the installation program of WordStar. You will be prompted to enter the name of the file to which you wish to save your changes. You may wish to call this file *ws132.exe*.

Refer to Appendix C of the WordStar Professional documentation for more information to install WordStar Professional in 132 column text modes.

### Running WordStar Professional in 132 column text

- 1 Use the *vga.exe* utility program on the VGA Card Utilities diskette to switch to the 132 column mode you want to use. Use the table below to determine the correct command.

To switch to:	Run the command:
132 column by 25 row text	<b>VGA 13225</b>
132 column by 43 row text	<b>VGA 13243</b>
Standard 80 column by 25 row text	<b>VGA VGA</b>

- 2 Start your modified copy of WordStar. You can now take advantage of the full screen capabilities of the 132 column text modes in WordStar Professional Release 4.

### Note

You may want to incorporate all the commands needed to start WordStar Professional in 132 column text mode in a batch file so the process of starting the program will be automatic.

### Example batch file contents:

```
VGA 13243
WS132
VGA VGA
```

By means of the last command the system will return to the standard mode (80 column by 25 row text) after quitting WordStar Professional.

---

## WordPerfect

WordPerfect can make use of 132 column text modes without any special modification to the software. All you need to do is tell the software the number of rows and columns of text you can display on your monitor and the software will be able to take advantage of the new configuration.

First you have to use the appropriate 132 column mode switching program on the VGA Card Utilities diskette to switch to the 132 column mode you want to use. Use the table below to determine the correct command.

To switch to:	Run the command:
132 column by 25 row text	<b>VGA 13225</b>
132 column by 43 row text	<b>VGA 13243</b>
Standard 80 column by 25 row text	<b>VGA VGA</b>

Then you can start WordPerfect.

In the Set-up menu you have to enter the number of rows and the number of columns.

Once you have configured WordPerfect, you will not need to use the Setup menu unless you wish to change the configuration.

When you are in the WordPerfect program, you can set your margins to be as wide as 132 characters across.

### Note

You may want to incorporate all the commands needed to start WordPerfect in 132 column mode in a batch file so the process of starting the program will be automatic.

### Example batch file contents:

```
VGA 13243
WP
VGA VGA
```

By means of the last command the system will return to the standard mode (80 column by 25 row text) after quitting WordPerfect.

## APPENDIX A: TECHNICAL INFORMATION

### Standard modes

Mode	Resolution	Colors	Monitors supported	Emulation
0	40x25	monochrome	VGA monitor	CGA
1	40x25	color	VGA monitor	CGA
2	80x25	monochrome	VGA monitor	CGA
3	80x25	color	VGA monitor	CGA
4	320x200	4 colors	VGA monitor	CGA
5	320x200	monochrome	VGA monitor	CGA
6	640x200	monochrome	VGA monitor	CGA
7	80x25	monochrome	VGA monitor	MDA
D	320x200	16 colors	VGA monitor	EGA
E	640x200	16 colors	VGA monitor	EGA
F	640x350	monochrome	VGA monitor	EGA
10	640x350	16 colors	VGA monitor	EGA
11	640x480	2 colors	VGA monitor	VGA
12	640x480	16 colors	VGA monitor	VGA
13	320x200	256 colors	VGA monitor	VGA

More experienced users may want to know the interface to these modes:

AH = 0

AL = number of mode (see table above)

Interrupt 10h

## APPENDIX B: TROUBLESHOOTING THE VGA INSTALLATION

- 1 Make sure the VGA card is firmly seated in its expansion slot, and that it is not touching other boards in your system.
- 2 Check the monitor cable to ensure that it is properly connected to the VGA card, and that it has the proper pinout configuration.
- 3 Make sure your computer is a **Tulip** system or 100% compatible.
- 4 Check your computer's switch and jumper settings, and those on the VGA card to ensure that all settings are correct for your computer system.
- 5 Check your software. The VGA card can emulate different display adapters. Be sure you are using the correct software configuration.
- 6 Check your monitor. The VGA card can work with a number of different monitor types. Be sure you have configured the VGA for the monitor you are using.
- 7 Make sure you are using the correct *vga.exe* commands when running in HGC or CGA compatibility modes.
- 8 Run the VGA diagnostics program.

Here are some typical symptoms and solutions to installation problems:

- **The image takes a few moments to "settle" on the screen when changing modes or when first turned on.**

*It is normal for any monitor to warm up for some time before producing a complete stable image. If the monitor has been on for longer than 30 minutes and still produces a "shaky" image that doesn't settle for a few moments, the reason is that the monitor is not synchronizing properly to the signals coming from the graphics board. To rectify this situation, simply adjust the horizontal and vertical positions to center the image.*

- **One long beep & two short beeps on power up of system.**

*VGA card not properly seated in expansion slot or expansion slot connector is dirty. Reseat or clean "gold fingers". A pencil eraser works well.*

- **No display**

*System not configured appropriately for a VGA card. See the installation section of this manual for details.*

*Monitor signal and/or power cable not properly plugged in.*

*Monitor not turned on.*

*Brightness and/or contrast controls on monitor not turned up far enough.*

- **Screen displays distorted images or screen goes blank when software is executed.**

*Software not configured for or compatible with board's current video standard configuration. Reconfigure software for VGA or EGA video or set the VGA card to a video standard supported by the software.*

*Software is configured for a "color" mode and the board is currently operating in "monochrome" mode or vice versa. Use the vga.exe utility to change mapping mode.*

*Check that your monitor was powered on prior to starting your computer system. The VGA card may recognize some color monitors as monochrome when they are still powered off during startup. This will result in your VGA card operating in "monochrome" mapped modes and your software may be configured for "color" operation. Use the vga.exe utility to change to color mapping mode as needed.*



## GLOSSARY

### **Analog monitor**

A variety of video displays that uses continuously variable color control voltages to allow an extremely large number of colors to be displayed while requiring only a few inputs (electric signals of the three main colors red, green and blue). (Also refer to "VGA monitor".)

### **BIOS or ROM BIOS**

Acronym for Basic Input-Output System. These are the programs that are permanently stored in your computer system in ROM (Read Only Memory) providing the power-on self test and the ability to recognize and use the VGA card in your system. The VGA card has BIOS extension that provides a set of software functions for controlling the VGA video system.

### **CGA**

The Color/Graphics Adapter and the video standard defined by the Color/Graphics Adapter's video hardware and capabilities.

### **Default (standard) mode**

The default mode refers to the set of capabilities and resolutions currently available as well as the current display mode of the VGA card upon system start up when no software has been run to change to another display mode. The default mode of the VGA card is always VGA text mode unless you use the *vga.exe* utility to lock the board in another mode.

### **Digital monitor**

A variety of video displays that uses on/off color control voltages to allow a limited number of colors to be displayed while requiring a larger number of *inputs* (electric signals of the three main colors red, green and blue).

### **Driver**

The part of a software application program that deals with a specific piece of equipment in the system. Some applications have different drivers for different types of video boards.

### **EGA**

The Enhanced Graphics Adapter and the video standard defined by the EGA's capabilities. Because of the similarities between the EGA and VGA standards it will often be necessary to treat your VGA card as if it is an EGA. This is especially true with respect to configuring application software.

### **Fixed sync monitor**

An analog monitor that operates using a fixed horizontal sync frequency. (e.g. Tulip VGA monitors.) Vertical sync frequency is variable to change the resolution displayed on screen.

### **Hercules graphics**

Hercules graphics is a video mode that provides bit mapped single color graphics at a resolution of 720 horizontal dots by 348 vertical dots.

### **Monochrome monitor**

A type of monitor that displays video information in shades of one color. Your VGA card defaults to monochrome mapping when used with a monochrome monitor.

### **Multi-sync monitor**

A monitor that will allow variable horizontal and vertical sync frequencies. This monitor e.g. supports the (non-standardized) graphics mode of 800x600.

### **VGA**

The VGA video standard drives analog display monitors and provides access to 262,144 different colors on color monitors.

**VGA monitor**

An analog monitor providing high resolution. The electric signals of the three main colors (red, green, blue) are used for monitor control. They are also used for composing the other colors. Your VGA card is capable of displaying 64 different levels of red, green and blue on a color display. The combinations of these red, green and blue signals allow 262.144 different possible colors to be displayed.

