

# **SOME IMPORTANT INFORMATION ABOUT THE STARTER KIT**

## **Dear Customer,**

The Starter Kit, described in this Manual on page 1-2, contains two new items which you will find very useful, and which are described below:

1. The Tutorial program **Getting to Know the M15**, which gives you an interesting introduction to your portable Personal Computer. This is included on the diskette marked : Keyboard Drivers, Getting to know.
2. The **Customer Test**, which helps you make an overall diagnosis of the hardware components of your system. You will find this program on the diskette marked CUSTOMER TEST.

**We recommend that you first of all read this manual to familiarise yourself with the system in general (cable connections, diskettes, battery, etc.), before trying to use the programs described in these blue pages.**

## **THE TUTORIAL: GETTING TO KNOW THE M15**

### **WHAT THE TUTORIAL PROGRAM DOES AND WHEN TO USE IT**

The Tutorial program gives you a general introduction to the system, and is run interactively with the user by means of messages on the screen.

You should use this program after first reading through this manual in order to familiarise yourself with the system.

### **HOW TO LOAD AND USE THE TUTORIAL PROGRAM**

1. The computer should be switched off, and connected to an external AC supply as described in this manual. (The Tutorial can of course be loaded and run on battery, like any other software program, provided the batteries are sufficiently charged.)
2. Activate the write-protect tag on the Keyboard Drivers/Tutorial diskette and insert the diskette into disk drive A (the right hand disk drive).
3. Switch the system on (setting the on/off switch to position 1).
4. The program is loaded automatically and is self-explanatory. You will be given simple instructions to follow, and invited to make selections by means of the function keys F1 to F6, and F9.

## **THE VIDEO GAME**

After you have selected the language in which you wish to conduct the Tutorial, you will be given a general introduction and some simple exercises. You will then see the main menu, which offers you, among other things, the choice of a little video game. This game likewise displays simple instructions for you to follow.

This is a chance to test your skill! Using the cursor control keys, you move the snake around the screen so as to find the 'food' (represented by a large rectangle) and eat it up.

When you successfully find and eat the food, you will be awarded a certain number of points, corresponding to the type of food. There are five levels of difficulty to select from, which present an increasing number of obstacles (represented by small rectangles) to be avoided in your search for food.

The difficulty level is selected by means of the function keys, and your score is displayed on the screen. Good hunting!

## **THE CUSTOMER TEST**

### **WHAT THE CUSTOMER TEST DOES AND WHEN TO USE IT**

On the Customer Test diskette, you will find a number of test routines which allow you to make an overall test of your system (the memory, the screen, the keyboard, the interfaces, etc.). The programme is used to help pinpoint the source of a problem, and can help to reduce repair time by giving you information about the defect, which you can then communicate to the appropriate after-sales service or repair technician. The AC adapter and the batteries are not covered by this test program.

We recommend that you use the Customer Test whenever you believe that there might be some hardware defect, or when the keyboard does not appear to be transmitting information correctly, or when the read/write operations in the disk drives appear to be running abnormally.

### **HOW TO LOAD AND USE THE CUSTOMER TEST**

You should proceed as follows:

1. Before beginning the Customer Test, we recommend that you make all the power cable connections between the AC outlet and the computer and run the test on AC supply, because the extensive read/write operations made during the test are very power-consuming.
2. Check that the system is switched off.
3. Activate the write-protect tag on the Customer Test diskette and insert the diskette in disk drive A (the right-hand disk drive).
4. Switch the system on (setting the on/off switch to position 1).

5. The Customer Test is loaded automatically, and is made self-explanatory by means of the messages appearing on the screen. You merely have to follow the simple instructions which you will be given.
6. After each test, you will be shown the results on the screen. If there is a "fail" indication, make note of the details and pass these on to your after-sales service or repair technician.
7. You may interrupt the test at any time by using the key combination **CTRL + BREAK**.

**Please note the following important points:**

It is possible to run the Customer Test in **automatic** or **non-automatic** mode.

When the test is run automatically, the system components are tested one after the other in succession. When the non-automatic mode is selected, you can choose any component which you wish to test individually. After you have chosen the language in which you wish to run the test, the first menu will ask you to select which of the two modes you prefer for the Customer Test.

**Important:**

When the program is testing the disk drives, the system will ask you to insert formatted, blank (scratch) diskettes in both drives: these diskettes are to be formatted beforehand by a special procedure, described below, which is selected during the test itself.

It is important then, in the following cases, to have both these specially formatted diskettes available:

- a. When you wish to run the Customer Test automatically, in which case the disk drives will be tested in turn;
- b. When, in non-automatic mode, you select individual test of the disk drives.

**THE FORMATTING OF TWO SPECIAL DISKETTES FOR THE CUSTOMER TEST**

To format the two diskettes, proceed as follows:

- Take two blank diskettes, or two diskettes containing data which you no longer need.
- Begin the test as described above.
- Select the non-automatic mode for the test.

The next menu will appear, offering you the following options:

- 0 Execute tests once
- 1 Format scratch diskette
- 2 Exit diagnostics program

1. Select option 1 (format scratch diskette).
2. On the menu which follows, select disk drive A for formatting.
3. Next, take the Customer Test diskette out of disk drive A and put a blank diskette (not write-protected) in its place.
4. When the diskette has been formatted the above menu appears again. Select once more the option "Format scratch diskette", and repeat the procedure for disk drive B (the left-hand disk drive), inserting the other blank diskette in drive B.
5. This ends the formatting procedure.
6. At this point, you may wish to leave both the diskettes in the disk drives and proceed with the Customer Test (once the Test Program has been loaded, it remains memory-resident, and it is not necessary to leave the Test diskette in the drive), making your selection from the next menu which appears. In this way the diskettes which the system asks for during the test will be waiting and ready in the disk drives.
7. If you wish to start the Customer Test again from the beginning, take the two blank diskettes from the disk drives after the formatting procedure and replace the Customer Test diskette.
8. The program can then be restarted by making a Reset (either by switching the system off and on, or by pressing the key combination **CTRL , ALT , DEL** . During the tests you will be asked, at the appropriate time, to insert the previously formatted diskettes in the disk drives.

**Important:**

When you wish to use the two diskettes for other purposes after completion of the tests, it is essential to reformat them using the **FORMAT** command of the MS DOS operating system.

**Whenever you wish to change diskettes during the Customer Test, make sure that the diskette in the drive is not being accessed. Look at the access indicator light for the drive concerned and ensure that it is not lit.**

**A point to remember:**

When you wish to test only certain components, select the **non-automatic mode** from the first menu, and then the program **Execute tests once**. You may then choose any component from the list which will be displayed. A complete test of all the system's components, which includes the test of the disk drives, is very time consuming and can last for up to 30 minutes.

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# YOUR PORTABLE PERSONAL COMPUTER

## GENERAL



Thank you for choosing this portable Personal Computer. By buying this particular PC, you have acquired a versatile system, which, because of its compatibility with Industry Standards, gives you access to a wide range of application software.

The system has an integrated rechargeable battery, which means that you can work with or without an AC supply, as you wish. Because of its compact measurements, it can be used almost anywhere.

Below is a brief overview of the technical specifications of the system:

- Internal storage capacity of 256, or 512K bytes, according to the configuration used; processing is based on the Intel 80C88 Processor (16 bit internal bus)
- 2 integrated floppy disk drives, each one with 720K bytes capacity, using 3.5" microdiskettes
- Interface for connection of an optional 5.25" floppy disk drive. This can be used to read/write software directly from/to 5.25" diskettes (capacity 360K bytes).
- Liquid crystal display, with 25 lines of 80 characters per line in text mode (or 25 lines of 40 characters per line)
- Graphics capability, with a resolution of 640 x 200 pixels.

The keyboard has 78 keys, and can be left in the system or taken out and moved to any position. Any of a range of national keyboard versions can be supplied. A large number of printers, one of which is portable, can be connected to the system, to meet the most widely varying demands. A carrier bag is supplied for carrying the system, along with its accessories.



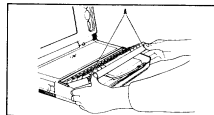
## HOW TO USE THIS MANUAL

At the end of this manual you will find a fold-out appendix, which contains:

- all the illustrations referred to in the text, in the order they are referred to, showing all the important operations which will have to be carried out on the computer.
- illustrations of all the available national keyboard versions.

Please unfold this appendix (marked →) and turn to the illustration (1,.).

When reference is made in the manual to certain components for example ( 4, ) or ( 3,B ) etc., the components will be found by these numbers in the illustrations of the appendix. For example the number ( 4, ) refers to Figure 4; the number ( 3,B ) refers to the component marked B in Figure 3.



In this way, you can follow the text and have the corresponding illustrations available at a glance.

**Important:** You will be able to use all the functions of the keyboard and the system to maximum benefit when you have loaded the operating system and the appropriate keyboard driver and font. To this effect, read the Chapter entitled "Keyboard Configuration when Installing the Operating System and Software" and the chapters following. All software is supplied separately and can be ordered from your dealer.

## THE STARTER KIT

The Starter Kit has been designed to supply everything necessary to begin working with the system.

The Kit, which has been supplied with your system, consists of the following:

- This manual
- 1 Diskette (3.5") labeled: Keyboard Drivers

On the diskette marked "Keyboard Drivers", you will find the national keyboard drivers, which are necessary when you wish to install software, such as the operating system or application programs.

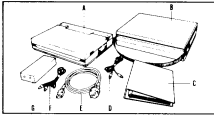
**Important:** The starter kit does not contain any operating system. This manual does not describe operating system commands or the special procedures for installation of application software. You will find the information on these subjects in the documentation delivered with the software concerned.

The operating system to be loaded in this computer is the MS-DOS Operating System, Version 3.2., which is supplied by your dealer.

Please read through this manual carefully. It will give you all the information necessary to set up and use the computer under different conditions (for example, running the system on batteries or from an AC outlet, charging the batteries, the care and handling of diskettes, and so on).

At this point we would like to wish you every success with your portable personal computer.

## CHECKING YOUR ORDER



Please make a brief check of the items in the package:

- the portable computer **(1,A)**, comprising display, keyboard, and two integrated floppy disk drives
- Starter Kit **(1,C)** with manual, and Keyboard Drivers diskette
- AC adapter **(1,G)**
- 1 AC power cable, for AC adapter-AC outlet connection **(1,E)**
- 1 cable for battery charging (the connector is thinner than that of the DC cable), for AC adapter/computer connection (through the battery charge socket) **(1,D)**
- 1 DC power cable, for connecting the computer to the AC adapter (through the DC socket), when the computer is run on the AC supply (the connector is thicker than that of the battery charging cable) **(1,F)**
- 1 carry case **(1,B)**

We recommend that you keep all the packing material, as it will be useful in case of a subsequent shipment.

## CHOOSING A WORK LOCATION

This computer system is designed to be portable, that is, you can use it safely in different locations and in varying working environments. If you intend to use the computer in a non-office environment, and in unusual or rough conditions, please pay attention to the following points:

Avoid:

1. using the system in a chemical or dust laden environment
2. exposing the equipment to extreme temperatures or humidity
3. knocks and vibration
4. placing the equipment near sources of electrical or magnetic interference, such as large transformers, high-frequency devices, or large electric motors.

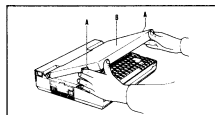
You should also take care:

- not to expose the system to direct sunlight.
- when operating from the AC outlet, to check that there is a ground (earth) connection.

For the technical characteristics of the equipment under unusual conditions, with respect to temperature and humidity, see the chapter on Technical Characteristics at the end of this manual.

## OPENING THE COMPUTER

1. The flip-up display, when closed, is held in place by two plastic catches, **(2,A)**, one on each side of the lid. To open, press both these catches simultaneously and lift the display **(2,B)** upward.
2. Set the display, which is held automatically in each working position, to the desired angle.



**Important:** The display lid can be set in many positions, up to the maximum angle of inclination. Pay attention to the following points when opening:

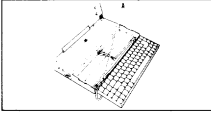
1. Always open the lid carefully, never try to force it.
2. You will find the point of most resistance when you have reached the maximum angle of opening.
3. When closing the display, let it down softly with your hands; do not let it fall back into place. Above all, **do not** slam it.

## REMOVING/REPLACING THE KEYBOARD

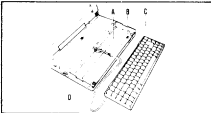


There are three different ways of positioning the keyboard:

- a. It is designed in such a way that you can quite easily leave it and use it in the transport position (3,.).
- b. If you wish, you can also take it out and hook it onto the edge of the housing as shown in the Figure (6,.). If you wish to attach the keyboard in this way, lift it out using the thumbgrooves (4,A) at the front and insert the two clips on the rear of the keyboard into the two spaces provided inside the front edge of the housing, as shown (6,A).
- c. You can take the keyboard out and place it anywhere you wish, up to a distance of 40 cm (about 16 inches). When you wish to do this, please proceed as follows:



1. Lift up the keyboard using the thumbgrooves (4,A) provided on the front, and take it out of the housing (5,.).
2. Pull the the keyboard cable out of the clamps (7,B)(7,D) underneath the keyboard (without pulling too hard).
3. Place the keyboard wherever you wish.
4. Check that the keyboard connector (7,A) is set straight in its socket. Apply slight pressure to ensure that the connector is fully inserted.



When you wish to disconnect the keyboard, press the small plastic catch on the top of the keyboard connector (7,A), while pulling at the same time. To re-insert the connector, push it into the socket until you hear a slight click.

When replacing the keyboard in its housing, be careful to push its cable back into the clamps and wind it around the plastic pin (7,C). When the keyboard is back in its original position, it should be evenly aligned with the sides of the housing.

Before closing the display lid, ensure that the keyboard is correctly in position.

## CONTROLS, INDICATORS, INTERFACES

Before you begin working, make a brief visual check of the system, the rear panel, and the AC Adapter.

You will see the following controls and indicators:

### SYSTEM AND DISPLAY

- Speaker (9,A)
- ON/OFF switch (8,A)

0 position = System Off  
1 position = System On

- Power indicator light (green) (9,C)

This indicator lights up when the system has been switched on.

- Battery indicator light (9,B)

This indicator lights up when the battery needs to be recharged.

- Display contrast control knob (9,D)

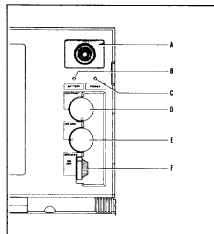
This is used to adjust the contrast setting on the display. Turn clockwise to increase the contrast. The screen will become darker.

- Volume control knob (9,E)

This controls the volume of the speaker. Turn clockwise to increase the volume.

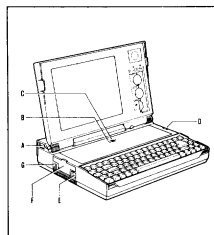
- SPEAKER ON/OFF switch (9,F)

This switches the speaker on or off.



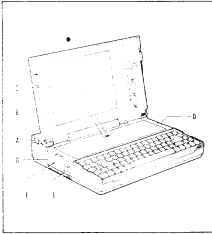
### THE DISK DRIVES

- Disk drive A (right hand side) (8,D)
- Disk drive B (left hand side) (8,G)
- Disk drive indicator light (for drive A) (8,C)



- Disk drive indicator light (for drive B) **(8,B)**

These indicators illuminate when the system is accessing the disk drives.



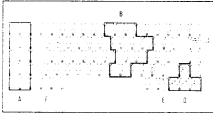
On each disk drive:

- A disk drive cover **(8,F)**  
This protects the disk drive.
- A disk drive release button **(8,E)**.

When pressed, this button partially ejects the microdiskette present in the disk drive.

## KEYBOARD

- 78 keys, including:
  - 10 Function Keys, F1 to F10 **(10,A)**
  - integrated numeric keypad **(10,B)**
  - cursor control keys **(10,D)**



- Indicator light on the NUM LOCK key **(10,C)**

When this indicator is lit, by pressing the key, the numeric keypad can be activated.

- Indicator light on the CAPS LOCK key **(10,E)**

When this indicator is lit, by pressing the key, the alphabetic section of the keyboard is in upper case mode.

- EDIT/SHIFT key, **(10,F)**

This is a toggle key used to activate the numeric keypad, and the PG UP, PG DN, HOME, and END functions.

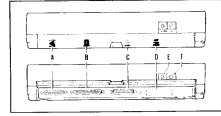
- Keyboard connector **(7,A)**

This connects the keyboard to the system.

## BACK PANEL/INTERFACES

Above the rear panel cover:

- Socket for DC power connection **(11,F)**
- Socket for battery recharge cable **(11,E)**



Under the rear panel cover:

- Parallel interface **(11,A)**

This is used to connect a printer (parallel).

- Serial interface **(11,C)**

This is used to connect equipment which requires a serial interface.

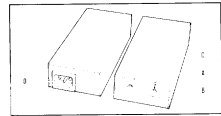
- Interface for 5.25" floppy disk drive **(11,B)**

This is used to connect the optional 5.25" floppy disk drive.

- Common bus **(11,D)**

## AC ADAPTER

- AC input socket **(12,D)**
- Socket for connection of DC power supply cable, marked DC **(12,C)**



For connection of the computer to the AC adapter, when operating from an AC outlet.

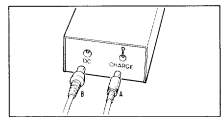
- Socket for connection of Battery recharge cable, marked "Charge" **(12,B)**

Used to charge the batteries in the computer.

- Battery charge indicator light **(12,A)**

Illuminates when the battery is being recharged.

**Note:** the DC sockets (on the AC adapter and on the computer) and connector jacks **(13,B)** are slightly larger than the battery charge sockets and connector jacks **(13,A)**.



## USING BATTERIES OR AC SUPPLY

Each time you are about to switch on the system, consider which type of power supply you wish to use:

- a. AC supply while not charging the batteries
- b. battery supply
- c. AC (through the AC adapter) while charging the batteries

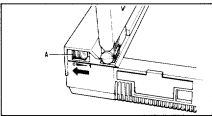
Your decision should be based on the following considerations:

- a. AC supply: connect the system to an AC outlet whenever there is one available.
- b. Battery supply: if you are travelling, or you find yourself in places where there is no AC outlet, you can run your system independently on the rechargeable batteries.
- c. AC supply while charging the batteries: if, when operating on batteries, the indicator light beside the display shows that the batteries have become discharged, connect the system to an AC outlet through the AC adapter, powering the system and recharging the batteries at the same time.

Battery operation entails certain time limits, and it is therefore advisable to plan your use of the system in advance when you intend to run it on batteries (this is explained in detail in this manual).

Each time you switch off the system after using the batteries, you should consider whether they have to be recharged.

## FIRST USE ON AC POWER

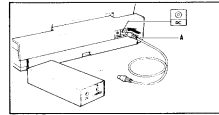


The first time you turn your system on we recommend the use of the AC power supply. When doing so, it is essential to proceed as follows:

1. Check that the ON/OFF switch (14,.) is in the O Position (= OFF), before making or changing any of the cable connections.
2. Ensure that the voltage and frequency values, indicated on the AC adapter, are the same as those of your AC outlet.



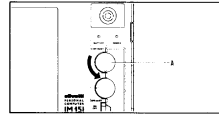
3. Insert the DC cable connector **(15,A)** in the DC socket on the rear of the computer. Insert the connector at the other end of the same cable in the DC socket **(16,A)** of the AC adapter.



4. Plug in the AC supply cable into the AC-Adapter **(17,A)**.

5. Connect the AC cable to the AC outlet. It is **important** that this is the last connection to be made, even when you intend to charge the batteries.

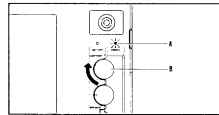
6. Turn the contrast control knob **(19,A)** to the minimum contrast position (anti-clockwise), in order to have a starting point from which to find the optimum setting.



7. Switch the system on (setting the ON/OFF switch **(20,A)** to position 1).

The power indicator light **(21,A)** (green, power ON) comes on.

8. Turn the contrast control knob **(21,B)** slowly clockwise so that the information appearing on the screen can be read clearly. In the maximum and minimum positions nothing can be distinguished on the screen.



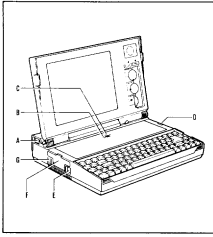
## THE AUTODIAGNOSTICS

When the system is switched on, an automatic test program is run, which is called the autodiagnosics. This program tests the main hardware components of the system and displays the results.

- The first time you switch on the system, because of the adjustments we have been making to the contrast, it is possible that you have not been able to see some of the information displayed; we therefore recommend, at this point, that you switch the system off, wait for several moments, and then switch the system on again. (Obviously, this operation of switching the system off and then on again is not necessary when the contrast control knob is left in the normal working position.)
- You can follow the diagnostics messages as they appear. On the left is shown the item that has been tested **(22,.)**, for example:

CPU (80C88) PASS

- The word PASS appearing to the right means that the test has been successful.
- If the word FAIL appears to the right this means that the item being tested has failed the test. The abbreviations used are in english (e.g. CPU = Central Processing Unit).



- On conclusion of the diagnostics (which last some seconds) the LED indicator light (**8,C**) for the right hand disk drive (**8,D**) (under the LCD) comes on. This indicates that the system is looking for a diskette in the disk drive. While it is doing so, the red indicator light remains lit. (**Never** remove a diskette from a disk drive while the red light is on.)
- This will last some seconds, and then the following message will appear:

**Insert system disk for drive A:  
and strike any key when ready.**

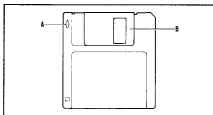
This message means that the system is now awaiting an operating system diskette (or a diskette with the operating system and application software) in **disk drive A** (the right-hand disk drive).

As mentioned previously, the operating system diskette is ordered and delivered separately. When you come to insert this diskette, please read the following section on the handling of diskettes before doing so.

## DISKETTES

### WORKING WITH DISKETTES

- For the operating system and application software, as well as to load and store data, you will be using 3.5" microdiskettes (also called micro floppy disks), storage capacity 720K bytes (when formatted) provided you don't have the optional disk drive.
- **Which types of diskette should be used in the system?** Use microdiskettes which carry the following indications: double sided, double density, double track, 135 tpi. These diskettes have an initial capacity of 1M byte, which gives you a capacity of 720K bytes when formatted.



- Take a look at the illustration (**23,.**). The diskette itself, the part which registers the data, is circular in form, has a magnetised surface (3.5" in diameter), and is placed inside a rigid, square, protective case of around 9 cm x 9.5 cm (3.5" x 3.7").
- The upper side of the diskette carries an arrow (**23,A**) marked into the surface. On the underside of the diskette you can see clearly the circular drive mechanism in the centre (**24,A**).
- At the front of the diskette (beside the arrow) is a sliding metal shutter (**23,B**), which is made such that when the diskette is inserted in the drive, it slides away to reveal a part of the surface of the diskette, through which the drive accesses the diskette in order to read/write data. (Do not touch the part of the diskette surface which can be uncovered by pulling back the metal shutter.)

When the diskette is taken out of the drive, the metal shutter slides back automatically, and in this way you do not need to take any particular precautions when handling it.

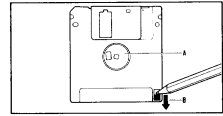
## WRITE-PROTECTION

The diskette carries a write-protect mechanism, which you can easily activate and deactivate by yourself.

When the write-protect mechanism has been activated, the disk can only be read, but not written to. In this way, you can protect any important information on the disk from being inadvertently erased or written over.

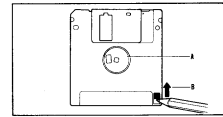
- The write protection is **activated** in the following way:

Hold the diskette in such a way that you are looking at the under side, with the circular drive mechanism visible in the centre, and the protective shutter away from you. Slide the tag **(24,B)** (in the bottom right hand corner), down as far as it will go using a fingernail, or the point of a pen, as indicated by the arrow in the illustration **(24,.)**, until you feel a click. The write protect opening should now be clearly visible, from both sides. The diskette can now not be written to, only read.



- The write protection is **deactivated** in the following way:

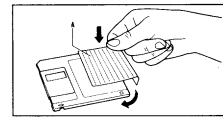
Hold the diskette as before and slide the tag **(25,B)** upwards as indicated in the illustration **(25,.)**, to cover the opening. When the opening is completely covered (you should again feel a click), the diskette can be written to and read from.



## ATTACHING LABELS

You can write information on the label **(26,A)** concerning the contents of the disk. There are two types of label:

- 7 x 7 cm. (2.8" x 2.8") format: these labels are attached to the diskette by placing them first of all in the recess provided on the upper side of the diskette (the side which shows the arrow), then folding them around the diskette into the recess on the under side.
- 7 x 3 cm. (2.75" x 1.2") format: these labels are attached to the upper side of the diskette only (the side which shows the arrow).

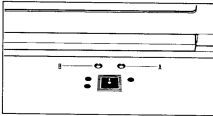


Never overlay more than two labels.

## SOME ADVICE ON THE CARE OF DISKETTES

1. Protect the diskettes from dust.
2. Protect them from high degrees of temperature and humidity.
3. Keep the diskettes in the box in which they were supplied, when not in use.
4. Do not expose the diskettes to electromagnetic fields.
5. Protect the diskettes from knocks and stresses, bending and distortion.
6. Be careful when attaching a new label in the place of an old one. When you wish to detach an old label, place the diskette flat on a table, and ensure that the diskette is not being bent in any way.

## DISKETTE ACCESS INDICATOR LIGHTS



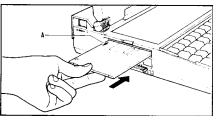
Under the display you will find two indicator lights, one on the left (**27,B**) for disk B (symbol : ), and one on the right (**27,A**) for disk drive A (symbol · ).

**Important:** These indicator lights illuminate when the system is accessing a disk drive in order to read or write a diskette. **Never remove a diskette from the drive, while these indicator lights are on.** If you do this, data may be lost, and the diskette, or worse, the disk drive may be damaged. As a matter of course, you should always look at these indicators before undertaking any action in connection with the disk drives.

## INSERTING AND REMOVING THE DISKETTES

To familiarise you with the use of diskettes, we propose the exercise given below. For this exercise, take the Keyboard Driver diskette supplied with the system, or any other microdiskette, and follow the steps below one by one. **Important:** you should use drive B: for the exercise, as the computer is still waiting for a system diskette in drive A.

### INSERTING A DISKETTE



1. Open the disk drive cover (**28,A**) (Disk drive B).
2. Hold the diskette as in the illustration (**29,.**), with the arrow (**29,A**) beside the metal shutter pointing towards the disk drive.
3. Push the diskette into the disk drive (**30,.**). When you encounter a slight resistance, push the diskette gently farther in

until you hear a click. The diskette should now be lodged securely in the disk drive.

When the diskette clicks into position, the diskette release button (**31,A**) is automatically pushed out and comes level with the side of the central unit. In this way, the button gives you a visual indication that there is a diskette in the disk drive.

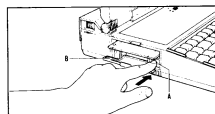
4. Close the drive cover (**31,B**).

## REMOVING A DISKETTE

1. Open the drive cover (**32,B**).
2. Press the drive release button (**32,A**) (it should remain in).

The diskette clicks out, and is pushed automatically about one centimeter out of the disk drive.

3. Pull the diskette all the way out of the disk drive.
4. Close the disk drive cover.



## BATTERY OPERATION / CHARGING UP THE BATTERIES

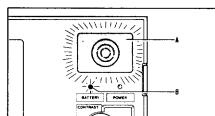
Your portable Personal Computer is equipped with rechargeable batteries.

### DURATION OF OPERATION ON BATTERIES (FROM NEWLY CHARGED BATTERIES)

- about 6 hours, when the the disk drives are used for 5 to 10 percent of the time.
- If the disk drives are used for a higher percentage of the time, the battery duration is reduced; if lower, then the duration is increased.

**You will be informed in two ways that the batteries have become discharged:**

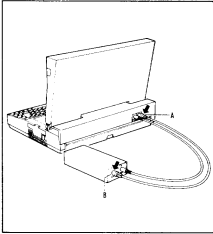
1. The battery indicator light beside the display (**33,B**) comes on.
2. An acoustic signal is emitted through the speaker (**33,A**) (5 beeps), at short intervals.



When the battery indicator light comes on and you hear the acoustic signal, this means that the batteries have become discharged and there remains between **4** and **6** minutes of battery power. The exact time remaining depends on the age of the batteries, and the amount of time the disk drives are used after the light comes on.

**When the battery indicator light comes on, it is very important to take the following steps.**

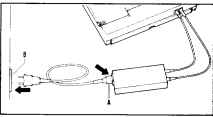
1. Bring your current work session to a close.
2. Avoid all activities which involve long read/write operations on the diskettes.
3. Store all your data.
4. Switch the system off.
5. Connect the battery charge cable, in the order shown below, if you wish to charge the batteries again:



- a. insert the charge cable connector into the socket on the rear of the computer marked "charge" **(34,A)**.
- b. insert the other charge cable connector into the AC adapter, in the socket marked "charge" **(34,B)**.

6. Connect the DC cable, if you wish to continue working, in the following order:

- a. insert the DC cable connector into the DC socket on the computer **(35,A)**
- b. insert the other connector on the same cable into the DC socket on the AC adapter **(35,B)**



7. Connect the AC cable to the AC adapter **(36,A)**.
8. The last step, as always, should be the connection of the AC cable to the AC outlet **(36,B)**.
9. If the cable connections are made in the proper order, the indicator light **(34,C)** on the AC adapter comes on, to indicate that the batteries are being charged.
10. Leave the cables connected in this way for about 8 hours.
11. Switch the system on again, if you wish to continue working.

#### **NOTE ON FILE SAVING**

We assume here that you know how important it is, during a working session, to store your files and data regularly, in order to avoid any loss which might be caused, for example, by a loss of power or an unintentional disconnection. This regular saving of files and data is **also important** when working on the battery, and we recommend that you do so more often than when working from an AC outlet.

## IMPORTANT ADVICE ON WORKING WITH BATTERIES

The rechargeable batteries which equip your system have a limited life. The batteries can support about 500 charge/recharge cycles.

If you keep to the following guidelines, you will get the maximum life time from your batteries:

1. If an AC outlet is within reach, connect your system to it. In this case, connect only the DC cable to the computer.
2. Do **not**, as a matter of routine, recharge your batteries each time you connect the system to an AC outlet.
3. Always recharge the batteries when you see the battery indicator light illuminate (batteries in low condition).

The battery charging time lasts for around 8 hours. There is a special timing mechanism in the AC adapter which cuts off the charging once this time has elapsed.

A red indicator light (**34,C**) on the AC adapter indicates that the battery is being charged. When the light goes off, the charging has stopped.

4. While the batteries are being recharged (around 8 hours), you should not break any of the connections between the system, AC adapter, and AC outlet.

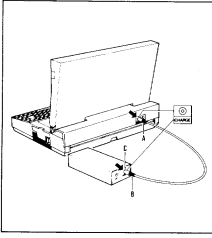
After each disconnection/reconnection of the AC cable from the AC outlet. The 8 hour recharge period starts again from the beginning (irrespective of how far the charging process has gone). You should therefore avoid interrupting the recharge period in this way.

The battery unit cannot be overcharged. It includes a safety device which breaks the charging current when overcharging is beginning to cause it to overheat.

5. Once the recharging is complete (the indicator light should turn off after 8 hours), we recommend that you switch the system off and remove the battery charging cable.
6. When you are no longer using the system, before putting it away, be careful to switch the system off in order to avoid completely discharging the batteries.
7. You should charge the batteries up in advance if you plan to run the system on them for long periods, or in places where there is no AC outlet.

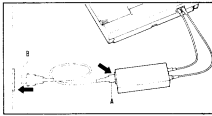
**Note:** When the battery cable is inserted into the battery socket, your system will only operate if the DC cable is also connected.

## CHARGING THE BATTERIES FOR THE FIRST TIME



The batteries which you will find inside the system have only been partially charged at the factory. Therefore we recommend that you charge them when you have connected the system for the first time. To do this, proceed as follows:

1. Switch the system off.
2. Pull out the AC connector from the AC outlet.
3. Insert the battery charging cable into the battery socket (**34,A**) on the rear of the system.
4. Insert the other connector on the battery cable into the battery charge socket (**34,B**) on the AC adapter.
5. Last step: reconnect the AC cable to the AC outlet (**36,B**).



The red indicator light (battery charging) on the AC adapter illuminates.

6. Leave the cables connected in this way for around 8 hours.
7. You can switch on at this point and continue to work while the battery is charging, provided that the DC cable is connected to the AC adapter and to the system. (Charging continues independently of the position of the ON/OFF switch.)

## A FEW TIPS ON CABLE CONNECTION/DISCONNECTION

Keep in mind the following points when connecting or disconnecting cables.

1. Before making any changes to cable connections, switch the system off, after first terminating your work session and storing all your data.
2. If working using the battery (the ON/OFF switch in the 1 position), **never** insert either the DC or battery charging cable, as all data will be immediately lost from the system's memory.
3. While working with one or both cables connected, **do not** remove either of them: this can also cause a loss of data.



## REPLACING THE BATTERIES

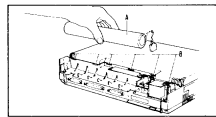
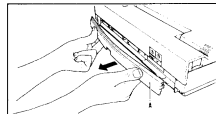
After a certain number of charge/recharge cycles (around 500) the need to be replaced.

### WHEN IS REPLACEMENT NECESSARY?

If, after a full charging cycle, the battery indicator light beside the display comes on within 3 to 4 hours of use (assuming the disk drives are in use for about 5 to 10% of this time), the battery needs to be replaced. (If for any reason you wish to take the battery out immediately after a charging cycle, please allow some time for the battery to cool down before touching it.)

In this case, proceed as follows:

1. Switch the system off, remove all cable-connectors from the back panel.
2. Open the rear panel cover **(37,A)** and slightly flex it so that the plastic pins at the ends come out from their holes; you can then remove it and put it aside.
3. Remove the two screws **(38,B)(38,A)** and put them aside.
4. Remove the battery compartment cover **(39,A)**.
5. Pull out the three-pin battery connector **(40,A)**.
6. Take out the battery **(41,A)**.
7. Insert a new battery (same type), and reconnect the three-pin connector **(42,A)**.
8. Replace the battery compartment cover (taking care to insert the tabs at the edges of the cover into the corresponding slots **(41,B)**) in the computer housing, and replace the screws.
9. Slightly flex the rear panel cover **(37,.)** before inserting it back in place, so that the pins at the ends enter back into their holes.
10. New batteries are to be recharged, as explained previously, for the full charging cycle of 8 hours.



## TRANSPORTING THE SYSTEM

When carrying the system to a new location, use the carrier bag supplied. This bag gives sufficient protection against minor knocks and jolts, and provides enough space for transporting the system, together with cables, AC adapter, manuals, and diskettes.

Before carrying the computer anywhere, take any diskettes out of the disk drives.

## PRINTERS

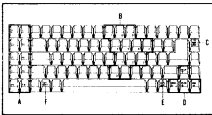
We offer you a wide variety of printers (with varying print speeds and qualities) for connection to your system:

- matrix printers. Our dot matrix printers offer printing speeds from 120 to 400 c.p.s. (characters per second).
- daisy wheel printers. Our daisy wheel printers offer printing speeds from 25 to 90 c.p.s.
- a thermal printers.

Your dealer can give you full information about all the printers available.

## KEYBOARD CONFIGURATION WHEN INSTALLING THE OPERATING SYSTEM AND SOFTWARE

By means of the keyboard you communicate with the system, using it to enter text, data, and commands.



Initially your system is configured to recognise the US-ASCII version of the keyboard. If your system does not have this version of the keyboard, it is important when loading your operating system or application software to load also your particular national keyboard driver program and font.

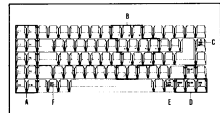
This is a simple operation: after successfully loading the operating system, insert the **Keyboard Drivers** diskette in drive A and type in the name of the keyboard driver program which corresponds to your version of the keyboard, followed by **<ENTER>**, and then type in the name of the font (where applicable) again followed by **<ENTER>**. You will find further explanation of this subject in the documentation delivered along with the software concerned.

Following is a list of the keyboard drivers which you will find on the **Keyboard Drivers** diskette, and which you can refer back to when installing the operating systems or software:

COUNTRY	KEYBOARD DRIVER	FONT
Denmark	KEYBDA	NORDIC
France	KEYBFR	GRAFTABL
Germany	KEYBGR	GRAFTABL
Greece	GREEK	—
Italy	KEYBIT	GRAFTABL
Norway	KEYBNO	NORDIC
Portugal	KEYBPO	PORTUGAL
Spain	SPAIN1	—
Spanish speaking	KEYBSP	GRAFTABL
Sweden/Finland	KEYBFS	GRAFTABL
Switzerland (French)	KEYBSF	GRAFTABL
Switzerland (German)	KEYBSG	GRAFTABL
United Kingdom	KEYBUK	GRAFTABL
US/ASCII	—	GRAFTABL

The following keyboard versions are shown in the illustrations:

US (43,.) (49,.), Italy (44,.), France (45,.), Germany (46,.), Spanish speaking (47,.), Spain 1 (48,.), United Kingdom (50,.), Switzerland (51,.), Finland/Sweden (52,.), Norway (53,.), Denmark (54,.).



Please turn to the illustration which corresponds to your national version. You will see the US-ASCII keyboard also shown on the same or adjacent page.

## WORKING WITH THE KEYBOARD

After loading the operating system software and the keyboard driver (if you do not have the US-ASCII keyboard), as explained in your software documentation, you will then have available all the functions and possibilities which are described below.

Your keyboard has the following types of keys:

- 10 Function Keys on the left of the keyboard:

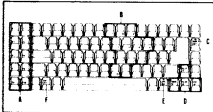
These keys have certain functions which are defined by the software which has been installed.

- The alphanumeric keys :

These keys are used to enter text and numbers, as on a normal typewriter.

- A numeric keypad (the area **(43,H)** in the illustration), integrated into the alphanumeric section.
- A number of special keys.

## ENTERING TEXT IN UPPER CASE



This is done as follows: Press and hold down one of the <SHIFT> keys **(43,E)****(43,G)** (marked with a broad arrow pointing upwards), and then press the letter to be entered in upper case.

When you wish to enter text all in upper case, the **alphabetic section** of the keyboard can be locked in the upper case mode by means of the <CAPS LOCK> key **(43,D)**. Thereafter, you can enter letters in lower case by pressing one of the <SHIFT> keys along with the letter to be entered in lower case.

To revert to lower case mode, simply press the <CAPS LOCK> key once more.

A LED indicator on the <CAPS LOCK> key lights up when the **alphabetic section** of the keyboard is in upper case mode.

## Multi-Character Keys

Some keys, on certain national keyboards, are capable of entering up to five characters, depending on which key combination is used along with them. The following illustration shows which key combination accesses which character on one of these multi-character keys (on the left is shown a general example, on the right is shown a special key from the Norwegian keyboard):

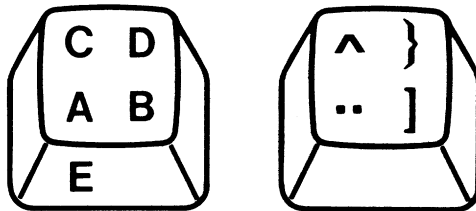


Fig. 1-1

Each character has a corresponding key combination as follows:

- A - The key alone is pressed (unshifted)
- B - Press and hold down <ALT> and then the key (unshifted)
- C - Press and hold down <SHIFT> and then the key
- D - Press and hold down <ALT> and <SHIFT> and then the key
- E - Press and hold down <CTRL> and <ALT> and then the key.

Note concerning the above:

When entering one of the above combinations, press the keys in the order shown, holding down the first while pressing the second, and so on. Hold down the keys until the desired action has taken effect.

The above table concerns only the alphanumeric keys and **does not apply to the numeric keypad**, which will be explained later on. Dual function control keys (e.g. the cursor keys) will be explained separately. The number key pad will also be dealt with in a separate paragraph.

## THE CURSOR CONTROL KEYS

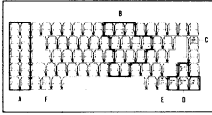
In the normal mode, i.e. without combining other keys, in combination with the appropriate software the block of keys marked with arrows on the right side of the keyboard (**43.C**) are used to direct the cursor on the screen as follows:

- Cursor one character to the right
- ← Cursor one character to the left
- ↑ Cursor one character upwards
- ↓ Cursor one character downwards

## THE EDIT/SHIFT KEY

This is a toggle key, i.e. when pressed, it remains down until pressed a second time, when it returns to its normal position; you can easily see, therefore, if the key has been activated, simply by looking at it. When it is pressed (in conjunction with certain application programs), the cursor keys on the right of the keyboard assume their secondary functions, which are as follows:

- HOME - Cursor to start of text
- END - to end of text
- PG UP - to start of preceding page
- PG DN - to start of following page



The **<EDIT/SHIFT>** key (**43,F**) returns to normal position when pressed a second time; the above keys then return to their normal (cursor control) functions.

**Note:** The **<INS>** key and the **<DEL>** key also assume their secondary functions, which are indicated on the keys.

## THE AUTOMATIC REPEAT FUNCTION

As long as a key is pressed, the corresponding letter or function will be repeated. This feature also applies to combinations of keys.

All keys for which the automatic repeat function serves a purpose possess this feature.

## DEAD KEY SYMBOLS

On the various national keyboards, there are keys marked with symbols which, when pressed, do not appear on the screen. These characters are used only in conjunction with other keys to produce certain seldom-used characters for which no separate key has been provided (for example accented letters). These keys are known as **Dead Keys**. For example, the following symbols may appear, depending on the keyboard:

ˆ ˇ ˘ ˙ ˚

Each national version of the keyboard possesses its own particular 'dead keys'. For example, in order to produce an accented character on a German keyboard, you would first press the dead key, followed by the letter which is to appear with the accent. When this is done, the system checks in order to verify that the accent plus character entered is a valid combination. If it is an illegal combination, both character and symbol appear on the screen and at the same time there is an audible signal to bring the error to your attention.

**Please note:** on the Spanish keyboard, the ~ character appears in this case as ■ .

The table below shows all the valid dead key letter combinations for all the national keyboard versions:

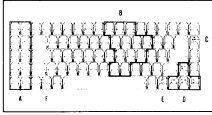
KEYBOARD	DEAD KEY SYMBOLS SUPPORTED	VALID CHARACTERS
FRANCE	.. ^	ä Ä ë ì ö Ö ü Ü ÿ â é î ó û
GERMANY	/' \	á é É í ó ú à è ì ò ù
GREECE	/' ..	ά έ η ί ó σ ω τ υ Α Ε Η Ι Ο Υ Ω
PORTUGAL	/' \ ^ ~	á é í ó ú Á É Í Ó Ú à è ì ò ù À È Ì Ò Ù â ê ó Â Ê Ò ã õ ñ Ã Õ Ñ
SPAIN INTERN. DENMARK, NORWAY, SWEDEN/FINLAND	/' \ ^ ..	á é É í ó ú à è ì ò ù â é î ó û ä ë ì ö ü ÿ Ä Ö Ü
SPAIN	/' \ ..	á é í ó ú Á É Í Ó Ú à è ì ò ù À È Ò ä ë ì ö ü Ä Ì Ö Ü
SWITZERLAND (FRENCH)	/' \ ^	á é í ó ú É à è ì ò ù â é î ó û
SWITZERLAND (GERMAN)	.. ~	ä ë ì ö ü ÿ Ä Ö Ü ñ Ñ

## THE NUMERIC KEYPAD

The keyboard has a block of number keys for entering sets of numbers. Since the keyboard has been designed to be compact, these keys do not appear as a separate block, but are included inside the alphanumeric area (indicated by the area **(43,H)** in the Figure **(43,,)**).

The numeric keypad is activated as follows:

Press the **<NUM LOCK>** key **(43,A)**. The indicator light on the key illuminates.



Press the **<EDIT/SHIFT>** key (**43,F**) (this is a toggle key and remains down, until pressed a second time).

The shaded area shown in the illustration can now be used to make numeric entries. On the numeric keypad, you should now have access to the following characters, which are marked on the front of the keys: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, +, .

You can de-activate the numeric keypad by releasing the **<EDIT/SHIFT>** key, and then pressing the **<NUM LOCK>** key (the indicator light on the latter goes out). All the above keys then return to their normal functions.

### HOW TO COMPLETE AN ENTRY

When you make a data input through the keyboard, the entry is not processed by the system until you press the **<ENTER>** key (**43,B**) (also sometimes called CR - Carriage Return). This key is to be found on the right hand side of the alphanumeric area of the keyboard, and is marked with an arrow bent to the left ( ← ).

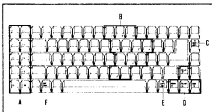
The data entered on the keyboard, and subsequently processed by the system when the **<ENTER>** key is pressed, constitute an Entry. When this entry consists of a Command given to the system to execute certain functions, execution of the command will begin only after the above mentioned **<ENTER>** key is pressed.

### CORRECTING SPELLING MISTAKES WHEN MAKING ENTRIES

Before you complete an entry by pressing the **<ENTER>** key, you may still correct any errors in the entry by using the Backspace key to bring the cursor back to the mistaken character or characters.

The Backspace key (**43,K**) is found in the top right part of the keyboard. This key will erase each character to the left of the cursor until you arrive at the mistaken character. You can then recompose your entry and press the **<ENTER>** key.




### OTHER SPECIAL CHARACTERS

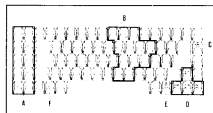


All the other special keys, which have not been mentioned so far, can be found in the following table, with an explanation of their functions. The keys are explained from left to right of the keyboard, starting from the top.

Please note that the explanations given serve only as a general guide, and that the function of each key still depends on the particular program which has been loaded.



KEY SYMBOL US-ASCII	FUNCTION
ESC	Function key, never used in combination with other keys:  frequently used to return to the previous page of a menu (ESC = ESCAPE)
	Backspace key, used to erase characters on the screen before completing an entry (deletes from right to left)
SCROLL LOCK	Stops scrolling on the screen, or changes the type of scrolling (with the appropriate software)
BREAK	The same key as the SCROLL LOCK key: interrupts an output, or a listing, or the running of a program; the BREAK function is activated when the key is pressed together with SHIFT
	Used to jump to the next tabulation point on a line
NUM LOCK	Switches to the numeric keypad, in order to make numeric entries; used only in conjunction with EDIT/SHIFT
CTRL	Function key used only in conjunction with other keys (CTRL = CONTROL)
ENTER or CR	Used to complete an entry (CR = Carriage Return)
DEL	The character indicated by the cursor is erased (Delete=DEL)
	Only used together with other keys, to switch to the upper case, or to select the alternative function of a key (there are two of these keys on the keyboard)
INS	Insert-Mode; entries are added to the screen, without overwriting; striking the key again returns to overstrike mode (INS = INSERT)
PRT SC	Prints the contents of a screen (hardcopy) (PRT SC = PRINT SCREEN); must be pressed together with SHIFT



EDIT/SHIFT	This is a toggle key: when used in conjunction with NumLock, it activates the numeric keypad. Otherwise, when pressed, it activates the alternative functions of the cursor keys. Then in conjunction with word-processing programs, it activates the Home, End, Pg Up, Pg Dn, functions
ALT	Function key, used only together with other keys (ALT = ALTERNATE)
CAPS LOCK	Locks the alphabetic section of the keyboard into upper case: a second action on the key returns to lower case

### SWITCHING BACK TO THE US-ASCII KEYBOARD

After loading a national keyboard driver, you can return to the US-ASCII keyboard by pressing the key combination <CTRL> + <ALT> + <F1> .

You can then select your national keyboard version using the key combination <CTRL> + <ALT> + <F2> .

### THE SWISS-GERMAN/SWISS-FRENCH KEYBOARD

There is only one Swiss keyboard version, which serves for both the Swiss-French and Swiss-German character sets. If you have this keyboard, you must load the correct keyboard driver. The keyboard driver affects three keys, which are shown in the illustration.

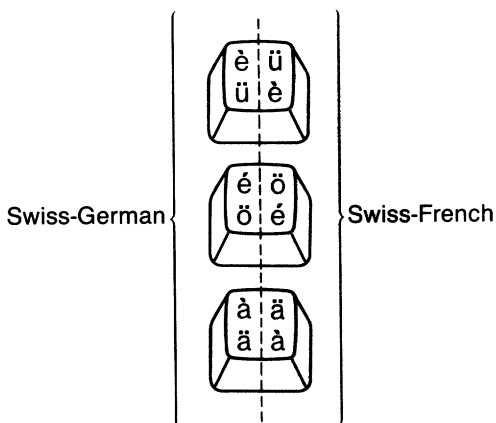
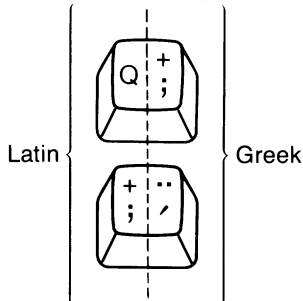


Fig. 1-2 The Swiss-German/Swiss-French Special Character Keys

## THE GREEK KEYBOARD

Both Greek and Latin characters can be entered on this keyboard. When delivered, the keyboard is configured for the Latin alphabet. In order to change to the Greek alphabet, simply press the <ALT> and <ENTER> keys, at the same time. To return to the Latin alphabet, use the same procedure.

Only the alphabetic area of the keyboard is affected by this procedure. The other keys retain the same functions for both, with the following exceptions:



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Fig. 1-3 The Greek/Latin Special Character Keys

## THE PORTUGUESE KEYBOARD

On the Portuguese keyboard, the characters ü and Ü are produced by first pressing the < ~ > key, and then either u or U.

## THE RESET FUNCTION

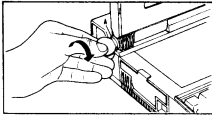
The Reset is an important function of your computer system, and is used, for example, when the computer is blocked or is not accepting commands from the keyboard.

When a Reset is made, all the data stored in the system's memory is lost. All contents of the memory, registers, etc., are set to zero, and the operating system is reloaded.

Once the operating system has been successfully loaded, a Reset is made by pressing the key combination <CTRL> + <ALT> + <DEL>. This is called a **Software Reset**.

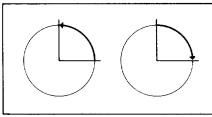
If the operating system has not been loaded successfully, or if for any reason the system is not accepting commands from the keyboard, a system reset can only be made by switching the system on and off (this is called a **Hardware Reset**).

## SETTING/RE-ADJUSTING THE RESISTANCE OF THE DISPLAY HINGES



The display unit, when opened, has a certain resistance to movement which is adjusted by means of the two screws (55,A)(56,A). These screws have been set in such a way at the factory that no adjustment is necessary. After a certain period, however, some re-adjustment may appear necessary in order to increase or decrease the resistance; in this case you can proceed as follows:

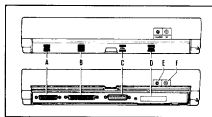
1. Find a medium-sized coin.
2. To increase the resistance of the display hinges, turn both screws one quarter turn clockwise (55,.) (56,.).
3. To decrease the resistance of the display hinges, turn the screws one quarter turn anti-clockwise (58,.) (59,.).
4. Never turn the screws more than one quarter turn (57,.) at a time, and check after each turn the screen's resistance to movement back and forth. The screen is at its optimum setting when it remains securely in any of the working positions (opened over 90 degrees), and there is only a slight or medium resistance to a change of position.



## EXPANDING THE MEMORY ON THE 256K BYTE VERSION

If you have a system with the 256K bytes user RAM, the memory can be extended to 512K bytes by insertion of a memory expansion card. This must be done by an authorised technician.

## UPGRADING THE SYSTEM WITH THE 5.25 OPTIONAL DISK DRIVE



A 5.25" disk drive can be connected to the floppy disk drive interface (11,B). This disk drive uses diskettes which have a capacity of 320K bytes (when formatted), and is powered independently of the system by connection to an AC outlet. It is used to read and write data and programs directly from/to 5.25" diskettes. When connected, you can easily use programs and data available on 5.25" diskettes, either directly, or transfer them to 3.5" microdiskettes.

Your dealer will be able to give you further details about the optional disk drive, and how to expand your memory via the memory expansion card.

## FAULT FINDING AND TROUBLESHOOTING

There is a variety of situations in which problems may arise, for which you can pinpoint the cause, and then easily supply the remedy.

Following is a short list of these:

PROBLEM	POSSIBLE CAUSE	REMEDY
When the system is switched on (Power indicator light ON ) nothing appears on the screen.	a) On AC supply: You have not adjusted the contrast control correctly.  b) On battery: The battery is completely discharged. You may have forgotten to switch the system off. (In this case the POWER indicator light does not come on.)	Turn the contrast control slowly in both directions, and find the optimum setting.  Change back to AC operation. Recharge the batteries.
On battery: after switching the system on, several lines appear on the screen, the diagnostics do not run, the battery indicator does not light, and there is no acoustic signal (or only one Beep).	Batteries too discharged.	Change to AC. Charge the batteries.
On battery: relatively new batteries are still not sufficiently charged up after a charging cycle (the battery charge indicator on the AC adapter is off after a charging cycle of 8 hours).  The battery low-indicator light on the system goes on when you return to battery operation.	Batteries fully discharged. You might have forgotten to switch the system off.	In this case try a second charging cycle. Switch the system off, take the AC plug out of the AC outlet, and then put it back in. In this way, a new charging cycle is started. If the 2nd cycle is not successful, consult your dealer. The battery may need to be replaced.

## TECHNICAL CHARACTERISTICS

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CPU:	80C88 (4.77 MHz)
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ROM:	16K bytes
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RAM:	User RAM: 256K bytes, 512K bytes depending on configuration. Video RAM: 16K bytes
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CLOCK:	Battery-backed clock/calender
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Minifloppy disk drive:	Two 3.5" disk drives. Diskettes used: double sided, double density, 135 t.p.i. No. of heads: 2 No. of cylinders (tracks): 80 Data transfer rate: 250K bits/sec.
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Power supply to Central Unit:	5 V DC (from Power Unit) 5 V DC (from battery)
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System power consumption:	max. 20 W
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Display:	1:2.4 aspect ratio Liquid crystal display (LCD) Alphanumeric: 25 lines of 80 characters 25 lines of 40 characters (by selection) Graphic: 640 x 200 pixels 320 x 200 pixels
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Keyboard:	78 keys, including: 10 Function keys Numeric keypad (integrated into alphanumeric area) LEDs indicating numeric keypad and upper case mode
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Battery:	Ni-Cd-Battery set, 5 V 500 charge/recharge cycles 6 hours operation with 10 % use of the disk drives 8 hours recharging time
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Interfaces:	Parallel (Centronics) Serial (RS 232C) Interface for the optional 5.25" disk drive Common Bus
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Ambient conditions	Temperature range: from 5 to 35° C (41 to 95° F). Relative Humidity: from 20 to 80 per cent, non condensing. Altitude (max.): operating 3000 m. (10,000 feet), non-operating 10,000 m. (33,000 feet)
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Dimensions/ Weight:	385 x 276 x 72 mm. (15.15 x 10.8 x 2.83 inches) 5,700 Kg (12.5 lbs).
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AC Adapter:	Input: AC (voltage, frequency according to the label on the AC-Adapter) Output: 5 V DC for battery charging, 5 V DC to system AC supply current variations tolerated: Voltage +/-10 per cent Frequency +/-1 per cent
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## FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

**Warning:** This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

### INFORMATION TO THE USER

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals and the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

USA

If this equipment does cause 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 the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- Check that PC board mounting screws, connector screws, and ground wires are well secured.
- Check that PC board slot covers are in place when PC boards are not mounted.

If necessary, the user should consult the dealer for additional suggestions.

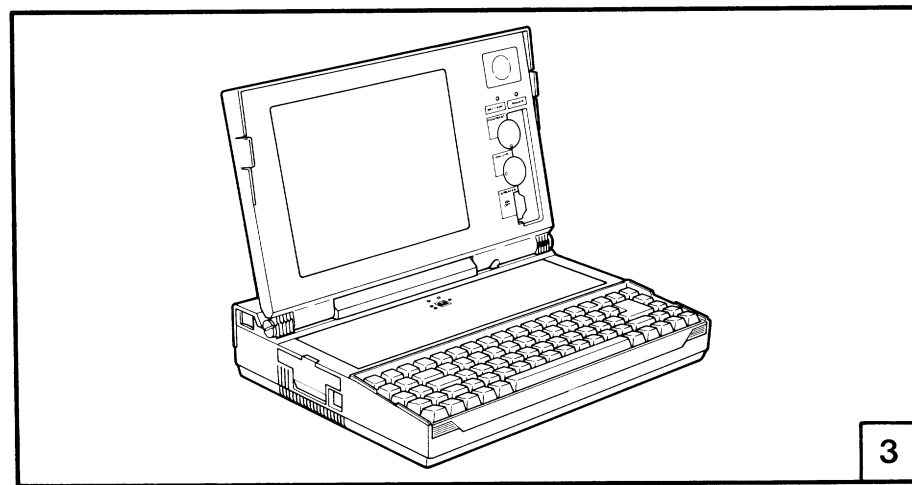
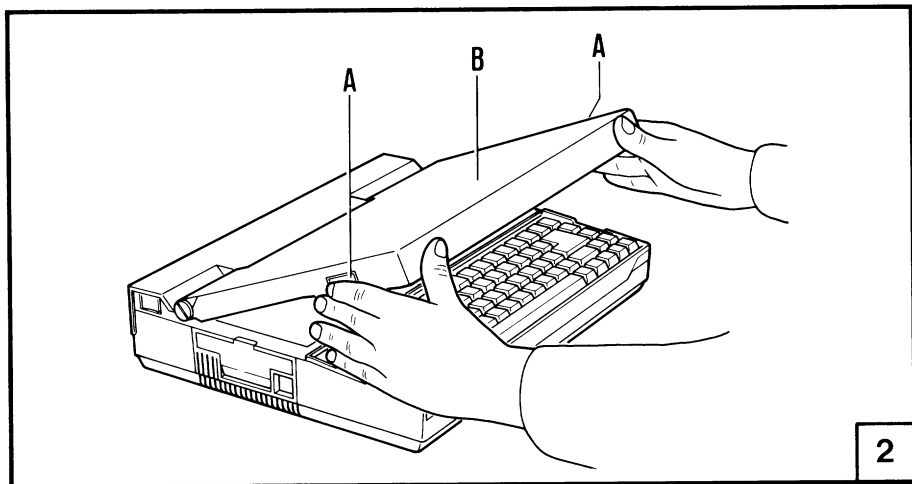
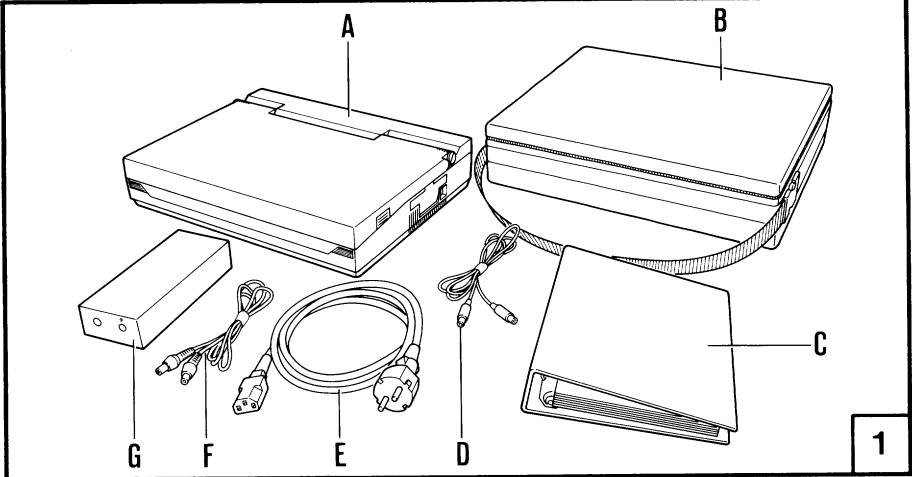
The manufacturer cannot be held responsible for the interference caused by unauthorized modifications to the computer.

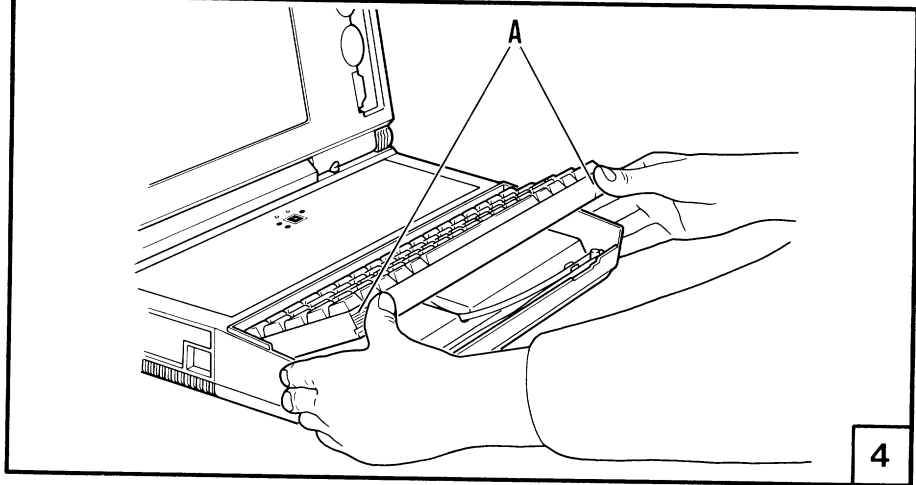
Connecting of peripherals not supplied by the manufacturer to this computer, requires the use of grounded shielded cables with in-line filter if needed.

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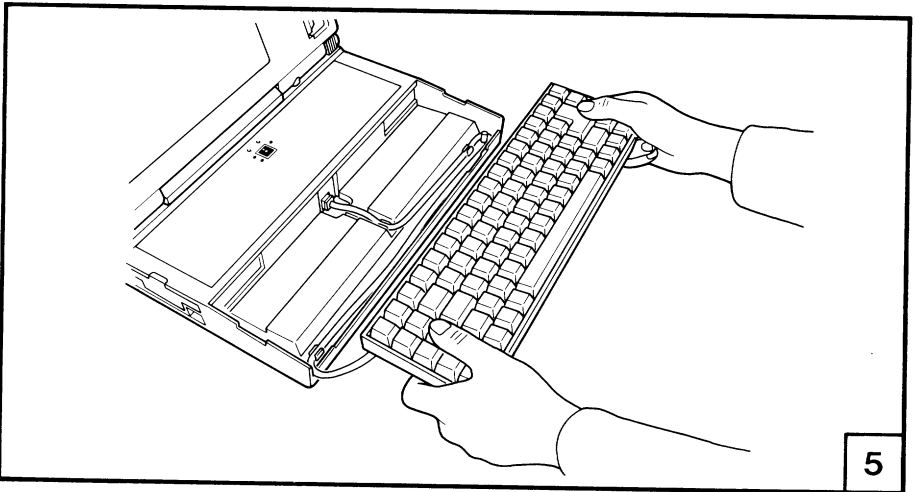
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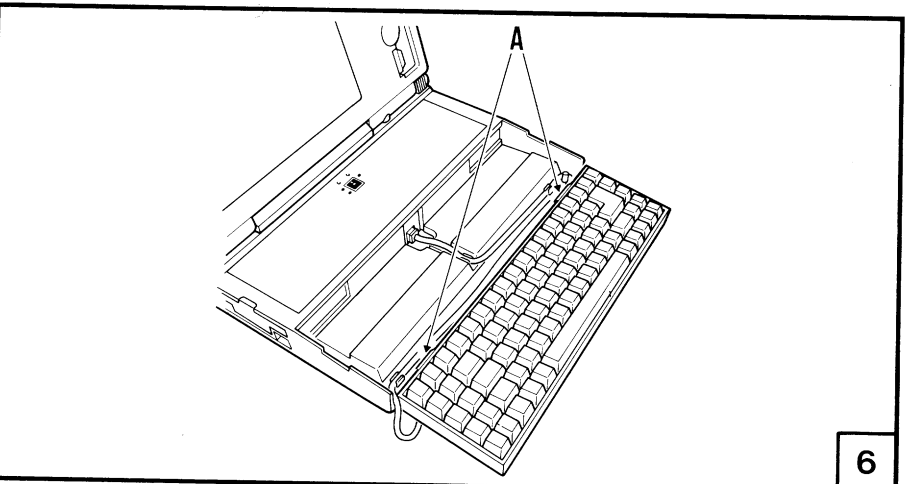




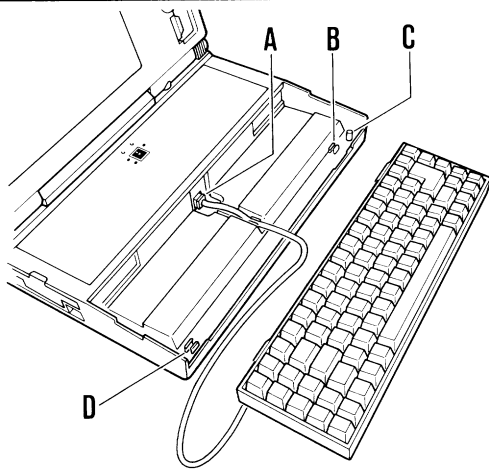
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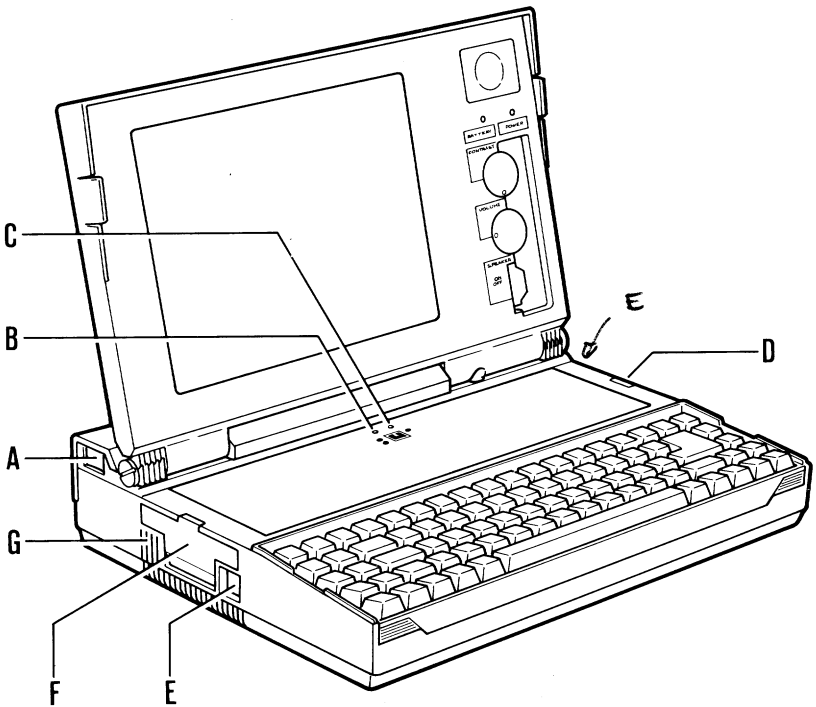
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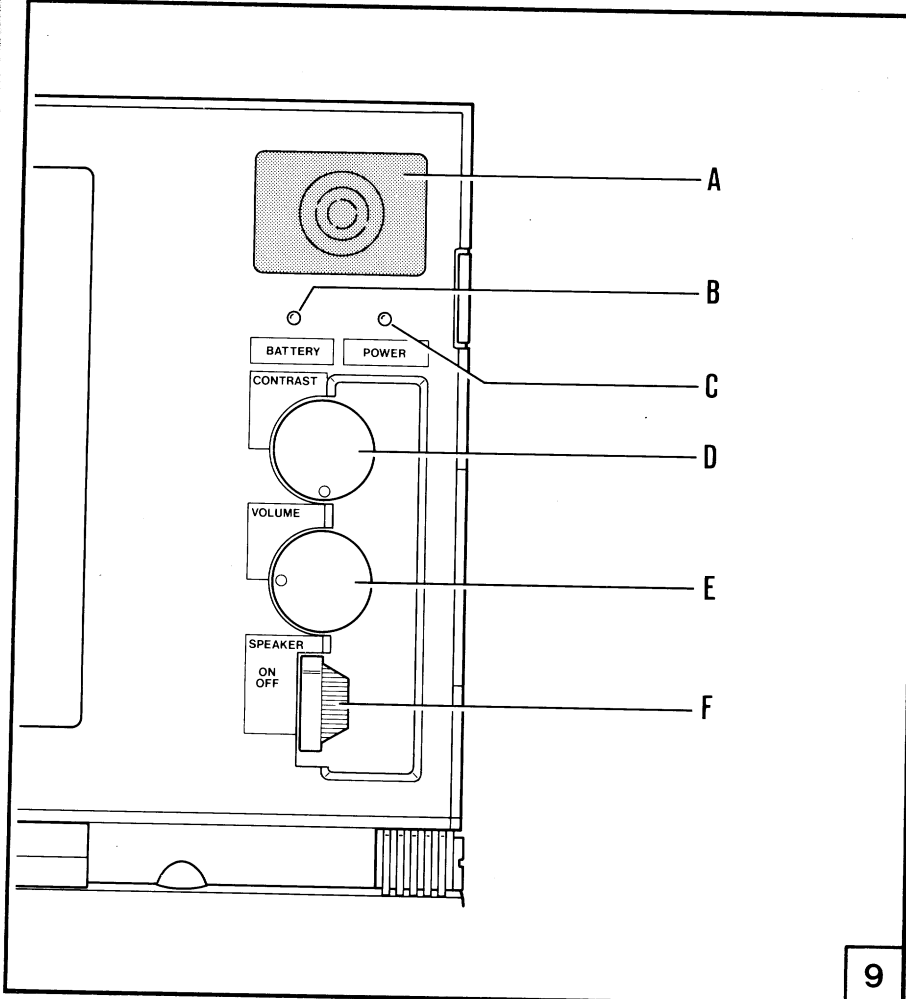
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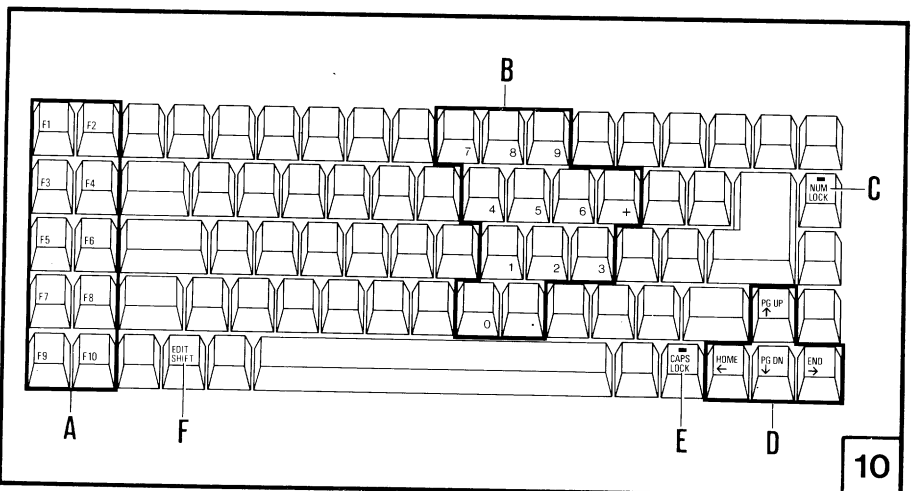
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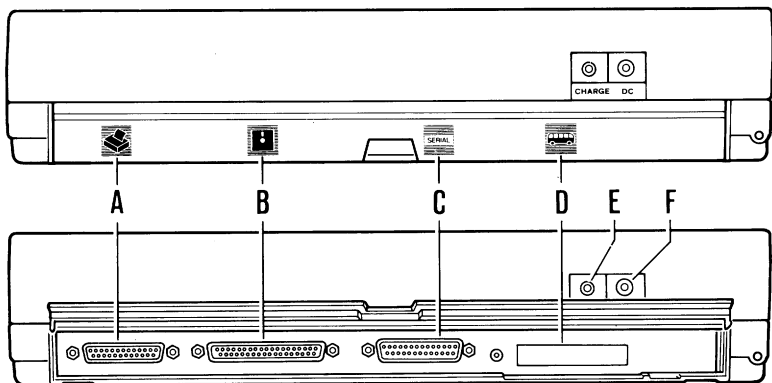
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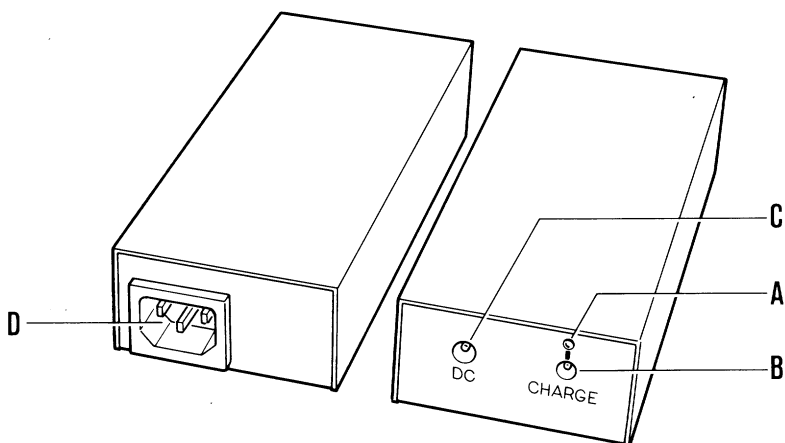
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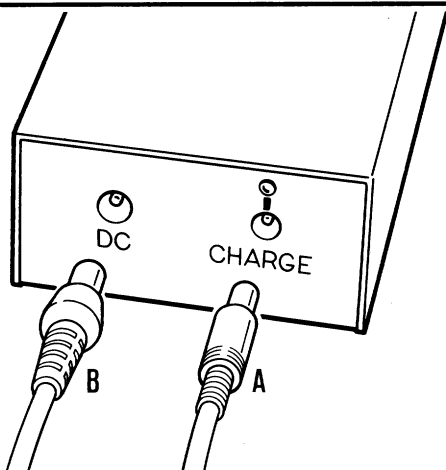
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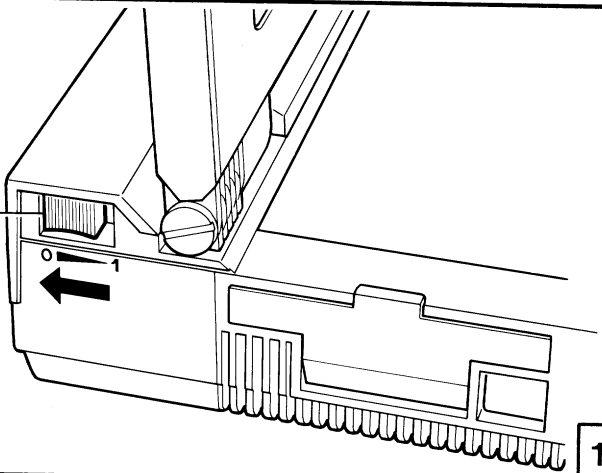


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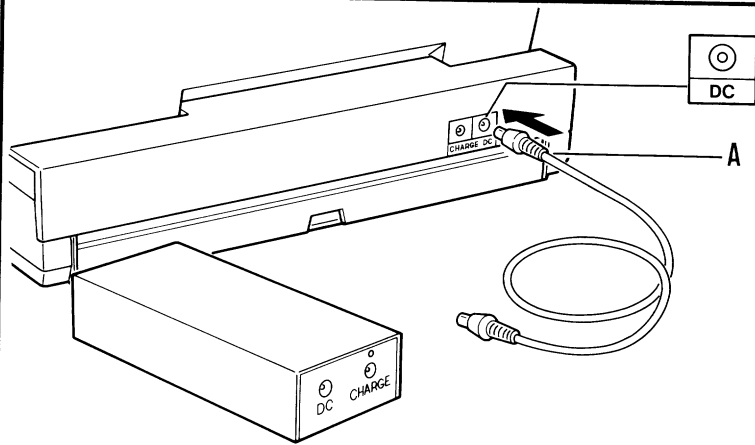


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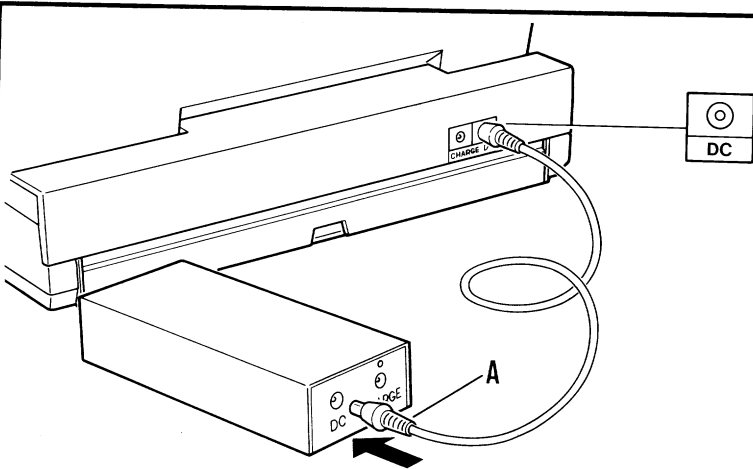
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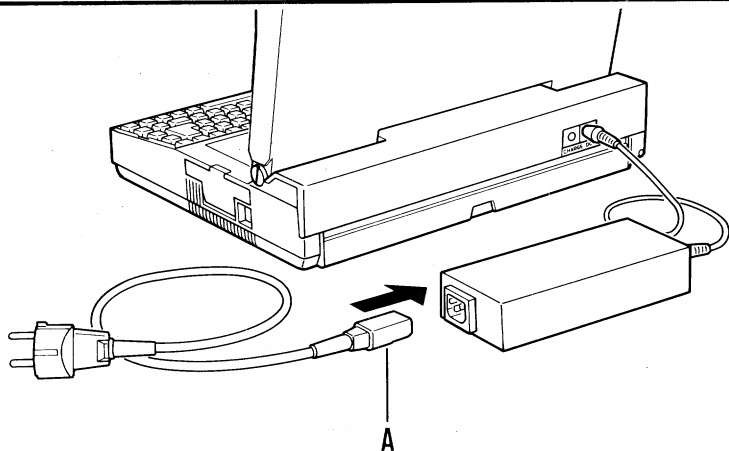
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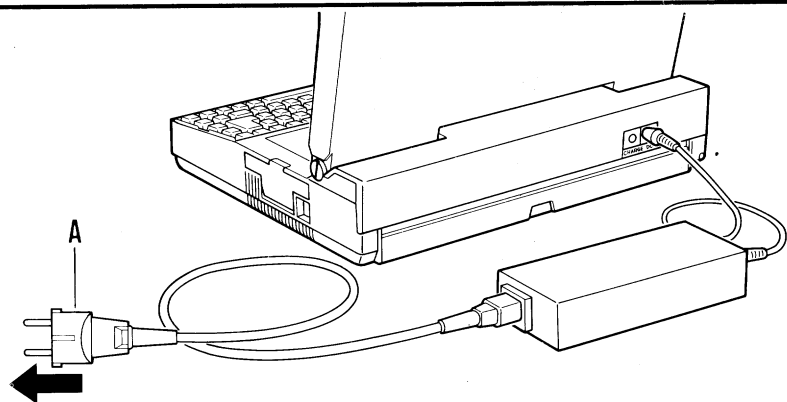
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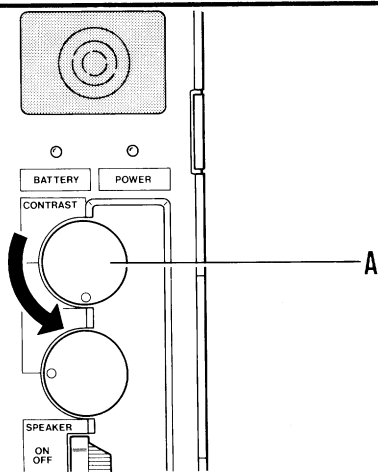
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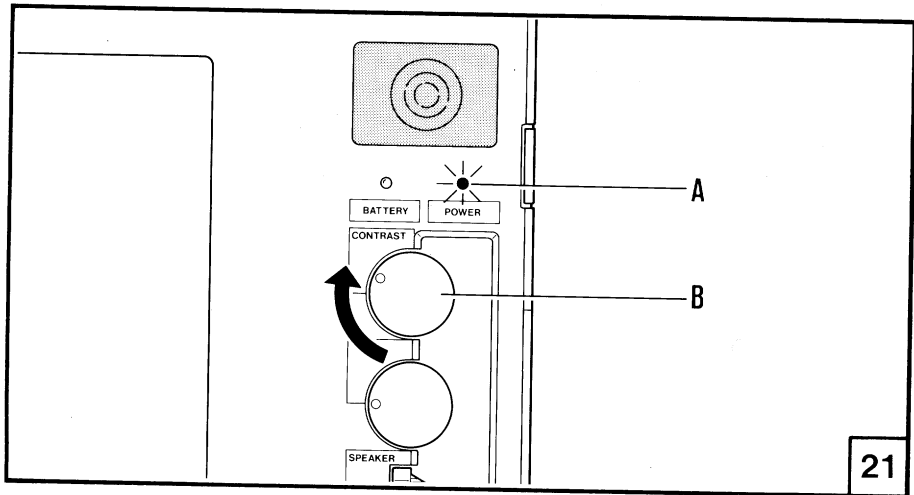
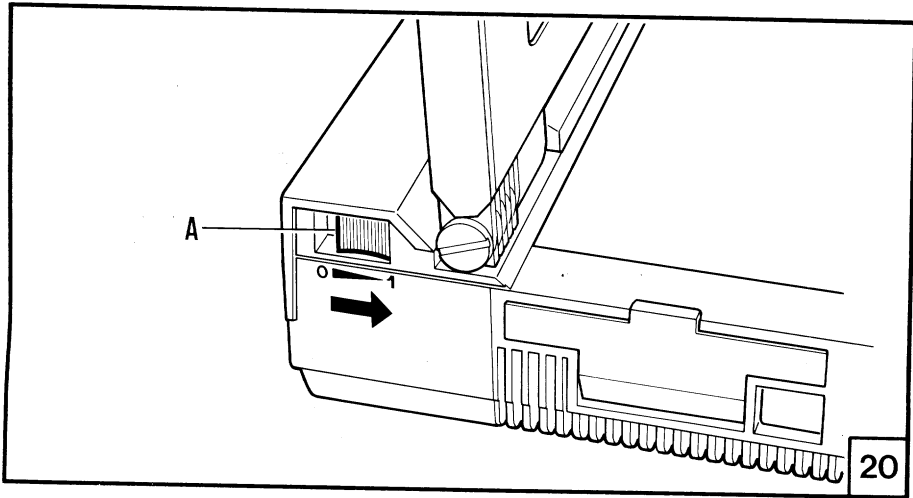
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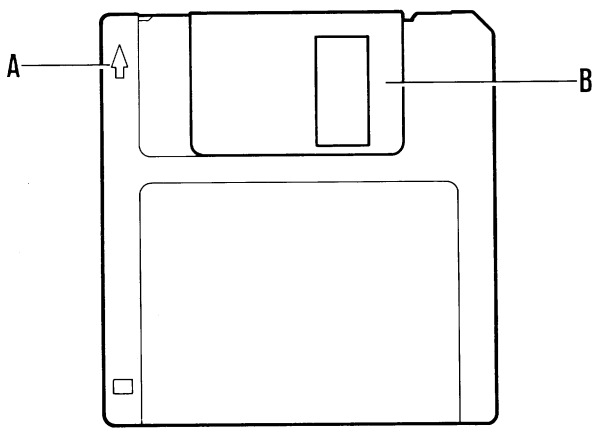


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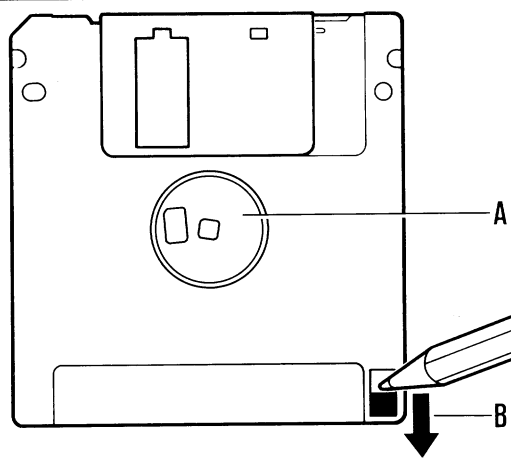


CPU (80C88)	Pass
Rom module	Pass
TIMER	Pass
⋮	
⋮	
⋮	

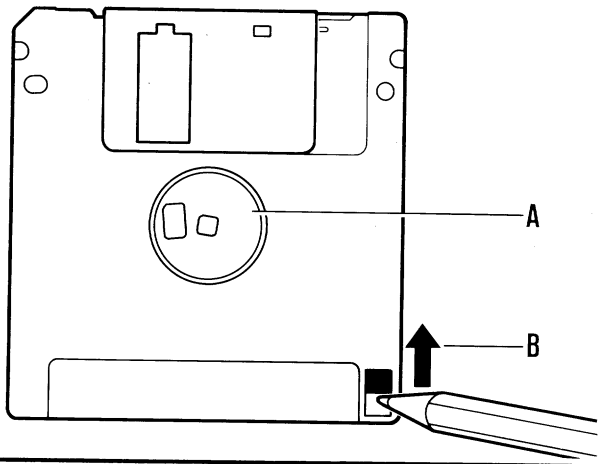




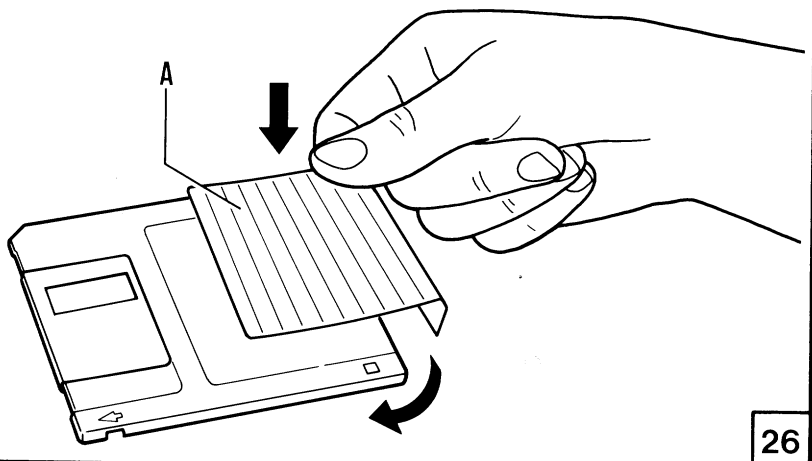
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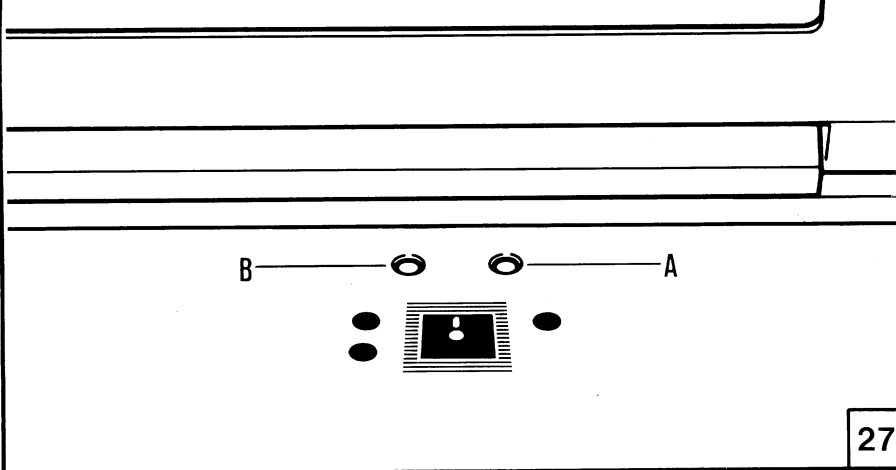
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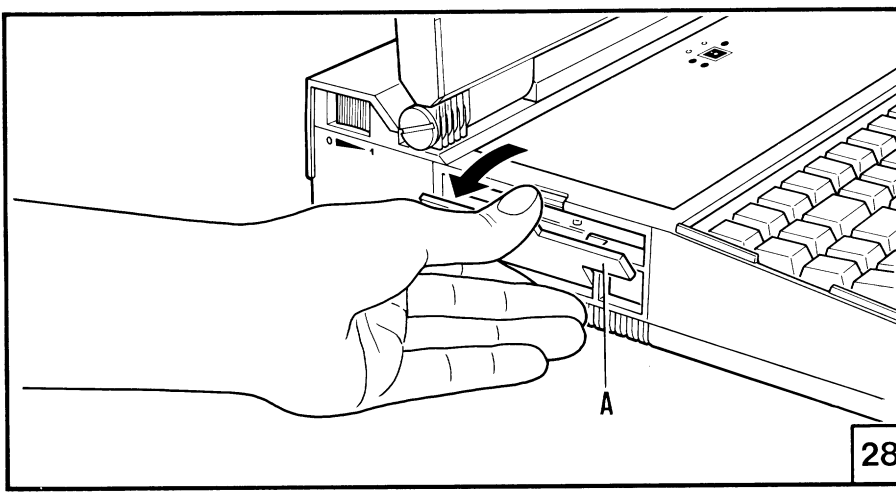
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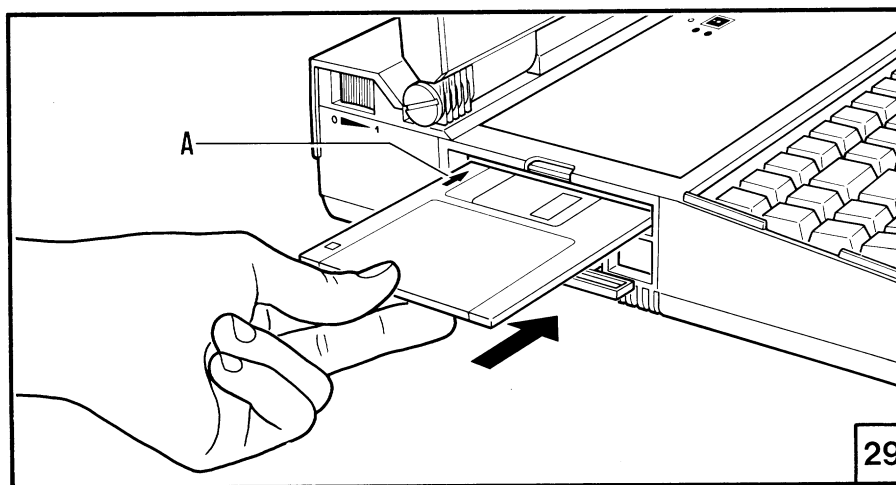
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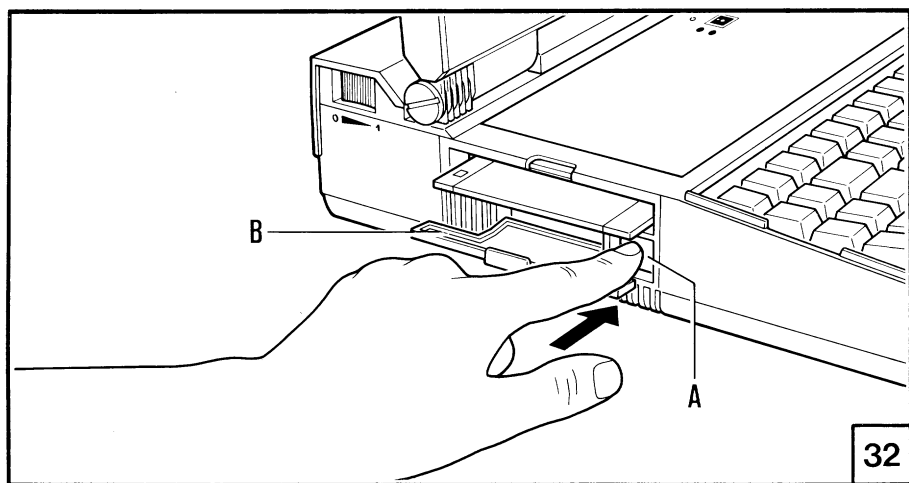
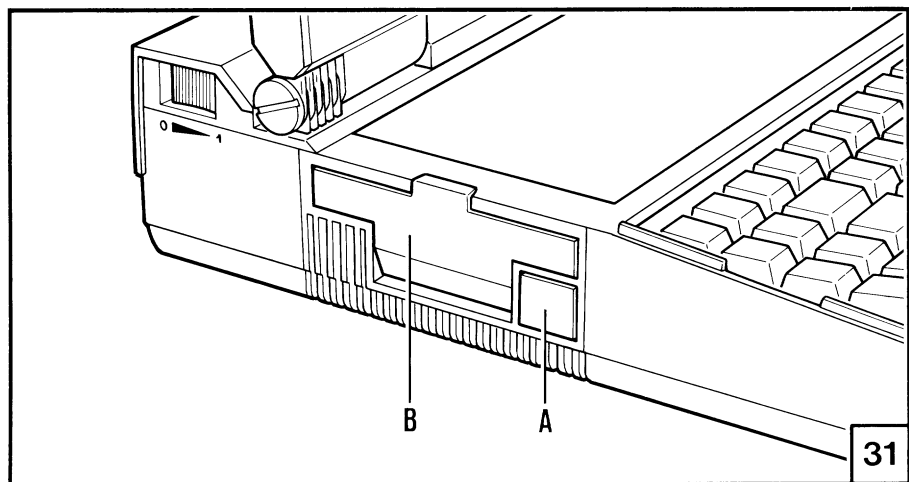
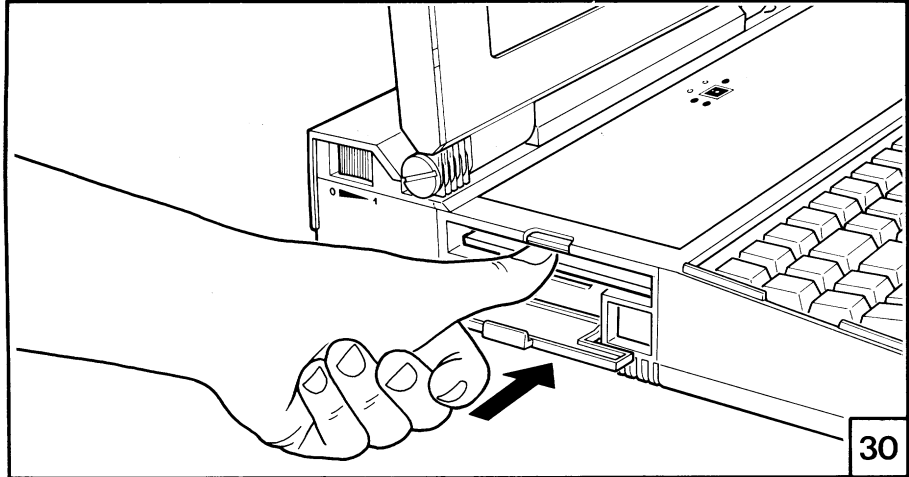
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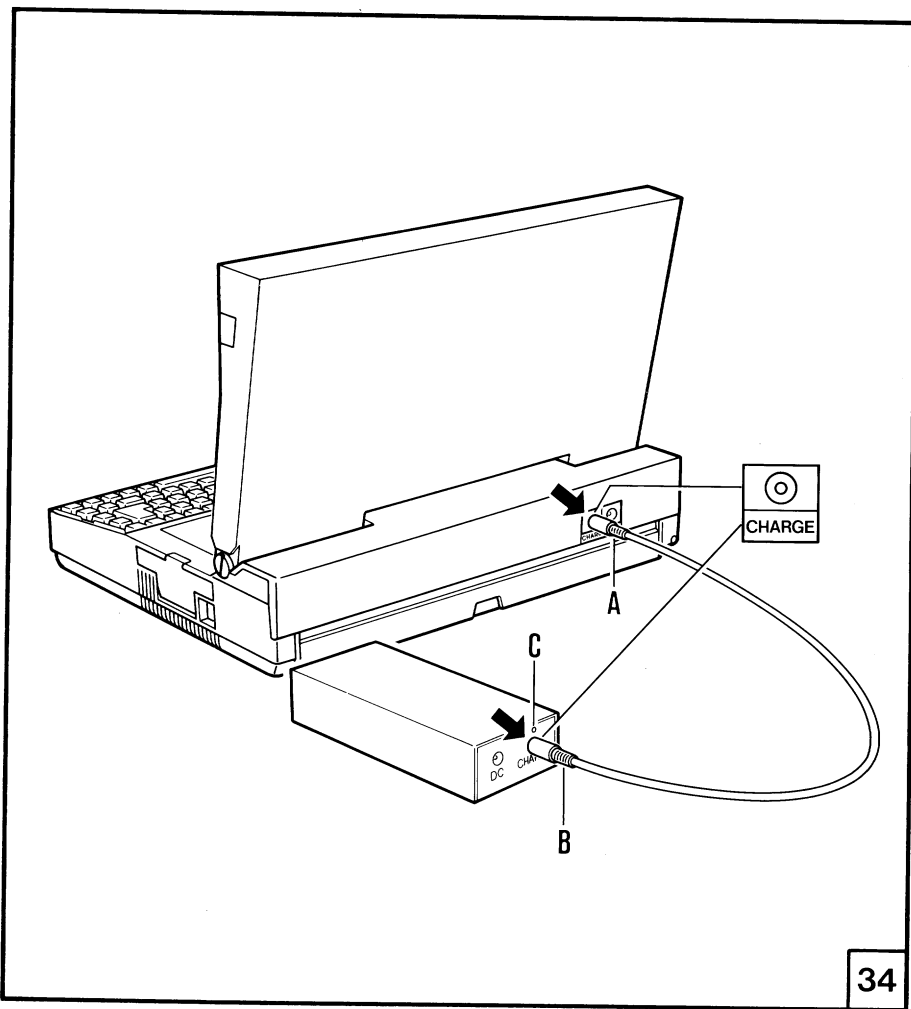
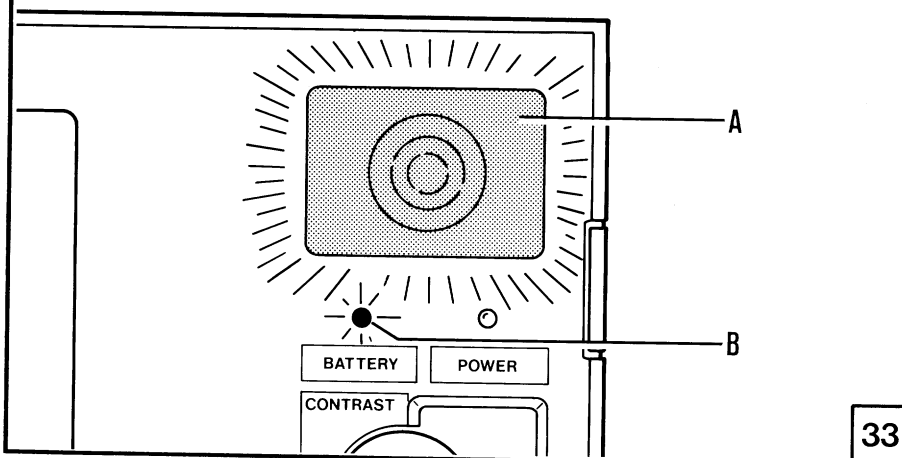


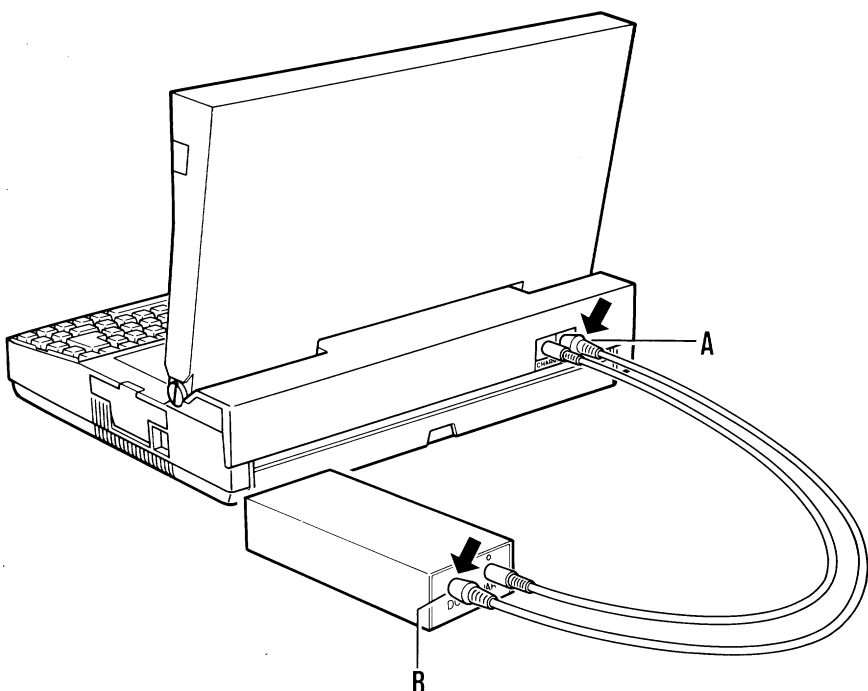
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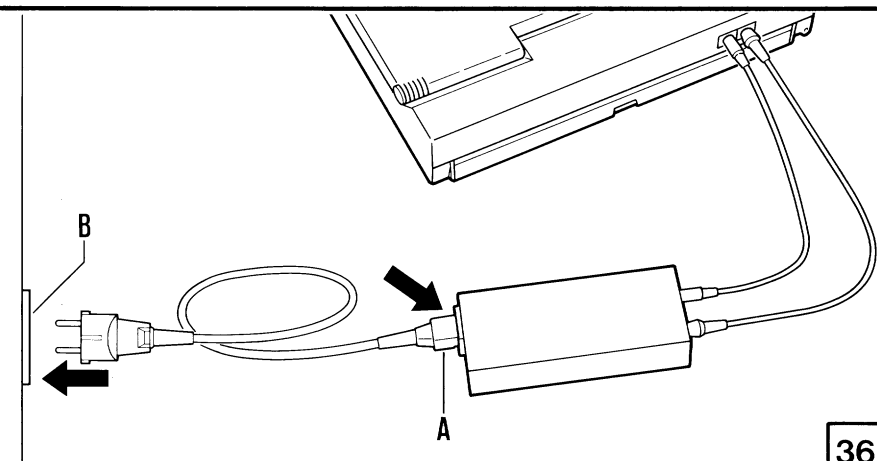
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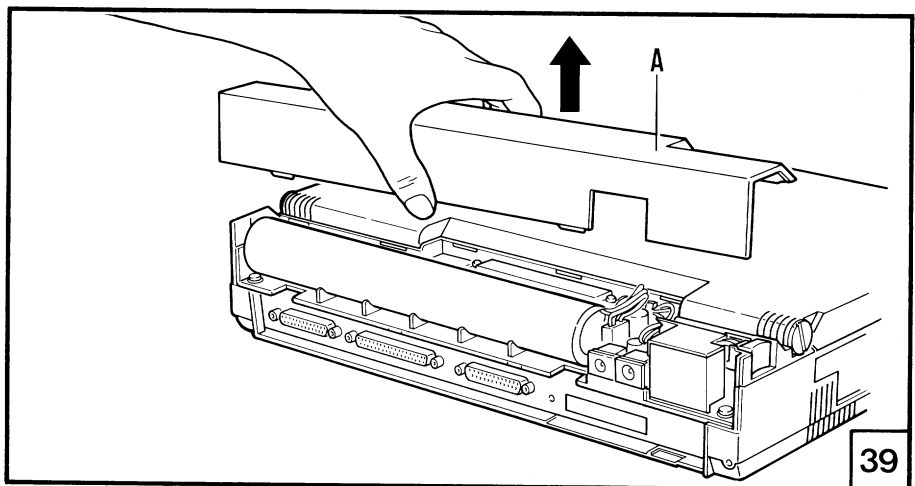
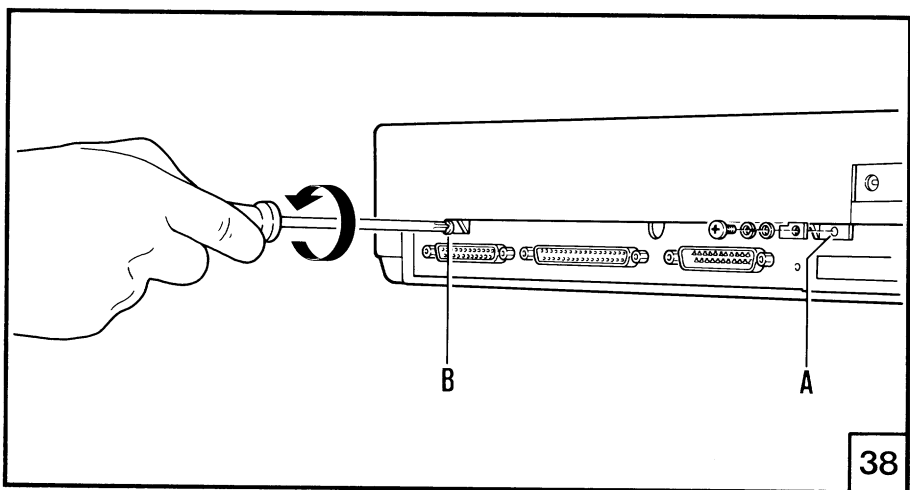
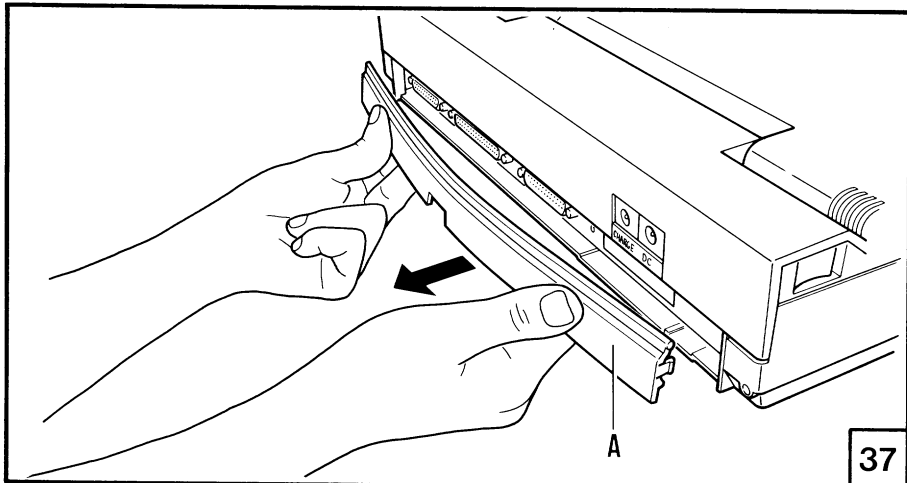


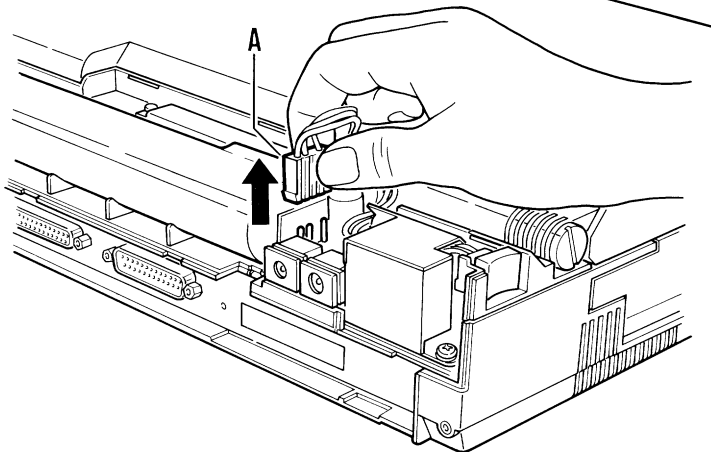


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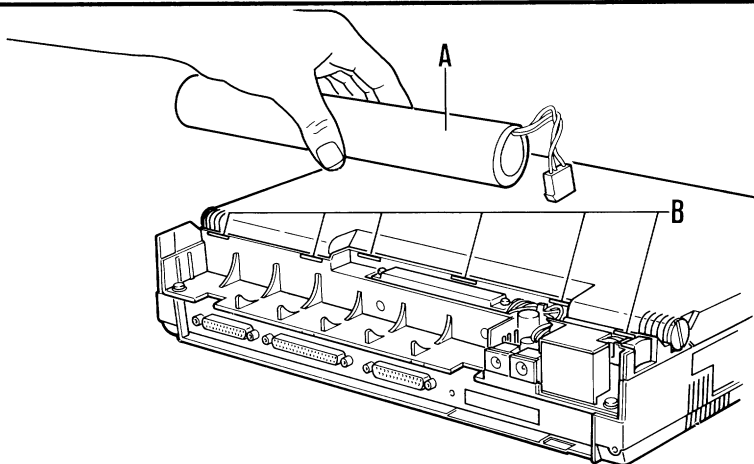


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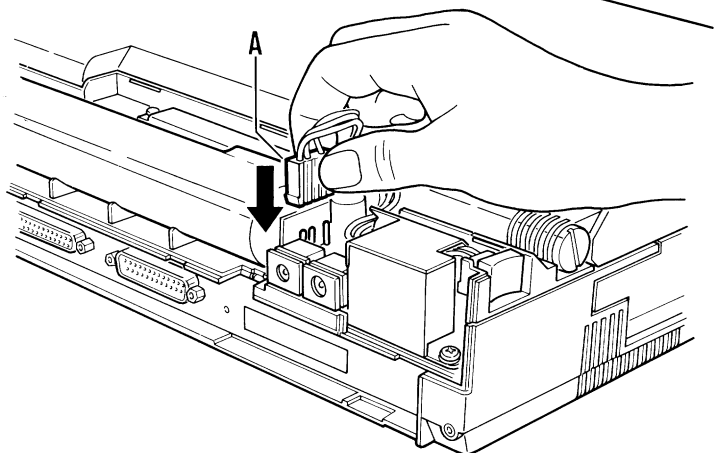




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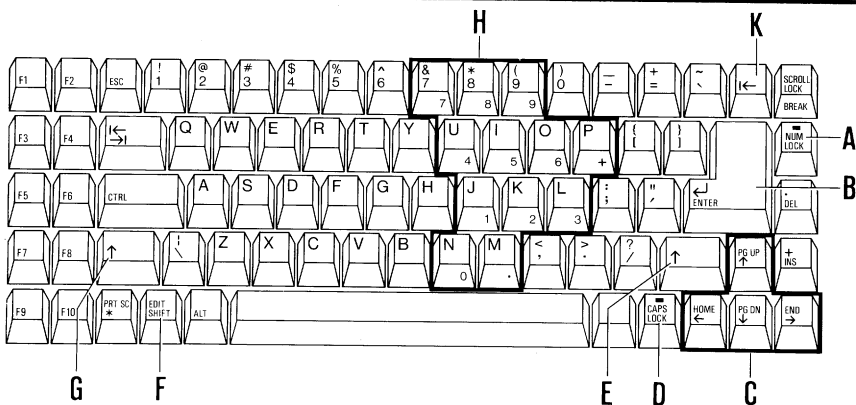


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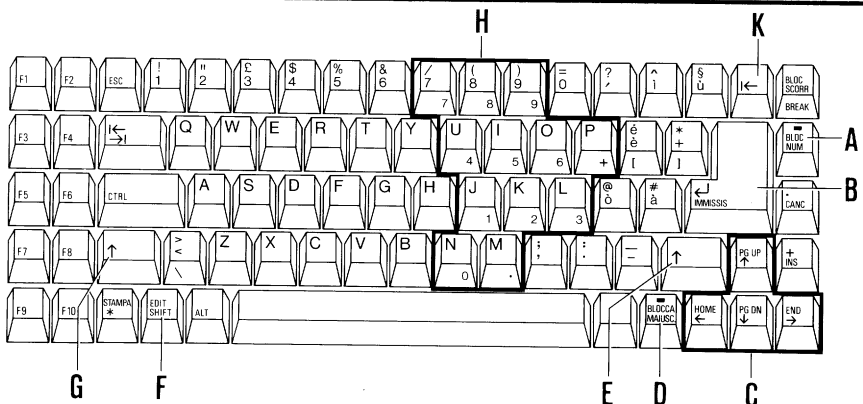
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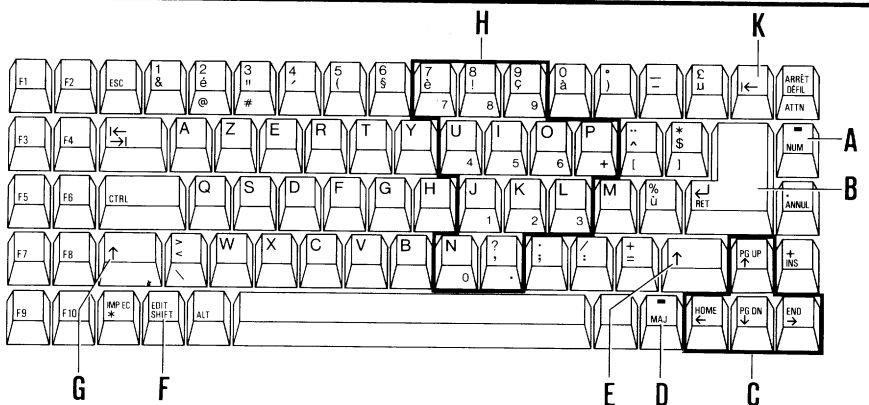
US-ASCII

43



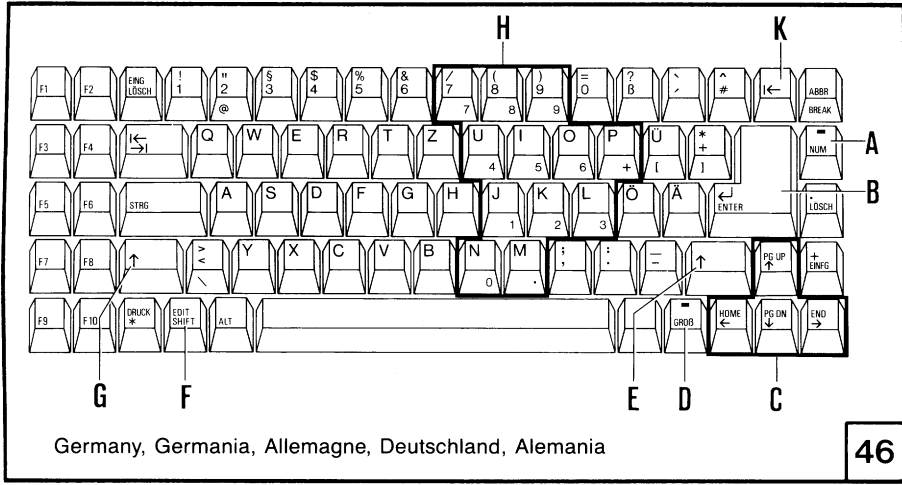
Italy, Italia, Italie, Italien, Italia

44

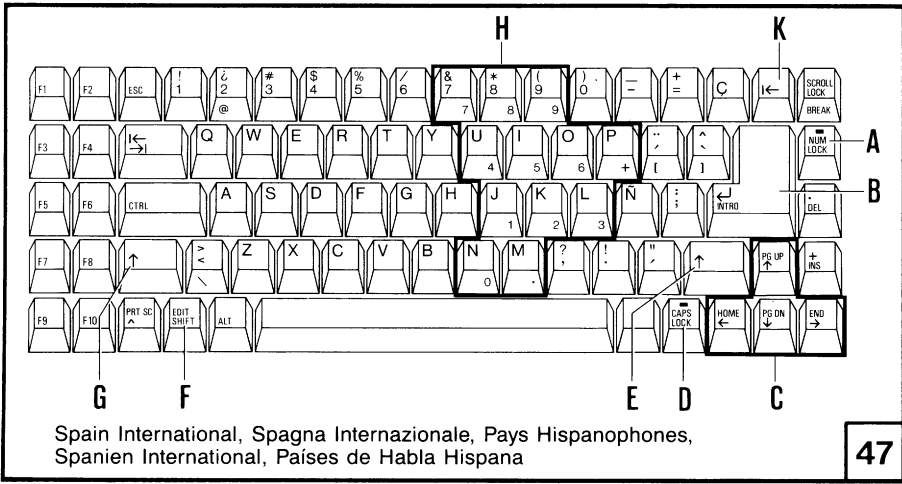


France, Francia, France, Frankreich, Francia

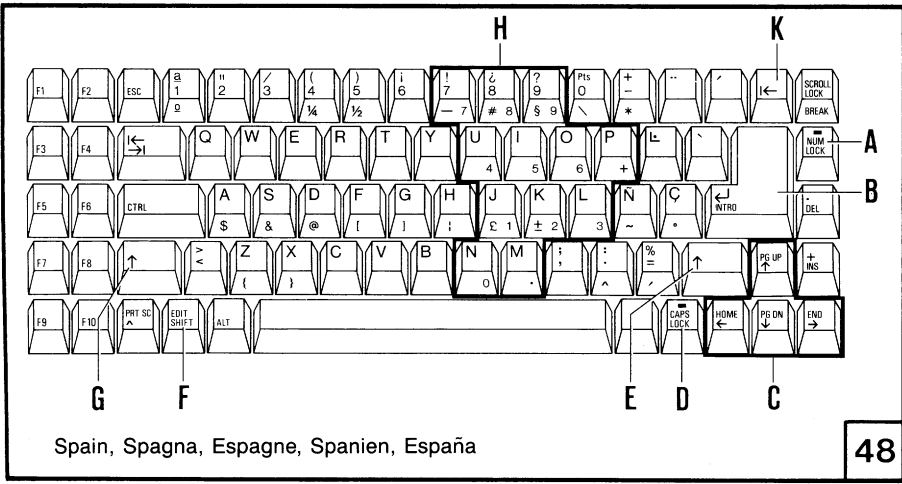
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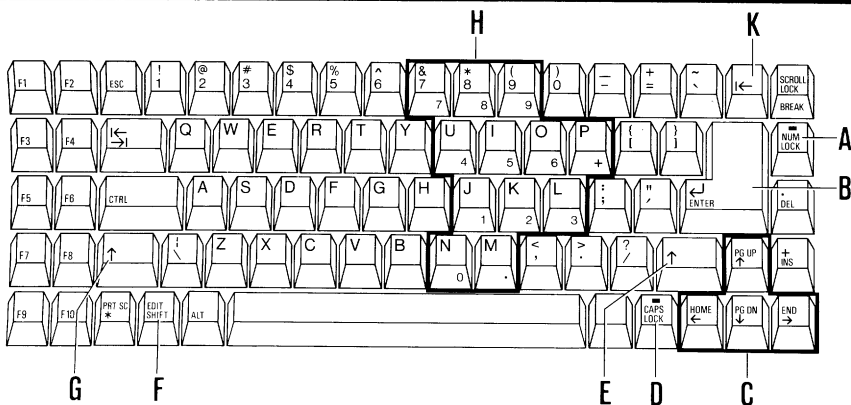
Germany, Germania, Allemagne, Deutschland, Alemania



Spain International, Spagna Internazionale, Pays Hispanophones, Spanien International, Países de Habla Hispana

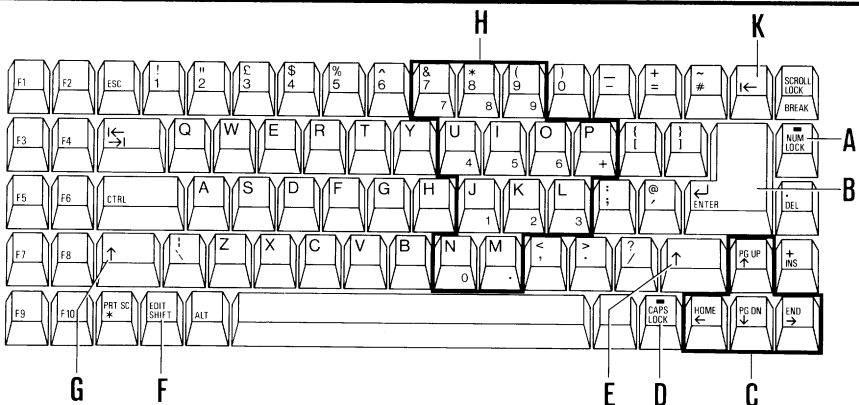


Spain, Spagna, Espagne, Spanien, España



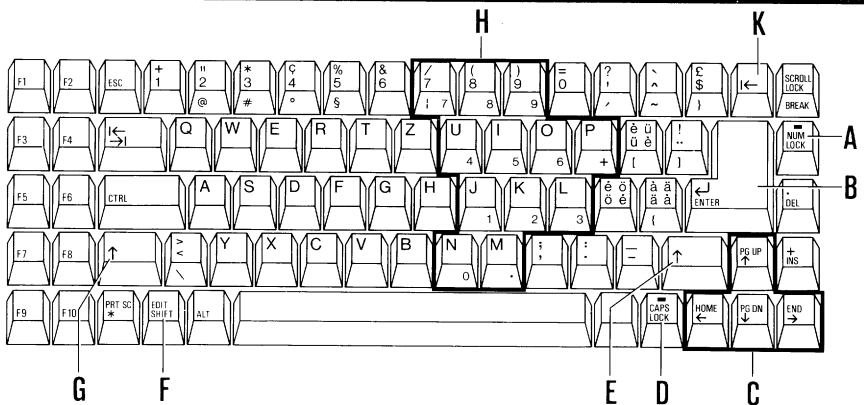
US-ASCII

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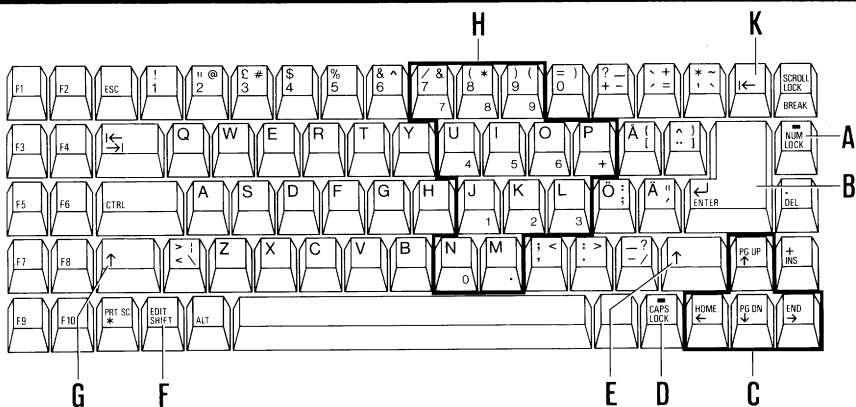
United Kingdom, Inghilterra, Royaume Uni, Großbritannien, Reino Unido

50



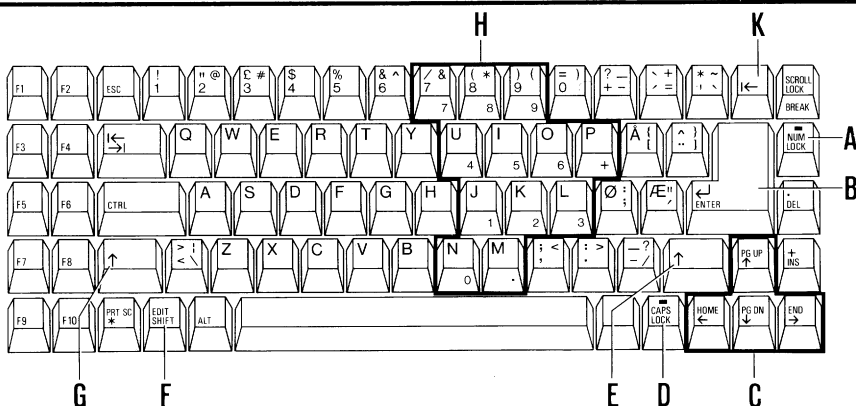
Switzerland, Svizzera, Suisse, Schweiz, Suiza

51



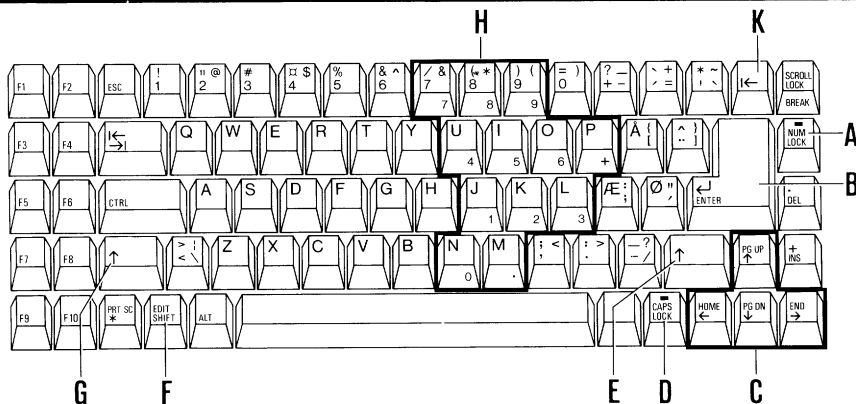
Sweden/Finland, Svezia/Finlandia, Suede/Finlande, Schweden/Finland, Suecia/Finlandia

52



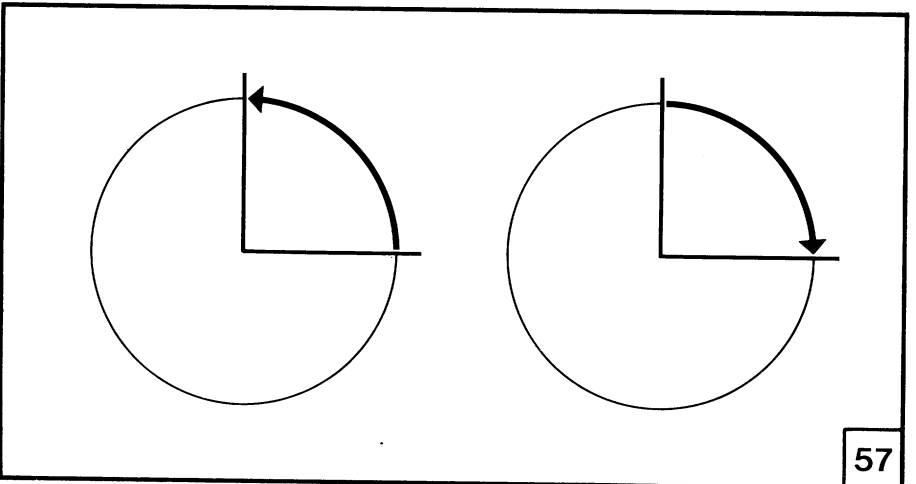
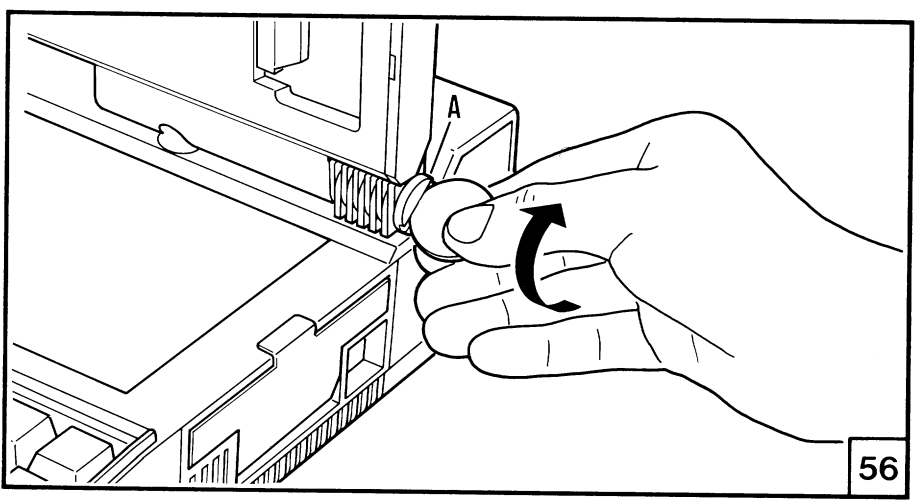
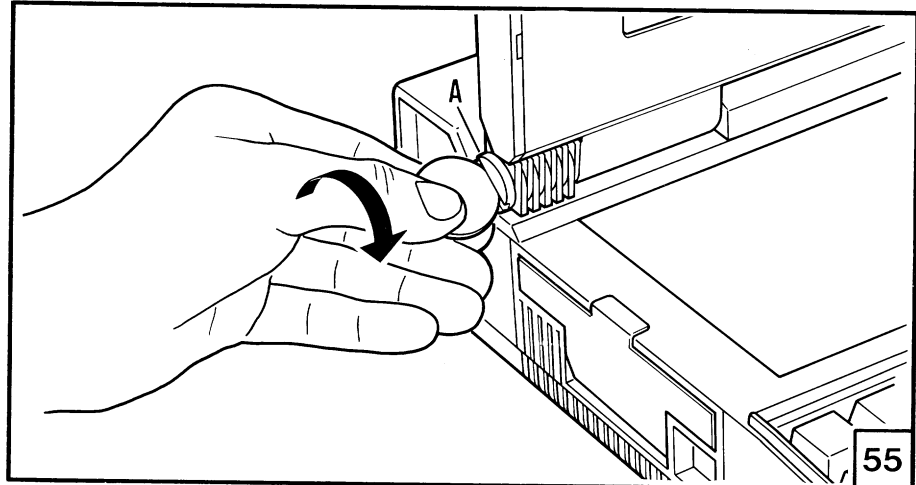
Norway, Norvegia, Norvege, Norwegen, Noruega

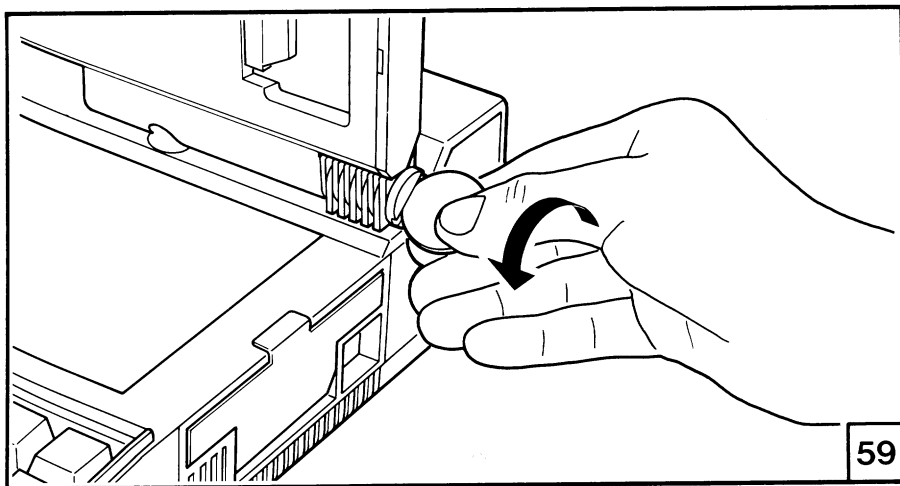
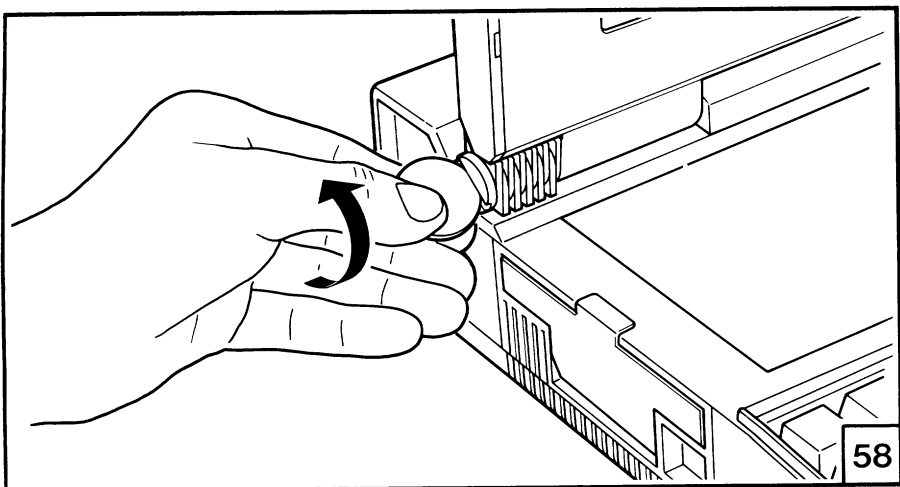
53



Denmark, Danimarca, Danmark, Dänemark, Dinamarca

54

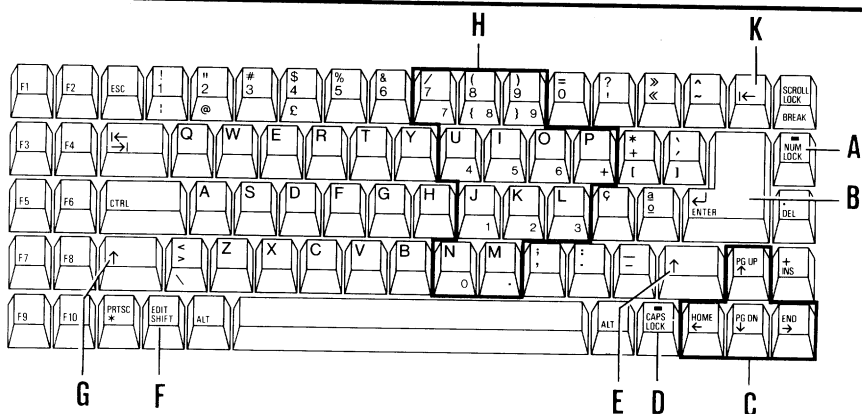




**Keyboards**  
**Tastiere**  
**Clavièrs**  
**Tastaturen**  
**Teclados**

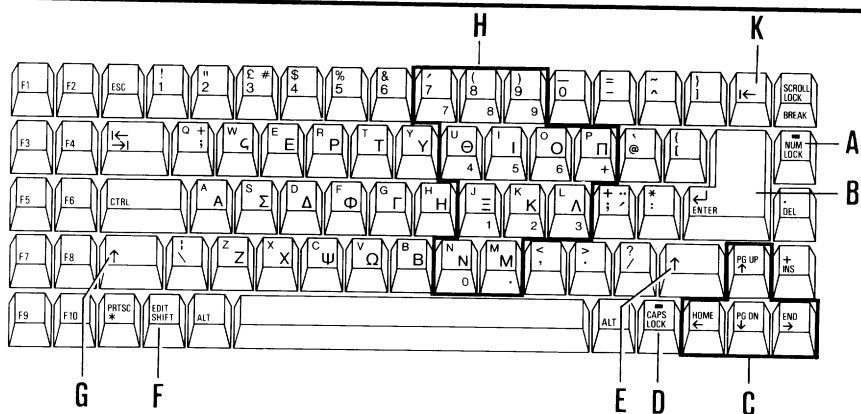
**61** ← Portugal, Portogallo, Portugal, Portugal Portugal.

**62** ← Greece, Grecia, Grèce, Griechenland, Grecia.



Portugal, Portugallo, Portugal, Portugal Portugal.

61



Greece, Grecia, Grèce, Griechenland, Grecia.

62