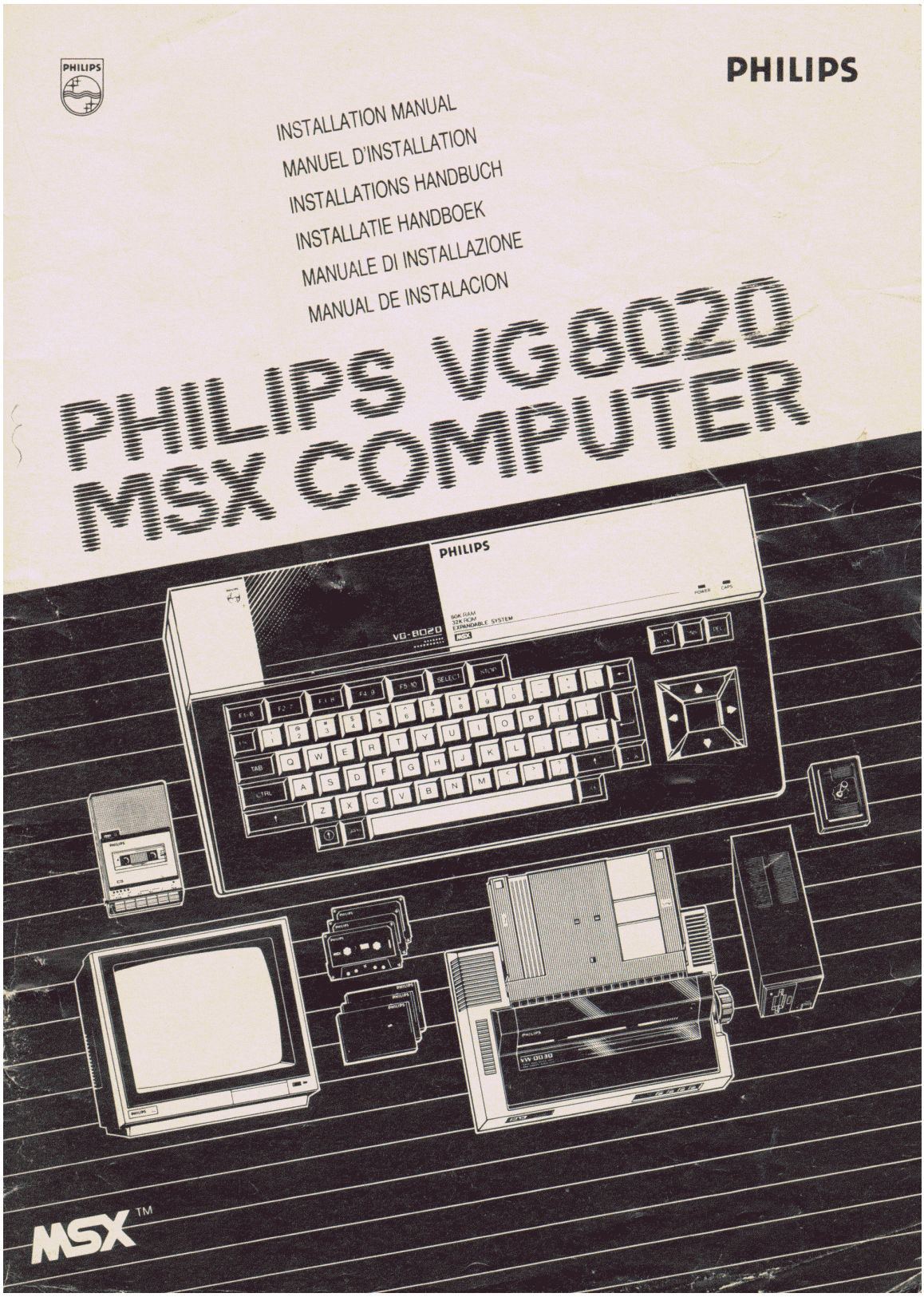

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CONTENTS

INTRODUCTION

You now own a modern and versatile home computer that can be used to learn and write your own computer programs, from the simplest, right up to the most complex. You can also use it for using one of the many ready-made MSX programs available today and their number is rapidly growing!

This computer meets the international MSX standard specification: the latest breakthrough in home computers! MSX stands for compatibility, both in hardware and in software. It widens your choice and increases your possibilities, now and in the future.

This computer has a built-in MSX-BASIC interpreter. It recognises almost all traditional instructions from the Microsoft BASIC-80 version and has additional instructions for music, colour, moving objects ("sprites") and the use of handcontrols, making MSX to the most versatile and easy to use home computer system available today.

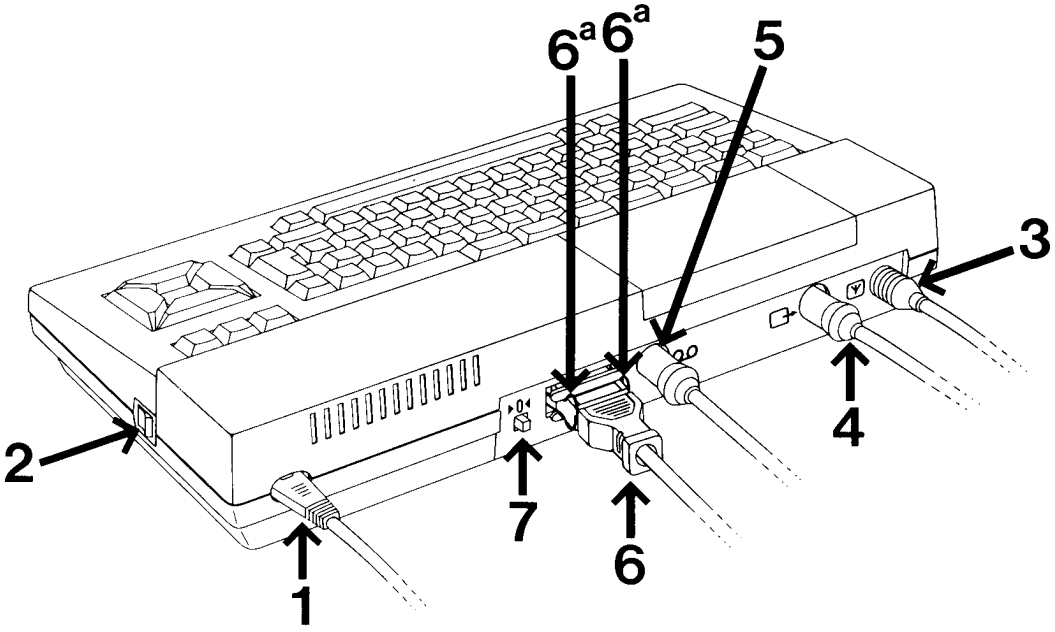
In this manual you will first read how to install your computer. Chapter ③ deals with the keyboard, concentrating specially on the function keys and control keys. We recommend you carefully read chapter ④ since it tells you how to care for your computer. The technical information is to be found in the appendices.

This manual serves as a supplement to the special MSX-BASIC manual provided with your computer, your guide to computing pleasure!

CHAPTER 1

MAKING THE CONNECTIONS

Most of the connection sockets are to be found in the rear of your computer:



① **Mains connector**
Take the power cable, connect it to the computer and insert the plug into a mains outlet.

② YOUR COMPUTER SHOULD BE TURNED OFF BEFORE YOU MAKE ANY FURTHER CONNECTIONS!
Check the power-on indicator. If it lights up, press the **power switch** ② before you continue.

③ **TV connector**
Take the special TV cable, connect one end to the computer and the other to the aerial inlet of your TV set.

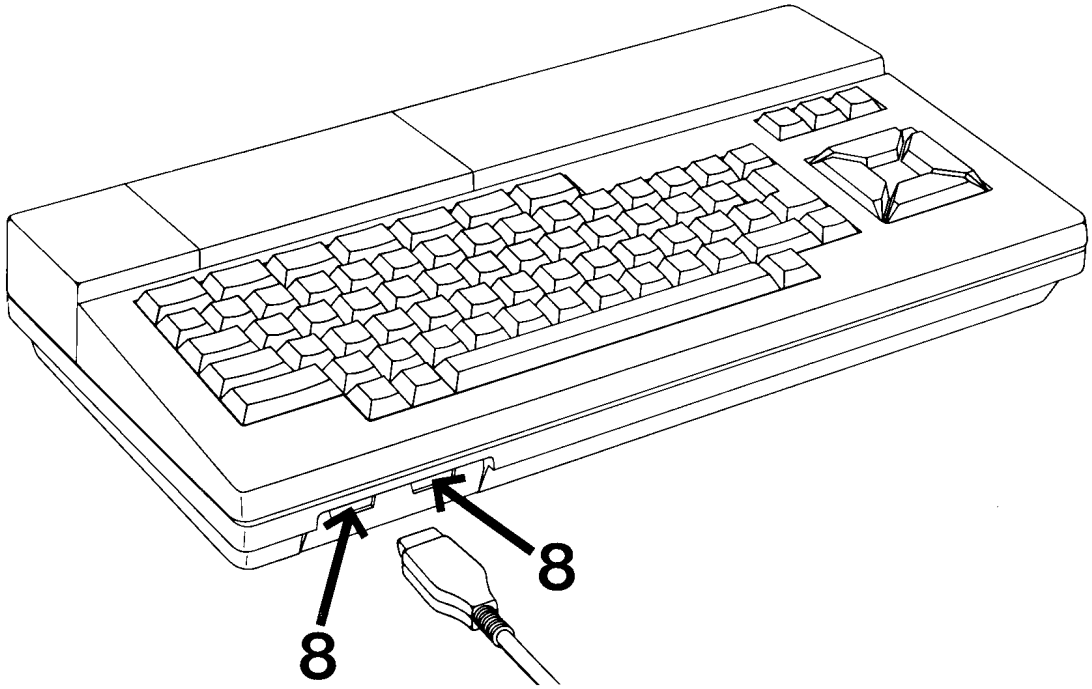
④ **Monitor connector**
When you have the good fortune to have a special monitor, the monitor cable should be plugged in here.

⑤ **Connector for data recorder**
Your data recorder cable should be plugged in here.

⑥ **Printer connector**
If you have an MSX printer, the plug of the connector cable will fit here very neatly. Do not forget to secure the plug with the locking-clips ⑥A.

⑦ **RESET button**

In the rear of your computer you will also find the RESET button. If you press this button while your computer is turned on, it will be reset to its initial stage again. It means that any information, stored in the computer memory at that time, is lost!



⑧ **Joystick connectors**

Most MSX video games can be played with the cursor keys of your computer. If you prefer to use handcontrols with joysticks, they should be connected here. The connectors are numbered "1" and "2". When using one handcontrol only, use connector "1".

CHAPTER 2

USING THE CARTRIDGE SLOTS

WARNING
ALWAYS MAKE SURE THAT YOUR COMPUTER IS TURNED OFF BEFORE CONNECTING PERIPHERAL EQUIPMENT OR INSERTING A CARTRIDGE IN ONE OF THE CARTRIDGE SLOTS!

Install the configuration you want to use before you start because any information stored in the computer memory is lost when you turn it off to connect a data recorder, disk drive, printer, etc.

The cartridge slots are located under the hinging, transparent lid in the top ridge of your computer. In some cases you may have to remove the lid, depending on the cartridge(s) you are using.

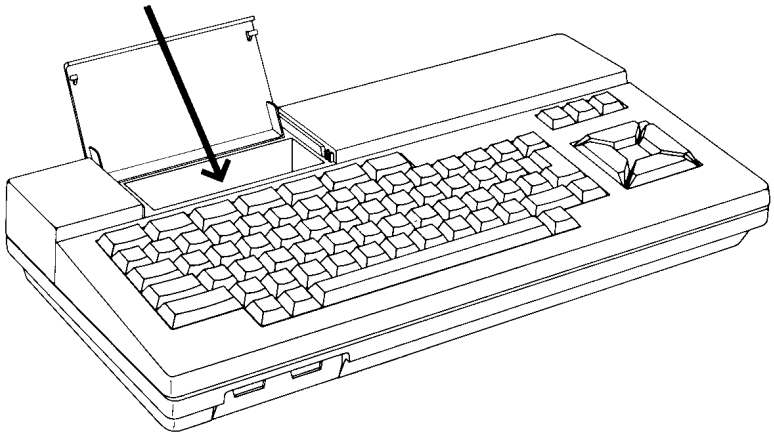
These slots can be used for a number of purposes and it basically makes no difference which one of the two you use. In many cases you may have to use both. If so, please note that the slots are numbered "1" and "2". Slot number 1 always has priority over slot number 2!

Program cartridges

Some of the MSX software is available on ROM cartridges. Insert the cartridge in one of the cartridge slots with the label facing you. Consult the program manual concerning the use of the program before starting.

Interface cartridges

Your computer has special connectors for TV, monitor, data recorder and printer. If you want to use other peripherals, such as a disk drive, you will have to use a special interface cartridge. Follow the instructions provided with the MSX peripherals you are using.



Note: When you have a disk drive interface connected, the interface software takes up some of the RAM capacity of your computer. When using specially developed MSX software on cassette, like some of the more complex games, you may find that you cannot load the program, caused by lack of memory space. You can overcome this by first removing the interface from the computer. An alternative solution is to press the **SHIFT** key and keep it depressed while you press the **RESET** button and wait for the restart cycle to be completed.

CHAPTER 3

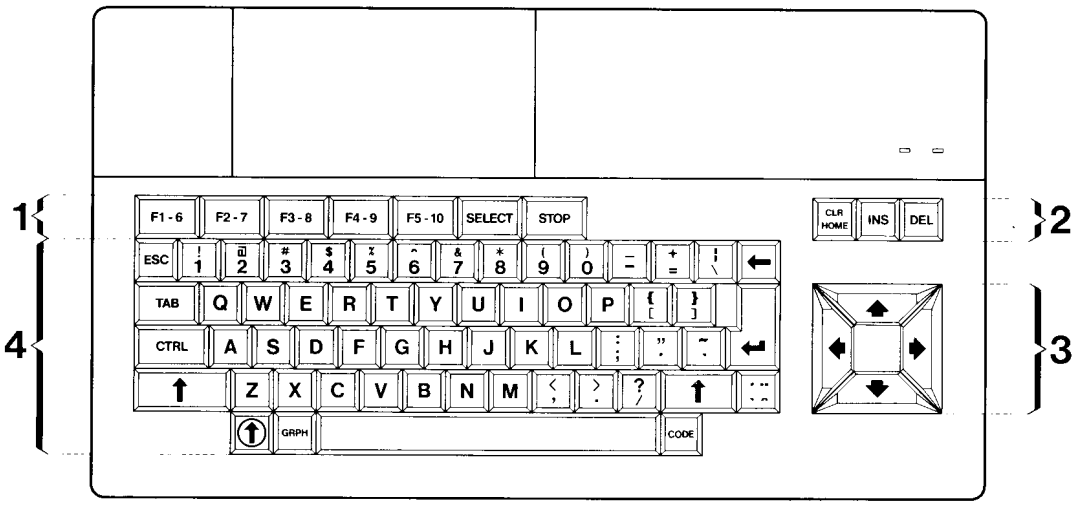
THE KEYBOARD

It is important that you familiarise yourself with the keyboard of your computer. Do not hesitate to "play" with it before you start working with it seriously.

You will find that the keys respond effortlessly. If you keep a key depressed longer than necessary, you will see that it creates the same effect as when you keep tapping that key repeatedly.

The keyboard is divided into four groups of keys:

① Five **function keys** along with **"STOP"** and **"SELECT"**.
② Three "command keys": **"CLR/HOME"**, **"INS"**, and **"DEL"**.
③ Cursor control keys.
④ Standard typewriter keys along with special keys such as: **"ESC"**. **"TAB"**, **"CTRL"**, etc.



The following function description of the various keys applies to their functions with MSX-BASIC. When running commercial programs these functions may be different; consult the instructions you receive with those programs.

① The function keys

The function keys are pre-programmed to standard functions for MSX-BASIC. Those standard functions are indicated at the bottom of your screen, following the key indicators **F1** to **F5**. When you press the **SHIFT** key you will see the pre-programmed function **F6** to **F10** for the same keys when pressing the **SHIFT** key. Example: when pressing the **SHIFT** key and **F1** simultaneously the **F6** function is executed, etc.

These function keys are programmable to different functions (See your MSX-BASIC manual).

Additional function keys are:

SELECT The function of this key is determined by the software you are using.

STOP This key performs a pause function and is used to temporarily halt the running of a program. It will continue running when you press the same **STOP** key again.

If you press the **STOP** and **CTRL** keys simultaneously the program execution will be stopped.

② The command keys
The command keys perform the following functions:

CLR/HOME When you press this key, the cursor will move to the first position of the first line.

CLR/HOME + ↑ When you press the **CLR/HOME** and **SHIFT** keys simultaneously, all text and/or images are removed from your screen.

INS This key initiates the insert function. When you type a character, it will appear in the position of the cursor key while the complete text remains intact, moving one position to the right. You can stop the insert function by pressing the **INS** key again.

DEL When you press the **DEL** key (**"DEL"** = delete) the character, covered by the cursor is removed from the screen.

③ Cursor control keys
These keys serve to move the cursor without effecting the content of the screen. The arrows on the keys indicate the direction of movement.

④ Typewriter keys
These keys function exactly like those you will find on a modern, standard typewriter. When you press the "A"-key, the character "a" will appear on your screen in lower case. When your press the same key, in combination with the key (the SHIFT key), it will produce the capital letter "A", etc.

In addition to the character keys this section of your keyboard includes the following keys:

ESC The function of this key is determined by the software your are using.

TAB When you press this key, the cursor will move to the next tabulator stop ("TAB" stands for "tabulator".)

CTRL This key only functions when used in combination with another key. ("CTRL" stands for "control".)

↑ (=SHIFT) The function of this key has already been described in the preceding paragraph.

⇪ (=CAPS) When you press this key the CAPS-indicator will light up. All alphabetical keys will now produce capital letters. Press the ⇪ key again to restore their normal function, printing lower case letters. ("CAPS" stands for "capitals".)

← (=BS) When you press this key, the cursor will move one position to the left, removing the character it encounters. ("BS" stands for "backspace").

↵ (=RETURN) This key is used after typing an MSX-BASIC instruction or command. (Also referred to as "ENTER".)

GRPH When you press this key simultaneously with a character key, a lower case graphic symbol will be entered. When you press the GRPH and SHIFT keys simultaneously, along with a character key, an upper case graphic symbol will appear on your screen. (See appendix B.)

CODE When you press this key, simultaneously with a character key, a specific lower case character will be entered in lower case. When pressing the CODE key and the SHIFT key simultaneously with a character key a specific character in upper case (capital) will be entered. (See appendix B.)

This key is used to put an accent mark on a character.
Examples:
To put an (`) accent on a character you first press the accent key. No accent will be displayed yet. Then you press the character key of the letter requiring the accent and it will appear on the screen, complete with accent.
To use the (´) accent you press the accent key, simultaneously with the **SHIFT** key.

To produce the (^) accent on a character you press the accent key along with the **CODE** key, then follow the same procedure again.
To produce the (¨) accent the same applies again with the only difference that you now have to press the **CODE** and **SHIFT** keys, simultaneously with the accent key.

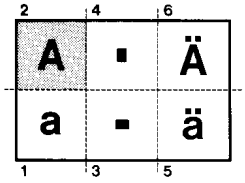
These accents can only be used in combination with vowels.

SPACE The long, blank key at the bottom edge of the keyboard (between the **GRAPH** and **CODE** keys) is referred to as the **SPACE** bar. When you press it it creates an open space between. It is often given a special, different function in the various ready-made programs.

Summary
Practically every key of your computer keyboard is capable of producing 6 different characters:

1. Lower case characters.
2. Upper case characters (capitals) when pressing the **SHIFT** key.
3. Lower case graphic symbols when pressing the **GRPH** key.
4. Upper case graphic symbols, when pressing the **GRPH** and **SHIFT** keys.
5. Lower case special characters, when pressing the **CODE** key.
6. Upper case special characters, when pressing the **CODE** and SHIFT keys.

Example:
This diagram shows the various characters and symbols you can produce with the key marked "A" on your keyboard:



You will find a complete review of all characters and symbols in appendix B.

CHAPTER 4

HOW TO CARE FOR YOUR COMPUTER

The exterior of your computer can be cleaned with a dry piece of cloth. Never use chemical cleaners!
If you use a data recorder, the recorder heads should be cleaned regularly. Follow the instructions provided with the recorder.
Make sure that you store your casettes in a cool place, keeping them away from direct sunlight and other heat sources and keep them clear of magnetic fields to avoid loss of information stored on your cassettes.
If your computer doesn"t function properly turn the computer off immediately and take it to your dealer for a check-up.
All repairs should be performed by authorised technicians only. Never attempt to open the console yourself.
Like all other electrical and electronic equipment, your computer is allergic to excess humidity. Never spill any liquids on the computer!
Ventilation openings have been provided for the necessary cooling. See to it that these openings are left free when your computer is in operation in order to maintain the proper air circulation.
Keep your computer away from heat sources such as stoves, radiators and direct sunlight.
Never touch the contact points of the connectors with your fingers since this may cause undue corrosion.
Arrange the connection cables in such a way that nobody can stumble over them.
When removing a plug, never pull it by the cable but take a firm hold of the plug itself.
Never let your computer drop when moving it and don"t let anything heavy drop on it.

For technical specifications see appendix A, page 49.

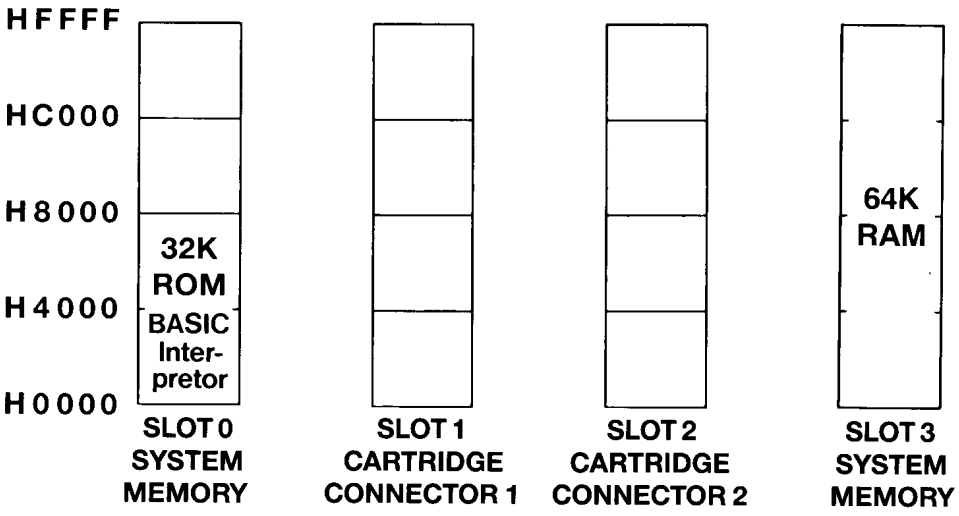
Appendix A

TECHNICAL SPECIFICATION

1. THE CHIP-SET

CPU	Central Processing Unit	:	Z80A, 3.5 MHz.
VDP	Video Display Processor	:	TI TMS-9929A or similar chip.
PSG	Programmable Sound Generator	:	GI AY-3-8910 or similar chip.
PPI	Programmable Peripheral Interface	:	I 8255.

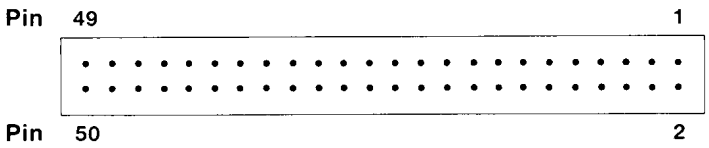
2. MEMORY BUILD-UP



Your MSX computer also has a separate 16K video RAM.

Working with MSX-BASIC, you have the memory adresses &H8000 to &HFFFF at your disposal as user memory. Parts of the memory space however are taken up by the MSX-BASIC interpreter. When starting up your configuration you can see on your monitor screen how large the available free memory space is.

3. CARTRIDGE CONNECTORS



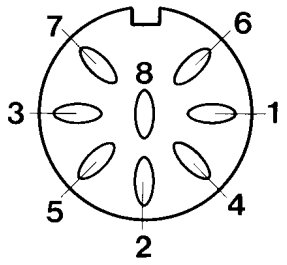
Pin	Name	I/O	Pin	Name	I/O
1	$\overline{CSI}$	O	2	$\overline{CS2}$	O
3	$\overline{CS12}$	O	4	$\overline{SLTSL}$	O
5	Reserve	–	6	$\overline{RFSH}$	O
7	$\overline{WAIT}$	I	8	$\overline{INT}$	I
9	$\overline{M1}$	O	10	$\overline{BUSDIR}$	I
11	$\overline{IORQ}$	O	12	$\overline{MERQ}$	O
13	$\overline{WR}$	O	14	$\overline{RD}$	O
15	$\overline{RESET}$	O	16	Reserve	–
17	A9	O	18	A15	O
19	A11	O	20	A10	O
21	A7	O	22	A6	O
23	A12	O	24	A8	O
25	A14	O	26	A13	O
27	A1	O	28	A0	O
29	A3	O	30	A2	O
31	A5	O	32	A4	O
33	D1	I/O	34	D0	I/O
35	D3	I/O	36	D2	I/O
37	D5	I/O	38	D4	I/O
39	D7	I/O	40	D6	I/O
41	GND	–	42	CLOCK	O
43	GND	–	44	SW1	–
45	− 5V	–	46	SW2	–
47	− 5V	–	48	+ 12V	–
49	SOUNDIN	I	50	− 12V	–

Pin	Name	Content
1	$\overline{CS1}$	ROM addresses 4000 ~ 7FFF select signal
2	$\overline{CS2}$	ROM addresses 8000 ~ BFFF select signal
3	$\overline{CS12}$	ROM addresses 4000 ~BFFF select signal (for 256k ROM)
4	$\overline{SLTSL}$	Slot select signal
5	Reserve	Reserved signal line ~ use inhibited
6	$\overline{RFSH}$	Refresh cycle signal
7	$\overline{WAIT}$	CPU's WAIT request signal
8	$\overline{INT}$	Interrupt request signal to CPU
9	$\overline{M1}$	Signal expressing CPU fetch cycle
10	$\overline{BUSDIR}$	This signal controls direction of external data bus buffer Cartridges are selected and L level is output from each cartridge at data transmission time
11	$\overline{IORQ}$	I/O request signal
12	$\overline{MERQ}$	Memory request signal
13	$\overline{WR}$	Write timing signal
14	$\overline{RD}$	Read timing signal
15	$\overline{RESET}$	System reset signal
16	Reserve	Reserved signal line ~ use inhibited
17 ~ 32	A0 ~ A15	Address bus signals

33 ~ 40	D0 ~ D7	Data bus signals
41	GND	Signal ground
42	CLOCK	CPU clock 3.579545MHz
43	GND	Signal ground
44, 46	SW1, SW2	For insertion/removal protect
45,47	+ 5V	+ 5V power source
48	+ 12V	+ 12V power source
49	SOUNDIN	Sound input signal (– 5bdm)
50	– 12V	– 12V power source

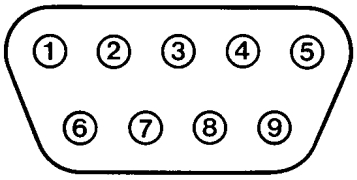
4. DATA RECORDER CONNECTOR

Pin	Name	I/O
1	GND	
2	GND	
3	GND	
4	CMTOUT	O
5	CMTIN	I
6	REM +	O
7	REM –	O
8	GND	



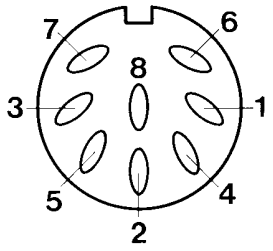
5. JOY STICK CONNECTORS

Pin	Name	I/O
1	FWD	I
2	BACK	I
3	LEFT	I
4	RIGHT	I
5	+ 5 V	
6	TRG 1	I/O
7	TRG 2	O
8	Output	O
9	GND	



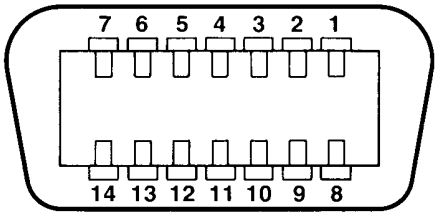
6. MONITOR CONNECTOR

Pin	Name	I/O
1	+ 5 V	
2	GND	
3	AUDIO	O
4	Luminance	O
5	VIDEO	O
6	+ 12 V	
7	NC	
8	NC	

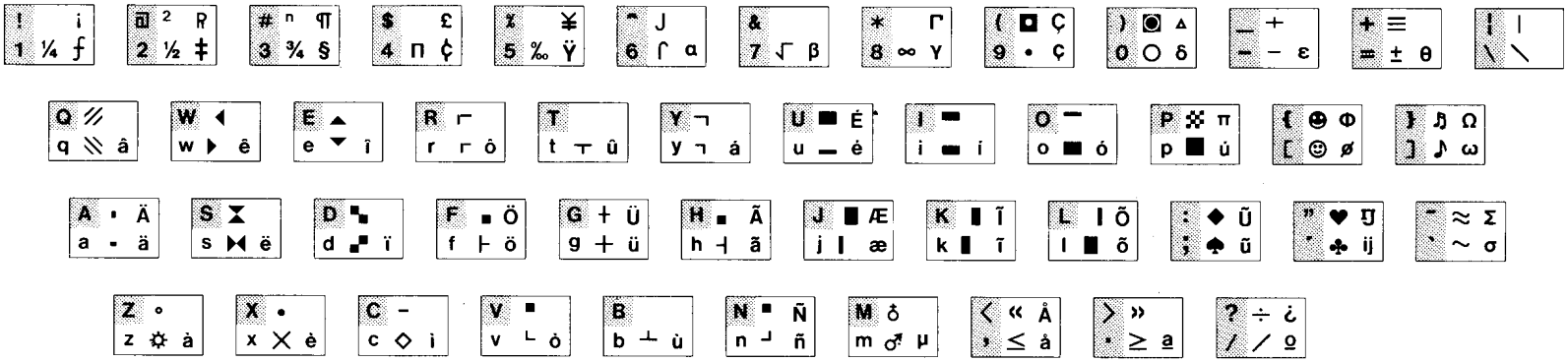


7. PRINTER CONNECTOR

Pin	Name	I/O
1	$\overline{\text{PSTB}}$	O
2	PDB0	O
3	PDB1	O
4	PDB2	O
5	PDB3	O
6	PDB4	O
7	PDB5	O
8	PDB6	O
9	PDB7	O
10	NC	
11	BUSY	I
12	NC	
13	NC	
14	GND	



Appendix B



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