

SLOGGER

**Electron
Rombox Plus**

ELECTRON ROMBOX PLUS

INTRODUCTION

The Electron ROMBOX PLUS by Slogger has been designed to be compatible with the Acorn PLUS1 but with the added facility to allow the popular ROM based software to be used on the Electron micro-computer.

The ROMBOX PLUS offers the following facilities

- * * * 2 cartridge slots
- * * * 4 Sideways ROM / RAM slots
- * * * Centronics Printer interface

The 2 cartridge slots are identical to the Acorn PLUS1 and may thus be used for interfacing to a wide variety of add-ons such as ROM cartridges, Disk interfaces, Communications links, Joystick interfaces, second processors and others.

The 4 ROM / RAM slots allow the user to insert ROM software (so popular on the BBC computers) directly into the Electron system. The ability to utilise up to 64K Sideways RAM as standard is a feature that not even the BBC can boast.

The Centronics Printer interface is a must for anyone who intends to make serious use of his computer.

SECTION 1 - FITTING INSTRUCTIONS

1 INSTALLING THE ROMBOX PLUS

If you have not fitted an interface to your Electron before then read the following instructions carefully:

1. NEVER fit an interface to the rear of your Electron whilst the power is on as this may cause permanent damage to both your Electron and interface. I.e. ALWAYS switch power off.
2. Turn your Electron upside down (it's easier to see what you're doing) and remove the protective cover from the expansion plug (it may already be off).
3. Turn the ROMBOX PLUS upside down and locate its front connector to either the Electron expansion plug or the PLUS 3 connector if you are using it. Push the units together so that they join neatly.
4. With the two holes in the ROMBOX PLUS lined up with the two screw holes in the Electron or PLUS 3, fit the two plastic screws provided to secure the two units together. DO NOT overtighten ...

Installation is now complete.

SECTION 2 - USING THE CARTRIDGE SLOTS

1 INTRODUCTION

The ROMBOX PLUS has 2 Cartridge slots on its upper surface to the right hand side. These give provision for many uses. The most popular uses are EPROM CARTRIDGES which provide the opportunity to add extra ROMS to the system. Disk Interfaces are also on the market which will work in the Cartridge Slots allowing the user to use standard BBC Drives on the Electron. A third use is now also applicable. An RS 423 interface has been designed which works in the ROMBOX PLUS. This allows the user to have all the functions of the RS423 on the BBC. For example, Serial Printers can now easily be used and the world of communications is now available to the Electron user.

2 USING EPROM CARTRIDGES

When installing the Cartridge, please notice that it will only enter its slot easily in one direction. If it is not entered in this way, then it will almost certainly severely damage the Cartridge and destroy any ROMS contained therein.

3 USING DISK INTERFACES

When using Disk Interfaces, they can be used in either of the two slots. There are several available on the market, namely the Slogger Electron Disk System which may be used in the ROMBOX PLUS.

4 USING RS 423

The RS423 units supplied for use on the PLUS 1 will work equally as well on the ROMBOX PLUS. Care should also be taken when installing these units as if they are fitted the wrong way around then the system can be badly damaged.

The ROMBOX PLUS Cartridge slots are identical to those in the Acorn PLUS 1 and so all new developments for the Electron will be totally compatible.

5 FOR ADVANCED USERS

The Cartridge ports can be used for many purposes, the more popular and readily available have already been mentioned. However, an advanced user suitably experienced in computer hardware may wish to devise new units for personal use. For this purpose, the Pin Out signals of the ROMBOX PLUS rear cartridge slot are shown below.

	+5v	___A1___o	o___B1___	+5v
	OE2	___A2___o	o___B2___	A10
	RST	___A3___o	o___B3___	D3
	R/W	___A4___o	o___B4___	A11
	A8	___A5___o	o___B5___	A9
	A13	___A6___o	o___B6___	D7
	A12	___A7___o	o___B7___	D6
	PHI OUT	___A8___o	o___B8___	D5
	-5v	___A9___o	o___B9___	D4
		o	o___B10___	OE3
	NRDY	___A11___o	o___B11___	A7
	NMI	___A12___o	o___B12___	A6
	IRQ	___A13___o	o___B13___	A5
	NPFC	___A14___o	o___B14___	A4
	NPFD	___A15___o	o___B15___	A3
	QA	___A16___o	o___B16___	A2
	16mhz	___A17___o	o___B17___	A1
+5v	ROMSTB	___A18___o	o___B18___	A0
	SOUNDOUT	___A19___o	o___B19___	D0
---		___A20___o	o___B20___	D2
	SOUNDIN	___A21___o	o___B21___	D1
4k7	0v	___A22___o	o___B22___	0v

SECTION 3 - ROM SOFTWARE

3.0 INTRODUCTION

The Electron Operating System supports 16 paged ROMs, each having a capacity of up to 16K bytes. Four of these pages are internal to the Electron and being of special significance to the Operating System are not available to the general user. The BASIC language ROM itself uses two of these four reserved pages.

The remaining 12 pages are generally available for running ROM software and the Slogger ROMBOX PLUS is arranged to access four of these pages in its ROM slots.

3.1 ROM DETAILS

ROM (READ ONLY MEMORY)

A ROM is an electronic device that has data stored invisibly in its microcircuits, data that is accessible only to a computer or some other special purpose equipment. It is this data that is called software.

Physically a ROM is an almost flat rectangular 'chip' of hard plastic or ceramic material about 3 cms by 1.5 cms with two rows of connector pins along its length.

Once correctly fitted into a socket on the ROMBOX PLUS the electronic data stored inside the ROM is directly accessible to the computer.

A ROM based system has no moving parts and so can transfer data to the computer many thousands of times faster than a cassette or disk system. For ROM systems the transfer is only one way however and it is not possible to load data into a ROM except with special equipment.

ROMS are specified by the amount of data they can store, usually in thousands of Bytes with the capital letter K. The ROMBOX PLUS can run ROMS of 8K byte or 16K byte size.

3.2 FITTING ROMS AND RAMS

ROMS and RAMS are very sensitive to static electricity and can be easily destroyed if handled badly. Static electricity can be produced by simply rubbing against anything made of nylon. Removal of a pullover containing nylon can create static electricity often noted in the form of crackling.

For this reason, it is a good idea to avoid touching the pins of the ROM device until the pins have been located into a vacant socket.

When fitting ROMS it is essential to fit the correct way round. There are only two possible ways to fit a ROM, the wrong way will almost certainly destroy the device when power is applied. One end of the ROM has an indentation. When inserting the Rom ensure that this end faces away from the back of the Electron and lines up with the indentation in the socket.

With previously unused ROMS it may be difficult to insert the device due to the legs of the ROM being splayed out slightly. The legs can be realigned slightly by carefully resting the rows of pins on a flat surface one row after another and rebending the rows slightly.

3.3 REMOVING ROMS AND RAMS

Firstly switch the power to the unit off, then gently lever out the Rom you wish to remove first from one end and then the other, taking care not to bend the legs of the ROM.

Once removed, the ROM should be placed somewhere safe to avoid it being unduly handled.

3.4 SELECTING A LANGUAGE ROM DURING A SESSION

A language ROM is a piece of software which takes over the computer when selected i.e. BASIC or PASCAL. A language ROM may also take the form of a word processor such as STARWORD or a Database such as STARSTORE or even a Machine code monitor such as STARMON.

A language ROM may be selected at any time during your session on the computer by typing:

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*<ROM title> <RETURN>
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<ROM title> - is the language name that the ROM will recognise as a call to itself.

e.g. *BASIC <RETURN> will select the BASIC language ROM or *STORE will select STARSTORE, etc.

Generally the command *HELP can be used to give information on the screen as to which ROMS have been fitted or what facilities they offer.

3.5 SELECTING THE DEFAULT LANGUAGE ON RESET

The default language, for the Electron, can be set as any chosen language e.g. BASIC, PASCAL or STARWORD etc which the Electron will automatically run at switch-on or by pressing the CTRL-BREAK key.

Following a hard reset the Operating System will always select the language ROM in the highest ROM page as the default. BASIC resides in ROM page 11 and unless a language ROM exists in a Page of a higher priority then this ROM will always be entered on a hard BREAK. In order for a different ROM to be entered in these circumstances, a language ROM must reside in one of the pages 12 to 15.

The ROMBOX PLUS allows this since its 4 ROM sockets may be set to be Pages 4,5,6 and 7 or alternative Pages 12,13,14 and 15.

SECTION 4 - USING THE PRINTER OUTLET

4.1 CHOOSING AND CONNECTING YOUR PRINTER

Slogger's ROMBOX PLUS has been designed to work with all parallel printers that use the Centronics Parallel interface.

The printer requires a standard BBC connector lead, Acorn part No. ANG04. This is readily available from ourselves if not already supplied with your Printer.

To connect your Printer, simply connect the Printer lead to its socket on the rear of the ROMBOX PLUS. Please make sure that the Arrow on your Printer lead is facing upwards when attaching it.

4.2 PRINTING

The Slogger ROMBOX PLUS contains all the necessary circuitry to control your printer. It also contains a ROM which controls the printing environment and allows the Electron to be controlled much the same as the BBC computer.

Two commands are available which will copy all screen outputs to the printer:

VDU2	...Turn printer ON
VDU3	...Turn printer OFF
CTRL-B	...Turn printer ON
CTRL-C	...Turn printer OFF

On entering the VDU2 command or simply pressing the CTRL-B key, all screen outputs will be sent to the printer.

The printed output may also require the input of a line feed. This is achieved by typing *FX6,0 before the use of VDU2.

SECTION 5 - SIDEWAYS RAM

The Slogger ROMBOX PLUS supports up to 64K Sideways RAM in its 4 ROM sockets or the Slogger 32K RAM Cartridge.

The 16K RAMS may be fitted into ANY socket as with the 8K/16K ROMS but a single 8K RAM chip may be fitted into socket 6/14 provided the 'links' are set correctly. With either 8K or 16K of RAM fitted to socket 6/14 this may then be used as a Printer buffer to optimise the throughput of your computer at print time. The 32K cartridge occupies one cartridge port and may be used as two separate 16K pages.

The Sideways RAMS may also of course be loaded with 'ROM images' from cassette or disk. This provides a very effective means of storing lesser used ROM software and loading into the computer's memory without having to continuously extract and insert TOMS when the ROM sockets are over subscribed.

SECTION 6 - OPTION SELECTION

6.1 INTRODUCTION

On the left hand side of the ROMBOX PLUS you will find two 'jumpers' together. These options provide the flexibility of allowing different devices to be used, as well as controlling the way in which ROMs can be accessed by the computer.

Each option jumper covers two of three vertical pins and so can be fitted in one of two positions, EAST or WEST.

The rear 'jumper' of the two is referred to as A1.

The nearer 'jumper' of the two is referred to as A2.

EAST is with the two pins furthest to the right hand side linked together.

WEST is with the two pins furthest to the left hand side linked together.

OPTION A1

This option controls the type of device connected to the ROMBOX PLUS in the third socket only...Page 6/14.

A1 EAST

A single 8K static RAM chip (6264) can be used in this socket.

A1 WEST

Single 8K or 16K ROMS or EPROMS for 16K RAMS may be used in this Socket.

OPTION A2

This configures the 4 sockets as either Sideways pages 4,5,6 and 7 or alternatively as pages 12,13,14 and 15.

A2 EAST

The 4 sockets are selected as pages 12, 13, 14 and 15.

A2 WEST

The 4 sockets are selected as pages 4, 5, 6 and 7.

SECTION 7 - TECHNICAL SPECIFICATION

The Electron Operating System supports 16 paged ROMs, referenced as ROM pages 0 through to 15. Four of these pages 8,9,10 and 11 are internal to the Electron and being of special significance to the Operating System are not available to the general user. The BASIC language ROM resides in page 11.

The remaining 12 can be made generally available and the Slogger ROMBOX PLUS is arranged to access these as follows:

Cartridge slots	Rear...Pages 0,1 Front..Pages 2,3
ROM sockets	A2 East...Pages 12, 13, 14 and 15 A2 West...Pages 4, 5, 6 and 7
Expansion ROM	Page 12

The ROMBOX PLUS contains all the necessary circuitry to control the Sideways ROMS, the Cartridge slots and also the Printer interface. This 'hardware' is in turn controlled by software present in the EXPANSION ROM inside the ROMBOX PLUS. It is important to know that this EPROM takes Page 12. This means that no ROMS are to be used in socket 12 when 12, 13, 14 and 15 are selected as it will interfere with the operating software.

The ADFS in the PLUS 3 takes Sideways page 4. If 4,5,6 and 7 are selected then 4 must remain empty so as not to interfere with the system.

SECTION 8 - COMMAND DESCRIPTIONS

8.1 *FX COMMANDS

Listed below are some additional commands that become available when using the ROMBOX PLUS which may prove useful.

*FX3,0 SENDS PRINTED OUTPUT TO SCREEN AND PRINTER
*FX3,10 SENDS PRINTED OUTPUT TO PRINTER
*FX3,4 SENDS PRINTED OUTPUT TO SCREEN
*FX3,6 SENDS PRINTED OUTPUT TO NEITHER DEVICE

*FX5,0 SELECTS PRINTER DRIVER TO 'PRINTER DUMP'
*FX5,1 SELECTS PRINTER DRIVER TO 'PRINTER PORT'

*FX21,0 EMPTIES THE KEYBOARD BUFFER
*FX21,3 EMPTIES THE PRINTER OUTPUT BUFFER
*FX21,4 EMPTIES THE SOUND OUTPUT BUFFER 0
*FX21,5 EMPTIES THE SOUND OUTPUT BUFFER 1
*FX21,6 EMPTIES THE SOUND OUTPUT BUFFER 2
*FX21,7 EMPTIES THE SOUND OUTPUT BUFFER 3

*FX163,128,0 ENABLES INPUT/OUTPUT TO PRINTER
*FX163,128,1 DISABLES INPUT/OUTPUT TO PRINTER

*FX225,0 IGNORES THE FUNCTION KEYS
*FX225,1 FUNCTION KEYS GENERATE THE CHARACTER STRING DEFINED BY THE USER

*FX226,0 IGNORES FUNCTION KEYS IN THE RANGE A TO P
*FX226,1 FUNCTION KEYS IN THE RANGE A TO P WILL GENERATE THEIR BASIC KEYWORDS

*FX227,0 IGNORES FUNCTION KEYS IN THE RANGE Q TO Z
*FX227,1 FUNCTION KEYS IN THE RANGE Q TO Z WILL GENERATE THEIR BASIC KEYWORDS

*FX229,0 PRESSING ESCAPE WILL INTERRUPT THE BASIC PROGRAM
*FX229,1 PRESSING ESCAPE WILL NOT INTERRUPT THE BASIC PROGRAM

*FX230,0 ENABLES THE ESCAPE KEY
*FX230,1 DISABLES THE ESCAPE KEY

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