SLOGGER

Electron
Rombox Plus

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ELECTRON ROMBOX PLUS
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INTRODUCTION
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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
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1.1  INSTALLING THE ROMBOX PLUS
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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.
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SECTION 2 - USING THE CARTRIDGE SLOTS

2.1 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.

2.2 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.

2.3 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.

2.4 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.

2.5 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:
        *<ROM title> <RETURN>

<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 usd 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

9.1 *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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