

QUASAR ELECTRONICS KIT # SC22/23 - SX-II SBC

The main hardware & software documentation for the Southern Cross 2 (SX-2) is supplied in pdf format in the download detailed below. Please print out both of these manuals. This documentation is to take you through the construction phase of the SX2.

The files may also be downloaded from

<http://www.quasarelectronics.com/software.htm>

sx2_v2.pdf – this documentation.

sx2_mvs31.pdf - System Monitor Users Manual.

sx2_hardv2.pdf - Hardware Manual.

term.exe - a simple terminal program.

*.equ - software & hardware equate files. For users to include when you write your own software so your program can access the hardware & those user-accessible software routines of the MVS31 monitor.

sx2_mods.pdf - this version of the Southern Cross II has been upgraded to use an AT89C52 for IC1 instead of the 80C32 and EPROM 17C64.

ASSEMBLY

Not all the components which can go on the SX2 are supplied in this kit. All the components (which mainly go in the bottom left of the board) to do with saving your BASIC programs in EPROM are not included.

Some of the IC's required to expand the capability of the SX2 are also not supplied: 8052-BASIC IC, 82C55 PPI & DS1216C. The user must add these if & when required. A list of all these components is given on the next page.

The components supplied in this Kit are given in the Kit Components listing. First check the components supplied in the Kit against the list. Identify all the components. It is generally best to solder the lowest height components first: the resistors, diodes & IC sockets. Make sure to get the diodes the correct way around. Match up the bar on the diodes with the bar on the overlay. All IC socket needed to populate the board are supplied.

There are several points to watch:

- make sure you identify the preprogrammed parts. Each has a sticker on top.

- mount the crystal Y2 slightly above the PCB. This is because there are vias exposed underneath the case. We have supplied a small 49US package for the crystal. Maybe also put some insulation tape on the PCB to make sure there is no contact.
- the SIL resistor networks have to be around the correct way. The dot on the network must go in the box marked on the overlay.
- put a wire **link** in the D1 position. If you add the EPROM components later replace it with a BAT41 or 48.
- be careful to get electrolytic capacitors around the right way. C1 C2 C3 C4 C16
- the power supply is 9V-12V centre positive

The cable to connect the serial port of your PC (or terminal) comes premade. The 10 pin socket on one end fits into J5 (8031 mode) or J6 (BASIC mode) as outlined on page 1 of the Hardware Manual. The 9 pin connector goes to your serial port on a PC or to a terminal. Use a straight through cable when connecting to the serial port. If you use a 9-to-25 pin adaptor note that some mouse adaptors for this function will not work as not all the pins are adapted over.

Now please print out the first page of the Hardware Manual (sx2_hardv2.pdf) and read the **Getting Started, Running in 8031 Mode** Section.

EXPANSION

As mentioned the components to write your program to EPROM have not been included in this kit. They are listed below. See the Hardware Manual for details. The PCB is designed to fit into a Retex box model RA1.

SOUTHERN CROSS 1 & 2 COMPARED

Both are single board computers. The SX1 uses a Z80 while the SX2 now uses an 89C52. In the SX1 an on-board keypad was used as input & seven-segment displays used as output. In the SX2 both input & output are done via a terminal program – see below - connected to a PC.

The SX2 has more program debugging features. The SX1 can only single step one instruction at a time. The SX2 can do that as well as set breakpoints & watchpoints. A breakpoint means that the program runs until it reaches the point where the breakpoint is set. The user can then examine memory to see if the

QUASAR ELECTRONICS KIT # SC22/23 - SX-II SBC

program is running correctly. They can single step from there or run the program again. There is also an inbuilt disassembler so that if the user is single-stepping the actual assembled code is displayed on the screen as it steps. This is very useful for practical code debugging.

The add-on 8x8 card & relay boards used in the SX1 can be used in the SX2 (at port J4) but no code routines to test them are built into the SX2 monitor.

QUESTIONS & PROBLEMS

You can email our Support Team directly at

[mailto: support@quasarelectronics.com](mailto:support@quasarelectronics.com)

The SX2 was first released in August, 1996.
This revised version was released may, 2002.
Revised documentation May 2002.

EPROM PROGRAMMING OPTION

These components are not supplied.

EEPROM Programming Option Expansion.

Resistors 1/4W:

0.5R	R2	1
330R	R3	1
1K5	R6	1
4K7	R4	1
10K	R5 R7 R8	3
MC34063, DC-DC	IC12	1
7407, hex o/c buffer	IC13	1
1N5817	D3	1
BAT41 or 48 Schottky diode	D1	1
2N4403	Q1	1
10uH inductor	L2	1
180uH inductor	L1	1
5K multi-turn trimpot	VR1	1
4 pole DIP switch	SW2	1
10uF/25V ecap	C10 C12	2
100nF monoblok	C8 9 11 13	4

For Expansion, not supplied

26 pin straight header	J3	1
26 pin box header	J2	1
82C55,PPI	IC6	1
DS1216C Smart Watch		1
8052-BASIC IC		1

KIT COMPONENTS

ResNet 9x10K SIL 10P9R	SIL1	1
ResNet 5x10K SIL 6P5R	SIL2	1
Hatkey switch	SW1	1
5mm red	LEDD2	1
100nF monoblok	DC1-10, DC13	11
Nut & bolt 6mm or 8mm		1 set
Ceramic capacitors:		
10pF ceramic	C3 C4	2
27pF ceramic	C1 C2	2
Electrolytic capacitors:		
10uF	C5 7 14 15 16 17	6
1000uF/35V	C6	1
SPDT Switch	SW3	1
10 pin box header	J5 J6	2
16 pin box header	J1 J4	2
Power Jack	J7	1
74HC245	IC2	1
74HC573	IC3	1
DS1232	IC14	1
MAX232	IC8	1
SCC2691	IC7	1
7805	IC11	1
Preprogrammed devices:		
AT89C52-24PC	IC1	1
IO_GAL, 16V8A	IC10	1
MEM_GAL, 16V8A	IC9	1
IC Sockets:		
8 pin		2
14 pin		1
20 pin		
24 pin		1
28 pin		2
40 pin		2
Serial cable assembly		1
Heatsink HS-110		1
Southern Cross 2 PCB		1
Software and documentation via internet download		

How to Use 'term.exe' Communications Program

The SX-II SBC requires a communications program to transfer data between the serial port on the PC and the kit. In Windows 9x there is a comms program called 'Hyperterminal' already built-in. In Windows 3.1x comes with the 'Terminal' comms program built in. There are many comms program you can download from software sites.

Alternatively, you can use the simple DOS-based comms program available from our website called 'term.exe'. It is a simple, basic terminal program which does its job without a lot of 'bells & whistles'. (Also, as of this moment we do not have a Windows version of the software!)

You may download it from <http://www.quasarelectronics.com/software.htm>

How to install 'term.exe'

This is a detailed explanation of how we have installed 'term.exe' in a Windows 98 system. There are slight differences with Windows 95 and 2000 but it gives you an idea of how to do it.

1. 'term.exe' comes on the floppy disk with this kit or you can get it from my website as given above. You will have to unzip it first.
2. Move 'term.exe' to the same folder as Hyperterminal.
C:\Program Files\Accessories\Hyperterminal
(I did this because sometimes I use Hyperterminal and all my hex files for programming firmware are in the same folder.)
3. Right click on some blank space on the desktop and select "New → Shortcut".
4. Click on the "Browse" button and find 'term.exe' on your hard disk in the above mentioned folder
5. Click on it and select "open". Click "Next", "Next" then "Finish".

You should now have an icon on your desktop. If you want to change the icon's name then right click on it and select "Rename".

6. Right click on this icon and select "Properties".
7. Click on the "Program" tab.
8. Go to the end of the "Cmd line" box and type in " 9600" (you **must** include the leading space). If you are using COM2 then type " /2 9600" instead. Notice that the "Working" directory/folder is set to the same as the "Cmd line". You can change this if necessary.
9. Tick the "Close on exit" box. This will shutdown the DOS window when you quit 'term.exe'.
10. Click on the "Change Icon..." button if you want to change the icon associated with this shortcut.
11. Click on the "Screen" tab and select "Full-screen".
12. Click "OK".

To run 'term.exe' simply click on the desktop icon. To see the syntax go to the Start button and Run 'term /?' when logged into the Hyperterminal folder.

How to Use 'term.exe' Communications Program

Communicating with the SX-II

There is a Menu in the SX-II Firmware. Power the kit, attach a straight-thru serial cable, then click on the term.exe icon. Or start term.exe, connect power and the serial cable. The order does not matter.

Now usually hitting Enter, will bring up the announcement. Or press Reset then press Enter – you may need to press Enter 2 or 3 times. Sometimes this may not work firsttime. Do Alt-Q to exit the program, then click on the term.exe icon again to start it again. Almost always this restart will bring up the Announcement after hitting Enter. If not do the restart again. You should not need more than 2 restarts.

Press '?' (Shift and the ? key) and you will get a list of commands. Now go to the Documentation.

Contact Us

You may contact our support staff at [mailto: support@quasarelectronics.com](mailto:support@quasarelectronics.com)

If you have suggestions on how to improve this documentation email us at [mailto: sales@quasarelectronics.com](mailto:sales@quasarelectronics.com)

May 16, 2002.
