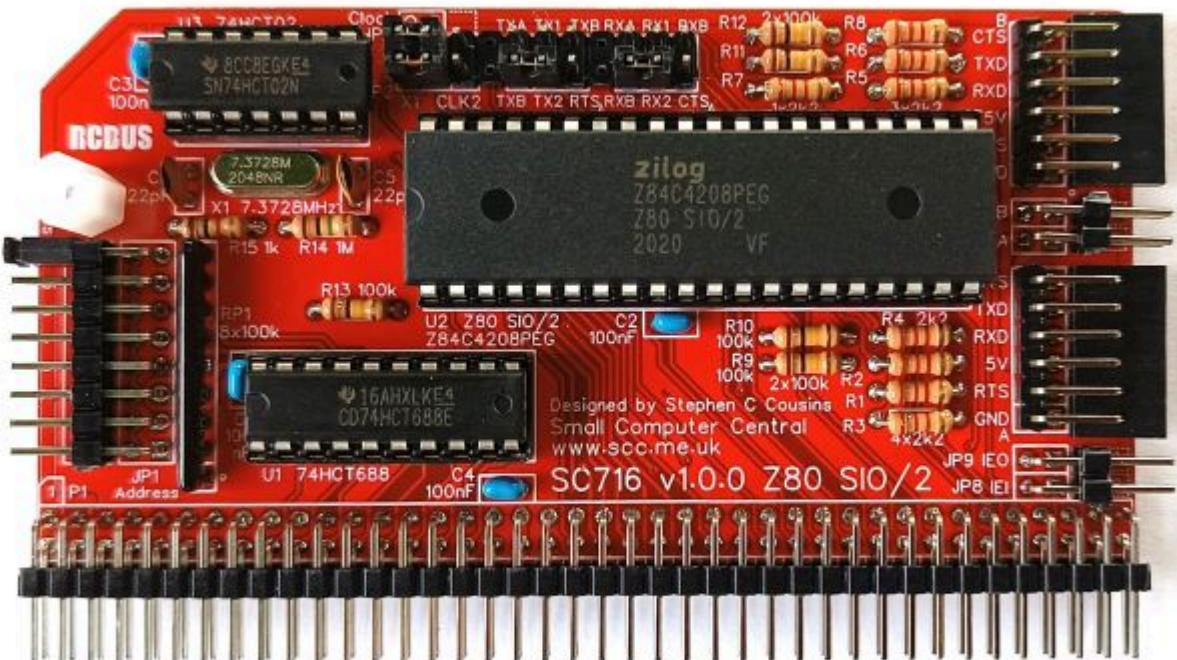


# Small Computer Central

## SC716 – RCBus Z80 SIO/2 Serial Module

SC716 is a dual serial port module using a Z80 SIO/2, designed for the RCBus. It has its own clock oscillator making the baud rate independent of the processor speed.



- SC716 – Assembly guide
- SC716 – Compatibility
- SC716 – Parts list
- SC716 – Printed circuit board
- SC716 – User guide
- SC700 series information (<https://smallcomputercentral.com/rcbus/sc700-series/>)
- SC700 series support (<https://smallcomputercentral.com/support/>)

## Downloads

- SC716, v1.0, Kit contents sheet (PDF) ([https://smallcomputercentral.com/wp-content/uploads/2023/05/sc716-kit-contents\\_v1.0.0\\_2023-05-14-1.pdf](https://smallcomputercentral.com/wp-content/uploads/2023/05/sc716-kit-contents_v1.0.0_2023-05-14-1.pdf))
- SC716, v1.0, Schematic (PDF) ([https://smallcomputercentral.com/wp-content/uploads/2023/05/sc716\\_v1.0.0\\_2023-04-28\\_19-47\\_schematic.pdf](https://smallcomputercentral.com/wp-content/uploads/2023/05/sc716_v1.0.0_2023-04-28_19-47_schematic.pdf))

- SC716, v1.0, PCB design files (OSH WLabs) (<https://oshwlab.com/sccousins/sc716-v1-0-z80-sio2>)
- SC716, v1.0, Gerber files (ZIP) ([https://drive.google.com/file/d/1AR4TL-N20Ov7qVqV8oiM1U4JQYrslBIc/view?usp=share\\_link](https://drive.google.com/file/d/1AR4TL-N20Ov7qVqV8oiM1U4JQYrslBIc/view?usp=share_link))

## Errata

Nothing known

## Suppliers

<b>Kits</b>	<b>Website</b>	<b>From</b>	<b>Currency</b>
Small Computers Direct	SCDirect ( <a href="https://small-computers-direct.square.site/s/search?q=sc716">https://small-computers-direct.square.site/s/search?q=sc716</a> )	UK	GBP
Stephen C Cousins	Tindie ( <a href="https://www.tindie.com/search/?q=sc716">https://www.tindie.com/search/?q=sc716</a> )	UK	USD
Small Computer Central	Lectronz ( <a href="https://lectronz.com/products/search?q=sc716">https://lectronz.com/products/search?q=sc716</a> )	UK	Euro/USD
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<b>PCBs</b>	<b>Website</b>	<b>From</b>	<b>Currency</b>
Small Computers Direct	( <a href="https://small-computers-direct.square.site/s/search?q=sc733">https://small-computers-direct.square.site/s/search?q=sc733</a> ) SCDirect ( <a href="https://small-computers-direct.square.site/s/search?q=sc716">https://small-computers-direct.square.site/s/search?q=sc716</a> )	UK	GBP
Stephen C Cousins	Tindie ( <a href="https://www.tindie.com/products/tindiescx/picknmix-boards-for-rcbus-80pin/">https://www.tindie.com/products/tindiescx/picknmix-boards-for-rcbus-80pin/</a> )	UK	USD
Small Computer Central	Lectronz ( <a href="https://lectronz.com/products/pick-n-mix-boards-for-rcbus-80pin">https://lectronz.com/products/pick-n-mix-boards-for-rcbus-80pin</a> )	UK	Euro/USD
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<b>Assembled and Tested</b>	<b>Website</b>	<b>From</b>	<b>Currency</b>
Not available			
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<b>Components</b>			
See parts list			

*Small Computers Direct does not collect VAT for EU countries*

*Tindie does not collect VAT for EU countries*

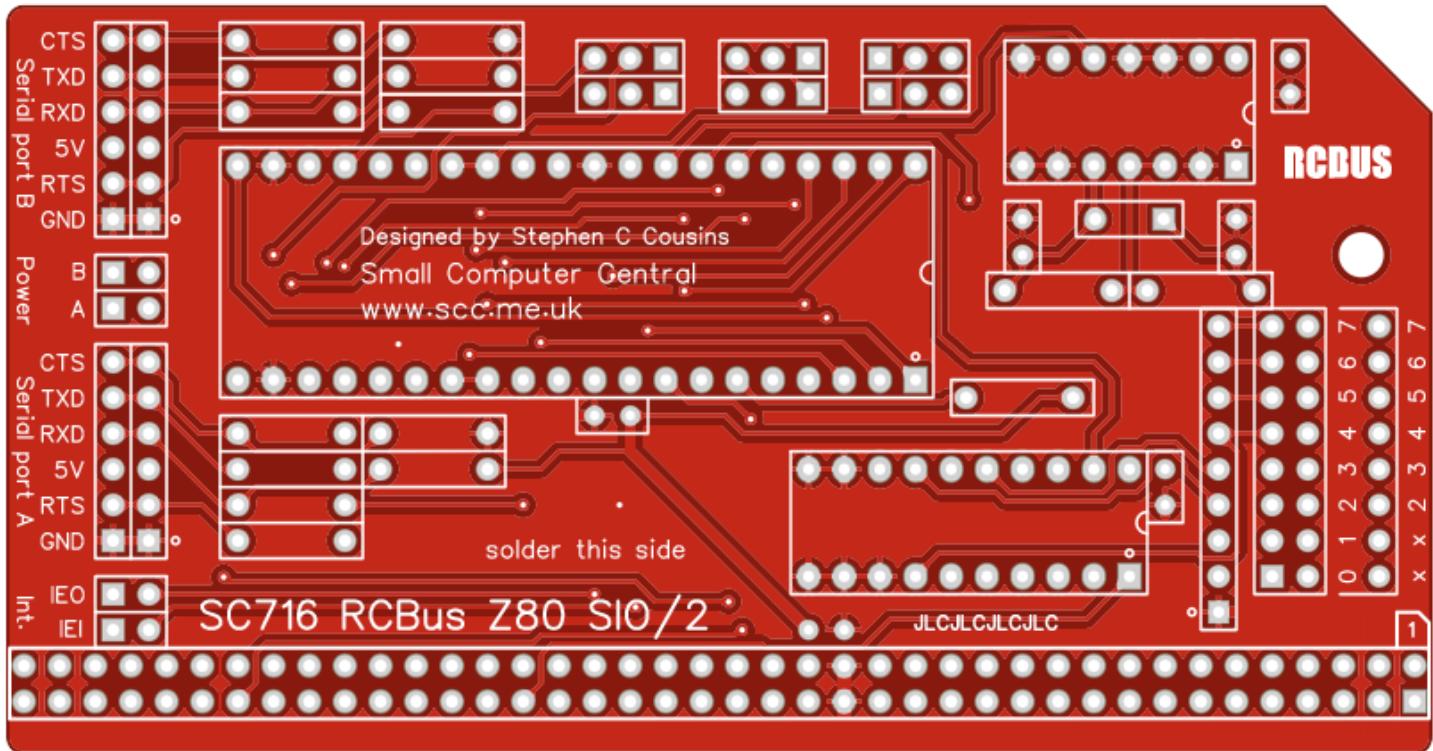
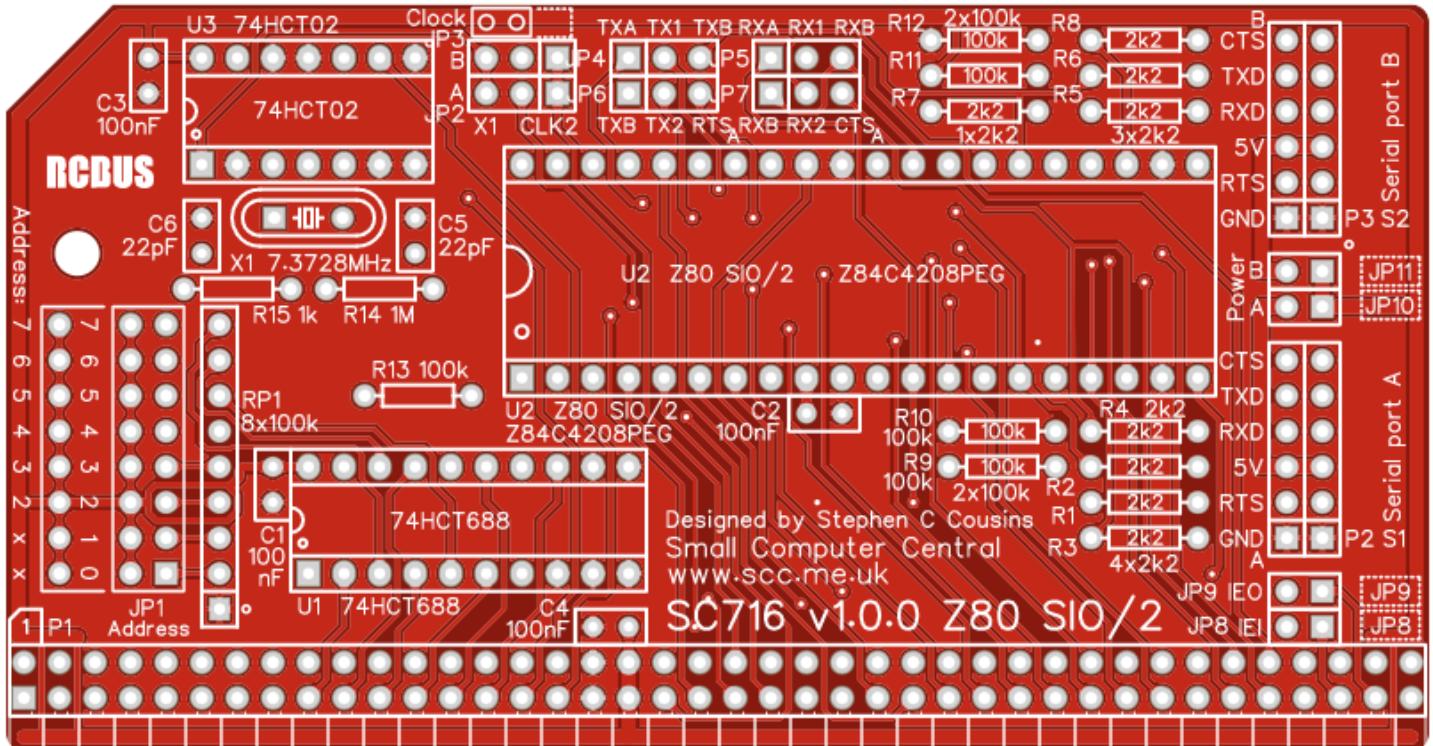
*Lectronz does collect EU VAT for orders up to 150 EUR*

## Parts List

<b>Reference</b>	<b>Qty</b>	<b>Component</b>
PCB	1	SC716, v1.0, PCB
C1 to C4	4	Capacitor, ceramic, 100 nF
C5 and C6	2	Capacitor, ceramic, 22 pF
JP1	1	Header, male, 2 row x 8 pin, angled
JP2 +3+4+5+6+7	1	Header, male, 2 row x 11 pin, straight (some pins need to be removed)
JP8+9 JP10+11	2	Header, male, 2 row x 2 pin, angled
Jumper	16	Jumper shunt
P1	1	Header, male, 2 row x 40 pin, angled
P2 and P3	2	Header, male, 1 row x 6 pin, angled
R1 to R8	8	Resistor, 2k2, 0.25W
R9 to R13	5	Resistor, 100k, 0.25W
R14	1	Resistor, 1M, 0.25W
R15	1	Resistor, 1k, 0.25W
RP1	1	Resistor network, 8x100k, SIL, 9-pin
S1 and S2	2	Header, female, 1 row x 6 pin, angled
Screw (for spacer)	1	Machine screw, 6mm, M3
Spacer	1	Spacer, 10mm, M3, nylon
U1	1	74HCT688
U2	1	Z80 SIO/2, Z84C4208PEG, or Z80 SIO/2, Z84C4210PEG
U3	1	74HCT02
X1	1	Crystal, 7.3728 MHz
IC socket 20-pin U1	1	Socket, DIP, 20-pin
IC socket 40-pin U2	1	Socket, DIP, 40 pin
IC socket 14-pin U3	1	Socket, DIP, 14-pin

*Component details and sourcing (<https://smallcomputercentral.com/components/>)*

## Printed Circuit Board



# User Guide

SC716 is a dual serial port module using a Z80 SIO/2. It includes a clock oscillator to generate a baud rate independent of the processor speed.

The module supports the Z80 interrupt priority chain with jumpers to allow it to use the bus pins specified in the RCBus specification. Alternatively, the IEI and IEO signals are available on JP8 and JP9.

It also has jumpers to allow various serial signals to be connected to the bus RX, TX, RX2 and TX2 signals. This allows serial terminal modules, or other serial devices, to be connected to SC716 via dedicated pins on the RCBus.

Jumpers allow serial port devices to be powered from the module or the retro computer to be powered from either serial port.

When the baud rate is generated from the onboard clock oscillator, the baud rate is usually 115200 baud. The data format is typically 8 data bits, no parity, 1 stop bit. Alternatively, the serial clock can be provided by the bus CLK2 signal.

Details about programming a Z80 SIO can be found in the Z80 SIO datasheet (PDF) (<https://drive.google.com/file/d/1ZCt1S1F0NASjZ3dQNydnT6eiGw-Io9a6/view?usp=sharing>).

### Input/output port functions

<b>I/O Address</b>	<b>Read</b>	<b>Write</b>
Configurable *1 base address	Read Z80 SIO/2	Write Z80 SIO/2
base + 0	Port A control	Port A control
base + 1	Port A data	Port A data
base + 2	Port B control	Port B control
base + 3	Port B data	Port A data

1. The RCBus I/O base address should be set to match the software you are using. Typically, this is 0x80 or 0x84.

### Jumper options

<b>Jumper</b>	<b>Function</b>
JP 1	Set module's RCBus I/O address Typically, this will be 0x80 or 084
JP 2	Selects the serial clock source for port A JP 2.1-2 Clock source is bus CLK2 signal JP 2.2-3 Clock source is oscillator X1 The default is X1
JP 3	Selects the serial clock source for port B JP 3.1-2 Clock source is bus CLK2 signal JP 3.2-3 Clock source is oscillator X1 The default is X1
JP 4	Connects the bus TX signal to TXA or TXB JP 4.1-2 Connect port A TX signal to bus TX signal JP 4.2-3 Connect port B TX signal to bus TX signal The default is jumper shunt not fitted
JP 5	Connects the bus RX signal to RXA or RXB JP 5.1-2 Connect port A RX signal to bus RX signal JP 5.2-3 Connect port B RX signal to bus RX signal The default is jumper shunt not fitted

JP 6	Connects the bus TX2 signal to TXB or /RTSA JP 6.1-2 Connect port B TX signal to bus TX2 signal JP 6.2-3 Connect port A /RTS signal to bus TX2 signal The default is jumper shunt not fitted
JP 7	Connects the bus RX2 signal to RXB or /CTSA JP 7.1-2 Connect port B RX signal to bus RX2 signal JP 7.2-3 Connect port A /CTS signal to bus RX2 signal The default is jumper shunt not fitted
JP 8	Connects bus IEI signal to SIO/2 IEI signal The default is jumper shunt not fitted
JP 9	Connects bus IEO signal to SIO/2 IEO signal The default is jumper shunt not fitted
JP 10	Connects 5 volt power to serial port A connectors The default is jumper shunt not fitted
JP 11	Connects 5 volt power to serial port B connectors The default is jumper shunt not fitted

## Assembly Guide

Below is the suggested order of assembly. A general guide to assembling circuit boards can be found here (<https://smallcomputercentral.com/assembly-guide/>).

### 1. Resistors R1 to R15

These can be fitted either way around

### 2. Sockets S1 and S2

Ensure these are fitted flat against the circuit board

### 3. Sockets for U1 to U3

Fit such that the notch in the socket matches the curve in the outline on the PCB silkscreen

### 4. Decoupling capacitors C1 to C4

These can be fitted either way around

### 5. Header pins P2 and P3

Ensure the pins are parallel to socket S1 and S2

### 6. Bus header P1

Make sure the pins are parallel to the PCB so that the board is vertical when it is fitted into a backplane socket

### 7. Jumper pins JP1

### 8. Jumper pins JP8 plus JP9

### 9. Jumper pins JP10 plus JP11

### 10. Capacitors C5 to C6

These can be fitted either way around

### 11. Resistor network RP1

This must be fitted the correct way around whereby the dot on the component matches the dot on the PCB silkscreen

### 12. Jumper pins JP2 plus JP3 plus JP4 plus JP5 plus JP6 plus JP7

Pull the 4th and 8th pairs of pins out of the plastic with a pair of pliers so that the header pins fit in the holes for JP2 to JP7

### 13. Crystal X1

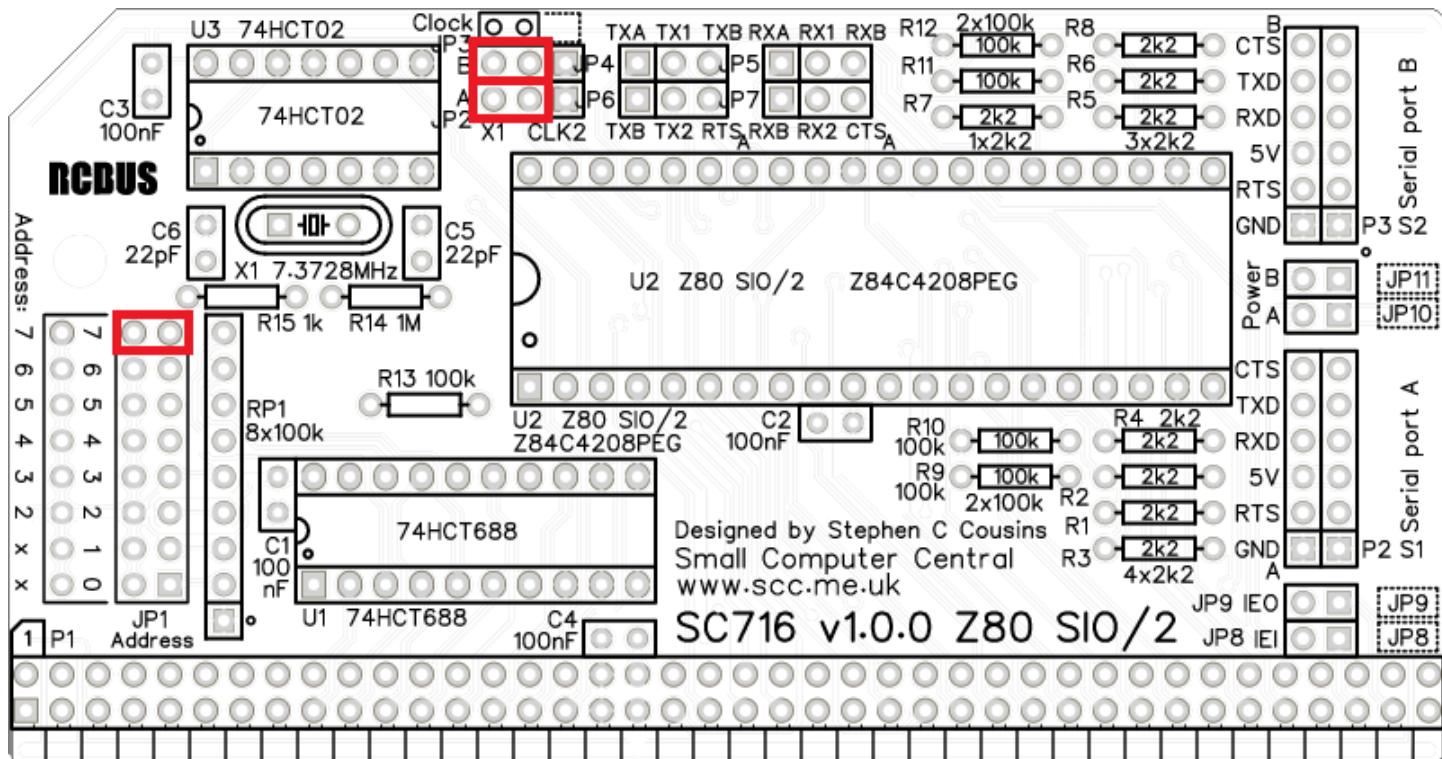
This can be fitted either way around

#### 14. Insert the integrated circuits into their sockets

Make sure the notch in the component is at the end indicated by the notch in the socket and the curve on the PCB silkscreen

15. Fit the nylon spacer in the mounting hole

Fit jumper shunts in the positions shown below. All other jumpers are optional and should only be fitted if the feature is required.



# Compatibility

This module conforms to the RCBus specification v1.0 (<https://smallcomputercentral.com/rcbus/>) for RCBus-2014 and RCBus-Z80.

It functions with 40-pin backplanes but does not have access to the second clock as an alternative baud rate source. It also does not have access to output serial signals to the second pair of TX and RX pins. An RCBus-Z80 compliant backplane is required to create an IEI/IEO interrupt daisy-chain on the backplane rather than wires between modules.

The RCBus specification includes RCBus-2014 (both RC2014 standard 40-pin bus and RC2014 enhanced 60-pin bus) and also the full 80-pin RCBus. The 80-pin RCBus provides support for advanced Z80 features, such as the interrupt daisy-chain, as well as support for other processor families.

The table below indicates electrical compatibility with each backplane type (40, 60 and 80 pin)



<b>Backplane</b>	?	<b>Compatibility notes</b>
RCBus 80-pin	✓	Fully supported
RCBus 60-pin (RC2014 enhanced)	✓	Limitations: Optional mode 2 interrupt chain requires wires between modules
RCBus 40-pin (RC2014 standard)	✓	Limitations: Optional mode 2 interrupt chain requires wires between modules Some optional signals are not available (CLK2, TX2, RX2)

## Notes

- This product is designed for hobby use and is not suitable for industrial, commercial, or safety-critical applications.
- The product contains small parts and is not suitable for young children.