

# Eval8r

State-of-the Art Evaluation  
Module for 8, 20 & 40-pin  
Microcontrollers

## PRODUCT GUIDE

(Version 2.00)



**The Embedded Solutions Company**

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## **Contacts**

### **Equinox Technologies UK Limited**

3 Atlas House, St Georges Square, Bolton, England BL1 2HB

**Telephone Sales** ..... : **+44 (0) 1204 529000**

**Fax** ..... : **+44 (0) 1204 535555**

**E-mail** ..... : **sales@equinox-tech.com**

**Web site** ..... : **www.equinox-tech.com**

For technical support on this product please e-mail us at:  
**evalu8r@equinox-tech.com**

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## Introduction

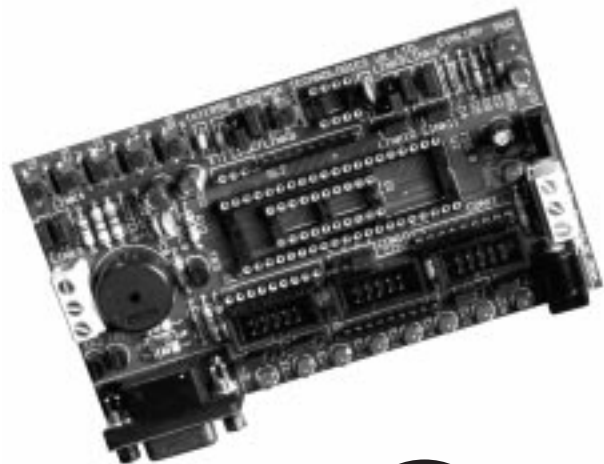
**T**he Evalu8r is a feature-packed evaluation module which has been specially designed to support a variety of different single-chip microcontrollers. Support is offered for for Atmel 8-pin, 20-pin and 40-pin AVR microcontrollers, together with support for 20-pin and 40-pin 8051 microcontrollers. The module supports a wealth of typical microcontroller peripherals including LED's, push buttons, sounder, A/D and serial communications. There is also the provision for two 8-bit ports to be brought out via headers allowing the user to develop off-board circuitry.

The Evalu8r module features an In-System Programming (ISP) port which allows the Atmel microcontrollers which support ISP to be programmed in-situe in the socket. The ISP port is designed to interface to any Equinox serial programmer including the 'Micro-ISP' and 'Activ8r'. Even the new Atmel AVR 8-pin microcontroller family (AT90S2323/AT90S2343) is supported by this module. It is also possible to place serial EEPROM's in the 8-pin socket and then communicate to these device from the master microcontroller.

The 'Evalu8r' module is now supplied as standard in both AVR and 8051 microcontroller systems. Many sample application programs based on this module are already in existence.

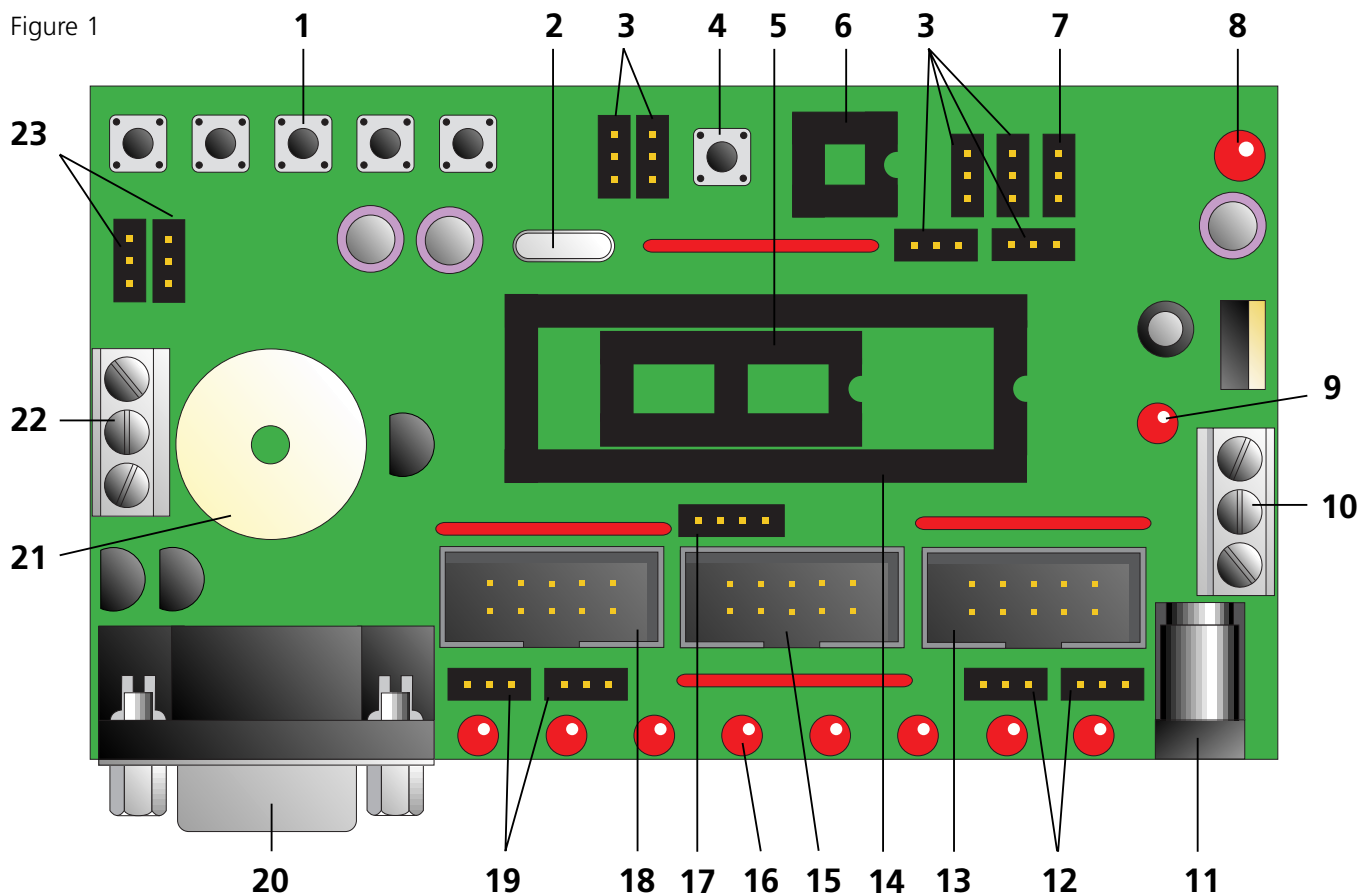
### MODULE HIGHLIGHTS

- Supports Atmel 8, 20 and 40-pin Microcontrollers
- Supports NEW Atmel 8-pin AVR microcontrollers
- Supports 8-pin serial EEPROM's
- Features In-System Reprogramming (ISP) Port
- User configurable RESET Polarity to support both 8051 and AVR microcontrollers
- 8 x Light Emitting Diodes (LED's)
- 5 Push Button Switches
- RS-232 Communications Driver Circuitry
- Simple Analogue to Digital (A/D) Converter using on-chip Comparator
- Two ports brought out to headers allowing external circuitry to be connected
- On-board power supply
- Pluggable Crystal



## Hardware Overview

Figure 1



### KEY:

- |                                          |                                             |
|------------------------------------------|---------------------------------------------|
| 1 Push Button Switches                   | 13 Port 2                                   |
| 2 Crystal                                | 14 40-pin Microcontroller Socket            |
| 3 Configuration Jumpers for U4           | 15 ISP Programming Socket                   |
| 4 Reset Switch                           | 16 LED's x 8                                |
| 5 20-pin Microcontroller Socket          | 17 U2 Configuration (CON10)                 |
| 6 8-pin Microcontroller Socket           | 18 Port 0                                   |
| 7 Configuration Jumper for Piezo Sounder | 19 Jumpers No: 1 & 2                        |
| 8 Power LED                              | 20 Serial Communications (RS-232) Connector |
| 9 Program LED                            | 21 Piezo Sounder                            |
| 10 Power Supply Screw Terminals          | 22 A/D Inputs                               |
| 11 Power Supply Input +9/+26v DC Unreg   | 23 Jumpers 3 & 4                            |
| 12 Jumpers No: 13 & 14                   |                                             |

## Jumper Configurations

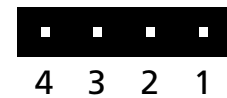
### Notes:

- 1** To disable LED's, remove SIL resistor pack SL1.
- 2** Pin 1 of SIL's denoted by square pad.

| Key | Link | Purpose            | 1-2   | 2-3  |
|-----|------|--------------------|-------|------|
| 19  | 1    | LED0 / A/D Select  | LED0  | AREF |
| 19  | 2    | LED1 / A/D Select  | LED1  | AIN  |
| 23  | 3    | Reset Sense        | 8051  | AVR  |
| 23  | 4    | Reset Sense        | 8051  | AVR  |
| -   | 5    | Not Used           | -     | -    |
| 7   | 6    | Sounder Enable     | On    | Off  |
| 3   | 7    | U4/2 Configuration | XTAL1 | P1.2 |
| 3   | 8    | U4/3 Configuration | XTAL2 | P1.4 |
| 3   | 9    | U4/4 Configuration | GND   | P1.1 |
| 3   | 10   | U4/5 Configuration | GND   | P1.5 |
| 3   | 11   | U4/7 Configuration | SCK2  | P1.7 |
| 3   | 12   | U4/1 Configuration | RESET | P1.3 |
| 12  | 13   | P1.2 Configuration | LED2  | AREF |
| 12  | 14   | P1.3 Configuration | LED3  | AIN  |

Figure 2

| CON10. U2 Configuration |      |      |
|-------------------------|------|------|
| Pin                     | 8051 | AVR  |
| 1                       | Vcc  | Vcc  |
| 2                       | EA   | ICP  |
| 3                       | ALE  | ALE  |
| 4                       | PSEN | OC1B |



As viewed in fig: 1  
featured on page 2

Figure 3

## Module Specifications

### Evalu8r Technical Specification

- Power Input .....**: a. +9 volts DC nominal (+25 volts Max)  
b. +9v DC unregulated, or +5v DC regulated.
- Power Connectors ..**: a. Standard 2.5mm ROKA type-centre positive.  
Accepts Equinox Power Supply  
b. Screw Terminals to accept external bench PSU.  
Pin 1 +5v  
Pin 2 +9v  
Pin 3 0v.
- Serial Port.....**: 3-wire asynchronous Communications interface, TxD, RxD, GND (RS-232 compatible).
- Serial Connector .....**: 9 way female D-type connector, PC compatible via. 1:1 cable  
Pin 2 - TxD Output from Evalu8r  
Pin 3 - RxD Input to Evalu8r  
Pin 5 - GND Signal Ground connection
- A/D Convertor.....**: Simple current source and comparator technique  
GND Signal Ground  
REF Voltage ramp from 65uA into 100nF approx.  
AIN Input to Evalu8r. Max range 0v to +5v (clamped)  
Noise filter built-in 10K/100nF approx.
- Status Indication.....**: Power-ON & PROG LED's.
- Sounder .....**: PIEZO type
- Device profiles .....**: 8, 20 and 40-pin devices are supported. There is room to fit either a 20-pin or a 40-pin ZIF socket if required.
- ISP Compatibility .....**: Equinox standard 10-way Header
- Other I/O .....**: 5 switches and 8 LED's on 20/40 pin microcontroller port pins.



# Device Support

## Atmel 20-pin 8051 microcontrollers

| Device Family | Microcontroller Socket | Number Of Pins | RESET Configuration |        |        | ISP |
|---------------|------------------------|----------------|---------------------|--------|--------|-----|
|               |                        |                | Polarity            | Link 3 | Link 4 |     |
| AT89C1051 (U) | U1                     | 20             | HIGH                | 1-2    | 1-2    | NO  |
| AT89C2051     | U1                     | 20             | HIGH                | 1-2    | 1-2    | NO  |
| AT89C4051     | U1                     | 20             | HIGH                | 1-2    | 1-2    | NO  |

Figure 4

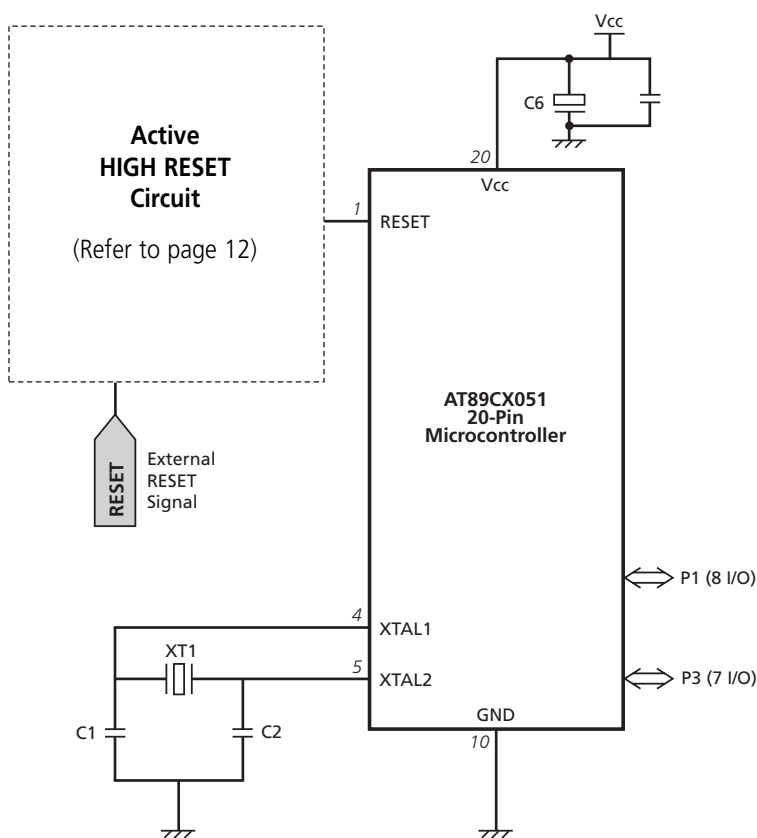


Figure 5

Figure 6

|             |    |    |             |
|-------------|----|----|-------------|
| RST         | 1  | 20 | VCC         |
| (RXD) P3.0  | 2  | 19 | P1.7        |
| P3.1        | 3  | 18 | P1.6        |
| XTAL2       | 4  | 17 | P1.5        |
| XTAL1       | 5  | 16 | P1.4        |
| (INT0) P3.2 | 6  | 15 | P1.3        |
| (INT1) P3.3 | 7  | 14 | P1.2        |
| (T0) P3.4   | 8  | 13 | P1.1 (AIN1) |
| (T1) P3.5   | 9  | 12 | P1.0 (AIN0) |
| GND         | 10 | 11 | P3.7        |

Pinout for the AT89X051

Figure 7

| Port | I/O | Function                     |
|------|-----|------------------------------|
| P1   | 8   | LED x 8                      |
| P3   | 7   | Push Button + Communications |

## Device Support Continued

### Atmel 40-pin 8051 microcontrollers

| Device Family | Microcontroller Socket | Number Of Pins | RESET Configuration |        |        | ISP | EA HIGH    |
|---------------|------------------------|----------------|---------------------|--------|--------|-----|------------|
|               |                        |                | Polarity            | Link 3 | Link 4 |     |            |
| AT89C51       | U2                     | 40             | HIGH                | 1-2    | 1-2    | NO  | CON 10 1-2 |
| AT89C52       | U2                     | 40             | HIGH                | 1-2    | 1-2    | NO  | CON 10 1-2 |
| AT89C55       | U2                     | 40             | HIGH                | 1-2    | 1-2    | NO  | CON 10 1-2 |
| AT89S8252     | U2                     | 40             | HIGH                | 1-2    | 1-2    | YES | CON 10 1-2 |
| AT89S53       | U2                     | 40             | HIGH                | 1-2    | 1-2    | YES | CON 10 1-2 |

Figure 8

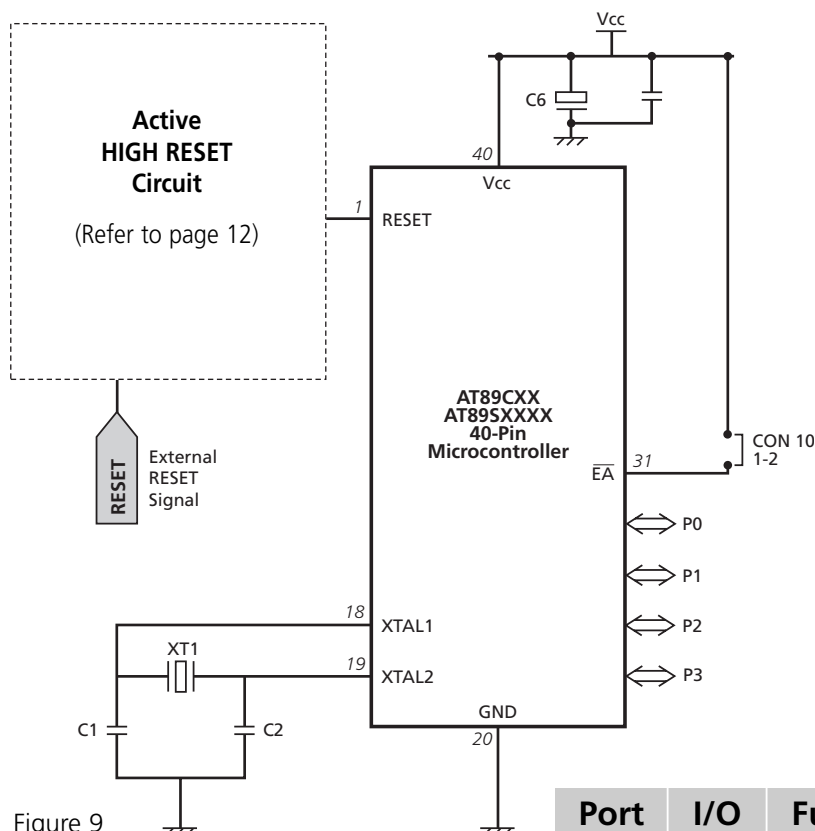


Figure 9

Figure 10

|              |    |    |            |
|--------------|----|----|------------|
| (T2) P1.0    | 1  | 40 | VCC        |
| (T2 EX) P1.1 | 2  | 39 | P0.0 (AD0) |
| P1.2         | 3  | 38 | P0.1 (AD1) |
| P1.3         | 4  | 37 | P0.2 (AD2) |
| (SS) P1.4    | 5  | 36 | P0.3 (AD3) |
| (MOSI) P1.5  | 6  | 35 | P0.4 (AD4) |
| (MISO) P1.6  | 7  | 34 | P0.5 (AD5) |
| (SCK) P1.7   | 8  | 33 | P0.6 (AD6) |
| RST          | 9  | 32 | P0.7 (AD7) |
| (RXD) P3.0   | 10 | 31 | EA/VPP     |
| (TXD) P3.1   | 11 | 30 | ALE/PROG   |
| (INT0) P3.2  | 12 | 29 | PSEN       |
| (INT1) P3.3  | 13 | 28 | P2.7 (A15) |
| (T0) P3.4    | 14 | 27 | P2.6 (A14) |
| (T1) P3.5    | 15 | 26 | P2.5 (A13) |
| (WR) P3.6    | 16 | 25 | P2.4 (A12) |
| (RD) P3.7    | 17 | 24 | P2.3 (A11) |
| XTAL2        | 18 | 23 | P2.2 (A10) |
| XTAL1        | 19 | 22 | P2.1 (A9)  |
| GND          | 20 | 21 | P2.0 (A8)  |

Pinout for the AT89S8252

| Port | I/O | Function                            |
|------|-----|-------------------------------------|
| P0.X | 8   | I/O Box Header (Con 11)             |
| P1.X | 8   | LED x 8 + ISP (3)                   |
| P2.X | 8   | I/O Box Header (Con 9)              |
| P3.X | 8   | Push Button + Serial Communications |

Figure 11

## Device Support Continued

### Atmel 40-pin AVR microcontrollers

| Device Family | Microcontroller Socket | Number Of Pins | RESET Configuration |        |        | ISP |
|---------------|------------------------|----------------|---------------------|--------|--------|-----|
|               |                        |                | Polarity            | Link 3 | Link 4 |     |
| AT90S4414     | U2                     | 40             | LOW                 | 2-3    | 2-3    | YES |
| AT90S8515     | U2                     | 40             | LOW                 | 2-3    | 2-3    | YES |

Figure 12

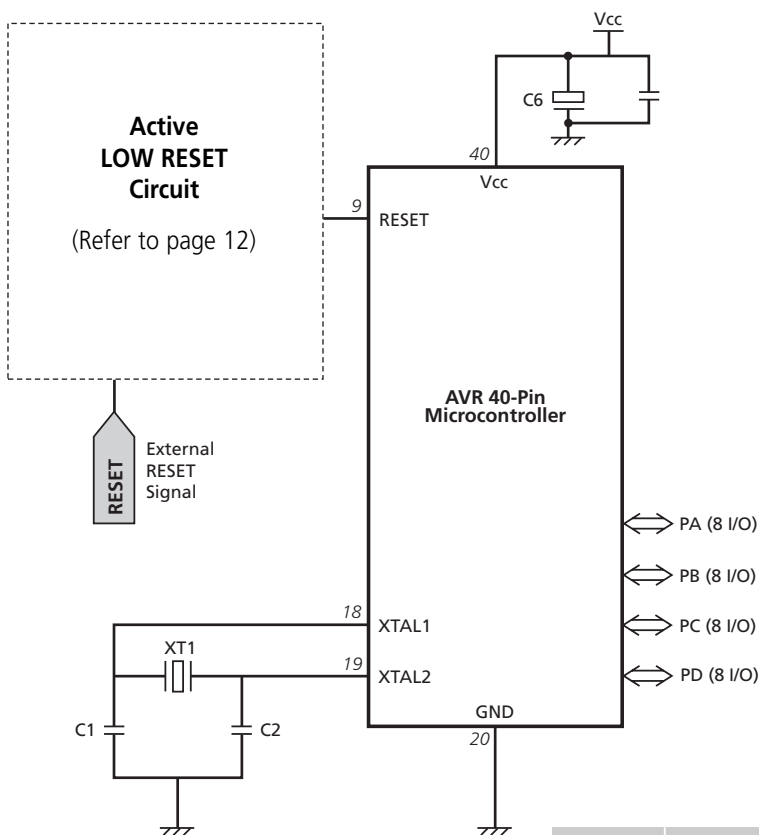


Figure 13

Figure 14

|            |    |    |           |
|------------|----|----|-----------|
| (T0) PB0   | 1  | 40 | VCC       |
| (T1) PB1   | 2  | 39 | PA0 (AD0) |
| (AIN0) PB2 | 3  | 38 | PA1 (AD1) |
| (AIN1) PB3 | 4  | 37 | PA2 (AD2) |
| (SS) PB4   | 5  | 36 | PA3 (AD3) |
| (MOSI) PB5 | 6  | 35 | PA4 (AD4) |
| (MISO) PB6 | 7  | 34 | PA5 (AD5) |
| (SCK) PB7  | 8  | 33 | PA6 (AD6) |
| RESET      | 9  | 32 | PA7 (AD7) |
| (RXD) PD0  | 10 | 31 | ICP       |
| (TXD) PD1  | 11 | 30 | ALE       |
| (INT0) PD2 | 12 | 29 | OC1B      |
| (INT1) PD3 | 13 | 28 | PC7 (A15) |
| PD4        | 14 | 27 | PC6 (A14) |
| (OC1A) PD5 | 15 | 26 | PC5 (A13) |
| (WR) PD6   | 16 | 25 | PC4 (A12) |
| (RD) PD7   | 17 | 24 | PC3 (A11) |
| XTAL2      | 18 | 23 | PC2 (A10) |
| XTAL1      | 19 | 22 | PC1 (A9)  |
| GND        | 20 | 21 | PC0 (A8)  |

Pinout for the AT90S8515 and AT90S4414

Figure 15

| Port | I/O | Function                            |
|------|-----|-------------------------------------|
| PA.X | 8   | I/O Box Header (Con 11)             |
| PB.X | 8   | LED x 8 + ISP (3)                   |
| PC.X | 8   | I/O Box Header (Con 9)              |
| PD.X | 8   | Push Button + Serial Communications |

**PLEASE NOTE:** The Evalu8r module does not support the Atmel AT90S8535 and AT90S4434 40-pin AVR devices

ICP, ALE and OC1B are brought out to Con10

## Device Support Continued

### Atmel 20-pin AVR microcontrollers

| Device Family | Microcontroller Socket | Number Of Pins | RESET Configuration |        |        | ISP |
|---------------|------------------------|----------------|---------------------|--------|--------|-----|
|               |                        |                | Polarity            | Link 3 | Link 4 |     |
| AT90S1200     | U1                     | 20             | LOW                 | 2-3    | 2-3    | YES |
| AT90S1200A    | U1                     | 20             | LOW                 | 2-3    | 2-3    | YES |
| AT90S2313     | U1                     | 20             | LOW                 | 2-3    | 2-3    | YES |

Figure 16

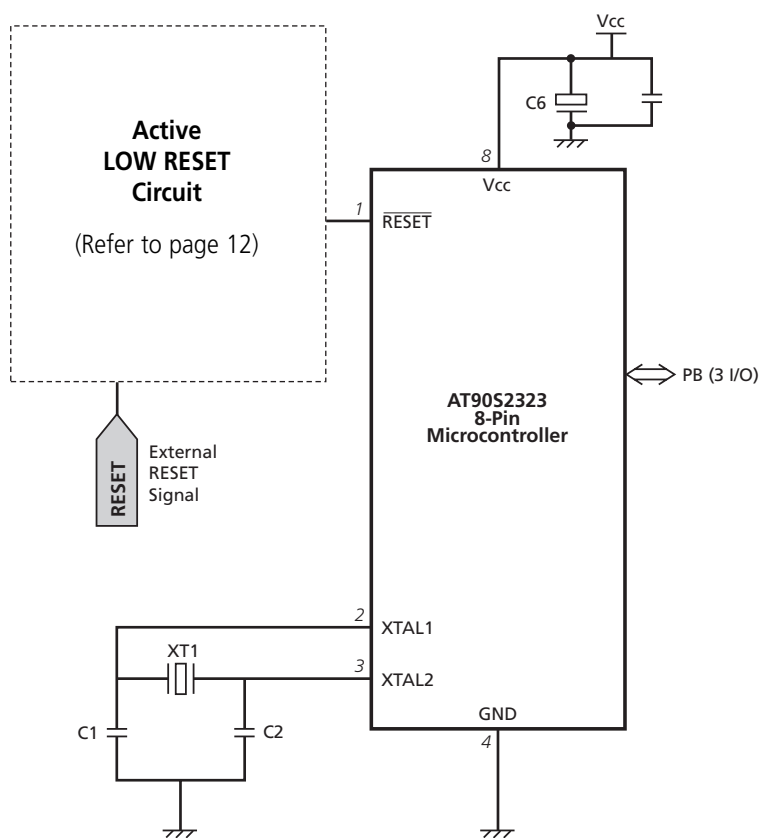


Figure 17

Figure 18

|            |    |    |            |
|------------|----|----|------------|
| RESET      | 1  | 20 | VCC        |
| (RXD) PD0  | 2  | 19 | PB7 (SCK)  |
| (TXD) PD1  | 3  | 18 | PB6 (MISO) |
| XTAL2      | 4  | 17 | PB5 (MOSI) |
| XTAL1      | 5  | 16 | PB4        |
| (INT0) PD2 | 6  | 15 | PB3 (OC1)  |
| (INT1) PD3 | 7  | 14 | PB2        |
| (T0) PD4   | 8  | 13 | PB1 (AIN1) |
| (T1) PD5   | 9  | 12 | PB0 (AIN0) |
| GND        | 10 | 11 | PD6 (ICP)  |

Pinout for the AT90S2313

| Port | I/O | Function                            |
|------|-----|-------------------------------------|
| PB   | 8   | LED x 8 + ISP (3)                   |
| PD   | 8   | Push Button + Serial Communications |

Figure 19

## Device Support Continued

### Atmel 8-pin AVR microcontrollers

Figure 20

| Device Family    | Microcontroller Socket | Number Of Pins | RESET Configuration |        |        | ISP |
|------------------|------------------------|----------------|---------------------|--------|--------|-----|
|                  |                        |                | Polarity            | Link 3 | Link 4 |     |
| <b>AT90S2323</b> | U4                     | 8              | LOW                 | 2-3    | 2-3    | YES |
| <b>AT90S2343</b> | U4                     | 8              | LOW                 | 2-3    | 2-3    | YES |

The Evalu8r module supports the Atmel 8-pin AVR devices. As there are many different modes in which these devices can be used, each pin of the 8-pin socket (U4) has been brought out to a jumper.

The 8-pin AVR table (figure 24) shows how to configure the jumpers so that the AT90S2323 can be operated from an external crystal and also in-system programmed.

| Pin | Function  | Link | Jumper |
|-----|-----------|------|--------|
| 1   | RESET Pin | 12   | 1-2    |
| 2   | XTAL 1    | 7    | 1-2    |
| 3   | XTAL 2    | 8    | 1-2    |
| 4   | GROUND    | 9    | 1-2    |
| 5   | P1.1      | 10   | 2-3    |
| 6   | P1.6      | -    | -      |
| 7   | P1.7      | 11   | 2-3    |
| 8   | Vcc       | -    | -      |

Figure 21

#### AT90S2323 Scenario

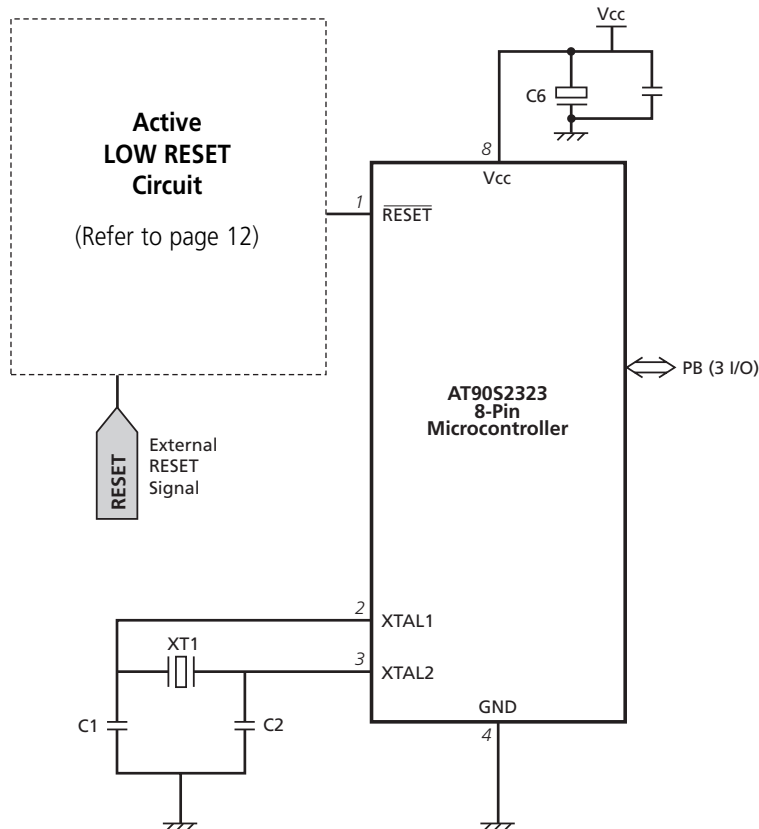
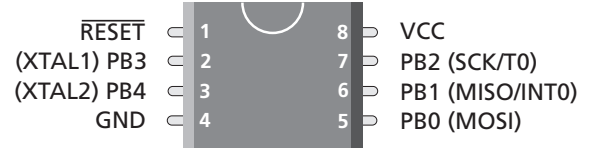


Figure 22

Figure 23



Pinout for the AT90S2323

- Configuration with external Crystal Oscillator

- 3 I/O lines are available

| Port | I/O | Function          |
|------|-----|-------------------|
| PB   | 3   | Spare I/O         |
|      |     | PB2 Con 3 Link 11 |
|      |     | PB3 LED6          |
|      |     | PB0 Con 3 Link 10 |

Figure 24

Device Support Continued

AT90S2343 Scenario

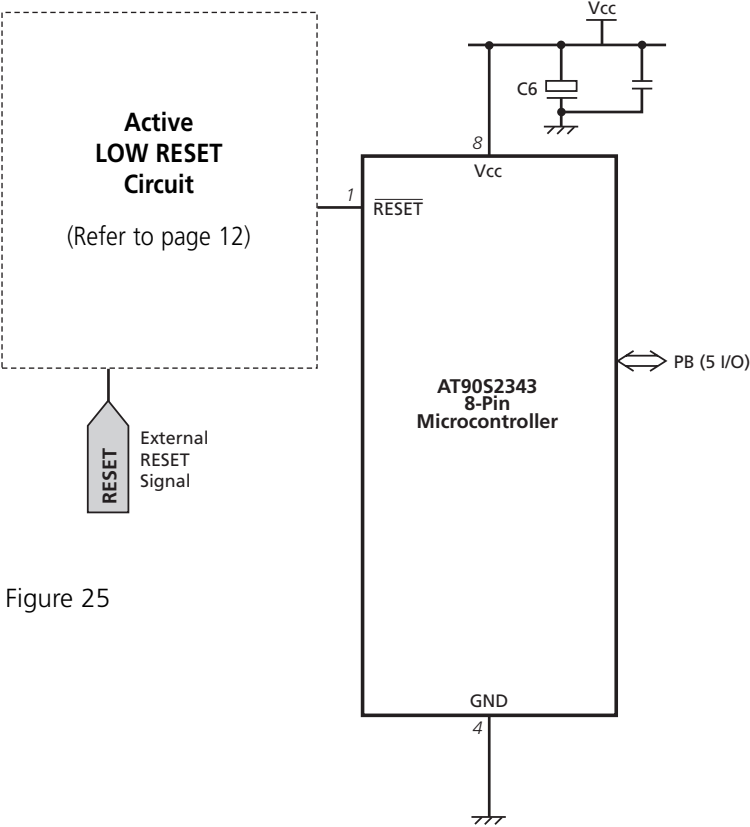


Figure 25

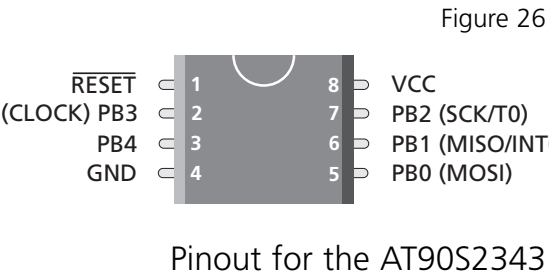


Figure 26

- Configuration with internal RC Oscillator enabled
- 5 I/O lines are available

| Port | I/O | Function        |
|------|-----|-----------------|
| PB   | 5   | Spare I/O       |
|      |     | PB0 Con3 Link11 |
|      |     | PB1             |
|      |     | PB2 Con3 Link11 |
|      |     | PB3 LED6        |
|      |     | PB4             |

Figure 27

## **Device Support** Continued

### **Atmel 8-pin Serial EEPROM Devices**

The Evalu8r module also supports connection of a Serial EEPROM device in the 8-pin socket (U4). The EEPROM power and I/O is configurable via jumpers. For more information on how to set the jumpers for a particular device please refer to the Evalu8r circuit schematic, attached at the back of this guide and consult the relevant data sheet of the EEPROM.

| Device Family | Microcontroller Socket | Number Of Pins |                           |
|---------------|------------------------|----------------|---------------------------|
| <b>24C</b>    | U4                     | 8              | Consult device data sheet |
| <b>25C</b>    | U4                     | 8              | Consult device data sheet |
| <b>93C</b>    | U4                     | 8              | Consult device data sheet |

Figure 28

## RESET Configurations

An important difference between the Atmel 89C/89S and AVR microcontrollers is the polarity of the RESET pin. The 89C/89S devices feature an ACTIVE HIGH Reset, where as the AVR devices feature an ACTIVE LOW Reset. The Evalu8r module features user configurable RESET polarity. It is necessary to change only two jumper settings as detailed below to support either ACTIVE HIGH or ACTIVE LOW RESET polarity.

### Active High RESET Function

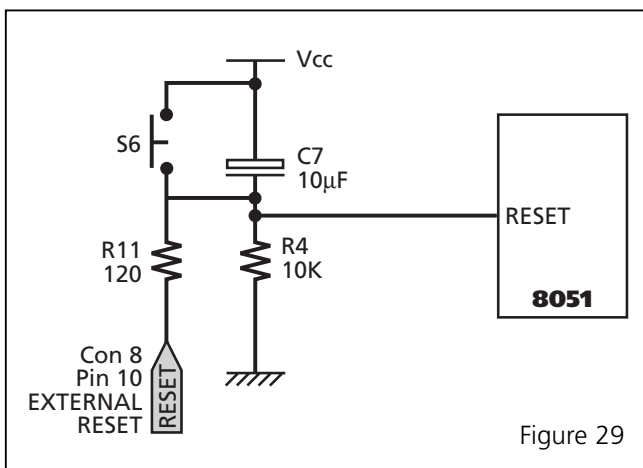


Figure 29

Suitable for 8051 microcontroller family  
e.g. 87C/89C/89S devices

Figure 31

| Link 3 | Link 4 |
|--------|--------|
| 1-2    | 1-2    |

### Active Low RESET Function

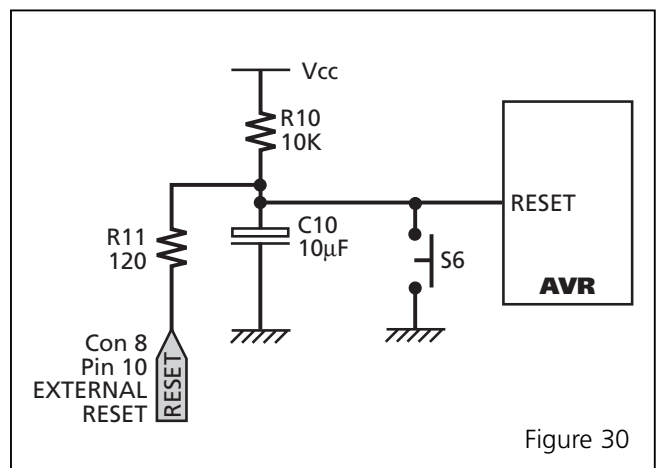


Figure 30

Suitable for:  
All AVR microcontrollers

Figure 32

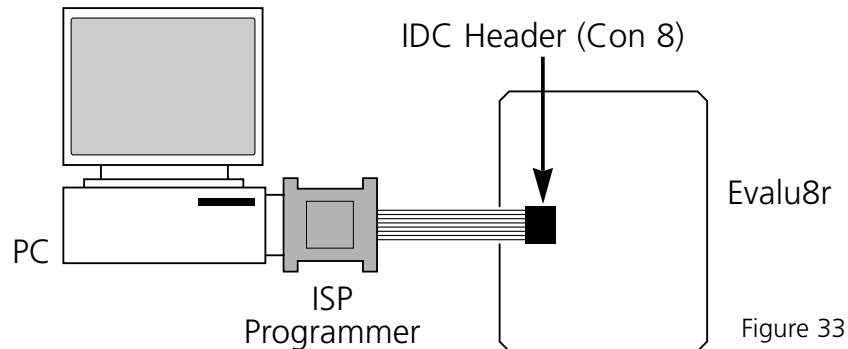
| Link 3 | Link 4 |
|--------|--------|
| 2-3    | 2-3    |

*Please note the use of a C/R RESET circuit  
will not prevent corruption of the on-chip  
AVR EEPROM*



## ISP (In-System Programming)

The Evalu8r is capable of supporting the In-System Programming (ISP) functionality available on the Atmel 89S and 90S(AVR) microcontroller derivatives. To facilitate ISP it is necessary to connect an Equinox 'Micro-ISP' or Activ8r programmer to the ISP header (Con 8) on the module as detailed in the figure below. Alternatively the ISP connection on the Equinox Activ8r may be used to connect to the Evalu8r.



### Prog LED

The Serial programmer will illuminate the 'PROG' LED (LED 9) on the Evalu8r during programming.

### ISP LED's

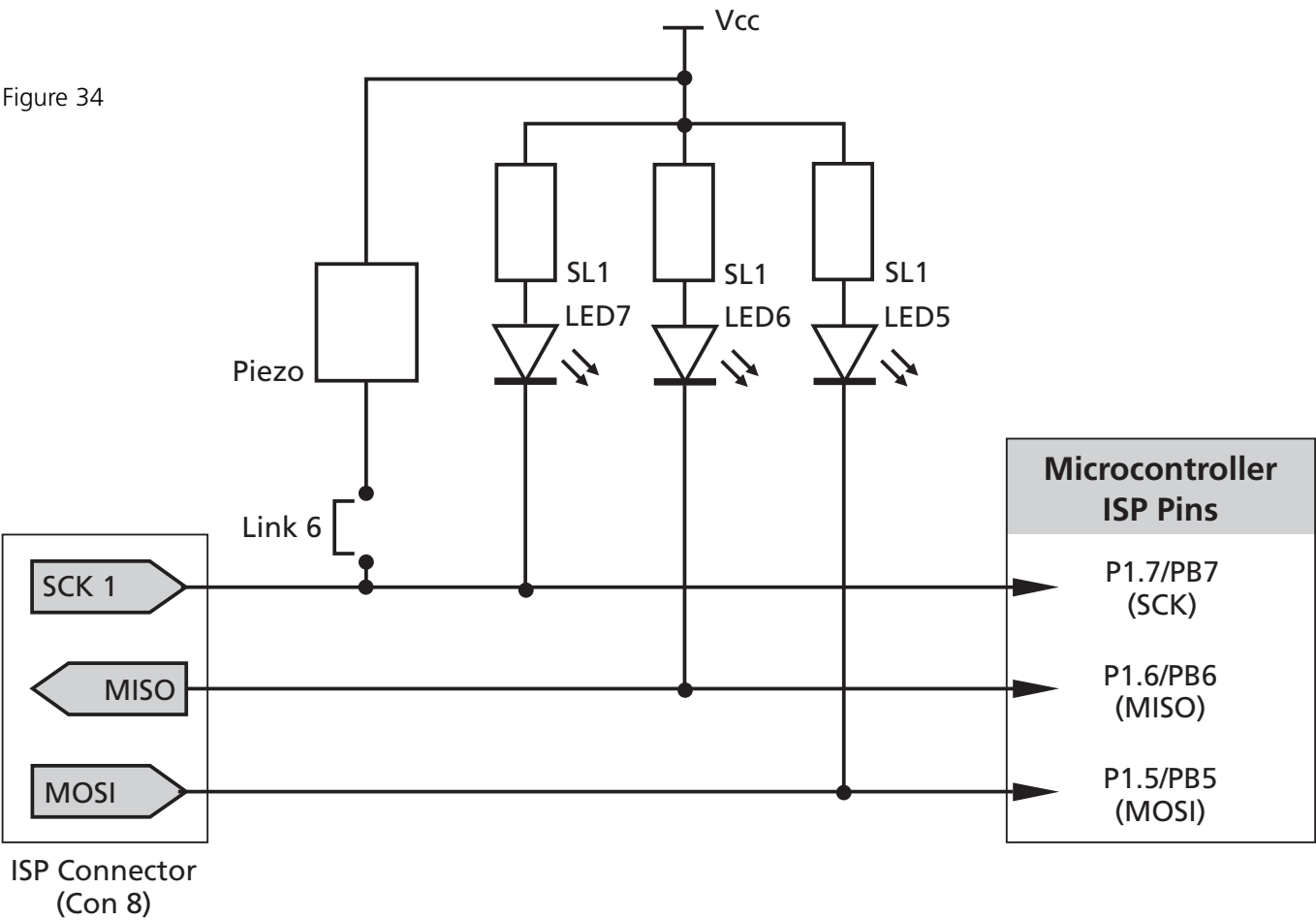
The MOSI/MISO/SCK lines from the serial programmer are shared with LED 5/6/7. During serial programming these LED's will flicker on and off. If any problems are encountered during programming it is possible to disconnect all 8 LED's by removing the resistor SIL pack (SL1).

### Piezo Sounder

The Evalu8r module is shipped with the Piezo Sounder enabled by default. This will make a noise during programming and is useful as an audible indication that ISP is working. To disable the sounder, simply remove link 6.

# Port sharing between ISP and LED's

Figure 34



Port sharing between ISP and LED's etc.

| 8051 | AVR | Function   | ISP  |
|------|-----|------------|------|
| P1.7 | PB7 | LED7/Piezo | SCK  |
| P1.6 | PB6 | LED6       | MISO |
| P1.5 | PB5 | LED5       | MOSI |

Figure 35

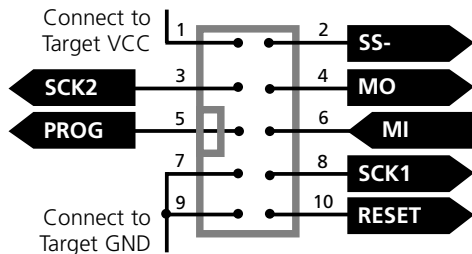
**ISP (In-System Programming)** Continued**10-Way IDC Header  
Top Pin View**

Figure 36

**ISP Connector Con 8****Note:**

*This is the view of the connector fitted to the target (e.g. Evalu8r) board, as seen from above (the component side).*

| Pin | Name            | I/O | Connected to:          |
|-----|-----------------|-----|------------------------|
| 1   | VCC             | -   | Module Vcc             |
| 2   | $\overline{SS}$ | O   | Target $\overline{SS}$ |
| 3   | SCK2            | O   | N/C                    |
| 4   | MO              | O   | Target MOSI            |
| 5   | PROG            | O   | PROGRAM LED            |
| 6   | MI              | I   | Target MISO            |
| 7   | GND             | -   | Module GND             |
| 8   | SCK1            | O   | Target SCK             |
| 9   | GND             | -   | Module GND             |
| 10  | RESET           | O   | Module RESET Circuit   |

Figure 37

## Pin Assignments

### 20-pin microcontrollers

| Pin | 8051  |        | AVR   |       | Function                   | Evalu8r                    |
|-----|-------|--------|-------|-------|----------------------------|----------------------------|
|     | Func1 | Func2  | Func1 | Func2 |                            |                            |
| 1   | RST   |        | RST   |       | RESET pin                  | 8051/AVR/ISP/RESET circuit |
| 2   | P3.0  | (RXD)  | PD0   | (RXD) | Serial UART RECEIVE        | RS-232 Serial RECEIVE      |
| 3   | P3.1  | (TXD)  | PD1   | (TXD) | Serial UART TRANSMIT       | RS-232 Serial Transmit     |
| 4   | XTAL2 |        | XTAL2 |       | Oscillator Output          | Pluggable Crystal          |
| 5   | XTAL1 |        | XTAL1 |       | Oscillator Input           | Pluggable Crystal          |
| 6   | P3.2  | INT0   | PD2   | INT0  | External Interrupt 0       | PB Switch 5                |
| 7   | P3.3  | (INT1) | PD2   | INT1  | External Interrupt 1       | PB Switch 4                |
| 8   | P3.4  | T0     | PD4   | T0    | Timer0 Input               | PB Switch 2                |
| 9   | P3.5  | (T1)   | PD5   | T1    | Timer1 Input               | PB Switch 3                |
| 10  | GND   |        |       |       | System GROUND connection   | GROUND                     |
| 11  | P3.7  |        | PD6   | ICP   |                            | PB Switch 1                |
| 12  | P1.0  | AIN0   | PB0   | AIN0  | Analogue Input 0           | LED 0 or A/D INPUT         |
| 13  | P1.1  | AIN1   | PB1   | AIN1  | Analogue Input 1           | LED 1 or A/D REF           |
| 14  | P1.2  |        | PB2   |       |                            | LED 2                      |
| 15  | P1.3  |        | PB3   | OC1   |                            | LED 3                      |
| 16  | P1.4  |        | PB4   |       |                            | LED 4                      |
| 17  | P1.5  |        | PB5   | MOSI  | SPI - Master OUT, Slave IN | LED 5 & SPI                |
| 18  | P1.6  |        | PB6   | MISO  | SPI - Master IN, Slave OUT | LED 6 & SPI                |
| 19  | P1.7  |        | PB7   | SCK   | SPI - Serial Clock         | LED 7 & SPI                |
| 20  | VCC   |        |       |       | System Vcc                 | Vcc                        |

Figure 38

## Pin Assignments Continued

Figure 39

| Pin | 8051  | Function  | Evalu8r               | AVR   | Function |
|-----|-------|-----------|-----------------------|-------|----------|
| 1   | P1.0  |           | LED1                  | PB0   | T0       |
| 2   | P1.1  |           | LED0                  | PB1   | T1       |
| 3   | P1.2  |           | LED2 or A/D Reference | PB2   | AIN0     |
| 4   | P1.3  |           | LED3 or A/D Input     | PB3   | AIN1     |
| 5   | P1.4  |           | LED4                  | PB4   | SS       |
| 6   | P1.5  |           | LED5 & SPI            | PB5   | MOSI     |
| 7   | P1.6  |           | LED6 & SPI            | PB6   | MISO     |
| 8   | P1.7  |           | LED7 & SPI            | PB7   | SCK      |
| 9   | RST   | Reset Pin | Links 3 & 4/CON8-10   | RESET |          |
| 10  | P3.0  | RXD       |                       | PD0   | RXD      |
| 11  | P3.1  | TXD       |                       | PD1   | TXD      |
| 12  | P3.2  | INT0      | SWITCH 5              | PD2   | INT0     |
| 13  | P3.3  | INT1      | SWITCH 4              | PD3   | INT1     |
| 14  | P3.4  | T0        | SWITCH 2              | PD4   |          |
| 15  | P3.5  | T1        | SWITCH 3              | PD5   | OC1A     |
| 16  | P3.6  |           |                       | PD6   | WR       |
| 17  | P3.7  |           | SWITCH 1              | PD7   | RD       |
| 18  | XTAL2 |           |                       | XTAL2 |          |
| 19  | XTAL1 |           |                       | XTAL1 |          |
| 20  | GND   |           | CON9-10               | GND   |          |
| 21  | P2.0  |           | CON9-2                | PC0   | A8       |
| 22  | P2.1  |           | CON9-3                | PC1   | A9       |
| 23  | P2.2  |           | CON9-4                | PC2   | A10      |
| 24  | P2.3  |           | CON9-5                | PC3   | A11      |
| 25  | P2.4  |           | CON9-6                | PC4   | A12      |
| 26  | P2.5  |           | CON9-7                | PC5   | A13      |
| 27  | P2.6  |           | CON9-8                | PC6   | A14      |
| 28  | P2.7  |           | CON9-9                | PC7   | A15      |
| 29  | PSEN  |           | CON10-4               | OC1B  |          |
| 30  | ALE   |           | CON10-3               | ALE   |          |
| 31  | EA    |           | CON10-2               | ICP   |          |
| 32  | P0.7  |           | CON11-9               | PA7   | AD7      |
| 33  | P0.6  |           | CON11-8               | PA6   | AD6      |
| 34  | P0.5  |           | CON11-7               | PA5   | AD5      |
| 35  | P0.4  |           | CON11-6               | PA4   | AD4      |
| 36  | P0.3  |           | CON11-5               | PA3   | AD3      |
| 37  | P0.2  |           | CON11-4               | PA2   | AD2      |
| 38  | P0.1  |           | CON11-3               | PA1   | AD1      |
| 39  | P0.0  |           | CON11-2               | PA0   | AD0      |
| 40  | Vcc   |           | CON11-1               | Vcc   |          |

## 40-pin microcontrollers

## I/O Headers

### 10-Way IDC Header Top Pin View

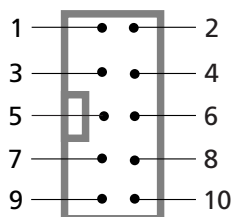


Figure 40

#### Note:

*This is the view of the connector fitted to the target (e.g. Evalu8r) board, as seen from above (the component side).*

The Evalu8r module features two I/O headers which each bring out a full 8-bit microcontroller port plus power and ground

| Connector | 8051 (40-pin) | AVR (40-pin) |
|-----------|---------------|--------------|
| CON 9     | P2.X          | PC0.X        |
| CON 11    | P0.X          | PA0.X        |

Figure 41

| Pin | Name | I/O |
|-----|------|-----|
| 1   | Vcc  | -   |
| 2   | PX.0 | I/O |
| 3   | PX.1 | I/O |
| 4   | PX.2 | I/O |
| 5   | PX.3 | I/O |
| 6   | PX.4 | I/O |
| 7   | PX.5 | I/O |
| 8   | PX.6 | I/O |
| 9   | PX.7 | I/O |
| 10  | GND  | -   |

Figure 42

## LED Port

The Evalu8r module features 8 LED's connected to one contiguous 8-bit microcontroller I/O port. As some of the I/O ports have dual functionality it is necessary to set certain jumpers to ensure that all 8 LED's are connected.

The table below shows jumper settings and also the port assignments for 8051 & AVR microcontrollers.

To disconnect all LED's simply remove the resistor SIL pack SL1.

| LED | Jumper Settings | 8051 | AVR |
|-----|-----------------|------|-----|
| 1   | Link 1 1-2      | P1.0 | PB0 |
| 2   | Link 2 1-2      | P1.1 | PB1 |
| 3   | -               | P1.2 | PB2 |
| 4   | -               | P1.3 | PB3 |
| 5   | -               | P1.4 | PB4 |
| 6   | -               | P1.5 | PB5 |
| 7   | -               | P1.6 | PB6 |
| 8   | -               | P1.7 | PB7 |

Figure 43

### High RESET Function

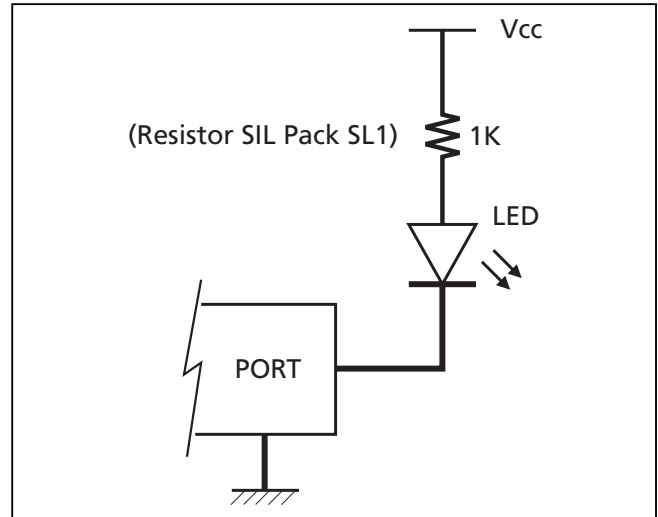


Figure 44

## AVR™ Support Products

| Order code                                                    | Description                                                                    |
|---------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>PROGRAMMING SYSTEMS</b>                                    |                                                                                |
| AVR2-ST                                                       | Professional AVR Microcontroller Starter System                                |
| AVR1-8K-DV                                                    | Professional AVR Microcontroller Development System                            |
| AVR1-820K                                                     | Atmel AT90S1200/AT90S23x3 AVR Microcontroller Starter Kit                      |
| MPW-PLUS                                                      | Micro-Pro Professional Device Programming System                               |
| UISP-S3-SYS                                                   | Micro-ISP Series III Professional Serial Programming System                    |
| UISP-UPG1                                                     | Micro-ISP Upgrade: Atmel ATmega programming support                            |
| ACT-UPG1                                                      | Activ8r Upgrade: Atmel ATmega programming support                              |
| UISP-EXP1                                                     | Low Voltage (+3V) In-System Programming (ISP) Expansion Module                 |
| <b>EVALUATION/OEM MODULES</b>                                 |                                                                                |
| OEM-UC-20/40                                                  | Universal 8051/AVR Microcontroller OEM Module                                  |
| EVALU8R-1P                                                    | Evalu8r - Universal 8051/AVR Microcontroller Evaluation Module                 |
| <b>PACKAGE ADAPTORS ETC.</b>                                  |                                                                                |
| AD-PLCC44-A                                                   | Programming adaptor - 44-pin PLCC to DIL-40                                    |
| AD-DIL40-PLCC44-A                                             | Emulation adaptor - 44-pin PLCC on target system to 40-pin DIL                 |
| AD-SOIC20-A                                                   | Microcontroller Programming adaptor - 20-pin SOIC to 20-pin DIL                |
| AD-SOIC8-A                                                    | Microcontroller Programming adaptor - 8-pin SOIC to 8-pin DIL                  |
| AD-8535-A                                                     | Parallel programming adaptor - Atmel AT90S8535/AT90S4434 (40-pin DIL)          |
| AD-TQFP44-A                                                   | Programming adaptor - 44-pin TQFP to 40-pin DIL                                |
| SS-90S8515-P                                                  | ISP Socket Stealer Module fitted with Atmel AT90S8515 microcontroller (DIL)    |
| SS-90S8515-J                                                  | ISP Socket Stealer Module fitted with Atmel AT90S8515 microcontroller (PLCC)   |
| <b>AVR BASIC Programming Language</b>                         |                                                                                |
| AVR-BAS-LITE                                                  | AVR BASIC LITE Version (1K bytes - AT90S1200 support only)                     |
| AVR-BAS-8K                                                    | AVR BASIC 8K Version (8K bytes - All AVR derivatives supported)                |
| AVR-BAS-FULL                                                  | AVR BASIC Full Version (8K bytes - All AVR derivatives supported)              |
| AVR-BAS-8KF                                                   | AVR BASIC 8K to FULL version upgrade                                           |
| <b>IAR AT90S Language Tools</b>                               |                                                                                |
| EWA90BAS-EE                                                   | "IAR Baseline Tool Set" - C compiler, assembler, debugger (8K code limit)      |
| EWA90                                                         | "IAR Full AT90S Version" - C compiler, assembler, debugger (unrestricted code) |
| <b>DO-BOX (Dynamically Optimised BASIC Box) + Accessories</b> |                                                                                |
| DOBOX-ST1                                                     | DO-BOX Starter System 1                                                        |
| DOBOX-DV1                                                     | DO-BOX Development System 1                                                    |
| DOBOX-MOD1                                                    | DO-BOX Module 1                                                                |
| DOBOX-PM1                                                     | DO-BOX Prototyping Module                                                      |
| DOBOX-AM1                                                     | DO-BOX Applications Module 1                                                   |
| <b>LITERATURE</b>                                             |                                                                                |
| CD-AT98                                                       | Atmel CD-ROM Databook 1998                                                     |
| DB-AVR-981                                                    | Atmel AVR Microcontroller Data Book (Paper format)                             |
| MAN-AVRBAS-REF                                                | AVR BASIC Reference Guide                                                      |
| MAN-AVRBAS-GS                                                 | AVR BASIC Getting Started Guide                                                |
| <b>MISCELLANEOUS</b>                                          |                                                                                |
| CAB-SER1                                                      | PC Serial Cable Adaptor Kit (9W-25W & 25W-9W)                                  |
| CAB-PAR25MM                                                   | PC Parallel Cable (25W to 25W M/M 2M)                                          |





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