



Turning Ideas Into Reality

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SIO8 IC

Stand Alone UART IC

8 bits of input and 8 bits of output

General Description

The SIO8 IC is a stand alone UART designed to provide 8 bits of input and output data to connect to RS-232, USB, RS-485, Ethernet or directly to your UART. Outputs can be used to drive relays, logic, optocouplers or a transistors. Inputs can be from switches, relay contacts, logic, optocouplers or a transistor switched to ground. The SIO8 has internal pull resistors on most inputs to minimize additional parts. If the MODE pin is open or high, the data on the IA0-7 pins are transmitted only after a byte is received on the SIN- pin. If the MODE pin is low, the SIO8 IC transmits data anytime the inputs change or every of 100 mS, or 1000 mS, depending on the state of the SPD pin. A positive pulse is generated on the RXP pin every time a byte is received on the SIN- pin. The serial format to the SIO8 is standard asynchronous format, using 8 bits, 1 stop and no parity at 9600 BPS. Other formats and encoding are available, contact the factory. A .1 uF bypass capacitor is suggested across the VDD and VSS pins. The part uses the standard 28 pin .3 inch width SOIC package.

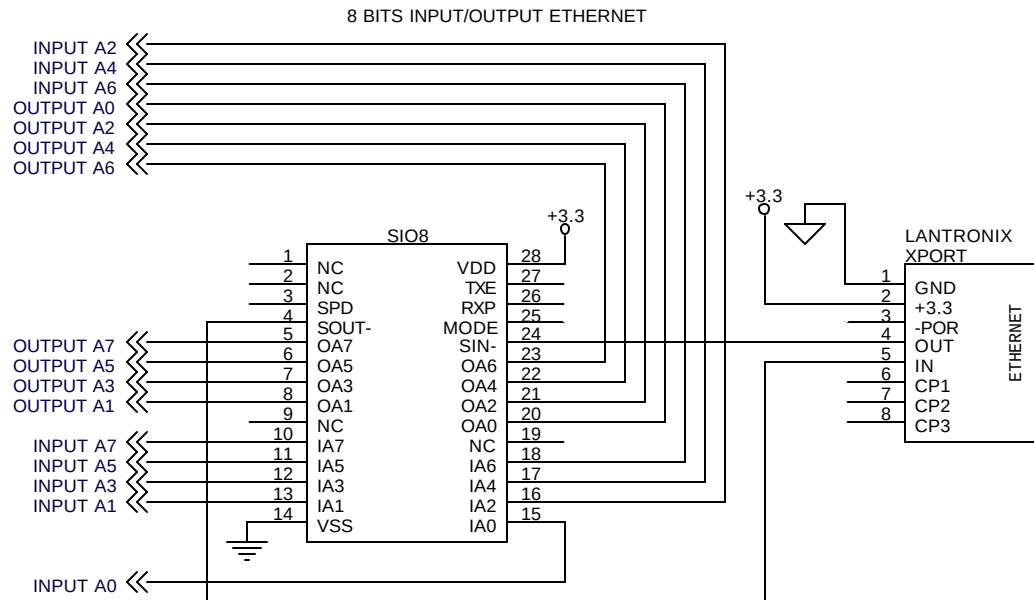
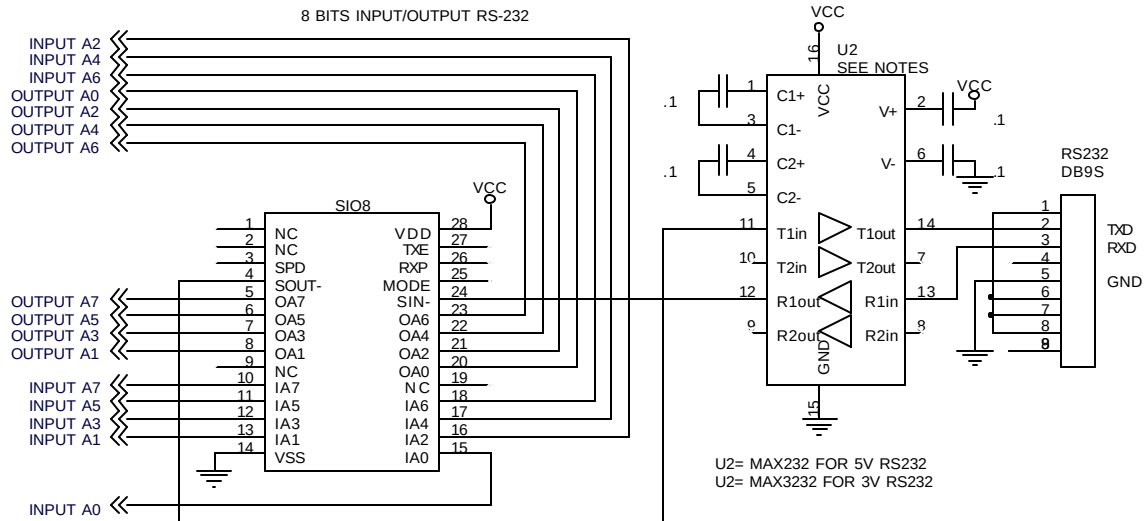
Features

- Asynchronous serial control for 8 bits of input and 8 bits of output.
- Can connect with RS-232, RS -485, USB or Ethernet or UART.
- Inputs can be switches, relay contacts, optocouplers, and logic.
- On chip input pull up resistors on most inputs.
- Outputs can be used to drive relays, transistors, optocouplers, and logic.
- No external parts required.
- Low power consumption 5 mA typical.
- Supply voltage 2.4 to 5.25 volts.
- All timing internally generated.
- TTL and CMOS compatible outputs.
- Part is in full production.
- SOIC and DIP 28 Pin Package.
- ROHS Compliant
- Low EMI

Applications

- Input Output Expansion
- Remote control
- Process control
- Building Automation
- Off site monitoring
- Security systems
- Internet of things
- Machine control

Example Circuits





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Pin Description

Pin #	Description	Pin #	Description
1	NC	28	VDD
2	NC	27	TXE
3	SPD	26	RXP
4	SOUT-	25	MODE
5	OA7	24	SIN-
6	OA5	23	OA6
7	OA3	22	OA4
8	OA1	21	OA2
9	NC	20	OA0
10	IA7	19	NC
11	IA5	18	IA6
12	IA3	17	IA4
13	IA1	16	IA2
14	VSS	15	IA0

OA0-7

These output bits are set when a byte is received on the SIN- pin. Output drivers may be required for high power loads. The RXP pin generates a positive pulse after these bits are set.

SIN-

This is the serial input pin. It may be tied directly to the UART transmitter output of your UART or microprocessor; to a RS-232 receiver such as the MAX232; an Ethernet interface such as the Lantronix Xport; or a USB IC such as the FT232. This pin is high in the idle state, the input format is 8 bits, 1 stop, no parity at 9600 BPS. Other formats and baud rates are available, please contact the factory for information. The byte received on this pin will be transferred to the OA0-7 pins, then a positive pulse is generated on the RXP output. This pin does not have an internal pull up resistor. It is recommended your software periodically send the byte that is transferred to the OA0-7 pins even if they have not changed to recover from communications errors or power failures.

You can drive this input with any hexadecimal terminal program like REALTERM for testing and development.

SOUT-

This is the serial output pin. It may be tied directly to the UART receiver input of your UART or microprocessor; to a RS-232 driver such as the MAX232; an Ethernet interface such as the Lantronix Xport, or a USB IC such as the FT232. This pin sends the data on the IA0-7 pins, adding start and stop bits. See the description of the MODE pin to determine when this data will be sent. This pin is high in the idle state, the output format is 8 bits, 1 stop, no parity at 9600 BPS. Other output formats and baud rates are available, please contact the factory for information.

You can monitor this output with any hexadecimal terminal program like REALTERM. Hyperterm does not display in hexadecimal.

IA0-7

These are the input bits that will be transmitted on the SOUT- pin. These inputs have internal pull up resistors.



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MODE

This pin determines the transmit mode. If this pin is high or open, the SIO8 transmits the data on the IA0-7 pins only after a byte is received on the SIN- pin. In this case, a byte must be written to the OA0-7 pins to read the inputs on the IA0-7 pins.

If this pin is low or grounded, the SIO8 transmits data anytime the inputs on the IA0-7 pins change, or the delay determined by the SPD pin times out. If the pin is low or grounded, a full duplex channel must be used, and RS-485 may not be used for the interface, as RS-485 is half duplex. This input has an internal pull up resistor.

SPD

This pin determines the delay before retransmit if the inputs do not change. If this pin is low or grounded, the delay is 1000 mS, if this pin is high or open, the delay is 100 mS. This input has an internal pull up resistor. If the MODE pin is high or open, this input has no effect.

RXP

This pin outputs a positive pulse after a byte is received on the SIN- pin and the bits are placed on the OA0-7 pins.

TXE

This pin goes high while the byte on the SOUT- pin is being transmitted. This pin goes low again after the stop bit has been sent. This pin is designed to drive the RE - (receiver enable) and DE (driver enable) pins on a RS-485 driver IC. Please note, in RS-485 applications, an external pull up resistor is required on the SIN- pin. Mode pin must be high or open for RS-485 applications, requiring a write to the output byte first, to be able to read the new input byte.

VSS

Connect to system ground.

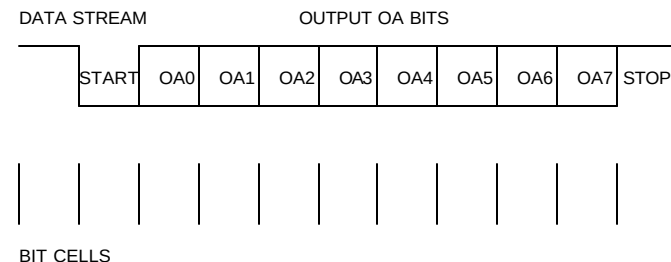
VDD

Connect to supply voltage of 2.4 to 5 volts. A .1 uF decoupling capacitor to ground is recommended.

NOTES:

Make no connection to the NC pins. Pins 9 and 19 must be left unconnected.

Serial Input Stream



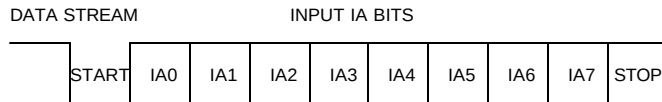
When a byte is received on the SIN- pin the byte is placed on the OA0-7 pins. The SIO8 automatically removes start and stop bits from the data stream. The data is format is 9600 BPS, 8 bits, 1 stop, no parity. After the data is placed on the OA0-7 pins, the RXP pin generates a positive pulse.



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Serial Output Stream



BIT CELLS

(MODE=low or grounded)

When the input bits on IA0-7 change, or the 100 mS or 1000 mS (depending on the state of the SPD pin) delay times out, the SIO8 transmits one byte on the SOUT- pin. The bits from IA0-7 are transmitted. The SIO8 automatically adds start and stop bits to the data stream. The data is transmitted at 9600 BPS, 8 bits, 1 stop, no parity.

(MODE=high or open)

After a byte is received on the SIN- pin the SIO8 transmits one byte on the SOUT- pin. The bits from IA0-7 are transmitted. The SIO8 automatically adds start and stop bits to the data stream. The data is transmitted at 9600 BPS, 8 bits, 1 stop, no parity.

Absolute Maximum Ratings

Symbol	Description	Min	Typical	Max	Units	Notes
T _{stg}	Storage Temperature	-55	25	+100	°C	
T _a	Operating Temperature	-40		+85	°C	
V _{dd}	V _{dd} - V _{ss} Voltage	-0.5		+6.0	V	
V _{io}	Input Voltage	V _{ss} - 0.5		V _{dd} +0.5	V	
I _{mio}	Maximum current into any pin	-25		+50	mA	
ESD	Electrostatic Discharge Voltage	2000			V	Human Body Model ESD
LU	Latch up current			200	mA	

DC Electrical Characteristics

Symbol	Description	Min	Typical	Max	Units	Notes
V _{dd}	Supply Voltage	2.4		5.25	V	
I _{dd}	Supply Current		5	8	mA	Note 1
V _{oh}	High Output Level	V _{dd} - 1.0			V	I _{oh} =10 mA
V _{ol}	Low Output Voltage			0.75	V	I _{ol} =25 mA
V _{ih}	Input High Level	2.1			V	
V _{il}	Input Low Level			0.8	V	
I _{oh}	High Level Source Current			10	mA	
I _{ol}	Low Level Sink Current			25	mA	
C _{io}	Capacitive load		3.5	10	pF	
I _l	Input leakage		1		nA	
R _{pu}	Pull Up Resistors On Inputs IA0-6	4	5.6	8	k?	

Note 1: Vdd=5VDC, all inputs and outputs open



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Theory Of Operation

The SIO8 IC is a custom programmed microprocessor designed to monitor and control a serial input/output stream.

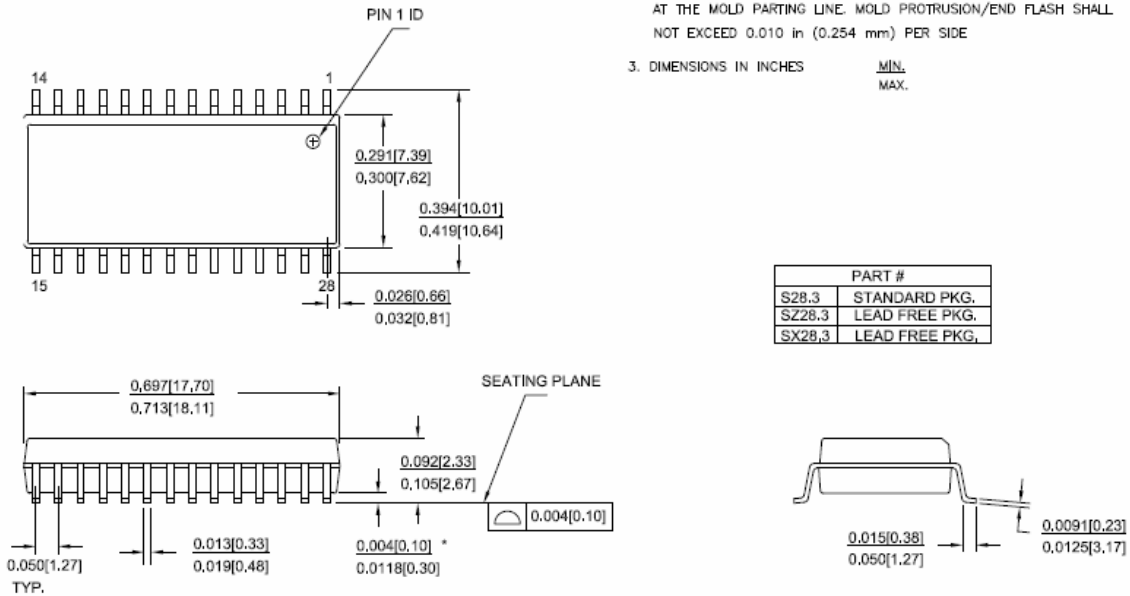
When a byte is received on the SIN- pins, it is placed on the OA0-7 pins and generates a positive pulse on the RXP pin.

If the mode pin is low or grounded anytime an input IA0-7 changes, or the 100 mS or 1000 mS timer expires, the part transmits the data on the IA0-7 pins.

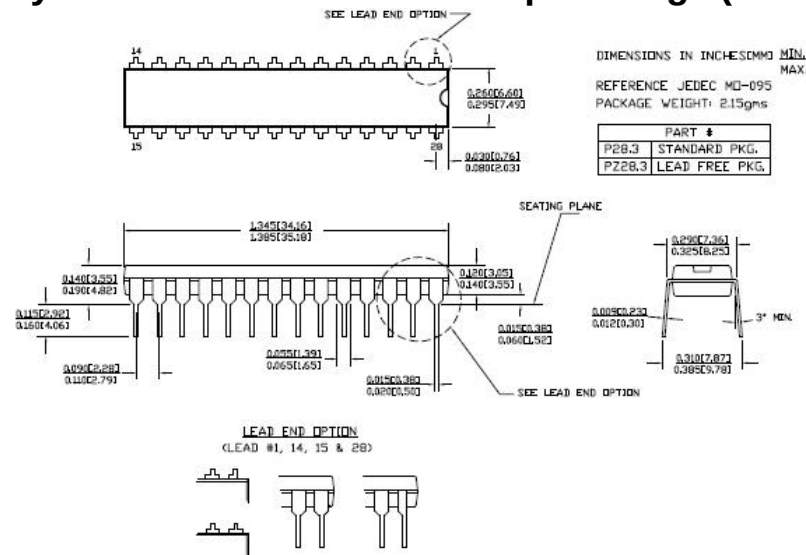
If the mode pin is high or open, the SIO8 IC transmits only after a byte is received on the SIN- pin.

The data is standard asynchronous format 8 data bits, 1 stop bit and no parity. Baud rate is 9600 BPS. It is recommended that the OA0-7 byte be sent periodically even if there is no change, to recover from power failure or serial data errors.

Physical Dimensions SOIC-28



Physical Dimensions 28 Pin Dip Package (-DIP Suffix)



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