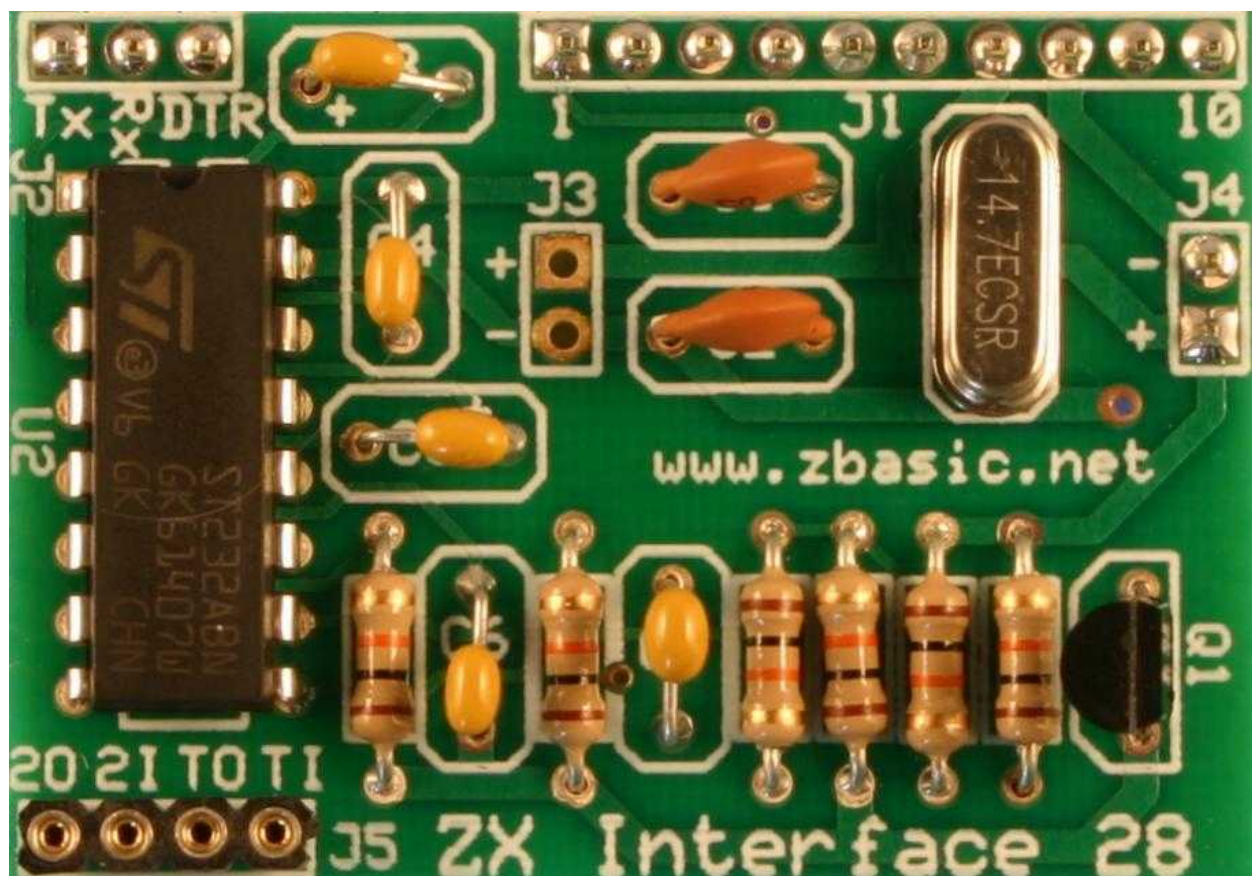


ZX-28 Interface Module Reference Manual



Version 1.0

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Table of Contents

Introduction 1

Connections and Jumpers 1

 J1 1

 J2..... 2

 J3, J4 2

 J5..... 3

Assembly Procedure..... 3

Schematic..... 4

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ZX-28 Interface Module

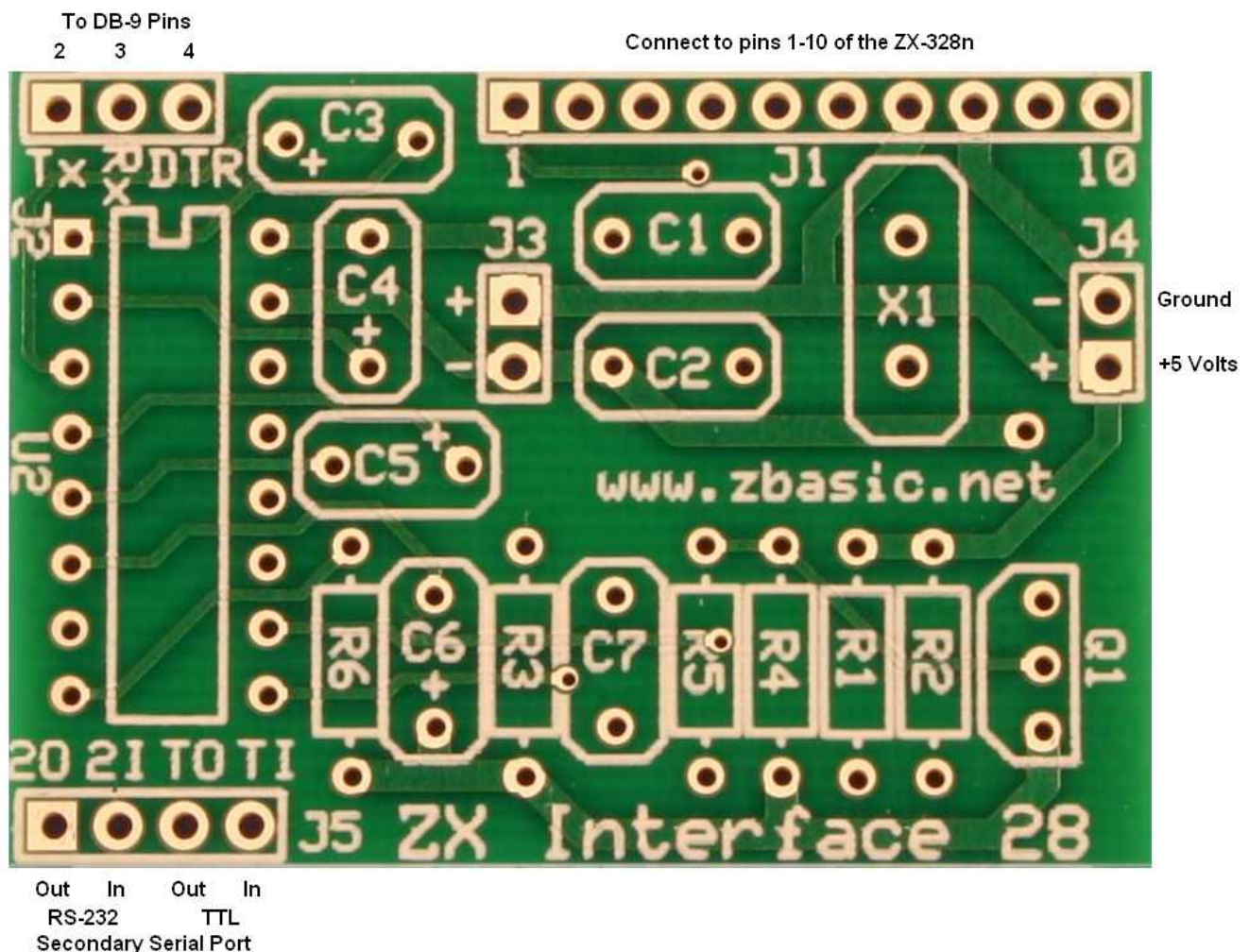
Introduction

The ZX-28 Interface Module (for brevity, Module hereafter) is intended to simplify the prototyping of a project using a ZX-328n or similar compatible 28-pin ZX device. It provides most of the external circuitry (e.g. crystal, serial level converter) that is necessary to support a 28-pin ZX microcontroller. It could also be used for other ZX devices that do not require external EEPROM for Program Memory.

The Module is provided as a kit to be assembled by the purchaser. It is designed to be plugged into a solderless breadboard but it may be wired directly to another circuit assembly if desired.

Connections and Jumpers

The Module connects to a ZX device via J1. It also provides RS-232 signal level conversion for Com1 via J2 and supports two additional level conversion paths (one input and one output) via J5. The annotated image below illustrates the layout of the Module's PCB.



J1

The pins of J1, marked as 1 through 10, and are intended to be connected to the corresponding pins of a ZX-328n or similar compatible 28-pin ZX device.

J2

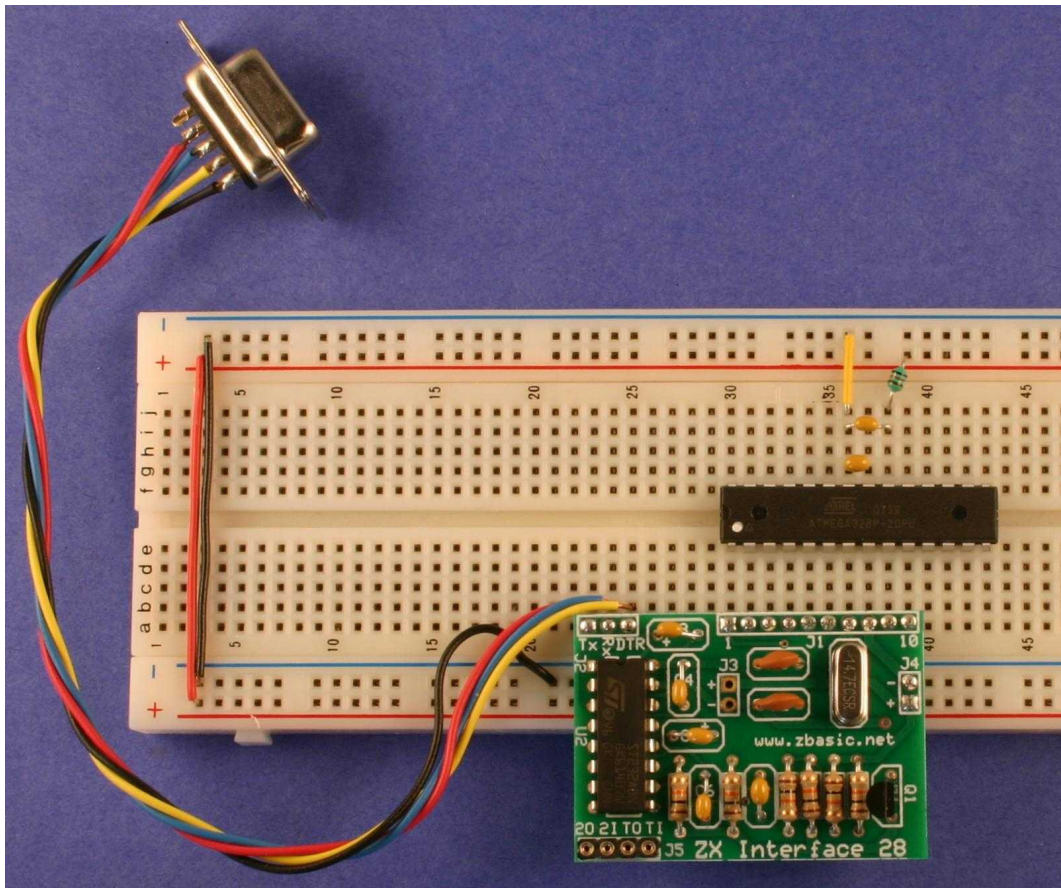
These connections provide the RS-232 level signals that are usually connected to a DB-9 serial connector as indicated in the table. Note that pin 5 of the DB-9 must be connected to the same ground as the interface board itself.

J2 Signals			
Signal	Direction	DB-9 Pin	Description
TxD	Output	2	Transmit Data
RxD	Input	3	Receive Data
DTR	Input	4	ATN signal
	Common	5	RS-232 ground

J3, J4

Either of these connections may be used to convey power to the Module. Note that J3 and J4 are oriented backwards with respect to one another. In most cases, you will choose to use either J3 or J4, but not both, depending on how you connect the Module to the external circuitry.

The physical spacing of the holes of J1, J2, J3 and J4 is designed to mate to a standard solderless breadboard that has an array of holes on 0.100" centers. The spacing between the holes of J1/J2 and the closest hole of J3/J4 is 0.300". Note that the holes of J3/J4 align with the outermost holes of J1. Although many or most solderless breadboards are compatible with this physical layout, not all are so you'll need to check yours carefully before attempting to install the Module on the solderless breadboard. The picture below shows the Module with square pins installed and plugged into a compatible solderless breadboard.



ZX-28 Interface Module Connected to a ZX-328n on a Solderless Breadboard

J5

This connection may be used for the level conversion for a secondary serial port. The TI and TO connections are the TTL input and output to/from the level converter while the 2I and 2O connections are the RS-232 level input and output. The picture on the preceding page shows the supplied SIP socket strip is installed in this connection. This facilitates connection by inserting wires (24 ga. maximum) into the sockets.

Required Components

The components required to support a 28-pin ZX device are listed in the table below. Note that three of the components are not mounted on the circuit board – one 100nF capacitor, one 10nF capacitor and the inductor.

Quantity	Description	Component Designators
1	ST232A RS-232 level converter	U1
1	Crystal, 14.7456MHz, 18pF	X1
1	Transistor, NPN, 2N3904	Q1
6	Resistor, 10K ohm, ¼ watt	R1, R2, R3, R4, R5, R6
2	Capacitor, ceramic, 27pF	C1, C2
5	Capacitor, ceramic, 100nF	C3, C4, C5, C6
2	Capacitor, ceramic, 10nF	C7
1	Inductor, 10uH, 200mA	

Assembly Procedure

The assembly sequence isn't critical so you may perform the steps in any convenient order. Note carefully the orientation marks for the ICs. Pin 1 of each has a square pad while the remaining ones are round.

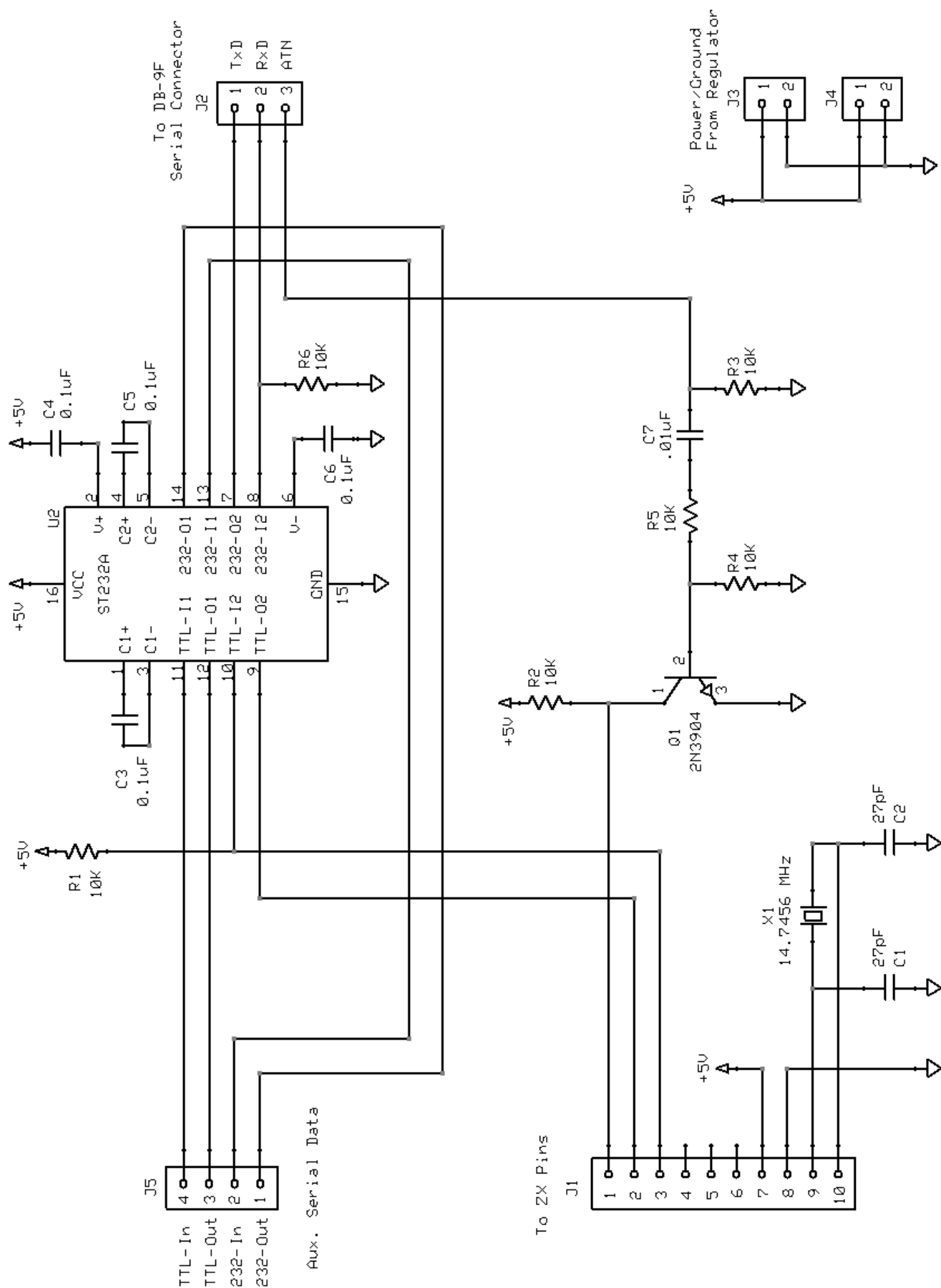
All six resistors are the same value – 10K. The inductor, which looks similar to a resistor, is not mounted on the board. Rather, it is connected between +5 supply and pin 20 of the ZX-328n as shown in the photo on the previous page.

There are three different capacitor values in the kit. C1 and C2 are 27pF capacitors. They are marked simply with “27”. C3 through C6 are 100nF capacitors, marked with “104”. C7 is a 10nF capacitor, marked with “103”. The remaining two capacitors, one 100nF and one 10nF, are filtering capacitors should be connected directly across pins of the ZX-328n on your breadboard as shown in the photo on the preceding page. The 100nF should be connected between pins 20 and 22 and the 10nF should be connected between pins 21 and 22. Pin 22 should also be grounded.

The transistor Q1 must be installed with its flat face toward the edge of the board. The crystal, X1, may be installed in either orientation.

If you plan to solder square pins to the board to connect the Module to a solderless breadboard, the simplest way to get them mounted squarely is to insert the square pins for J1, J2 and J3/J4 into the solderless breadboard and then place the board over the pins and solder them in place. This ensures that the pins are not misaligned. Whether you use J3 or J4 depends on how you configure the power and ground busses on your solderless breadboard but only one of them should be connected.

Schematic



A larger version of this schematic is available at http://www.zbasic.net/doc/ZX-28_Interface/schematic.jpg.