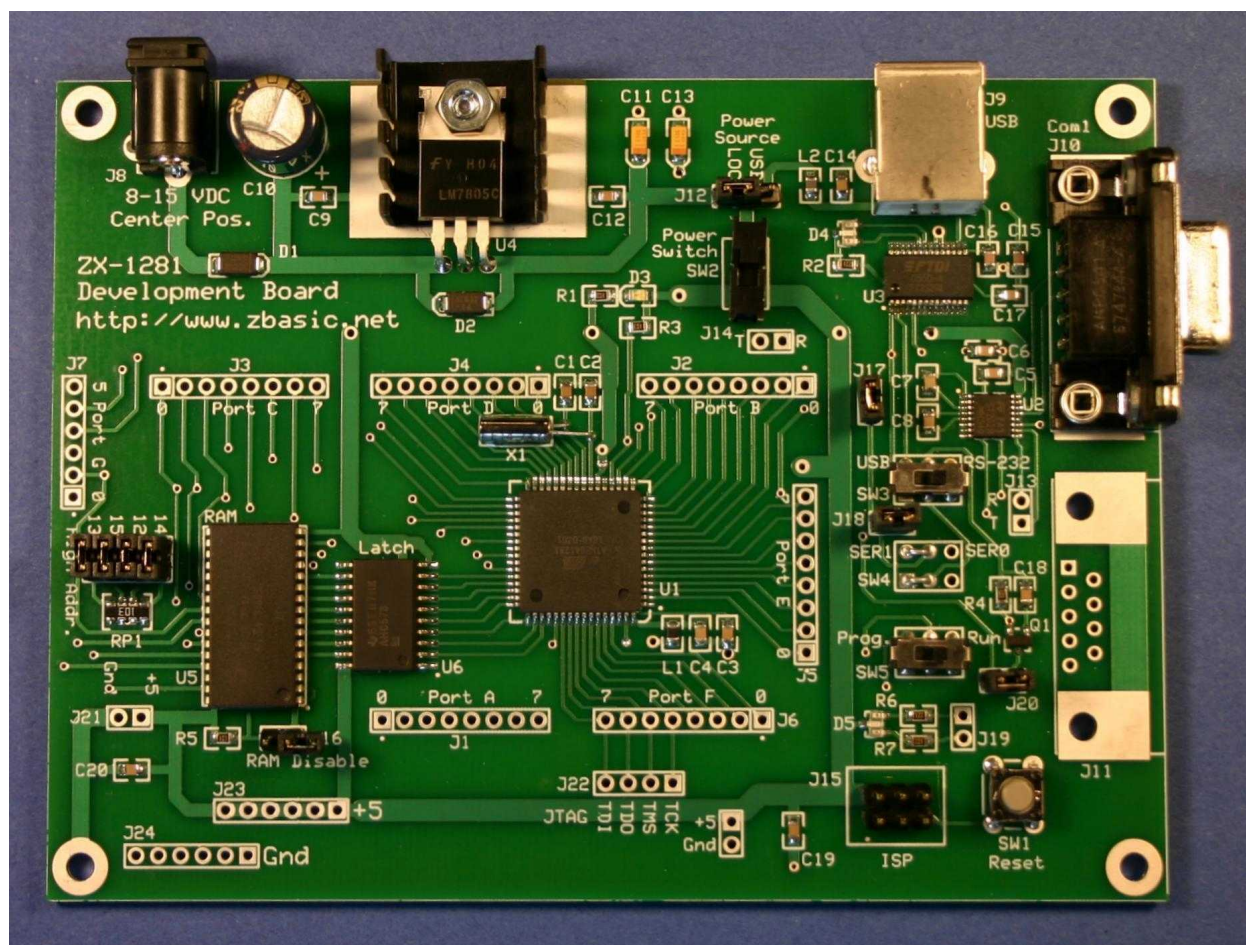


ZX-1281/ZX-1281n Development Board Reference Manual



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ZX-1281/ZX-1281n Development Board

Introduction

The ZX-1281/ZX-1281n Development Board (for brevity, Dev Board hereafter) is intended to be used to facilitate the construction and testing of a prototype ZX-1281 or ZX-1281n application. There are several configuration options on the Dev Board. For example, the Dev Board can be powered from the USB hub or from an external supply via the on-board regulator. Also, the on-board expansion RAM may be enabled or disabled.

The Dev Board, which includes a ZX-1281 or ZX-1281n processor, is provided completely assembled and ready to use. However, depending on the intended use, you may wish to install the SIP sockets or solder jumper wires to one or more of the I/O port connectors. Although your board may have either a ZX-1281 or a ZX-1281n, in the remainder of this document the notation ZX-1281 refers to either chip. Note that a ZX-1281n chip is distinguished by a white paint dot near pin 1.

This document applies to Rev. 3 boards. Earlier revision boards are similar but not identical.

Preparation for Use

The jumpers and switches are set at the factory assuming that the Dev Board will be powered via the on-board regulator and that a standard serial port will be used for communication with the ZX-1281. If this is how you intend to operate it, simply connect an external supply to J8, connect your serial cable to J10 and activate the power switch. You should then see the output from the default “Hello, world” program, confirming that the ZX-1281 is operating correctly and ready to accept your program. You will have to select the correct serial port in the IDE if you end up using a serial port other than Com 1. Select “Serial Port Options...” on the Options menu to make the change.

If you intend to use the USB interface, several additional steps will be required. Firstly, change the switch SW3 to the “USB” position. If you also intend to power the Dev Board from your USB hub, move jumper J12 to the “USB” position as well. Otherwise, connect an external power supply to J8. Connect a standard USB A-B cable between J9 of the Dev Board and your USB hub. When the power switch is activated, you should see several flashes on the Red/Green LED (D4, near the J9 connector). If you have previously installed compatible FTDI FT232R drivers, your OS should recognize the USB device on the Dev Board and automatically install drivers for it. Otherwise, you’ll need to download drivers from the FTDI site and install them manually. The FT232R drivers are available directly from FTDI at <http://www.ftdichip.com/Drivers/VCP.htm>. Note that the CDM driver is not available for all operating systems. Be sure to download the drivers for the FT232R device that match your OS.

Connections and Jumpers

J1-J7

The signals available on the connection points marked J1 through J7 are the corresponding bits of the I/O ports A through G, respectively. Except for Port G (J7), each connection comprises 8 connection points marked 0 through 7 corresponding to the bits of the port. Port G comprises only 6 bits.

J8

This coaxial connection may be used to provide unregulated or lightly regulated DC power to the Dev Board. The connector is compatible with a female coaxial connector that has an external barrel diameter of 5.5mm and an internal socket diameter of 2.1mm. Typically, power will be derived from an inexpensive “wall wart” type transformer with an output of 7.5V to 12V DC. The polarity of the supply should be center positive. The power is applied to the Dev Board through a diode so accidental reverse polarity will not harm the board.

J9

The Dev Board can be connected to a USB hub via a standard USB cable (not included) that has a Type A connector on one end (plugs into the hub) and a Type B connector on the other end (plugs into the J9 jack on the Dev Board). Note that jumper J12 controls whether power for the Dev Board is derived from the on-board regulator or from the USB hub. Also, switch SW3 controls whether the USB port or the standard RS-232 serial port will be used for Com1. Jumper J17 must be in place in order to use the USB port as Com1 and jumper J18 must be in place to use the RS-232 port for Com1.

J10, J11

These DB-9 connections are for standard RS-232 serial connections. Only J10 is installed by default. You may install a connector for J11 like Digi-Key # A32117-ND or Mouser # 571-5747844-4. Unless the configuration jumpers are set to use the USB port, J10 is connected to Com1 of the ZX-1281. If J11 is installed, J13 is used to access the TTL-level transmit and receive signals. SIP sockets installed in J13 may simplify such connections.

J12

This jumper is used to select the power source for the Dev Board, deriving from the USB hub or the on-board regulator powered via J8.

J13

This two-pin connection provides access to the TTL-level transmit and receive signals for the J11 serial port. The transmit signal is applied to an RS-232 level converter whose output is connected to pin 2 of J11. Similarly, the RS-232 signal on pin 3 of J11 is applied to the level converter and the corresponding TTL output is available as the receive signal.

J14

This two-pin connection provides access to the transmit and receive signals of the USB port. This is most useful if the USB port is not being used as the primary serial interface for Com1. In order for the USB port to be completely isolated from Com1, jumper J17 must also be removed.

J15

This Atmel-standard 6-pin jumper is used for programming the mega1281 chip. Note that switch SW5 must be in the "Prog" position in order to effect in-system programming.

J16

This jumper is used to enable or disable the on-board expansion RAM. With the jumper in place, the RAM is disabled thus allowing Ports A, C and G to be used for general I/O purposes.

J17

This jumper, normally in place, connects the transmit data line from Com1 to the USB port. In order to completely isolate the USB port from Com1, the jumper must be removed.

J18

This jumper, normally in place, connects the transmit data line from Com1 to the RS-232 level converter. In order to completely isolate the RS-232 level converter from Com1, the jumper must be removed.

J19

This connection (not present on boards earlier than Rev. 3) provides access to the cathodes of the auxillary dual-color LED. Applying a logic zero to pin 1 will illuminate the red LED while applying a logic zero to pin 2 will illuminate the green LED.

J20

This jumper, normally in place, connects the reset signal derived from DTR transitions to the reset input of the processor. It can be removed if this connection is not desired.

J21

This 2-pole connection provides access to the +5 and Ground signals. It may be useful for powering a logic probe or other testing fixtures. It may be useful to install square pins for this connection point.

J22

This 4-pole connection provides access to the processor's JTAG signals. Connections for +5 and Ground are also available nearby. In normal use, these signals are not useful to end-users but they may be if the Dev Board is being used in an unconventional way.

J23, J24

These connection points provide +5V and Ground reference.

J25-J28

These jumper blocks may be removed to restrict the effective size of the on-board external RAM chip. They are labeled on the board as High Addr. 15 to 13. When the jumper blocks are removed, the corresponding pins of Port C become available for use as general I/O pins if the ZX-1281 is also configured for reduced external RAM. The table below indicates the amount of RAM provided in various configurations.

Jumpers Installed	External RAM	Total User RAM
A15, A14, A13, A12	55.5K	62.875K
A14, A13, A12	32K	39.375K
A13, A12	16K	23.375K
A12	8K	15.375K
none	4K	11.375K

Note that the jumpers should not be moved while the processor is running.

Switches

SW1

This momentary contact pushbutton connects the reset line of the processor to ground when pressed.

SW2

This is the power switch for the Dev Board. Note that it turns the power on and off whether the power source is the on-board regulator or the USB hub. When the board is under power, the red LED (D3, near the power switch) will be illuminated.

SW3

This switch controls whether the Com1 serial port will be connected to the USB port or RS-232 level converter.

SW4

This “switch” controls which of the processor’s USARTs is connected to the Com1 serial interface. Normally, a switch is not installed at the factory. Rather, jumper wires are soldered in corresponding to the switch being in the “SER1” position since the ZX-1281 uses USART1 for Com1.

SW5

This switch should normally be left in the “Run” position. In the “Prog” position, the appropriate connections are made to allow in-system programming of the mega1281 CPU chip.

Schematics

The schematics on the following pages document the circuitry on the Dev Board. They may be useful for gaining a better understanding of the effects of the various switch and jumper positions. They may also be useful for deriving ideas for your own ZX-1281 project.

