

ICSP™ Adapters Instruction Manual

v1.2 – 17 Dec 2009

Notes On Manual v1.2

This manual describes the capabilities of our ICSP™ Adapters. There have been two major releases of the adapters. Rev 1.1 was the initial version and sold during most of the calendar year 2009. Rev 1.2 was introduced in December 2009 as an upgrade to the products. This manual will describe both versions and, where needed, distinguish between the two.

Physically Rev 1.2 ICSP™ Adapters were upgraded as follows:

- Replaced the plastic feet with adhesive rubber feet
- Increased the space between the ZIF release handle and the jumper block to make it easier to grasp the handle
- For ICSP28 and ICSP40 models moved the capacitor jumpers to the other edge of the board to help clear the area around the ZIF handle
- Added Pin 1 indicators to more clearly define chip placement

Introduction

This manual describes the capabilities and usage of Joshua 1 Systems ICSP™ Adapters. The adapters were developed to allow easy programming of individual Microchip™ PIC™ DIP packaged microcontrollers not yet installed on a printed circuit board. There are several distinct adapters designated by the size and style of the physical PIC chip.

The boards are designed to work closely with PICkit™ 2 and PICkit™ 3 programmer/debuggers from Microchip. They should also work with any other ICSP programmers/debuggers that follow the 6 pin ICSP connection standard. The user can also create an adapter cable to accommodate any unique connection of their ICSP programmer/debugger.

After analyzing the different DIP style versions of PIC microcontrollers we have separated the microcontrollers into Groups. Each Group uses a common set of connections for the various signals required for ICSP programming. We have classified all available production PIC chips as of this date. Future chips may fit within one of the available Groups or require custom configuration using jumper wires. Whether your programmer supports a given chip is a function of the programmer. Please refer to the programmer's documentation to determine which chips it can program.

The individual adapters vary in size and chip style supported and each adapter supports one or more distinct Groups of chips. For the supported Groups of chips the common signal connections are easily selected with labeled jumpers. Additionally there are a series of machined sockets to each side of the chip sockets and adjacent to the ICSP connector. User supplied jumpers can be inserted in these machined sockets to custom configure the signals. These sockets can also be used, perhaps in conjunction with a prototype breadboard, for simple research and development. This would allow using

the programmer/debugger, an ICSP Adapter, and a breadboard to build up a simple circuit for proof of concept and initial testing.

Trademarks

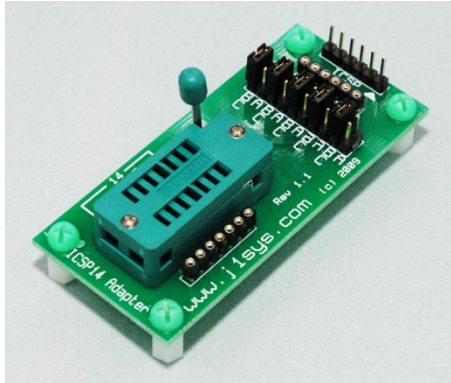
Throughout this manual the terms ICSP™, PIC™, PICkit™, and Microchip™ are trademarks of Microchip Technology Inc.

ICSP Adapter Models

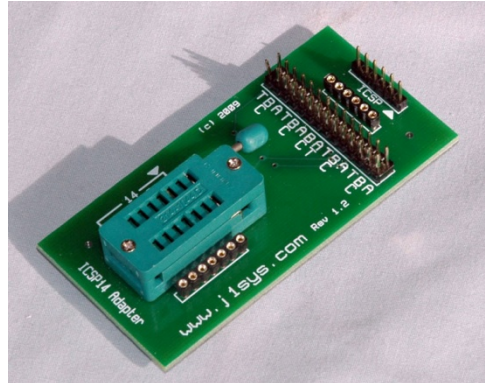
The various adapter models are covered on the following pages. Each adapter and the chips it supports are described on a separate page for quick reference.

ICSP14 - Supports 8 or 14 pin PIC Microcontrollers.

The standard jumpers are configured for Group A, B, and C .300in DIP chips. **Rev 1.2 added Group T.**



ICSP14 Rev 1.1



ICSP14 Rev 1.2

Group A - 8 pin VPP=8, VDD=2, VSS=7, PGD=5, PGC=4

PIC10F200, PIC10F202, PIC10F204, PIC10F206, PIC10F220, PIC10F222

Group B - 8 pin VPP=4, VDD=1, VSS=8, PGD=7, PGC=6

PIC12F508, PIC12F509, PIC12F510, PIC12F519, PIC12F609, PIC12F615, PIC12F629, PIC12F635,
PIC12F675, PIC12F683, PIC12HV609, PIC12HV615

Group C - 14 pin VPP=4, VDD=1, VSS=14, PGD=13, PGC=12

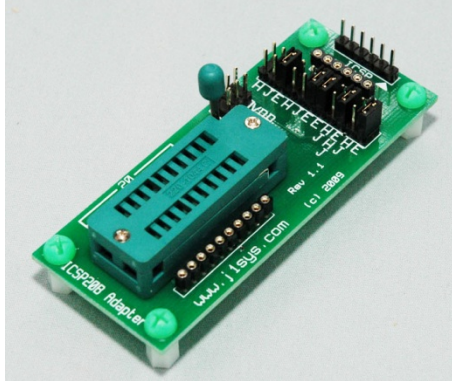
PIC16F505, PIC16F506, PIC16F526, PIC16F610, PIC16F616, PIC16F630, PIC16F636, PIC16F676,
PIC16F684, PIC16F688, PIC16HV610, PIC16HV616

Group T - 14 pin VPP=1, VDD=14, VSS=13, PGD=3, PGC=2 - **New Group available on Rev 1.2**

PIC24F04KA200

ICSP20B - Supports 18 or 20 pin PIC Microcontrollers.

The standard jumpers are configured for Group E, H, and J .300in DIP chips. Rev 1.2 has not yet been released. It will add two new Groups (U & V) and make minor changes to improve Group H and J. Expected to be available in January 2010.



ICSP20B Rev 1.1

Group E -

PIC16C432

Group H -

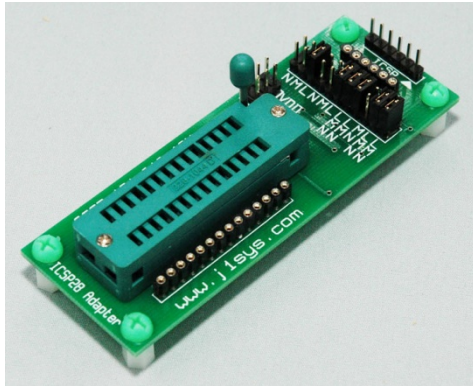
PIC24HJ12GP201, dsPIC33FJ12GP201

Group J -

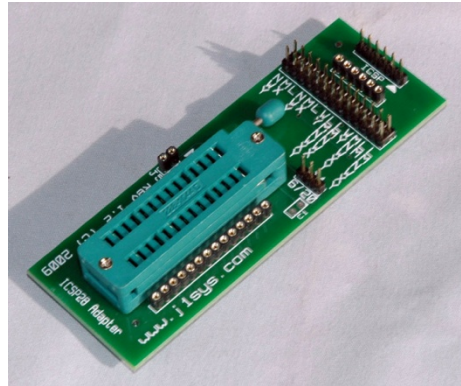
dsPIC30F2011, dsPIC30F3012

ICSP28 - Supports 28 pin PIC Microcontrollers.

The standard jumpers are configured for Group L, M, and N .300in DIP chips. **Rev 1.2 added Group W, X and Y.**



ICSP28 Rev 1.1



ICSP28 Rev 1.2

* Denotes Pin 6 VCAP connection. ** Denotes Pin 20 VCAP connection.

Group L - 28 pin VPP=1, VDD=20, VSS=19/8, PGD=28, PGC=27

PIC16F1933, PIC16F1936, PIC16F1938, PIC16F72, PIC16F722, PIC16F723, PIC16F726, PIC16F73, PIC16F737, PIC16F76, PIC16F767, PIC16F870, PIC16F872, PIC16F873A, PIC16F876A, PIC16F882, PIC16F883, PIC16F886, PIC16F913, PIC16F916, PIC16LF722, PIC16LF723, PIC16LF726, PIC18F2220, PIC18F2221, PIC18F2320, PIC18F2321, PIC18F2331, PIC18F23K20, PIC18F2410, PIC18F2420, PIC18F2423, PIC18F2431, PIC18F2450, PIC18F2455, PIC18F2458, PIC18F2480, PIC18F24J10*, PIC18F24J11*, PIC18F24J50*, PIC18F24K20, PIC18F2510, PIC18F2515, PIC18F2520, PIC18F2523, PIC18F2525, PIC18F2550, PIC18F2553, PIC18F2580, PIC18F2585, PIC18F25J10*, PIC18F25J11*, PIC18F25J50*, PIC18F25K20, PIC18F2610, PIC18F2620, PIC18F2680, PIC18F2682, PIC18F2685, PIC18F26J11*, PIC18F26J50*, PIC18F26K20, PIC18LF24J50*, PIC18LF25J50*, PIC18LF26J50*

Group M - 28 pin VPP=1, VDD=20/13, VSS=19/8, PGD=17, PGC=18

dsPIC30F1010, dsPIC30F2010, dsPIC30F2012, dsPIC30F2020, dsPIC30F3010, dsPIC30F3013
dsPIC30F4012

Group N - 28 pin VPP=1, VDD=13, VSS=19/8, PGD=4, PGC=5

dsPIC33FJ128GP202**, dsPIC33FJ128GP802**, dsPIC33FJ128MC202**, dsPIC33FJ128MC802**,
dsPIC33FJ12GP202**, dsPIC33FJ12MC202**, dsPIC33FJ32GP202**, dsPIC33FJ32GP302**,
dsPIC33FJ32MC202**, dsPIC33FJ32MC302**, dsPIC33FJ64GP202**, dsPIC33FJ64GP802**,
dsPIC33FJ64MC202**, dsPIC33FJ64MC802**, PIC24HJ128GP202, PIC24HJ128GP502,
PIC24HJ12GP202, PIC24HJ32GP202, PIC24HJ32GP302, PIC24HJ64GP202, PIC24HJ64GP502

Errata: The following chips were incorrectly listed as Group N in the earlier documentation. They have been moved to the new Group W which is available on Rev 1.2: PIC24FJ16GA002,

PIC24FJ32GA002, PIC24FJ48GA002, PIC24FJ64GA002. They will not correctly work with Rev 1.1 as Group N. Users can make them work with jumper wires equivalent to the Group W connections.

Note: Group N VDD was changed to connect to ONLY pin 13 on Rev 1.2. Rev 1.1 erroneously connected it to pin 20 also. You can black out the second 'N' connection from the right to fix the legends on the board.

Group W - 28 pin VPP=1, VDD=28/13, VSS=27/19/8, PGD=4, PGC=5 - **New Group available on Rev 1.2**

PIC24FJ16GA002**, PIC24FJ32GA002**, PIC24FJ32GA102**, PIC24FJ32GB002**,
PIC24FJ48GA002**, PIC24FJ64GA002**, PIC24FJ64GA102**, PIC24FJ64GB002**

Group X - 28 pin VPP=1, VDD=13, VSS=19/8, PGD=17, PGC=18 - **New Group available on Rev 1.2**

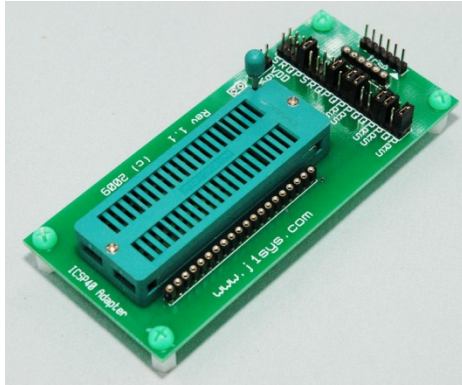
dsPIC33FJ06GS102**, dsPIC33FJ06GS202**, dsPIC33FJ16GS402**, dsPIC33FJ16GS502**

Group Y - 28 pin VPP=1, VDD=28/13, VSS=27/8, PGD=4, PGC=5 - **New Group available on Rev 1.2**

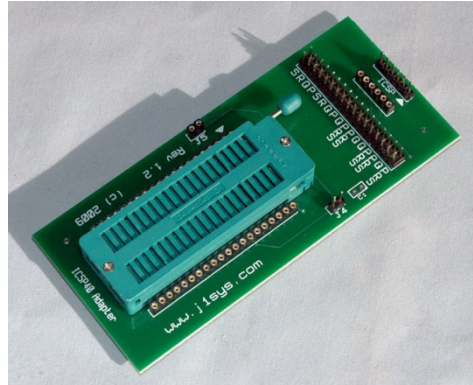
PIC24F08KA102, PIC24F16KA102

ICSP40 - Supports 40 pin PIC Microcontrollers.

The standard jumpers are configured for Group P, Q, R, and S .600in DIP chips.



ICSP40 Rev 1.1



ICSP40 Rev 1.2

* Denotes Pin 6 VCAP connection. ** Denotes Pin 2,7, or 14 VCAP connection. User must add jumper wires from J5 to appropriate pin.

Group P - 40 pin VPP=1, VDD=32/11, VSS=31/12, PGD=40, PGC=39

PIC16C65B, PIC16C765, PIC16C774, PIC16F1934, PIC16F1937, PIC16F724**, PIC16F727**,
PIC16F74, PIC16F747, PIC16F77, PIC16F777, PIC16F871, PIC16F874A, PIC16F877A, PIC16F884,
PIC16F887, PIC16F914, PIC16F917, PIC16LF724, PIC16LF727, PIC18F4220, PIC18F4221,
PIC18F4320, PIC18F4321, PIC18F4331, PIC18F43K20, PIC18F4410, PIC18F4420, PIC18F4423,
PIC18F4431, PIC18F4450, PIC18F4455, PIC18F4458, PIC18F4480, PIC18F44J10*, PIC18F44K20,
PIC18F4510, PIC18F4515, PIC18F4520, PIC18F4523, PIC18F4525, PIC18F4550, PIC18F4553,
PIC18F4580, PIC18F4585, PIC18F45J10*, PIC18F45K20, PIC18F4610, PIC18F4620, PIC18F4680,
PIC18F4682, PIC18F4685, PIC18F46K20

Group Q - 40 pin VPP=14, VDD=35/15, VSS=5/25, PGD=13, PGC=12

PIC16F59

Note: Rev 1.2 added a VSS connection to Pin 25. Users with Rev 1.1 can add a jumper wire from Pin 5 to Pin 25 to add ground manually.

Group R - 40 pin VPP=1, VSS=32/11, VSS=31/12, PGD=25, PGC=26

dsPIC30F3011, dsPIC30F4011

Group S - 40 pin VPP=1, VSS=32/11, VSS=31/12, PGD=9, PGC=8

dsPIC30F3014, dsPIC30F4013

Operation & Usage

Programming a chip is a simple procedure:

- 1) Determine the appropriate adapter and group for your target chip.
- 2) Place jumpers in the appropriate positions on the group selection header. All other positions should be empty.
- 3) Insert the target chip in the socket oriented properly. For DIP ZIF sockets: make sure the lever is in the upright position, Pin 1 is the pin nearest the lever, insert the target chip, and flip the lever to the down position. On ICSP14, ICSP20A, and ICSP20B adapters be sure to follow the silkscreened legends for chip position based on pin count.
- 4) Connect the programmer to the ICSP header. Be sure to align Pin 1 (VPP) to the arrow silkscreened on the board. Optionally you can use the 6 pin male/male connector and ribbon cable to extend the ICSP signals.
- 5) Program the target chip using your software.

ICSP Header Pin Out

The ICSP Header uses the standard 6 pin ICSP connection as follows:

Pin 1 – VPP / _MCLR (denoted by arrow on silkscreen)

Pin 2 – VDD

Pin 3 – VSS

Pin 4 – ICSPDAT

Pin 5 – ICSPCLK

Pin 6 – Aux

VDD/VCap Configuration Header Rev 1.1

On most of the adapters there is an additional jumper selection header and area for the installation by the user of an optional small capacitor. This feature was added for supporting the 'J' series of PIC chips. Some of the 'J' series will require the addition of several jumpers to configure the processor on-board voltage regulator along with the addition of a small capacitor for the regulator. By placing the appropriate jumper the user can connect the high side of the capacitor to an appropriate pin. The low side of the capacitor is tied to VSS. For ICSP20B and ICSP28 there is the option of using either Pin 6 or Pin 20. For ICSP40 there is only the option of using Pin 6. Please refer to the Microchip documentation for the on-board voltage regulator requirements and to our support forum for more information on using this feature. Future revisions to the manual should include a list of the supported chips and their configuration. Note: The jumpers are installed from the VDD or VCap pins to the center row of pins NOT across the pins.

VCap Configuration Header Rev 1.2

On ICSP28 and ICSP40 adapters there is an additional jumper selection header and area for the installation by the user of an optional small capacitor. This feature was added for supporting the 'J' series of PIC chips. Some of the 'J' series will require the addition of several jumpers to configure the processor on-board voltage regulator along with the addition of a small capacitor for the regulator. By placing the appropriate jumper the user can connect the high side of the capacitor to an appropriate pin. The low side of the capacitor is tied to VSS. For ICSP28 there is the option of using either Pin 6 or Pin 20. For ICSP40 there is only the option of using Pin 6. Additionally there is a jumper socket J5 which allows for other pins to be connected to the capacitor. This is used for few chips that require a VCAP connection on pin 2, 7, or 14. Please refer to the Microchip documentation for the on-board voltage regulator requirements and to our support forum for more information on using this feature. Future revisions to the manual should include a list of the supported chips and their configuration.

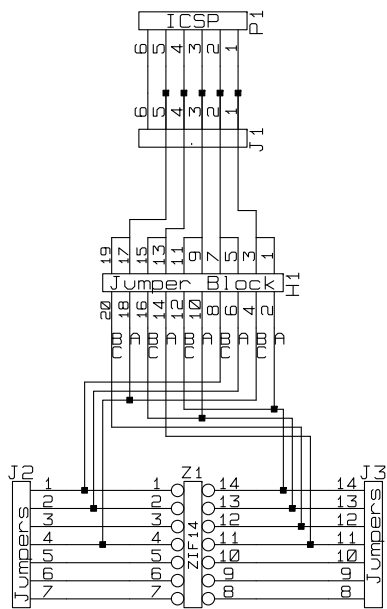
Support & Manual Updates

Please refer to our website and user forum for support on the ICSP Adapters. The website will also contain any updates to this manual.

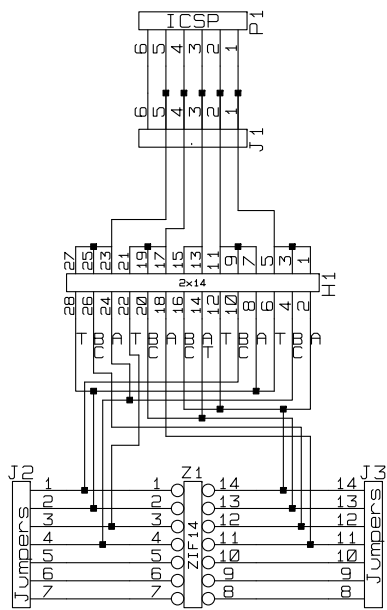
www.joshua1systems.com

Schematics

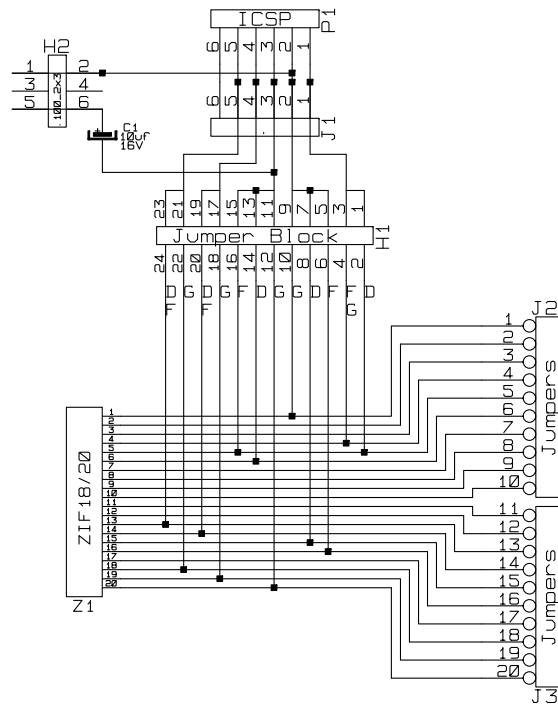
Please refer to the following pages for the schematics of each board and revision.



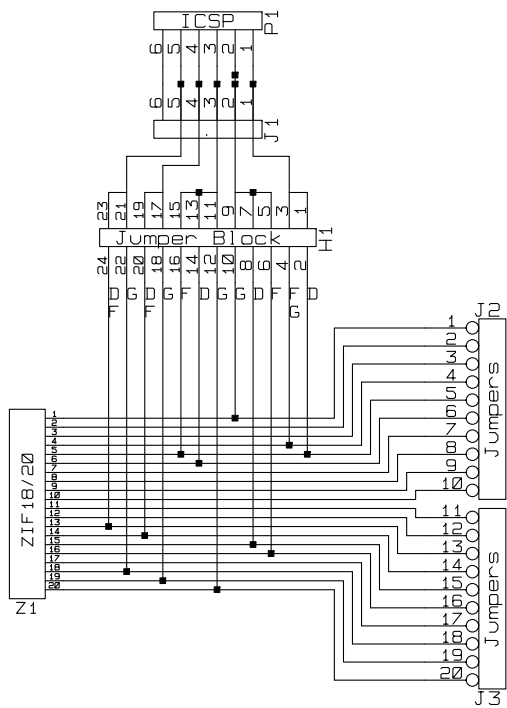
Joshua 1 Systems Inc.	
File: ICSP14.sch	
Sheet: /	
Title: ICSP14 - 8/14 Pin ZIF ICSP Adapter	
Size: A4	Date: 31 may 2008
KiCad E.D.A.	EESchema (20080825)
Rev: 1.1	Id: 1/1



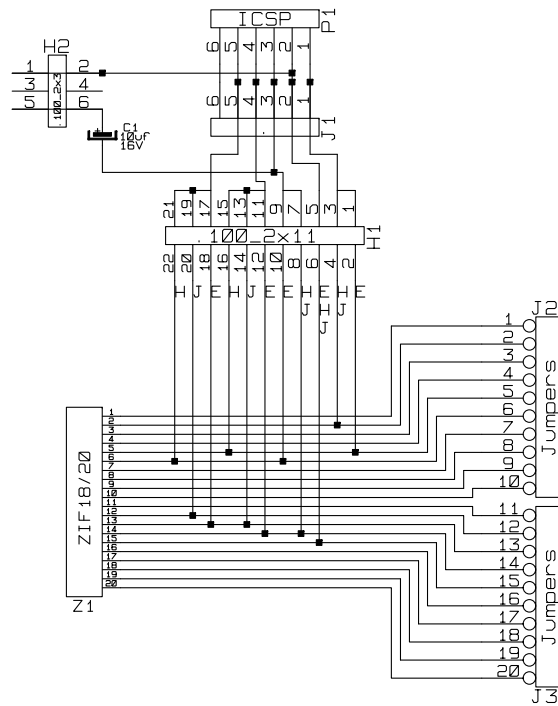
Joshua 1 Systems Inc.	
File: ICSP14.sch	
Sheet: /	
Title: ICSP14 - 8/14 Pin ZIF ICSP Adapter	
Size: A4	Date: 17 dec 2009
KiCad E.D.A.	EESchema (20080825)
	Rev: 1.2
	Id: 1/1



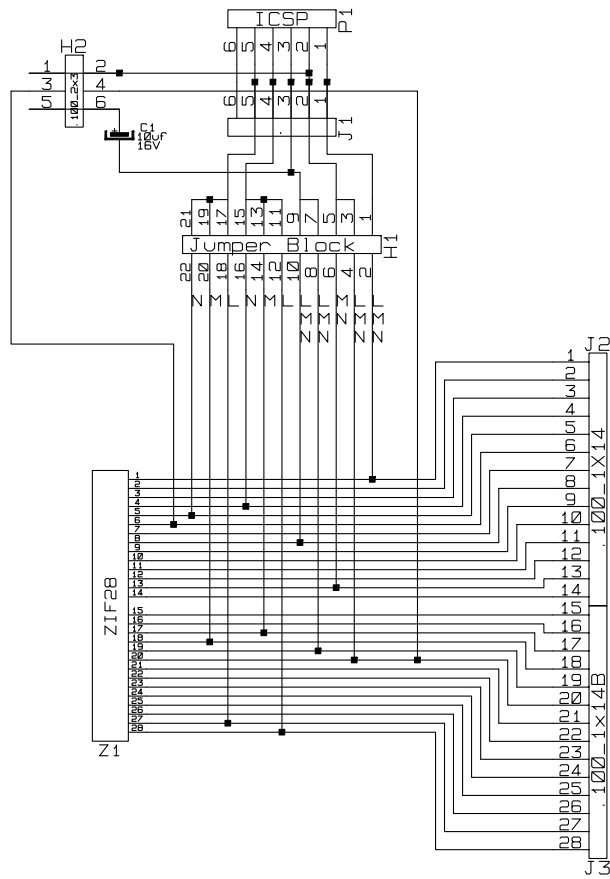
Joshua 1 Systems Inc.	
File: ICSP20A.sch	
Sheet: /	
Title: ICSP20A 20 Pin Adapter	
Size: A4	Date: 3 jun 2008
KiCad E.D.A.	EESchema (20080825)
	Rev: 1.1
	Id: 1/1



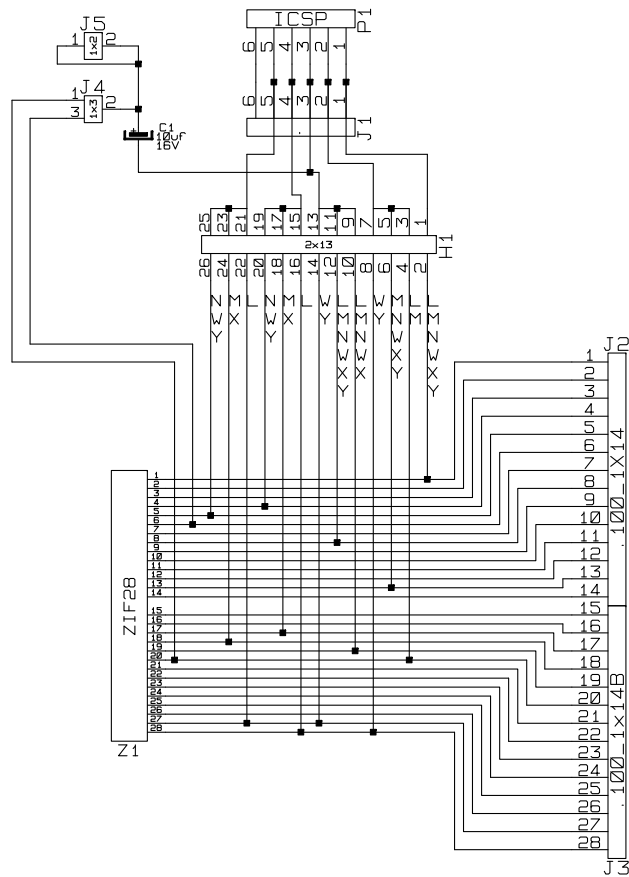
Joshua 1 Systems Inc.	
File: ICSP20A.sch	
Sheet: /	
Title: ICSP20A - 20 Pin Adapter	
Size: A4	Date: 17 dec 2009
KiCad E.D.A.	EESchema (20080825)
	Rev: 1.2
	Id: 1/1



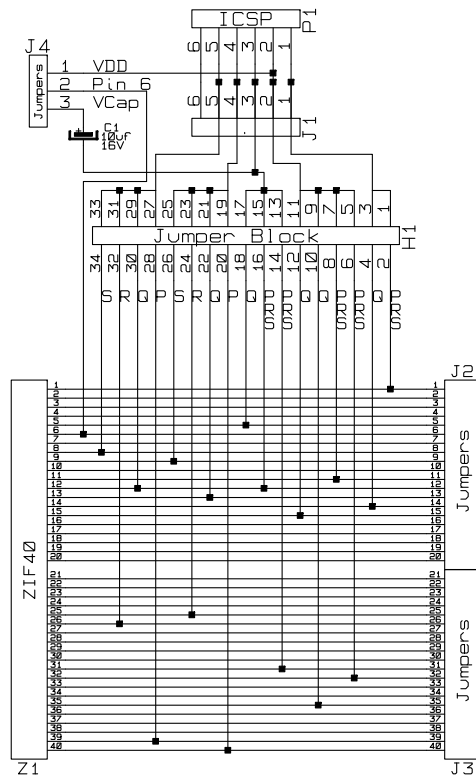
Joshua 1 Systems Inc.	
File: ICSP20B.sch	
Sheet: /	
Title: ICSP20B - 20 Pin Adapter	
Size: A4	Date: 4 jun 2008
KiCad E.D.A.	EESchema (20080825)
Rev: 1.1	Id: 1/1



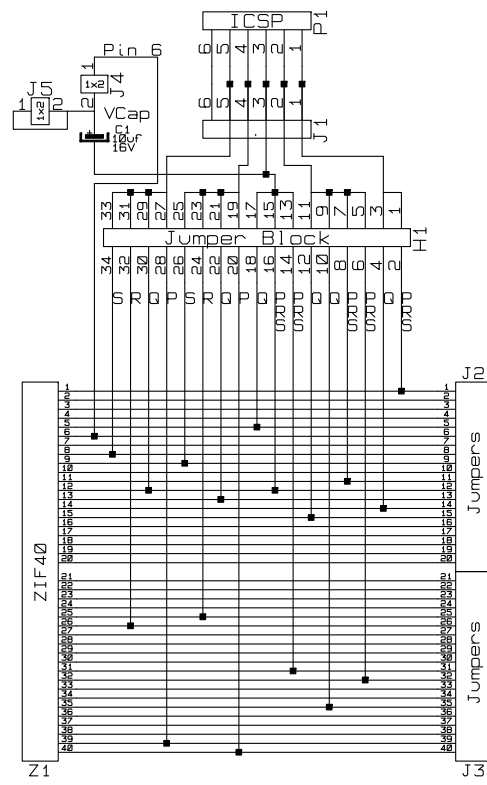
Joshua 1 Systems Inc.	
File: ICSP28.sch	
Sheet: /	
Title: ICSP28 - 28 Pin Adapter	
Size: A4	Date: 3 jun 2008
KiCad E.D.A.	EESchema (20080825)
Rev: 1.1	Id: 1/1



Joshua 1 Systems Inc.	
File: ICSP28.sch	
Sheet: /	
Title: ICSP28 - 28 Pin Adapter	
Size: A4	Date: 17 dec 2009
KiCad E.D.A.	EESchema (20080825)
Rev: 1.2	Id: 1/1



Joshua 1 Systems Inc.	
File: ICSP40.sch	
Sheet: /	
Title: ICSP40 - 40 Pin Adapter	
Size: A4	Date: 1 jun 2008
KiCad E.D.A.	EESchema (20080825)
Rev: 1.1	Id: 1/1



Joshua 1 Systems Inc.	
File: ICSP40.sch	
Sheet: /	
Title: ICSP40 - 40 Pin Adapter	
Size: A4	Date: 17 dec 2009
KiCad E.D.A.	EESchema (20080825)
	Rev: 1.2
	Id: 1/1