

## ADuC-H7020 development board

### Users Manual



All boards produced by Olimex are ROHS compliant

Rev. Initial, September 2005

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## INTRODUCTION

**ADuC-H7020** provide low cost way to develop with ADuC7020 microcontroller without need of fancy soldering skills. This board is designed to fit in normal DIL40 socket, so you can make your prototypes easy and troubles free. ADuC7020 is unique with the 1Msps ADCs and DACs and with the 3 phase PWM.

## BOARD FEATURES

- MCU: **ADuC7020** - ARM7TDMI Core, 16/32-bit RISC architecture, 5 Channels 12-bit, 1MSPS ADC, Differential and single-ended modes, 0 to Vref Analog Input Range, 4 Outputs 12-bit Voltage Output DACs, On-Chip 20ppm/°C Voltage Reference, On-Chip Temperature Sensor ( $\pm 3^{\circ}\text{C}$ ), Uncommitted Voltage Comparator, JTAG Port, Clocking options: Trimmed On-Chip Oscillator ( $\pm 2\%$ ), External Watch crystal, External clock source  
45MHz PLL with Programmable Divider, 62k Bytes Flash/EE Memory, 8k Bytes SRAM, In-Circuit Download, JTAG based Debug, Software triggered in-circuit re-programmability, UART, dual I2C and SPI Serial I/O, 14-Pin GPIO Port, 2 X General Purpose Timers, Wake-up and Watchdog Timers, Power Supply Monitor, PLA - Programmable Logic (Array), Power Specified for 3V operation, Active Mode: 6mW (@1MHz) 300mW (@45MHz), Fully specified for  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  operation;
- DIL-40 (0.6" wide) layout for easy mount on prototype/mother boards
- RESET button
- SERIAL DOWNLOAD (bootloader enable) button
- green LED status
- red power supply LED
- 32 768 Hz oscillator crystal
- power supply filtering capacitors and ferite bead
- PCB: FR-4, 1.5 mm (0,062"), green soldermask, white silkscreen component print

## ELECTROSTATIC WARNING

The ADuC-H7020 board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

## BOARD USE REQUIREMENTS

**Cables:** Depends on the used programming/debugging tool. It could be 1.8 meter USB A-B cable to connect [ARM-JTAG-EW](#) to USB host on PC or LPT cable in case of [ARM-JTAG](#) or other programming/debugging tools. You will need a serial cable if not for programming, than for configuring the board.

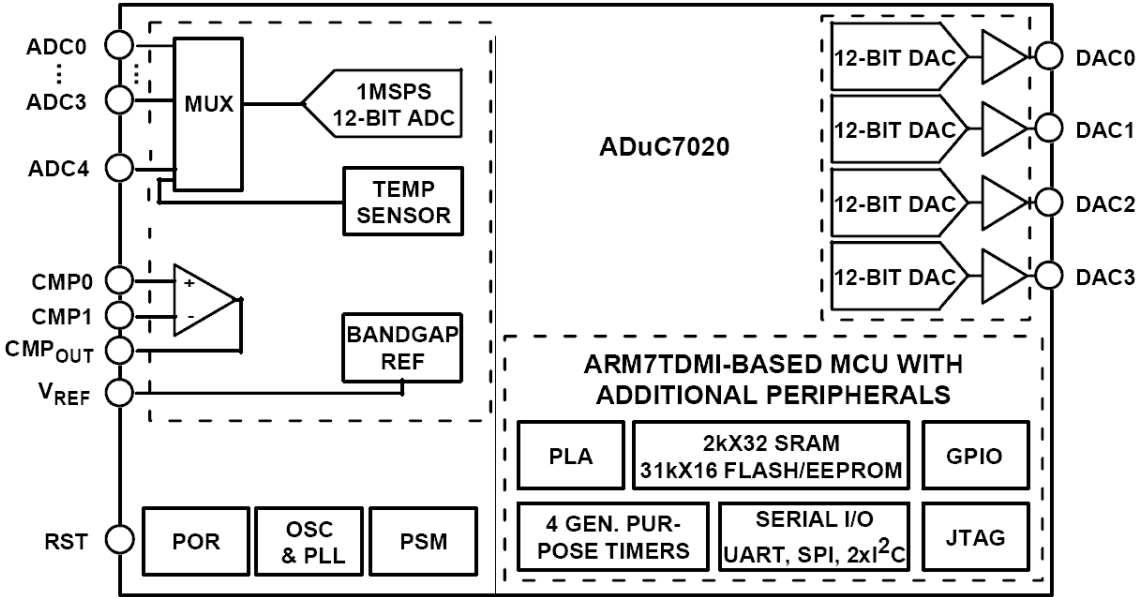
**Hardware:** Programmer/Debugger - some of Olimex programmers are applicable, for example [ARM-JTAG](#), [ARM-JTAG-EW](#), or other compatible programming/debugging tool.

## PROCESSOR FEATURES

**ADuC-H7020** board use fully integrated, 1 MSPS, 12-bit data acquisition systems incorporating a high performance multichannel ADC, a 16/32-bit MCU and Flash/EE Memory on a single chip with these features:

- Analog I/O
- Multi-Channel, 12-bit, 1 MSPS ADC - 5 Channels
- Differential and single-ended modes
- 0 to Vref Analog Input Range
- Multi-Channel 12-bit Voltage Output DACs - 4 Outputs
- On-Chip 20ppm/°C Voltage Reference
- On-Chip Temperature Sensor ( $\pm 3^{\circ}\text{C}$ )
- Uncommitted Voltage Comparator
- Microcontroller
  - ARM7TDMI Core, 16/32-bit RISC architecture
  - JTAG Port supports code download and debug
- Clocking options:
  - Trimmed On-Chip Oscillator ( $\pm 2\%$ )
  - External Watch crystal
  - External clock source
- 45MHz PLL with Programmable Divider Memory
- 62k Bytes Flash/EE Memory, 8k Bytes SRAM
- In-Circuit Download, JTAG based Debug
- Software triggered in-circuit re-programmability
- On-Chip Peripherals
  - UART, dual I<sup>2</sup>C and SPI Serial I/O
  - 14-Pin GPIO Port
  - 2 X General Purpose Timers
  - Wake-up and Watchdog Timers
  - Power Supply Monitor
  - PLA - Programmable Logic (Array)
- Power
  - Specified for 3V operation
  - Active Mode: 6mW (@1MHz)  
300mW (@45MHz)

# BLOCK DIAGRAM



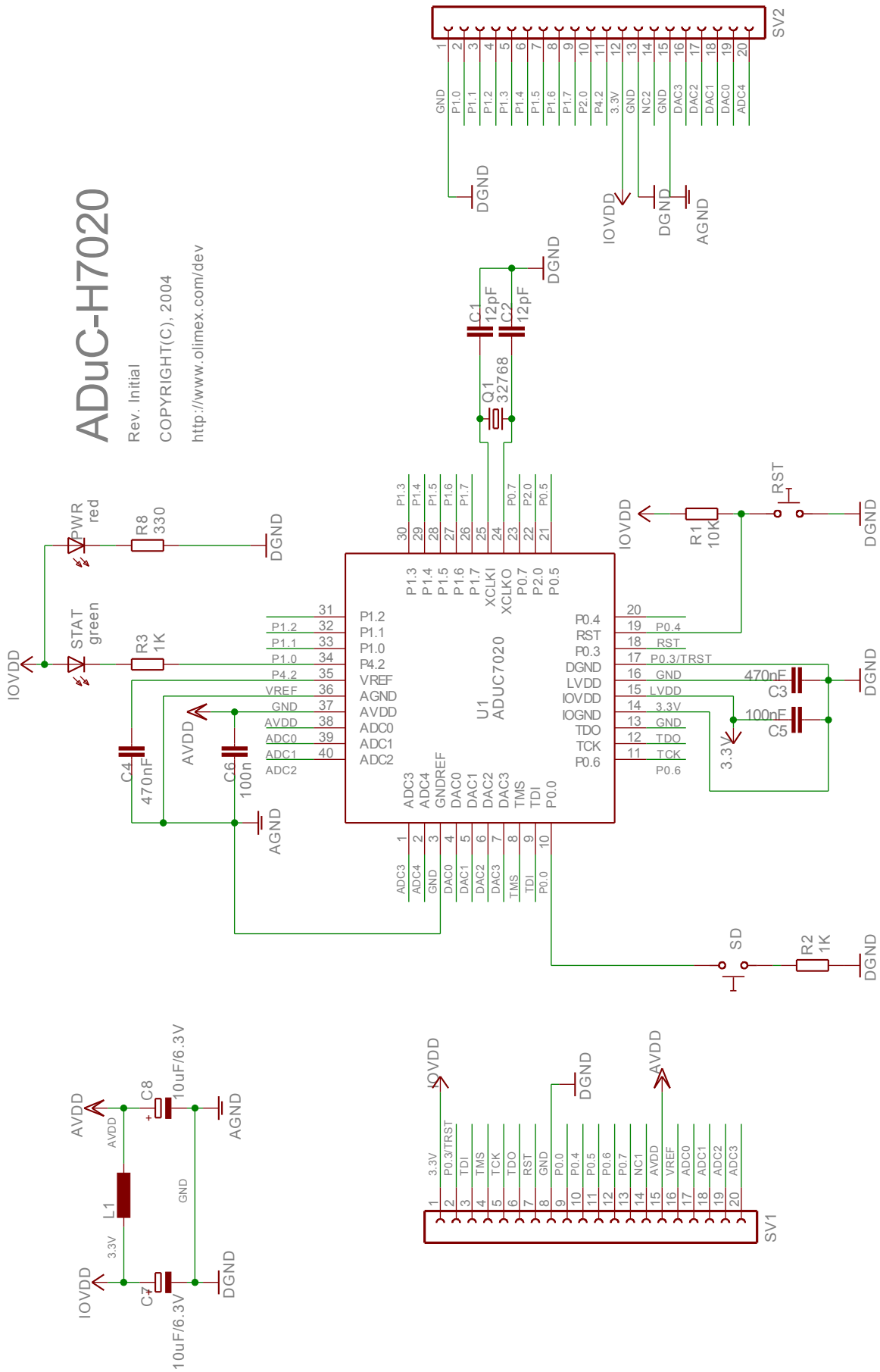
# MEMORY MAP

0xFFFFFFFF	
0xFFFFF820	Flash Control Interface
0xFFFFF800	
0xFFFFF46C	GPIO
0xFFFFF400	
0xFFFF0B54	PLA
0xFFFF0B00	
0xFFFF0A14	SPI
0xFFFF0A00	
0xFFFF0948	I <sup>2</sup> C1
0xFFFF0900	
0xFFFF0848	I <sup>2</sup> C0
0xFFFF0800	
0xFFFF0730	UART
0xFFFF0700	
0xFFFF0620	DAC
0xFFFF0600	
0xFFFF0538	ADC
0xFFFF0500	
0xFFFF0490	Bandgap Reference
0xFFFF048C	
0xFFFF0448	Power Supply Monitor
0xFFFF0440	
0xFFFF0420	PLL & Oscillator Control
0xFFFF0404	
0xFFFF0370	Watchdog Timer
0xFFFF0360	
0xFFFF0350	Wake Up Timer
0xFFFF0340	
0xFFFF0334	General Purpose Timer
0xFFFF0320	
0xFFFF0310	Timer 0
0xFFFF0300	
0xFFFF0238	Remap & System Control
0xFFFF0220	
0xFFFF0110	Interrupt Controller
0xFFFF0000	

# SCHEMATIC

## ADuC-H7020

Rev. Initial  
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## BOARD LAYOUT

### POWER CIRCUIT

ADuC-H7020 can take power (+3.3V) from SV1 pin 1 and pin 8 and from SV2 pin 12 and pin 13.

### RESET CIRCUIT

ADuC-H7020 reset circuit includes R1 (10k) pull-up, ADuC7020 pin 19 and RST button.

### CLOCK CIRCUIT

Quartz crystal Q1 32.768 KHz is connected to ADuC7020 pin 24 (XCLKO) and pin 25 (XCLKI).

### JUMPER DESCRIPTION

There are no jumpers on this board.

### INPUT/OUTPUT

**Reset button** with name **RST**, connected to ADuC7020 pin 19 (RST).

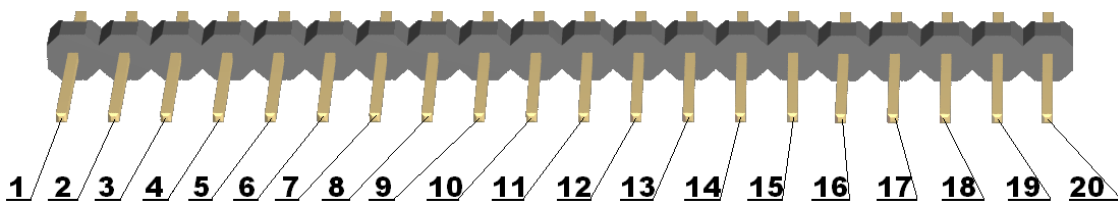
**User button** with name **SD**, connected to ADuC7020 pin 10 (P0.0).

**Status Led** with name **STAT**, connected to ADuC7020 pin 34 (P4.2).

**Power-on led** with name **PWR** – shows that +3.3V is supplied to the board.

### EXTERNAL CONNECTORS DESCRIPTION

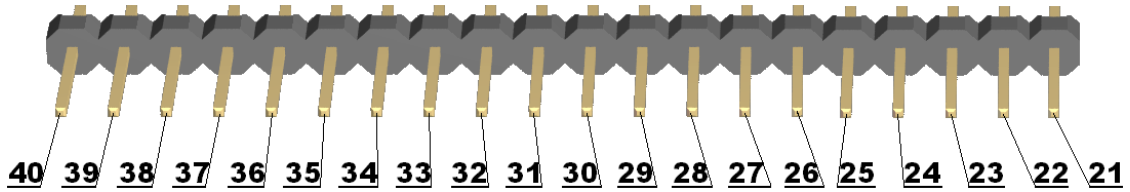
#### SV1:



Pin#	Signal Name	Pin#	Signal Name
1	3.3V	2	P0.3/TRST
3	TDI	4	TMS
5	TCK	6	TDO
7	RST	8	GND
9	P0.0	10	P0.4
11	P0.5	12	P0.6

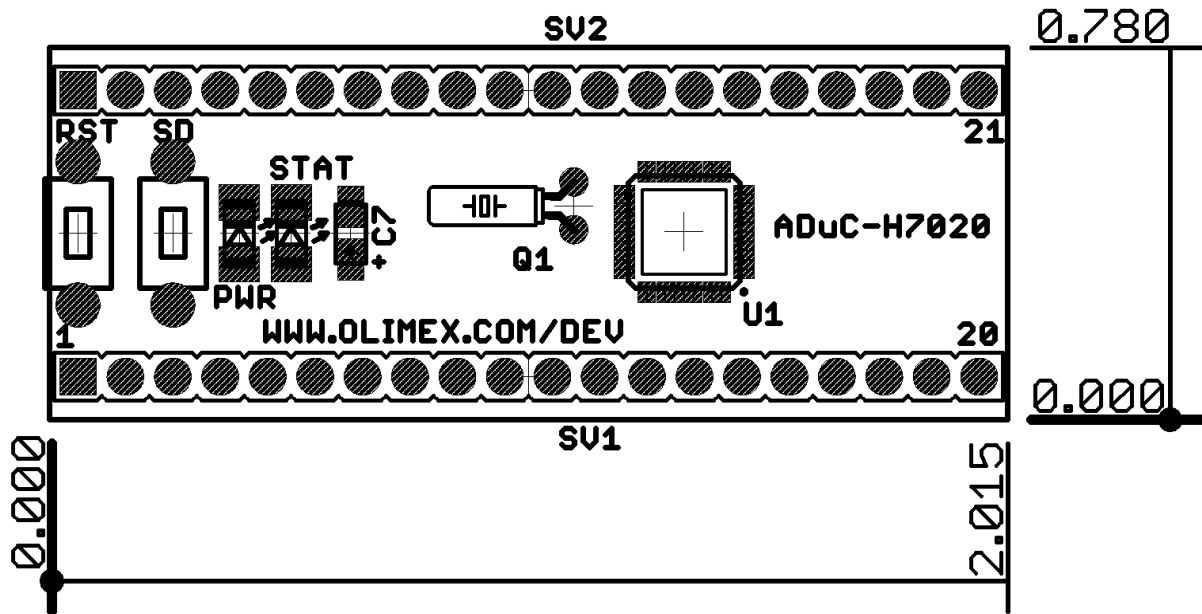
13	P0.7	14	NC
15	AVDD	16	VREF
17	ADC0	18	ADC1
19	ADC2	20	ADC3

**SV2:**



Pin#	Signal Name	Pin#	Signal Name
21	ADC4	22	DAC0
23	DAC1	24	DAC2
25	DAC3	26	AGND
27	NC	28	GND
29	3.3V	30	P4.2
31	P2.0	32	P1.7
33	P1.6	34	P1.5
35	P1.4	36	P1.3
37	P1.2	38	P1.1
39	P1.0	40	GND

**MECHANICAL DIMENSIONS**



- All measures are in Inches.





## AVAILABLE DEMO SOFTWARE

- [ADC read DAC write](#) demo code for EW-ARM
- [Blink LED](#) demo code for EW-ARM
- [RS232](#) , [UART](#), demo code for EW-ARM
- [DAC sinusoidal generation](#) demo code for EW-ARM
- [SPI demo code](#) for EW-ARM
- [Basic initializations for ADUC7020](#) demo code for EW-ARM

## **ORDER CODE**

**ADuC-H7020** - completely assembled and tested.

How to order?

You can order to us directly or by any of our distributors.

Check our web [www.olimex.com/dev](http://www.olimex.com/dev) for more info.

### **Revision history:**

REV. Initial      - create    September 2005

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