ADuC-IO7020 development board

Users Manual

Rev. A, September 2005
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INTRODUCTION

ADuC-IO7020 is very good platform for automation application which need fast ADC and DACs and need to commute high loads. It have 4 relays 240VAC/10A, 4 optoisolated inputs, RS232, JTAG and the 1Msps ADC/DACs are available on separate conenctor for connection to external sensors.

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 (±3°C), Uncommitted Voltage Comparator, JTAG Port, Clocking options: Trimmed On-Chip Oscillator (± 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°C to 85°C operation;

- JTAG connector for in-circuit programming and debugging with ARM-JTAG

- RS232 interface circuit and connector

- I2C connector

- RESET button

- SERIAL DOWNLOAD (bootloader enable) button

- LED status

- power supply circuit with plug-in power jack and diode protection

- 32 768 Hz oscillator crystal

- 4 RELAYs with 10A/250VAC NO and NC contacts with screw terminals

- extension header for ADC and DAC ports

- On-chip Bootloader, which can be accessed via RS232 using ARMWSD.exe. When you open ARMWSD.exe, click button Start and after that will be appeared message "Press Download and pulse Reset on hardware" - press button SD on AduC-MT7020 and pulse Reset button – this will give you access to Bootloader, where you can load your own program.

- PCB: FR-4, 1.5 mm (0,062"), green soldermask, white silkscreen component print

- four mounting holes 3.3 mm (0.13")

Downloaded from Elcodis.com electronic components distributor

ELECTROSTATIC WARNING

The ADuC-IO7020 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-IO7020 board use fully integrated, 1 MSPS, 12-bit data acquisition systems incorporating a high performance multichanel ADC, a 16/32-bit MCU and Flash/EE Memory on a single chip with these features:

– Analog I/O
– Multi-Channel, 12-bit, 1MSPS 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 (±3°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 (± 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 I²C and SPI Serial I/O

  – 14-Pin GPIO Port

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- 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)

<u>BLOCK DIAGRAM</u>
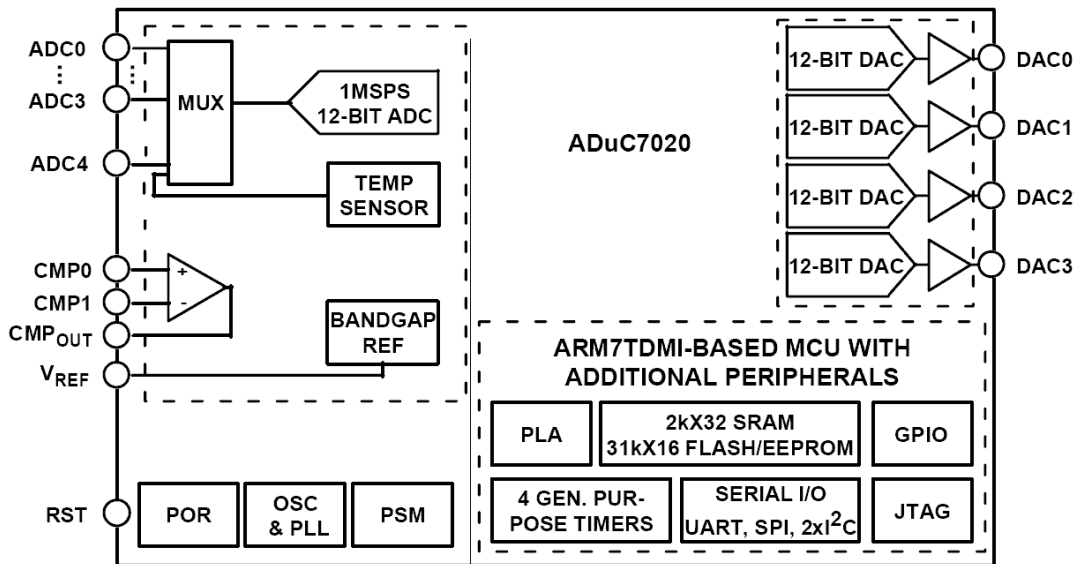
MEMORY MAP

Address	Block
0xFFFFFFFF	
0xFFFFF820	Flash Control Interface
0xFFFFF800	
0xFFFFF46C	GPIO
0xFFFFF400	
0xFFFF0B54	PLA
0xFFFF0B00	
0xFFFF0A14	SPI
0xFFFF0A00	
0xFFFF0948	I^{2}C1
0xFFFF0900	
0xFFFF0848	I^{2}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	

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SCHEMATIC

ADuC-IO7020

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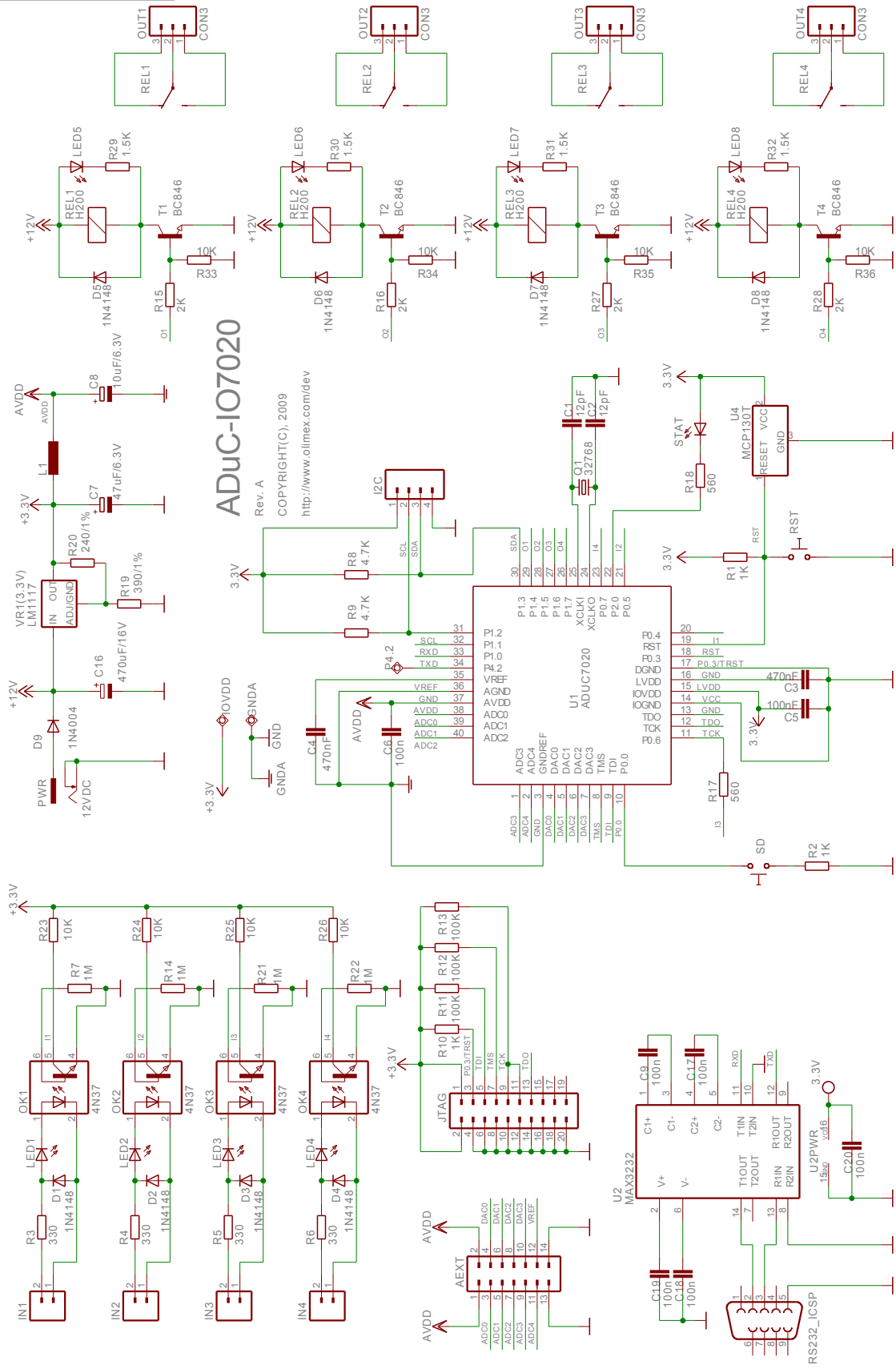
BOARD LAYOUT
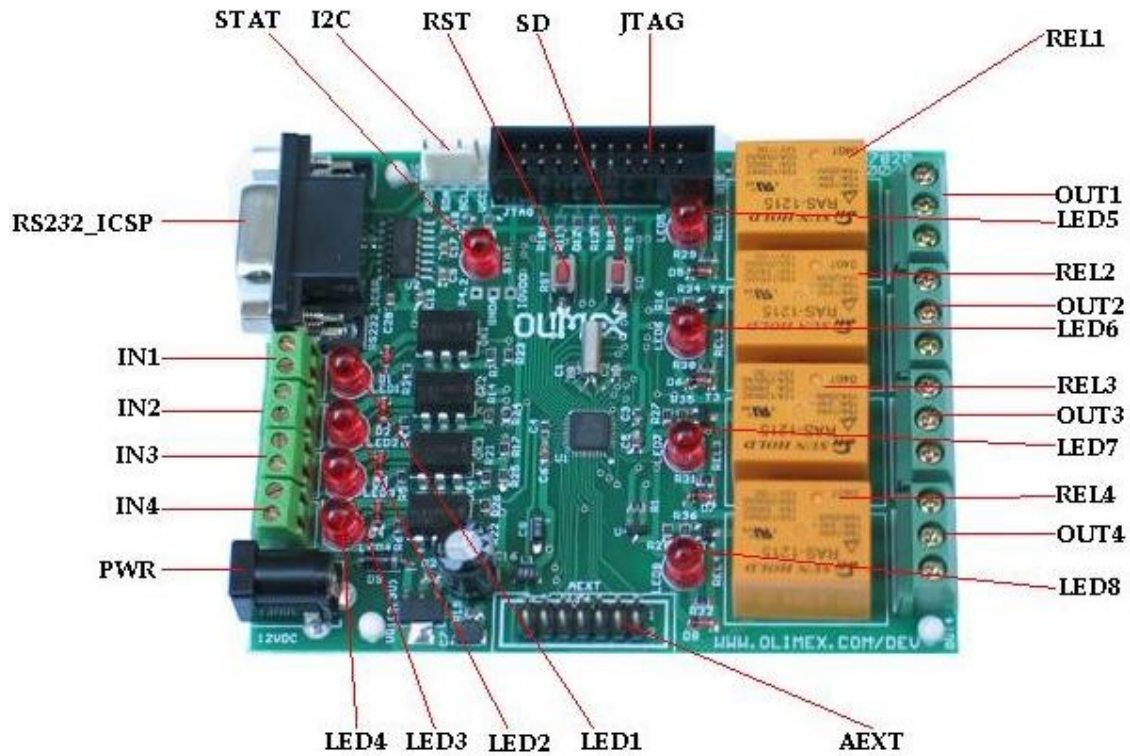
POWER CIRCUIT

ADuC-IO7020 can take power from:

- PWR_JACK where 12 V DC, is applied by external power source.

The board power consumption at first, without Relays is: about 40 mA, when all Relays are working the consumption is 180 mA.

RESET CIRCUIT

ADuC-IO7020 reset circuit is includes R1 (1k) pull-up, U4 (MCP130T), ADuC7020 pin 19 and RST button.

CLOCK CIRCUIT

Quartz crystal 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

Status LED (red) with name **STAT** connected to AduC7020 pin 22 (P2.0)

Status LED (red) with name **LED1** - indicates that OK1 is working

Status LED (red) with name **LED2** - indicate that OK2 is working

**Status LED (red)** with name **LED3** - indicate that OK3 is working

Status LED (red) with name **LED4** - indicate that OK4 is working

Status LED (red) with name **LED5** - indicate that REL1 is working

Status LED (red) with name **LED6** - indicate that REL2 is working

Status LED (red) with name **LED7** - indicate that REL3 is working

Status LED (red) with name **LED8** - indicate that REL4 is working

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

User button with name **SD**, connected to ADC7020 pin 10 (P0.0).
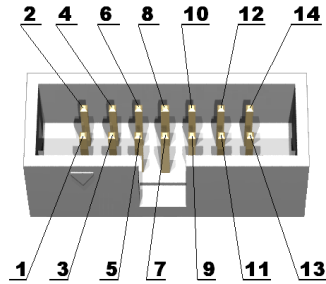
EXTERNAL CONNECTORS DESCRIPTION

JTAG
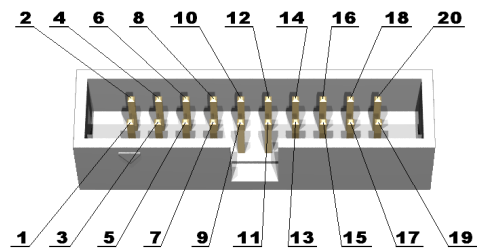
Pin #	Signal Name	Pin #	Signal Name
1	+3.3 V	2	+3.3 V
3	P0.3/TRST	4	GND
5	TDI	6	GND
7	TMS	8	GND
9	TCK	10	GND
11	TCK	12	GND
13	TDO	14	GND
15	Not Connected	16	GND
17	Not Connected	18	GND
19	Not Connected	20	GND

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PWR

Pin #	Signal Name
1	Power Input
2	GND
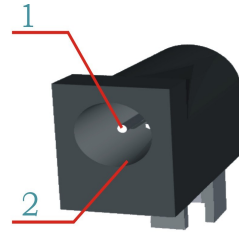
AEXT

Pin #	Signal Name	Pin #	Signal Name
1	AVDD	2	AVDD
3	ADC0	4	DAC0
5	ADC1	6	DAC1
7	ADC2	8	DAC2
9	ADC3	10	DAC3
11	ADC4	12	VREF
13	GND	14	GND

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RS232 ICSP

Pin #	Signal Name
1	Not connected
2	T1_OUT
3	R1_IN
4	Not Connected
5	GND
6	Not Connected
7	Not Connected
8	Not Connected
9	Not Connected
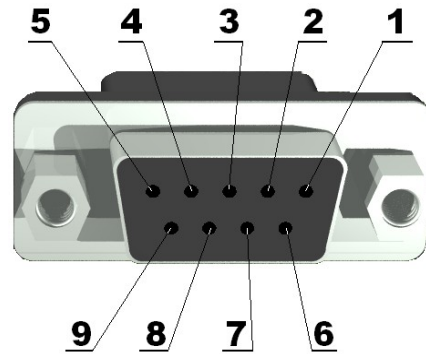
I2C

Pin #	Signal Name
1	+3.3 V
2	SCL
3	SDA
4	GND
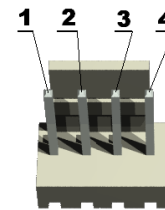
IN1, IN2, IN3, IN4

Pin #	Signal Name
1	Optoisolated Digital Input 1
2	Optoisolated Digital Input 2

OUT1, OUT2, OUT3, OUT4

Pin #	Signal Name
1	Relay output
2	Relay output
3	Relay output

Note: *Default state is pin 2 connected to pin 3.*

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MECHANICAL DIMENSIONS
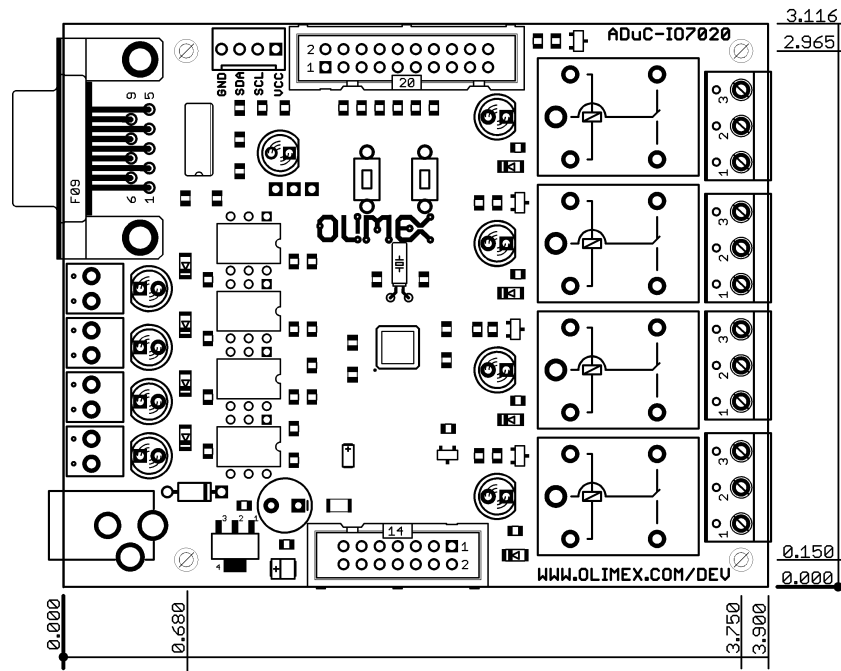
All measures are in Inches.

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

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ORDER CODE

ADuC-IO7020 - 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 for more info.

Revision history:

REV. A   - create   September 2005

Disclaimer: