



FORTHstamp

Silicon Valley Forth Interest Group

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Summary

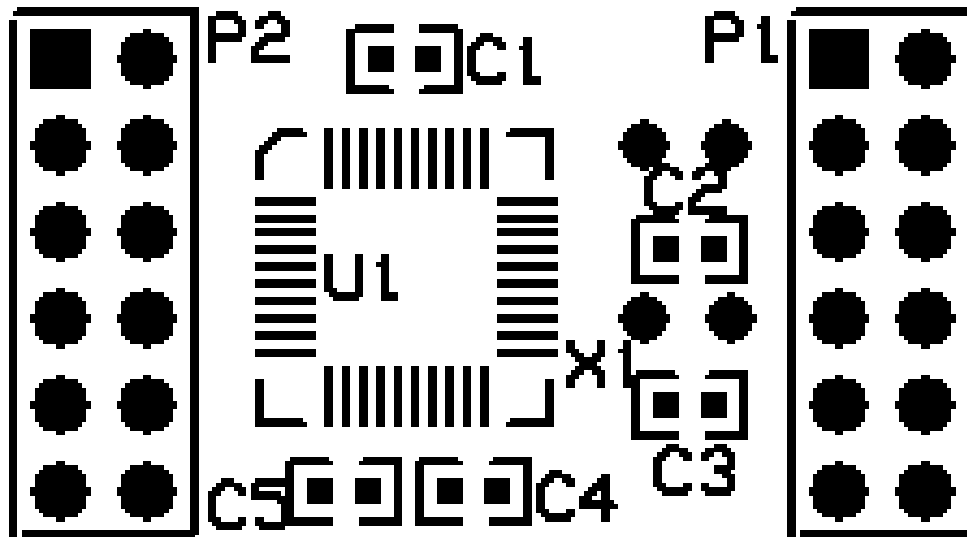
- ADuC7020 Microconverter
- FORTHstamp
- ADuC eForth
- ADuC Metacompiler
- Demonstrations
- Concluding Remarks



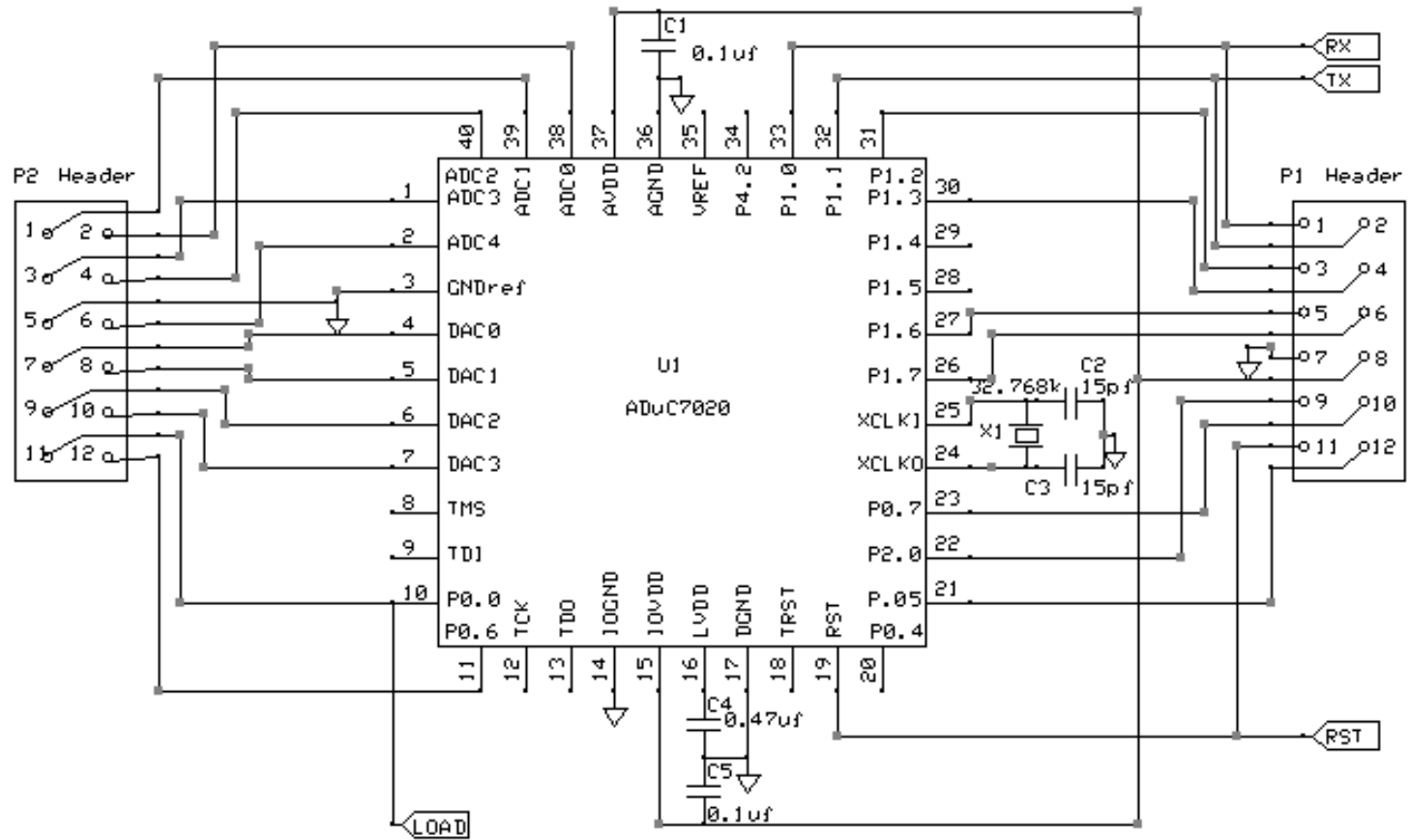
ADuC7020 Microconverter

- **40 Pin 5x5mm SMD Package**
- **45 MHz ARM7 core**
- **64 Kbytes Flash RAM**
- **5 Channels of 12-bit A/D**
- **4 Channel 12-bit D/A**
- **Serial Ports for UART, I2C, SPI**
- **Parallel Ports**
- **Counters, Timers, Interrupt Controller**

FORTHstamp Layout



FORTHstamp Schematics

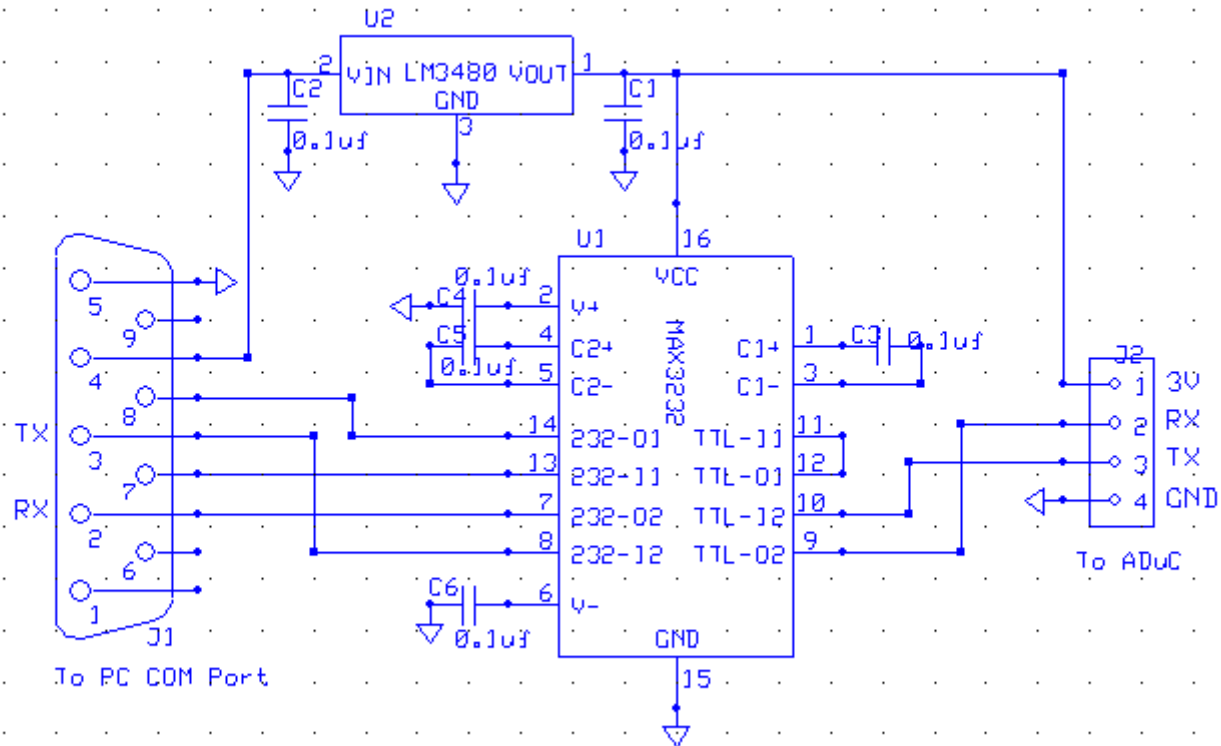




I/O Interfacing

- UART
- GPIO
- DAC
- ADC

UART33 Interface





ADuC eForth

- Implemented in assembler and in metacompiler
- Subroutine threading
- All ADuC registers are defined as constants
- Interrupt driven ADC sampling



ADuC Metacompiler

- Based on F# for Windows XP
- Automated one-click operation
- Including ARM7 assembler
- Generate an Intel HEX file for downloading to flash memory in ADuC
- Released with all source code



Metacompiler Files

- ADuCcompiler.fex Loader of metacompiler
- ARM7asm.F ARM7 assembler
- ADuCkernel.F Kernel words
- ADuCeforth.F High level words
- ADuCscope.f Application
- ADuCcompiler.f Compiler words



Metacompiler Demo

- Generate ADuC eForth v5.10
- Bring up ARMWSD for flashing
- Flash ADuCef.hex into ADuC7020
- Boot up ADuC eForth
- Exercise ADuC eForth



eForth Demonstration

```
: HELLO CR ." HELLO, WORLD!" ;  
HELLO  
: LOOPS FOR NEXT ;  
DECIMAL 1000000 LOOPS
```



GPIO Demonstration

HEX

0 GPIOCON !

Set up port P0

20000000 GP0DAT !

Output 0V on
P0.5

20200000 GP0DAT !

Output 3.3V on
P0.5

GP0DAT ?

Read P0 port



DAC Demonstration

13 DAC0CON !

Set up DAC0 to
output in 0-3.3V range

0 DAC0DAT !

Output 0V

4000000 DAC0DAT !

Output 0.8V

8000000 DAC0DAT !

Output 1.6V

FF00000 DAC0DAT !

Output 3.3V



ADC Demonstration

20 ADCCON !

0 ADCCP !

E3 ADCCON !

0 DAC0DAT !

ADC0DAT ?

8000000 DAC0DAT !

ADC0DAT ?

FF00000 DAC0DAT !

ADC0DAT ?

Turn on ADC

Select ADC0 as input
channel

Start ADC0

Output 0V

Read conversion results

Output 1.6V

Read conversion results

Output 3.3V

Read conversion results



Concluding Remarks

- ADuC7020 is a true Single Chip Computer
- FORTHstamp is a true Single-Board, Single-Chip FORTH Computer
- ADuC Metacompiler makes it possible to use FORTHstamp to develop real time applications

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- Thank you very much.