

AN672 APPLICATION NOTE

OPTIMIZING THE ST6 A/D CONVERTER ACCURACY

INTRODUCTION

When using the internal Analog to Digital Converter of the ST62 family and maximum A/D converter accuracy is required, it is desirable to filter out any noise present on the analog input, but also noise present on the ground and V_{CC} supply lines of the MCU as V_{CC} is also the voltage reference of the A/D converter. Good decoupling must be made with capacitors on the analog input and between V_{CC} and ground. It is also recommended to put the MCU in wait state while the conversion is in progress, so as to minimize noise injected into V_{CC} by the operation of the micro-controller itself.

Finally, when enough time is available, it is highly recommended to make several successive A/D conversions and take an average of the results. This is the most effective way to get the most accuracy out of the ST6 family A/D converter.

The following code fragment demonstrates a burst of 256 successive measurements, after which the average is put into the accumulator. The whole routine takes approximately 30 milliseconds with an 8 MHz clock. When less time is available, it is of course possible to reduce the number of conversions: 8, 16 or 32 conversions also give good results, although the most conversions give the best results.

```
;description: measures ADC input 256 times and stores average
     of the 256 measures into accumulator
;
average
  lid ior,10h ; global enable interrupts
  clr aver_lo ; aver_lo, aver_hi and count are RAM registers
  clr aver hi
  ldi count,255 ; set for 256 measurements
aver1
  ldi adcc,10110000b ; start conversion with interrupt
  wait
  lda,adc
add a, aver_lo
  jrnc aver2
  inc aver hi
aver2 ld aver lo,a
;================ end of two byte addition
  ld a, count
  jrz aver4
  dec count
  jp aver1 ;do it 256 times
aver4 lda,aver_lo
  cpi a, 127 ;round to next value if decimal part >0.5
  jrc aver3
  inc aver hi
aver3 lda, aver hi ;store high byte of result into accumulator,
        ; the low byte is not significant
  ret
adcint
  ldi adcc,10h
  reti
.org 0ff0h
  jp adcint
```

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