

## **Specifications**

12-bit Resolution, 1/2 LSB linearity

Software Selectable Input Ranges:  $\pm 10V$ ,  $\pm 5V$ , 0V to 10V, 0V to 5V

Fault-Protected Input Multiplexer ( $\pm 16.5V$ )

8 Analog Input Channels

6 $\mu$ s Conversion Time

Internal 4.096V Reference

For additional specifications, see attached MAX197 data book

## **Configuration**

Up to 8 A/D Converter Boards may be addressed by a Flashlite SBC. These boards must each be assigned a unique I/O address range. This is accomplished by setting the position of the three jumpers on the jumper block labeled JP1. All of the example software supplied with the A/D Converter Board assumes that the installed board is number 0.

The following table describes the correct jumper settings and the I/O base addresses for the 8 possible board numbers:

<b>Board Number</b>	<b>I/O Base Address</b>	<b>Top Jumper</b>	<b>Middle Jumper</b>	<b>Bottom Jumper</b>
0	2B0h	ON	ON	ON
1	2B8h	ON	ON	OFF
2	2C0h	ON	OFF	ON
3	2C8h	ON	OFF	OFF
4	2D0h	OFF	ON	ON
5	2D8h	OFF	ON	OFF
6	2E0h	OFF	OFF	ON
7	2E8h	OFF	OFF	OFF

## **Installation**

Connect the 40 pin connector J1 to J1 on the Flashlite SBC. Mount the A/D board above or below the Flashlite using 7/8" stackable standoffs. Connect the analog inputs to A/D board via J-4. The following chart describes the pinout of J4:

Pin Number	Description
1	Channel 0 Input
2	Channel 1 Input
3	Channel 2 Input
4	Channel 3 Input
5	Channel 4 Input
6	Channel 5 Input
7	Channel 6 Input
8	Channel 7 Input
9	Ground
10	+5V DC
11	Unused
12	Unused

## **Programming**

The A/D converter is accessed by first writing an 8-bit control byte to the I/O base address, waiting a minimum of 6 $\mu$ s., then reading the data as a 16 bit word from the I/O base address.

The Control byte format is as follows:

D7	D6	D5	D4	D3	D2	D1	D0
0	1	0	RNG	BIP	A2	A1	A0

The bits BIP and RNG set the A/D converter range and polarity according to the following table:

BIP	RNG	Input Range (V)
0	0	0 to 5
0	1	0 to 10
1	0	$\pm$ 5V
1	1	$\pm$ 10V

The bits A0 to A2 select the A/D channel for conversion according to the following table:

A2	A1	A0	CH0	CH1	CH2	CH3	CH4	CH5	CH6	CH7
0	0	0	X							
0	0	1		X						
0	1	0			X					
0	1	1				X				
1	0	0					X			
1	0	1						X		
1	1	0							X	
1	1	1								X

For additional technical information please consult the attached MAX197 data book.

## **Software**

Two demo programs and one software driver are included with the Flashlite Utilities Disk.

AD.ASM is a Quickbasic driver program for the JK microsystems A/D converter board. The driver uses oversampling and AC mains rejection to achieve 13-14 bits of resolution with a 12 bit A/D converter. The driver supports the following 3 functions:

ADLineFreq(freq%) Sets the AC mains rejections frequency.  
50 = 50hz AC mains frequency  
60 = 60hz AC mains frequency  
Default value is 60.

ADRange(range%) Sets the A/D converter range.  
0 = 0V - 5V  
1 =  $\pm 5V$   
2 = 0V - 10V  
3 =  $\pm 10V$   
Default value is 3

AD(chan%)            Sets the A/D converter channel and takes reading.  
Call with chan% = channel number (0-7), returns  
with result in chan%.

Takes 256 samples over the period of one  
cycle of mains power. The samples are averaged  
and the results are carried out to 16 bits. The  
results are returned in chan%. The result is  
normalized so that regardless of the A/D range,  
the transfer ratio is  $V = \text{chan\%} * (1.25/2^{12})$ .

TESTAD.BAS is an example program which, through the use of AD.OBJ, reads each  
of the 8 A/D channels in each of the 4 ranges and displays the data on the screen.  
By pressing the spacebar, the program will display the data as volts or as A/D  
counts. When the program displays in the A/D counts mode, the data is  
denormalized to the same transfer ratio as a single sample would have at that range.  
This allows quick verification of A/D offset and gain error values.

To recompile TESTAD.BAS perform the following;

```
bc testad /o            ' compile the program with the /o switch  
link testad+ad        ' link in the AD.OBJ driver
```

CAPTURE.COM is a demo program which waits for channel 0 to exceed .25 volts  
then begins capturing 2048 words of data at a 20Khz sample rate. After the data is  
captured it is converted into unsigned ASCII decimal values and written to a file in  
tab delimited format. The file name is specified on the command line when  
CAPTURE.COM is invoked. The file can then be downloaded into the development  
system and loaded directly into a Quattro or Excel spreadsheet for plotting. The  
source code, CAPTURE.ASM is also supplied.