

**ZLUSBREF01**  
**USB to SMBus Reference Design**

AN1469  
 REV.0.00  
 May 07, 2009

**Description**

The USB to SMBus™ Interface board allows communication between a Zilker Labs Digital-DC™ evaluation board and a PC. This interface board has been designed to bridge PMBus commands from a PC application program to the SMBus. The PMBus command set is used to configure a Digital-DC device as well as monitor the power supply. PMBus™ commands are accessed using the Zilker Labs interface software from a PC running Microsoft Windows. Refer to AN13 – *PMBus Command Set* for more information on PMBus commands.

The USB to SMBus interface board is used by connecting the SMBus interface connector directly to a Zilker Labs evaluation board. The SMBus connector is found on the lower left-hand side of each evaluation board. Refer to the Zilker Labs' product evaluation board quick start guide and product data sheet for more information.

**Features**

- SMBus control via USB
- SMBus 2.0 and I<sup>2</sup>C 2.1 compatible
- PMBus compliant
- Self powered from USB
- Pre-installed firmware
- Provides SMBus reference rail

**Applications**

This board has been designed to operate for the following conditions:

- Interface to Digital-DC EVBs
- $f_{SMBus} = 100 \text{ kHz}$
- Temperature range: 0°C to +70°C



Figure 1. USB to SMBus Interface

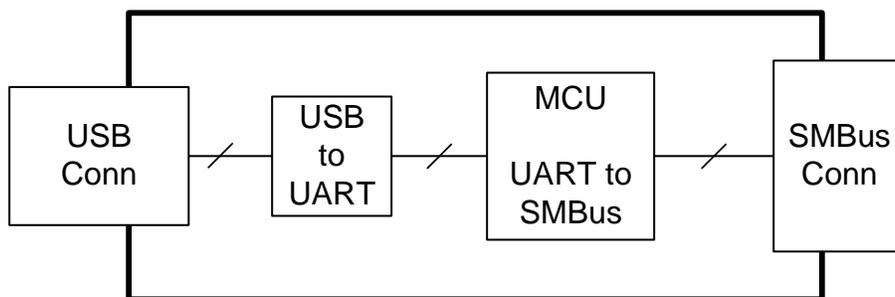


Figure 2. Block Diagram

# Schematics

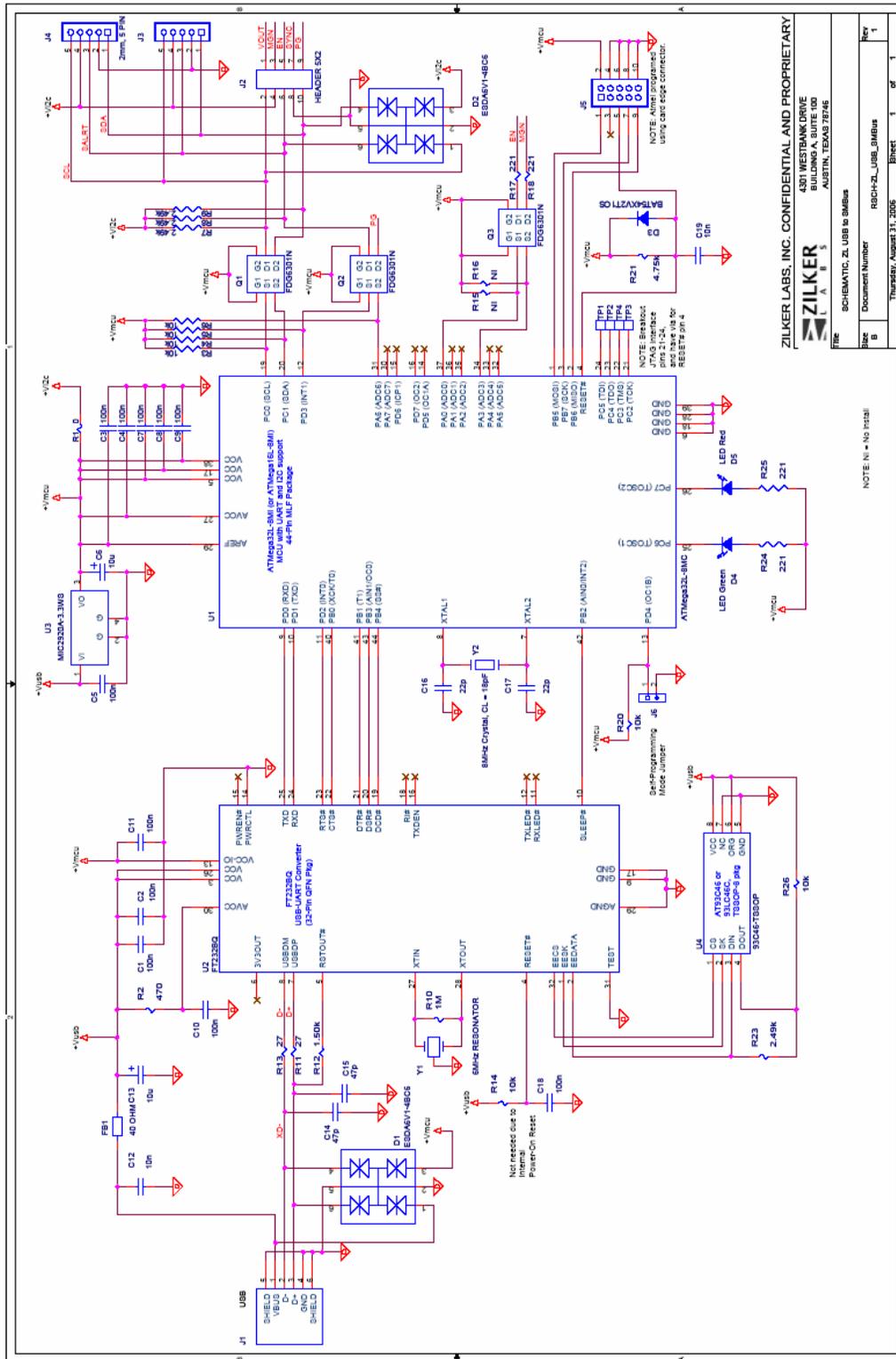


Figure 1. USB to SMBus

## Bill of Materials

Item	Quan	Reference	Value	Tol	Rating	Type	PCB Footprint	Manufacturer	Part Number
1	11	C1,C2,C3,C4,C5,C7,C8,C9,C10,C11	100n	10%	10V	X7R	SM0603	KEMET	C0603C104K8RACTU
2	2	C6,C13	10u	20%	6.3V		SM0603	PANASONIC-ECG	ECJ-1VB0J106M
3	2	C12,C19	10n	10%	25V	X7R	SM0603	PANASONIC-ECG	ECJ-1VB1E103K
4	2	C14,C15	47p	5%	50V	COG	SM0603	TDK	C1608C0G1H470J
5	2	C16,C17	22p	5%	50V	COG	SM0603	MURATA	GRM1885C1H220JA01D
6	2	D1,D2	ESDA6V1-4BC6		6.1V, 80W		SOT23_6L	ST MICRO	ESDA6V1-4BC6
7	1	D3	BAT54XV2T1OS		200mA		SOD-523	ON SEMI	BAT54XV2T1OS
8	1	D4	LED Green		20mA	CLR	SM0805_DIO_1C2A	CHICAGO MINI	CMD17-21VGC
9	1	D5	LED Red		20mA	CLR	SM0805_DIO_1C2A	CHICAGO MINI	CMD17-21VRC
10	1	FB1	40 OHM		1.5A	MLF	SM0805	STEWARD	MI0805K400R-00 MI0805K400R-01
11	1	J1	USB TYPE B				USB/B	MOLEX	67068-0000
12	1	J2	HEADER 5X2				HDRF5DUALRA100X100	SAMTEC	SSQ-105-02-T-D-RA
13	1	J3	5 PIN			SN	HDR5LK100	AMP	640456-5
14	1	J4	2mm, 5 PIN			SN	SIP_5P_2.0MM	Sullins	PRPN051PAEN
15	1	J6	2 PIN			SN	SIP2/100	TYCO	644456-2
16	3	Q1,Q2,Q3	FDG6301N		25V	DUAL N-CH	SC70-6	FAIRCHILD SEMI	FDG6301N
17	1	R1	0			THK FILM	SM0805	YAGEO	RC0805JR-070RL
18	1	R2	470	5%	63mW	THK FILM	SM0402	ROHM	MCRMZPF4700
19	2	R3,R5	10k	1%	100mW	THK FILM	SM0603	ROHM	MCR03EZPFX1002
20	5	R4,R6,R20,R26	10k	1%	63mW	THK FILM	SM0402	YAGEO	RC0402FR-0710KL
21	3	R7,R8,R9	2.49k	1%	100mW	THK FILM	SM0603	ROHM	MCR03EZPFX2491
22	1	R10	1M	1%	63mW	THK FILM	SM0402	ROHM	MCR01MZPF1004
23	2	R11,R13	27	5%	63mW	THK FILM	SM0402	YAGEO	RC0402JR-0727RL
24	1	R12	1.50k	1%	63mW	THK FILM	SM0402	YAGEO	RC0402FR-071K5L
25	4	R17,R18,R24,R25	221	1%	63mW	THK FILM	SM0402	YAGEO	RC0402FR-07221L
26	1	R21	4.75k	0.01	63mW	THK FILM	SM0402	PANASONIC-ECG	ERJ-2RKF4751X
27	1	R23	2.49k	0.01	63mW	THK FILM	SM0402	PANASONIC-ECG	ERJ-2RKF2491X
28	1	U1	ATMega32L-8MC			MCU	MLF44_7X7_DP	ATMEL	ATMEGA32L-8MC
29	1	U2	FT232BQ				TQFP32/.8P/9X9	FTDI	FT232BQ
30	1	U3	MIC2920A-3.3WS		400mA		SOT223_1234_REV1	MICREL	MIC2920A-3.3WS TR
31	1	U4	93C46-TSSOP		1.8 - 5.5V	93C46	TSSOP8/.65P/6.4	ATMEL	AT93C46-10TI-1.8
32	1	Y1	6MHz RESONATOR	0.01		COMM	CERALOCK	MURATA	CSTCR6M00G53-R0
33	1	Y2	8MHz Crystal, CL = 18pF	30ppm		CSM-7	X575CT	ECS INC	ECS-80-18-5P
NI		TP1,TP2,TP3,TP4	T POINT S				TP_020H		
NI		R15,R16	NI	1%			SM0402		
NI		J5	AVRISP_10PinConn				HDR10DUAL100X100		
NI		R14	10k	1%	63mW	THK FILM	SM0402	YAGEO	RC0402FR-0710KL
NI		C18	100n	0.1	10V	X7R	SM0603	KEMET	C0603C104K8RACTU

NI = Not Installed

## References

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- [1] AN13 – *PMBus Command Set*, Zilker Labs, Inc., 2007.
- [2] *ZL2005 Data Sheet*, Zilker Labs, Inc., 2006.
- [3] *ZL2105 Data Sheet*, Zilker Labs, Inc., 2007.
- [4] *ZL2005EV1 Quick Start Guide*, Zilker Labs, Inc., 2006.
- [5] *ZL2105EV1 Quick Start Guide*, Zilker Labs, Inc., 2006.

## Ordering Information

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Orderable Part Number	Description
ZLUSBREF01	USB to SMBus Interface

## Revision History

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Date	Rev. #	
3/27/2007	0.5	Preliminary Release
4/26/2007	1.0	Final Release

## NOTES

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