Application Note: USB Interface Board-AN01 – General Description

USB Interface Board

AN01 – General Description

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Revision History

Revision	Date	Owner	Description
1.0	07.10.2013	gheh	Initial release

1 General Description

This document describes the USB Interface Board which creates the link between our demo Boards and the USB Interface on the PC side.

This demo Board is used in conjunction with a number of different demo boards.

It supports SPI, I2C, UART, CAN and LIN as well as normal GPIO Interfaces and passed them onto USB Port.

The Protocol to the PC side is AMS-Stream via USB-HID and the appropriate driver which is built-in in modern Operating Systems.

1.1 Kit Content

The kit consists of the dual layer PCB USB Interface Board a USB Cable and a HDMI Type-D to Type-C Cable which is used to connect to the demo board.

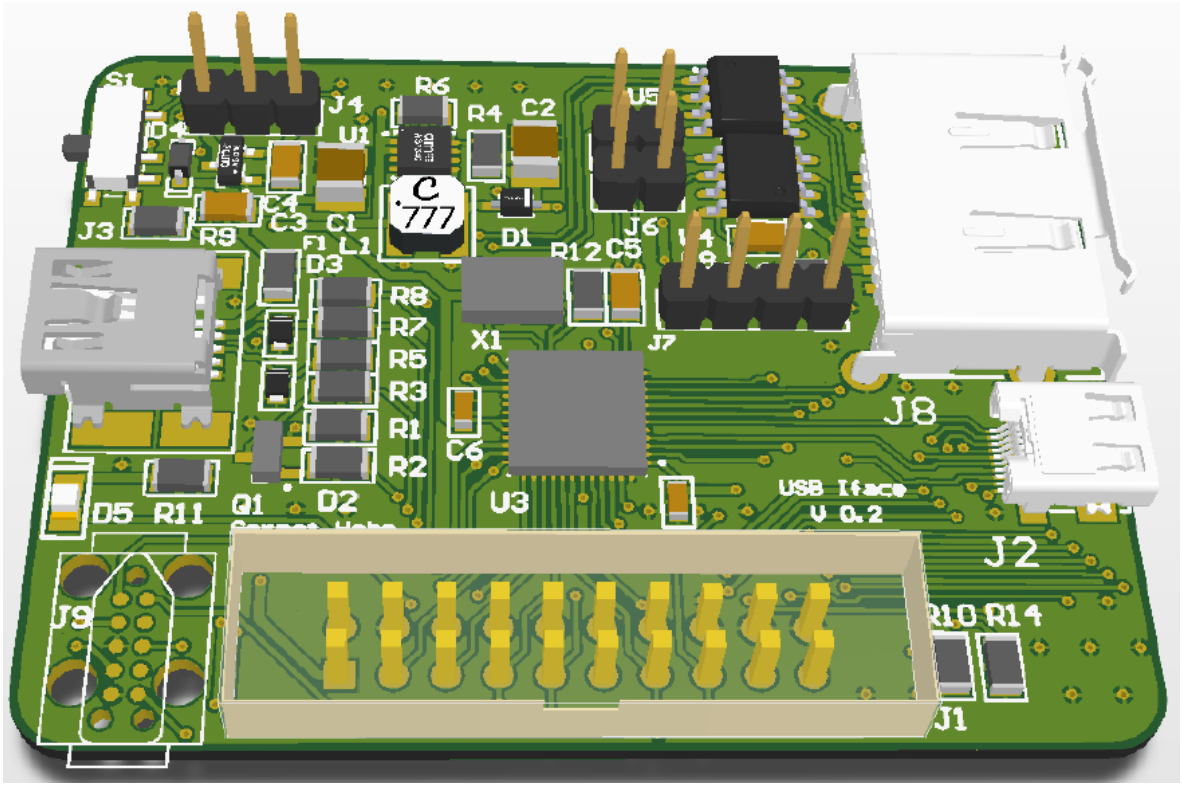

Figure 1: USB Interface Board

2 Getting Started

As this Interface Board is for a multitude of demos there is no general setup procedure. Typically you would install the Software of the Demo Board you're using, and then select the appropriate Interface voltage on the USB Interface Board as described in Chapter 4.1. Afterwards you connect the Demo Board via the HDMI or eSATA Cable and then the USB Interface board to the Computer via a USB cable. Important for normal operation the switch S1 has to point away from the left top edge otherwise the MCU will enter Firmware Update mode.

3 Hardware Description

The USB Interface Board is powered via J3 the USB Connector. It can run on 5V or 3.3V which is selectable via J4.

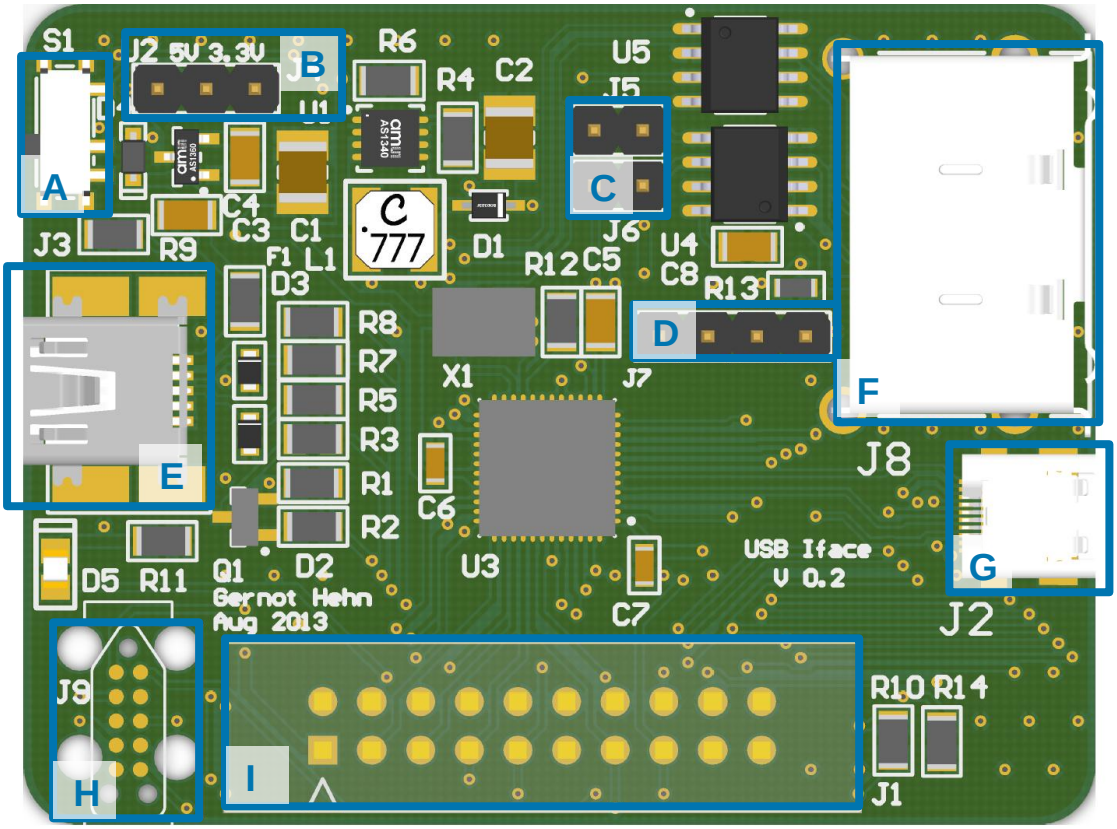

Figure 2: PCB Top Side Diagram

Label	Name	Designator	Description	Info
A	PROG_SWITCH	S1	Program Switch	Switch to enable Firmware Upload via USB
B	V_SELECT	J4	Votlage Selector	Selects between 3.3V and 5V supply and logic
C	LIN_EN	J5 / J6	Lin Enable	Jumper to enable LIN Interface bridge from left to right
D	UART	J7	Uart Connector	Allows to connect Bluetooth UART Interface
E	USB	J3	Usb Connector	Connects to the PC
F	CAN / LIN	J8	Automotive Interface Connector	Interfaces to the CAN and LIN Bus and provides 12V
G	SPI / I2C / UART / GPIO	J2	Serial Interface Connector	Interfaces to the Standard Serial Protocols
H/I	JTAG	J1/J9	JTAG Programming	Allow to Program and debug the

Label	Name	Designator	Description	Info
			Connector	chip. J9 is a Tag-Connect

Table 1: Connection Diagram

4 Configuration

4.1 Supply and Logic Voltage

The Supply and Logic voltage is configured by J4. Placing a jumper on the left two of the three pins will select 5V (which is required e.g. for the AS8506 demo boards). Placing the jumper in on the right two pins will select 3.3V operation (which is e.g required for the AS8510).

4.2 LIN Enable

To enable the LIN Interface two jumpers have to be placed on J5 and J6. This will disable one of the two serial Interfaces and redirect it to the LIN Transceiver.

4.3 Firmware Update

4.3.1 JTAG

The Firmware can be updated and changed either via the JTAG Interface which is accessible either via the standard 20 pin JTAG Connector J1 (which by default is not populated) or via the 10pin tag-connect plug J9 (http://www.tag-connect.com/TC2050-IDC)

4.3.2 USB

The Microcontroller has an integrated bootloader which allow software update via USB. This can be triggered by placing the Switch S1 in direction of the left top corner and then plugging in the USB cable. This will enumerate a new Serial Device which can then be programmed via the Flash USB Direct Programmer (http://www.spansion.com/Support/microcontrollers/developmentenvironment/Pages/usb-direct-download.aspx)

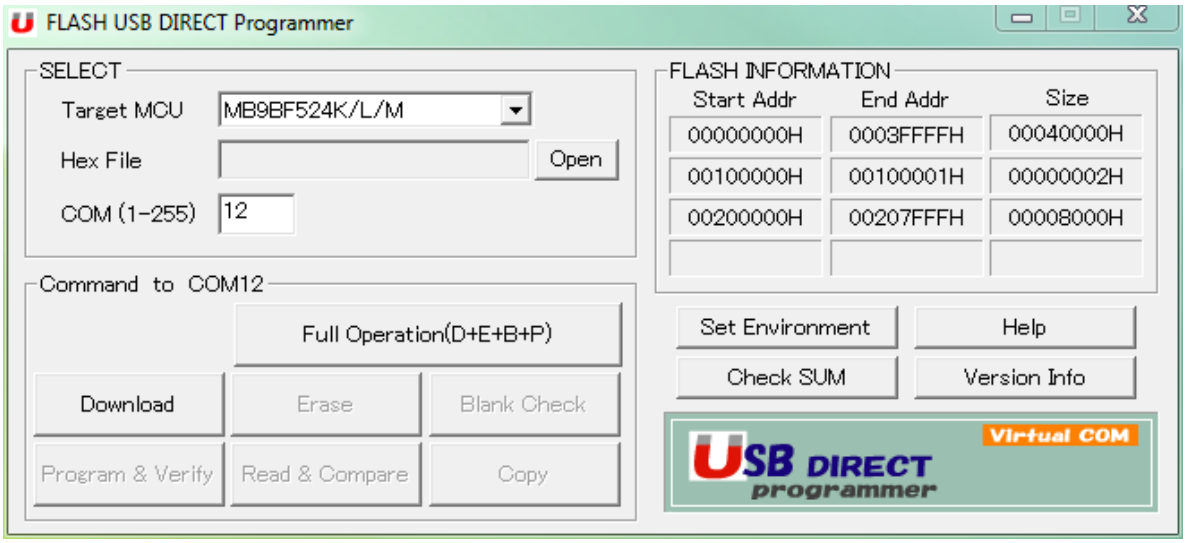

Figure 3: FLASH Usb Direct Programmer GUI

Be sure to select MB9BF524K/L/M as Target MCU and the hex file you want to upload. Then select the correct com Port which the Microcontroller enumerated to and click ***Full Operation***

5 Board Schematics, Layout and BOM

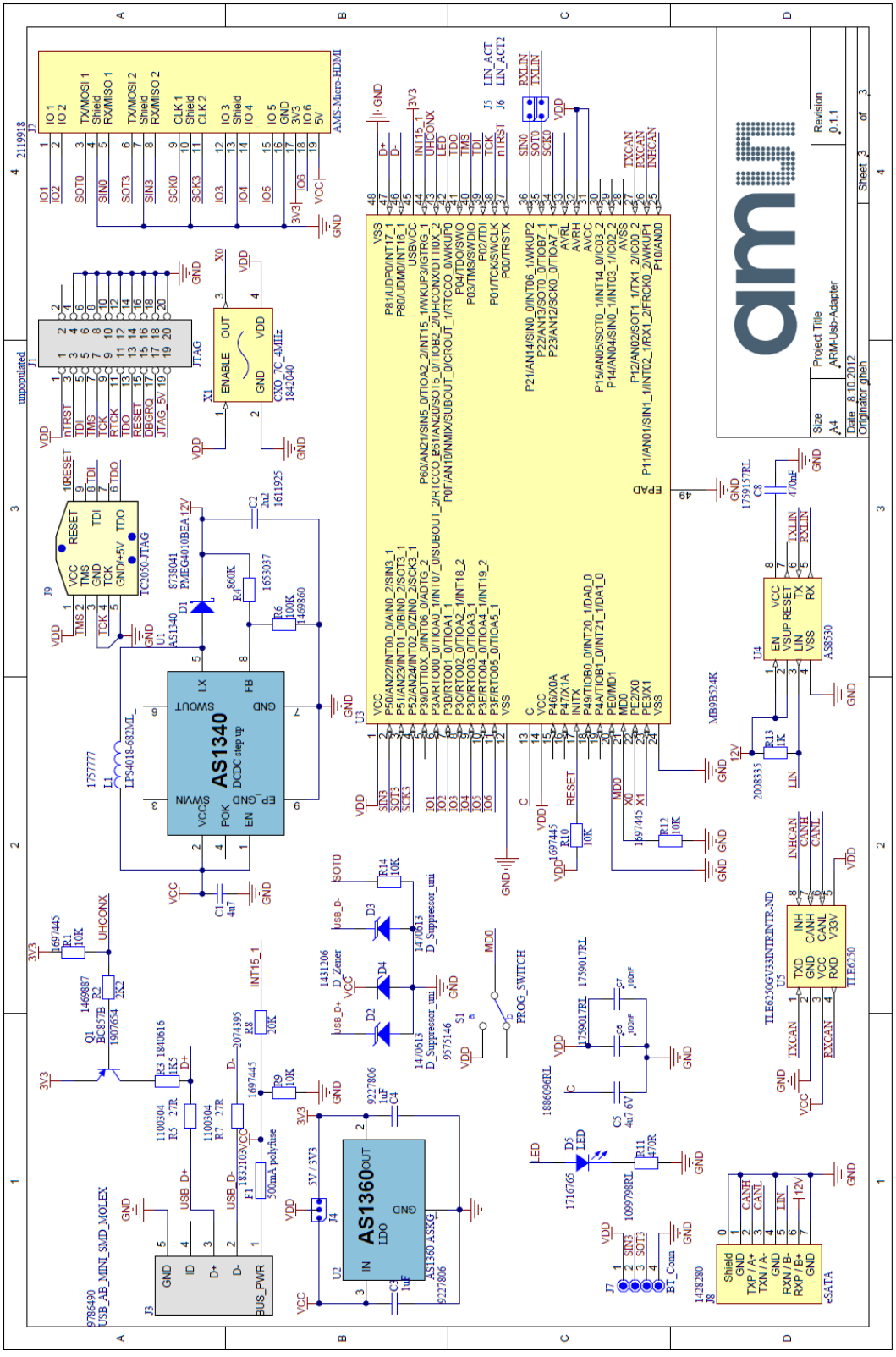

Figure 4: Schematic

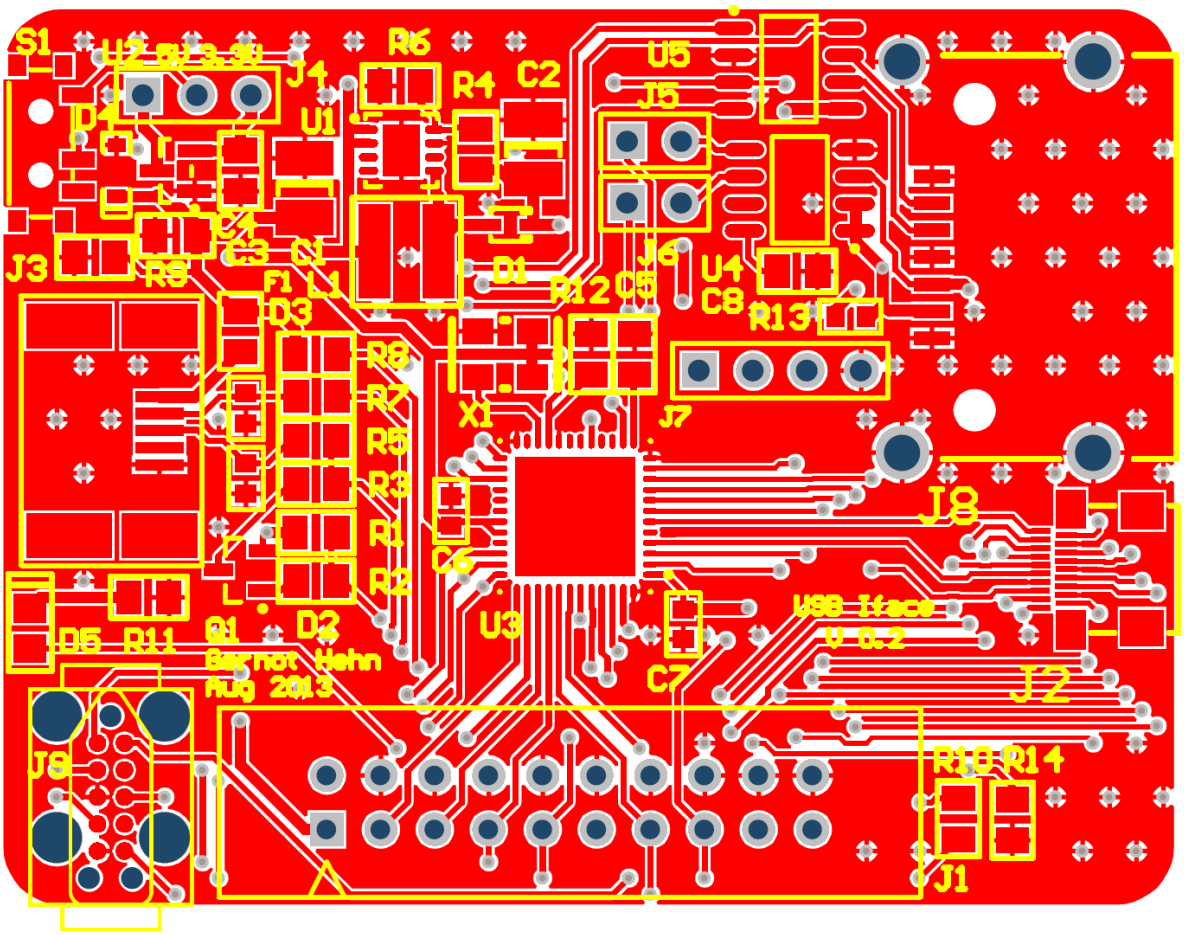

Figure 5: Top PCB Side

Bill of Materials

ARM-Usb-Adapter

Company:	ams AG
Originator:	gheh
PCB Name:	ARM-Usb-Adapter
PCB Version:	0.1.1
Report Date:	8.10.2012

#	Designator	Comment	Description	Manufacturer	Manufacturer Part Number	Quantity
1	C1	4u7	Ceramic Chip Capacitor - Standard	MULTICOMP	MCCA000579	1
2	C2	2u2	Ceramic Chip Capacitor - Standard	TAIYO YUDEN	GMK325BJ225KN-T	1
3	C3	1uF		KEMET	C0805C105Z4VACTU	1
4	C4	1uF		KEMET	C0805C105Z4VACTU	1
5	C5	4u7 6V		JOHANSON DIELECTRICS	6R3R15X475KV4E	1
6	C6	100nF		MULTICOMP	MCCA000160	1
7	C7	100nF		MULTICOMP	MCCA000160	1
8	C8	470nF		MULTICOMP	MCCA000287	1
9	D1	PMEG4010BEA		NXP	PMEG4010BEA	1
10	D2	D_Suppressor_uni		COOPER BUSSMANN	0603ESDA-TR1	1
11	D3	D_Suppressor_uni		COOPER BUSSMANN	0603ESDA-TR1	1
12	D4	D_Zener		ON SEMICONDUCTOR	MM3Z6V8T1G	1
13	D5	LED		MULTICOMP	OVS-0803	1
14	F1	500mA polyfuse	Fuse			1
15	J1	JTAG		MULTICOMP	MC9A12-2034	1
16	J2	AMS-Micro-HDMI				1
17	J3	USB_AB_MINI_SMD_MOLEX		MOLEX	56579-0576	1
18	J4	5V / 3V3				1
19	J5	LIN_ACT				1
20	J6	LIN_ACT2				1
21	J7	BT_Conn				1
22	J8	eSATA	MULTICOMP - 6SAU07MP-320B - STECKER,E-SATA,90°,SMT			1
23	J9	TC2050-JTAG	TC2050 SWD CONNECTOR DNP			1
24	L1	LPS4018-682ML_	Inductor	NXP	PMEG4010CEJ,115	1
25	Q1	BC857B	PNP General-purpose Transistor	NXP	BC857BW	1
26	R1	10K		TE CONNECTIVITY / NEOHM	CPF0805B10KE1	1
27	R2	2K2		VISHAY DRALORIC	CRCW08052K20FKEA	1
28	R3	1K5		YAGEO (PHYCOMP)	RED805DR-071K5L	1
29	R4	866K		VISHAY DRALORIC	CRCW0805866KFKEA	1
30	R5	27R		WELWYN	WCR0805-27RFI	1
31	R6	100K		VISHAY DRALORIC	CRCW0805100KFKEA	1
32	R7	27R				1
33	R8	20K		MULTICOMP	MCSR08X2002FTL	1
34	R9	10K		TE CONNECTIVITY / NEOHM	CPF0805B10KE1	1
35	R10	10K		TE CONNECTIVITY / NEOHM	CPF0805B10KE1	1
36	R11	470R		WELWYN	WCR0805-470RFI	1
37	R12	10K		TE CONNECTIVITY / NEOHM	CPF0805B10KE1	1
38	R13	1K		BOURNS	CR0603-FX-1001ELF	1
39	R14	10K				1
40	S1	PROG_SWITCH		C & K COMPONENTS	PCM12SMTR	1
41	U1	AS1340	50V, Micropower, DC-DC Boost Converter			1
42	U2	AS1360 ASKG	1.5uA Low-Power, LDO			1
43	U3	MB9B524K				1
44	U4	AS8530	LIN SBC			1
45	U5	TLE6250		Infineon Technologies	TLE6250G V33	1
46	X1	CXO_7C_4MHz		TXC	7C-4.000MBA-T	1
Approved			Notes			46

Figure 6: BOM

6 Ordering Information

The USB Interface Board can be ordered via:

Table 2: Ordering Information

Ordering Code	Productname	Materialnumber
USB-Interface-DK	USB Interface Board with ARM µc	990600769