EVALSPEAr300 - evaluation board for the SPEAr300

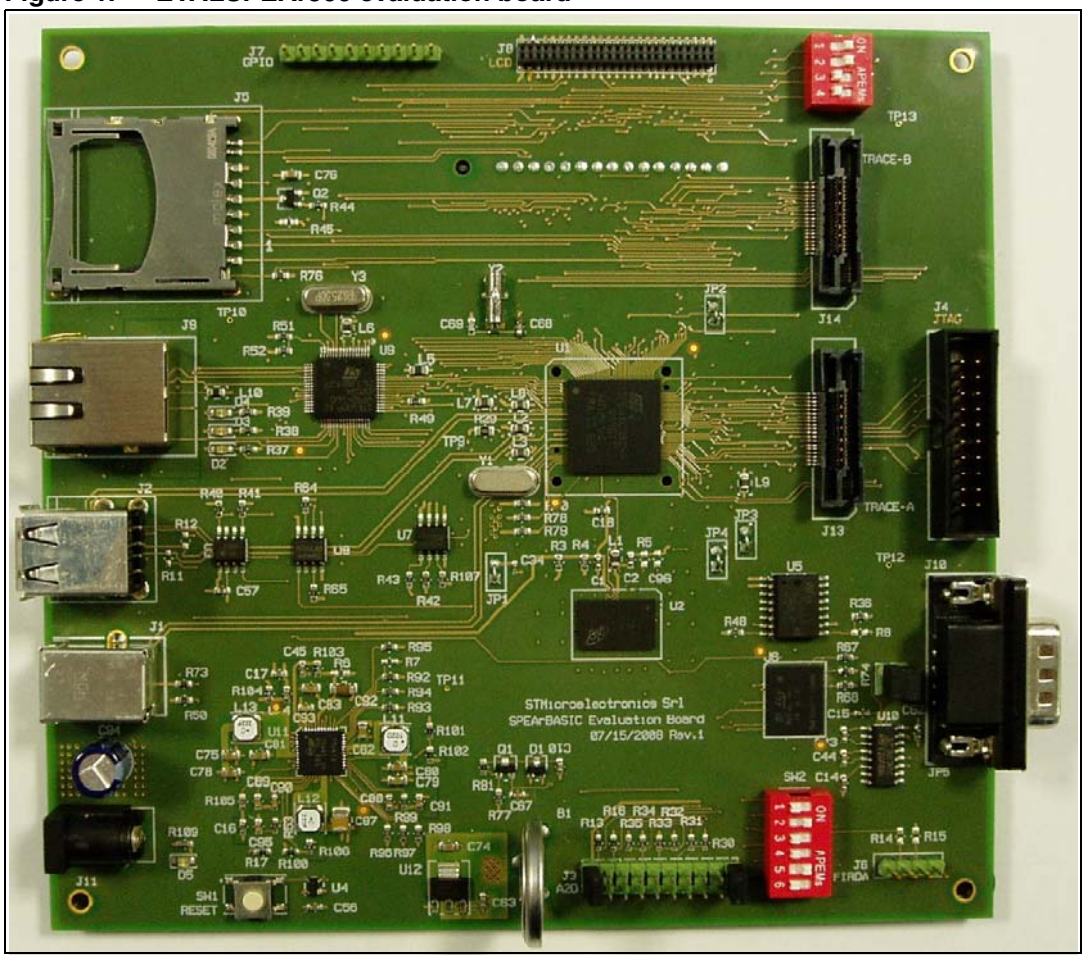
1 Description

The EVALSPEAr300 evaluation board for SPEAr300 is intended to be used for three main purposes:

- To allow you to quickly evaluate and debug software for the SPEAr300
- Act as a learning tool to rapidly get familiar with the SPEAr300 features
- Provide a starting point for the development of the final application board

It is equipped with most of the interfacRev 2es offered by the SPEAr300.

Figure 1. EVALSPEAr300 evaluation board



Contents

List of tables

List of figures

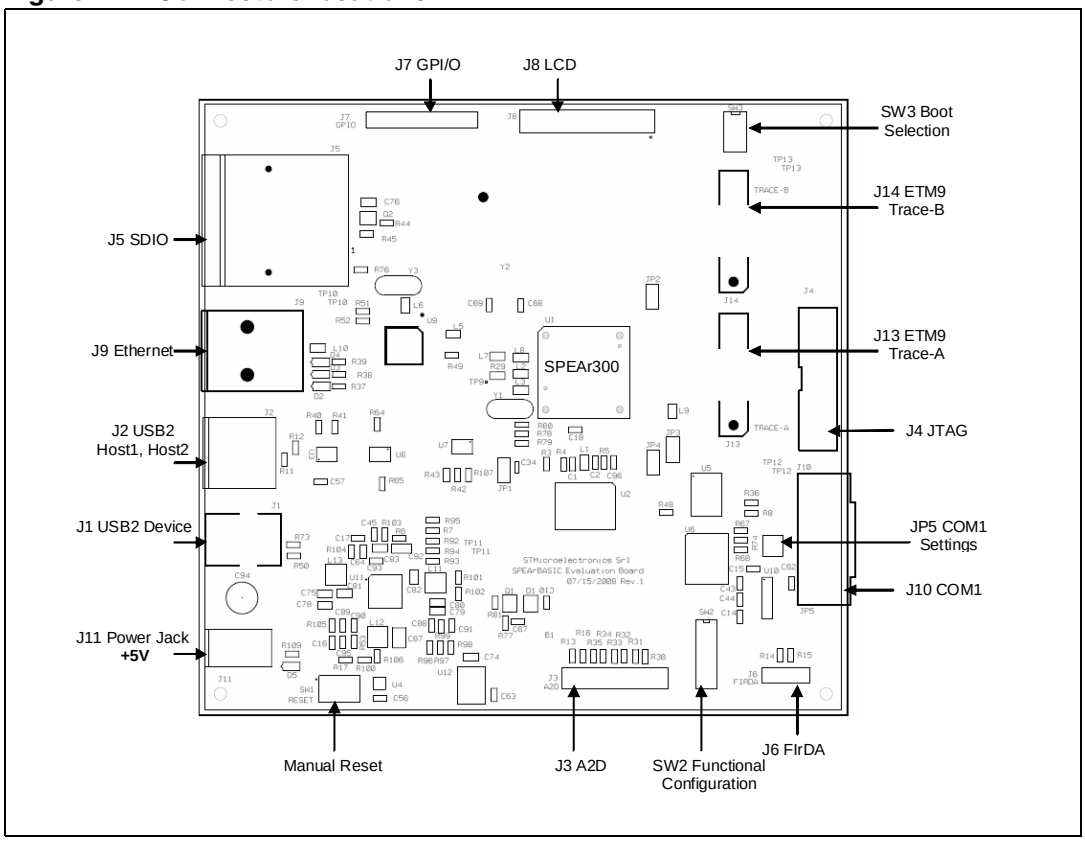
2 Contents of the kit

The EVALSPEAr300 evaluation board kit contains:

- SPEAr300 evaluation board
- AC/adapter (output voltage 5 V)
- 2 Plug Adapter (USA/Europe)
- User manual documentation

3 Connectors locations

Figure 2. Connectors locations



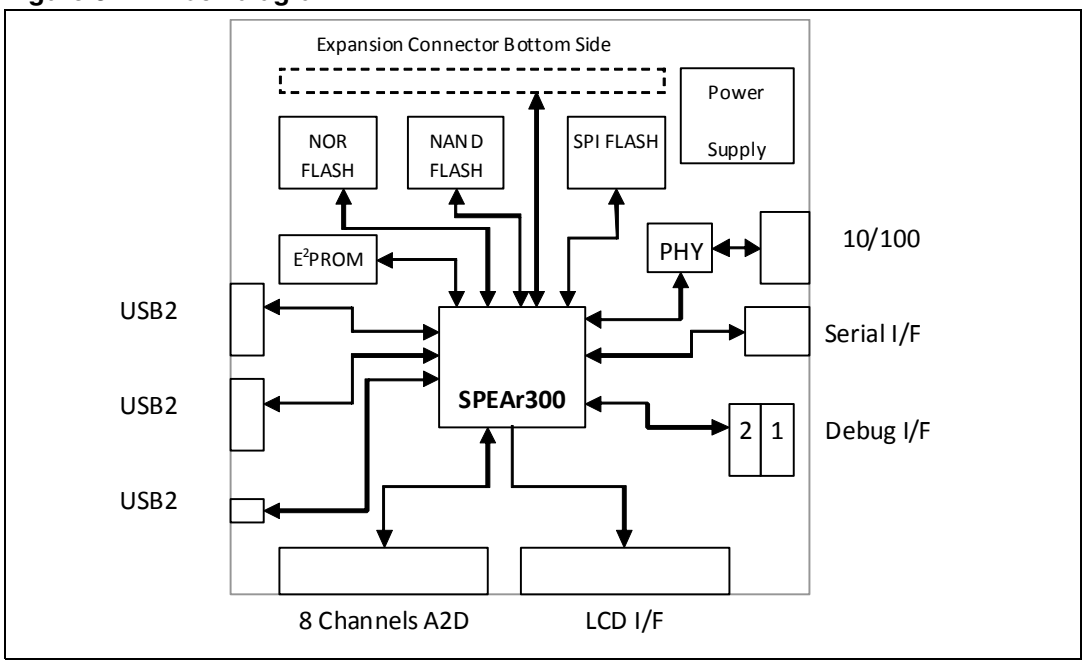
4 Features and block diagram

4.1 Features

- SPEAr300 embedded MPU
- Up to 2 Gb DDR2 333 MHz (std 128 MB)
- Up to 16 MB Serial Flash memory (std 8 MB)
- Up to 2 Gb NAND Flash memory (std 64 MB)
- 4 Kb Serial I^2C
- 4 Mb SPI Flash memory
- Two USB 2.0 full Host port channels
- One USB 2.0 HS Device
- 10/100 Ethernet port
- One serial port (up to 115 Kbaud)
- Debug ports (JTAG + ETM9)
- 8 ADC channels (10 bit, 1 Msamples)
- 8 GPIOs
- LCD I/F up to 24 bits-per-pixel (bpp)
- SD Card interface

4.2 Block diagram

Figure 3. Block diagram



5 Start up

5.1 Unpacking

ELECTROSTATIC WARNING:
The EVALSPEAr300 Evaluation board is shipped in protective anti-static packaging. The board must not be subjected to high electrostatic potentials. General practices for working with static sensitive devices should be applied when working with this board.

- **Wear an anti-static wristband** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the Spear300 evaluation board.
- **Self-grounding** - Touch a grounded conducting material before handling and periodically while handling the Spear300 evaluation board.
- **Use an anti-static pad** - When configuring the Spear300 evaluation board, place it on an antic-static pad to reduce the possibility of ESD damage.
- **Only handle the board edges** - When handling the Spear300 evaluation board.

5.2 Connection

- Connect a serial cable (RS232 on J4) to a host PC (see Figure 4).
- On a host PC running Windows or Linux, start the Terminal program.
- Connect the AC Adapter to a power outlet.
- Power ON the board (plug the jack of the AC/Adapter on J11). A sequence of boot messages is displayed, followed by the Linux console prompt.

For more information, refer to the *SPEAr300 evaluation board software getting started user manual* available on www.st.com/spear.

5.3 Booting procedure

The SPEAr300 Board is able to boot a Linux kernel pre-installed in the serial NOR Flash.

At power on, the serial port outputs a brief header message with some uBoot information (uBoot version, SDK version, and some internal hardware information). At this point you can choose to:

1. **Stop the system directly in uBoot**: For this you have to press the spacebar on the host computer keyboard before the boot delay time expires (default is 3 seconds).
2. **Boot Linux**: The system logs you in automatically as super user and the Linux shell prompt is displayed on the screen.

6 Block descriptions

6.1 Dynamic memory subsystem

The Dynamic memory subsystem is composed of three major parts:

6.1.1 Memory chip

The memory used is a Micron DDR2 device and its part number is: MT47H64M16HR-3. Its size is 128 Mb x 8 (16 Mb x 8 x 8 banks).

6.1.2 Local power supply

It is based on a Monolithic Voltage regulator for the chip set and DDR2/3 (PM6641). It is generated locally in order to minimize the layout impact and also to avoid any noise injection between different subsystems.

6.1.3 Signal termination

A parallel termination is added on the clock lines to compensate, if needed, the layout dissymmetry. Two 100 Ohm resistors are used for each line in order to obtain an impedance of 50 ohm. All the other terminations are directly inside the pads (both on the SPEAr300 and the memory sides).

6.2 Static memory subsystem

6.2.1 Serial Flash memory

This block is based on an M25P64 ST Serial Flash memory device. The size of this chip is 8 MB.

A resistor (R8) is also provided to protect the Flash memory from any unwanted write access.

6.2.2 Serial I^2C EEPROM

This block is based on the M24C04W ST Serial I^2C EEPROM. The size of this chip is 4 Kb.

A resistor (R107) is also provided to protect the EEPROM from any unwanted write access.

6.2.3 NAND Flash memory

This block is based on Nand512W3A2CZA6 ST NAND Flash memory. The size of this chip is 512 Mbit.

6.2.4 SPI Flash memory

This block is based on the M25P40 ST Serial Flash memory. The size of this chip is 4 Mb.

A resistor (R64) is also provided to protect the Flash memory from any unwanted write access.

6.3 Ethernet subsystem

This subsystem is based on the Ethernet PHY STE100P (U9) and a connector (J9) that also includes also all the required magnetics (Line transformer ratio 1:1).

Several LEDs are present to indicate the status of the line:

- The green LED in the connector is driven on continuously when 100 Mb/s network operating speed is detected.
- The yellow LED in the connector blinks when there is TX or RX activity. This LED is driven on continuously when the Link test detects a good link condition.
- The yellow LED (D4) is driven on continuously when a full duplex configuration is detected. This LED blinks at a 20 Hz frequency when a collision status is detected in the half duplex configuration.
- The yellow LED (D3) blinks at a 10 Hz frequency when ongoing receiving or transmitting is detected.
- The yellow LED (D2) is driven on continuously when 10 Mb/s network operating speed is detected.

6.4 USB 2.0 subsystem

6.4.1 Host ports

The board has two host ports (J2) that are fully compliant with the USB 2.0 specification (two controllers with one port each). This means that the two hosts can work in concurrent mode with the maximum possible bandwidth. Each host has also full control of the VBUS supplied by the ST2052 power switch that also provides overcurrent protection in case of a short circuit in the USB cable.

6.4.2 Device port

A USB 2.0 device port is also provided (J1).

6.5 Debug interface

Two debug interfaces are provided:

1. The JTAG interface can be used for "static" debug. This means that it is possible to set a breakpoint and, when the system stops, to verify the contents of the memory and/or registers and modify them if needed.
2. The ETM9 interface can be used for "dynamic" debug. The ETM9 block embedded in the SPEAr300 chip, sends all the information about the AHB transactions during the code execution to the external trace box and the external box stores this information in a local buffer. This makes it possible, by stopping the CPU activity, to analyze the actual program flow. For example, if a particular data abort occurs, you can set a breakpoint on the data abort location and then, when the breakpoint is reached, you can analyze the buffer trace. With this information, it becomes a simple task to identify the event that produced the problem.

The following configurations can be selected by setting SW2 bits [2:1].

Table 1. Switch 2 bits [2:1]

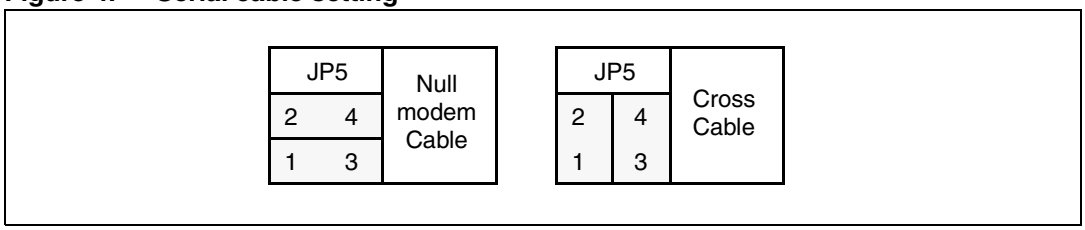
Sw2		Description
2	1	
0	0	No debug features available
0	1	The ARM JTAG is connected to J4
1	0	The ARM ETM bus available on J13 and J14

Please refer to the documentation of the trace box manufacturer for more information on the ETM interface (www.lauterbach.com, www.agilent.com, www.yokogawa.com).

6.6 Serial interface

One serial interface port is available. This typically used as OS monitor, is available on the J10 connector. It is possible to simulate a cross cable by changing the position of the J5 jumpers.

Figure 4. Serial cable setting



6.7 A/D interface

Eight analog input lines are provided on the J3 connector. The connector also allows you to determine the conversion range by setting the conversion limits on pins J3-19 (lower limit) and J3-1 (upper limit). The default setting is to have pins 1-2 and 19-20 shorted by jumpers.

In this way the conversion range is set to the maximum value (0 ~ 2.5V with a granularity of 2.44 mV) but by removing the two jumpers and providing different values on pin 1 and 19 it is possible to reduce the range and thus increase the granularity. For example if you input 1 V on J3-19 and 2 V on J3-1 the range will be 1 V ~ 2 V in steps of less than 1 mV.

In any case the following relationships between the pins should be ensured:

0 V	≤	J3-19	≤	J3 17 ~ 3	≤	J3-1	≤	2.5 V
AGND	≤	Vref_n	≤	ADC_In channels	≤	Vref_p	≤	AVDD

6.8 Real time clock (battery powered)

The real time clock (RTC) is powered with an external battery (3 V) in order to avoid losing its data even if the main power supply is switched off.

6.9 General power supply

From a 5 V external AC/DC regulator power source, this block, generates all the required voltages as follows:

- 1.2 V (Switching regulator PM6641) to supply the internal logic of the SPEAr300
- 1.8 V (Switching regulator PM6641) for the DDR2 memory.
- 2.5 V (LDO regulator) for the analog portion of SPEAr300
- 3.3 V (Switching regulator PM6641) to supply the other interfaces.

A power monitor is also present to provide the general reset of the board.

6.10 General-purpose I/Os

Eight general-purpose I/Os are present on the board. The eight lines are connected to the J7 connector. The same connector also has GND and 3.3V pins available.

Note: For the connector pinout, refer to the schematic drawing available on www.st.com/spear.

6.11 Reset switch

A manual reset switch (SW1) is available on the top side of the board.

6.12 LCD Interface

The J8 connector (p/n SFM-125-02-S-D manufacturer Samtec) is provided to allow you to connect an LCD daughter board. It mates with TFM-125-02-S-D.

The following signals are available on this connector:

- All the LCD interface signals
- Two analog inputs (A/D)
- +5 V
- GND

Note: For the connector pinout, refer to the schematic drawing

6.13 SDIO interface

A standard SDIO connector is also provided on the board (J5).

7 Jumper settings

7.1 Switch 2

Table 2. Switch 2 (SoC functional configuration)

Bit	Description
1	Test0 – see Debug configuration below
2	Test1 – see Debug configuration below
3	Test2 – see Debug configuration below
4	Test3 – see Debug configuration below
5	Test4 – see Debug configuration below
6	BootSel – see Debug configuration below

Table 3. Switch 2 (debug configuration)

Test bit		Debug configuration
2	1	
0	0	Normal Mode (No debug enabled)
0	1	ARM1 JTAG connected to J4
1	0	The ARM ETM bus available on J13 and J14

Table 4. Switch 2 (functional configuration)

Test bit				Functional configuration
6	**5**	**4**	**3**	
1	0	1	1	Configuration 3

Note: When DIP switch SW2-X is in the ON position, the bit value is 0. When the DIP switch is in the OFF position, the bit value is 1.

Bits 3, 4, and 5 allow you to set the Functional configuration. The default configuration is **Configuration 3**. For the other configurations, please refer to the user manual chapter 6 available on www.st.com/spear.

7.2 Switch 3

Table 5. Switch 3 (strapping options)

Boot from	SW3-1	SW3-2	SW3-3	SW3-4
USB_BOOT	0	0	0	0
ETH (parameter from SPI ROM)	0	0	0	1
ETH (parameter from I2C ROM)	0	0	1	0
Serial NOR (default setting)	0	0	1	1
Parallel NOR 8	0	1	0	0
Parallel NAND 8	0	1	0	1
Parallel NOR 16	0	1	1	0
Parallel NAND 16	0	1	1	1
SPI_BOOT	1	0	0	0
UART_BOOT	1	0	0	1
I2C_BOOT	1	0	1	0

Note: When DIP switch SW3-X is in the ON position, the bit value is 0. When the DIP switch is in the OFF position, the bit value is 1

8 Expansion connector

An expansion connector (J12 on bottom side) is provided for a companion board. The manufacturer is Tyco Electronics and the Part Number is 2-5767004-4

The following signals are available on this connector:

- +5 V
- GND
- All the PL_GPIO signals
- The four PL_CLK signals
- Host0_DP and DM

8.1 Board schematic

The board schematic is available on www.st.com/spear.

9 Evaluation board bill of materials (BOM)

Reference: SPEAr300 BOM Board Rev1 (Set. 17 2009)

Table 6. Capacitors

#	Qty	Ref. description	Value	Manufacturer	Manufacturer P/N
1	1	B1		Panasonic	BR/CR2032/1GVF1GV
2	58	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C26, C27, C28, C29, C31, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64	0.1uF	Vitramon	MR-VJ0603Y104KX
3	6	C25, C30, C32, C33, C34, C46	0.1UF	Murata	GRM155R71C104KA88D
4	3	C65, C66, C67	10nF	Kemet Electronics	C0603C103K5RAC
5	4	C68, C69, C70, C71	15pF	Murata	GRM1885C1H150JZ01D
6	2	C72, C73	33pF	Kemet Electronics	C0603C330J5GAC
7	10	C74, C75, C76, C77, C78, C79, C80, C81, C82, C83	10uF	Murata	GRM21BR61A106KE19
8	1	C84	470nF	Kemet Electronics	C0805C474K4RAC
9	2	C85, C86	10pF	Kemet Electronics	C0603C100J5GAC
10	1	C87	47uF	Murata	GRM32ER60J476ME20L
11	3	C88, C89, C90	22nF	Kemet Electronics	C0603C223K5RAC
12	1	C91	470pF	Kemet Electronics	C0603C471K5RAC
13	1	C92	22uF	Murata	GRM31CR60J226KE19
14	1	C93	33nF	Kemet Electronics	C0603C333K5RAC7867
15	1	C94	100uF 25V	Panasonic	ECA1HM101
16	1	C95	2.2nF	Kemet Electronics	C0603C222K5RAC
17	1	D1	BAV70LT1G	On Semiconductor	BAV70LT1G
18	3	D2, D3, D4	LED Yellow	Kingbright	KP-2012SYC
19	1	D5	LED Green	Kingbright	KP-2012SGC

Table 7. Connectors, inductors and transistors

#	Qty	Ref. description	Value	Manufacturer	Manufacturer P/N
20	1	J1	USB_Device	SAMTEC	USB-B-S-F-B-TH
21	1	J2	USB_Host	TYCO Electronics AMP	5787617-1
22	1	J3	A2D Conn.	TYCO Electronics AMP	5-826925-0
23	1	J4	JTAG_Conn. 20	TYCO Electronics AMP	2-1634688-0
24	1	J5	SDIO_CON	MOLEX	67993-8001
25	1	J6		TYCO Electronics AMP	5-826629-0
26	1	J7	GPIO conn.	TYCO Electronics AMP	5-826629-0
27	1	J8	LCD Conn.	SAMTEC	SFM-125-02-S-D
28	1	J9	ETH Conn.	Pulse	J00-0065NL
29	1	J10	Serial Conn.	TYCO Electronics AMP	5747840-2
30	1	J11	JACK 2.1MM	CLIFF Electronics	FC681491
31	1	J12	MICTOR_114	TYCO Electronics AMP	2-5767004-4
32	2	J13, J14	ETM Conn.	TYCO Electronics AMP	5767061-1
33	4	JP1, JP2, JP3, JP4	Jumper	TYCO Electronics AMP	5-826629-0
34	1	JP5	Jumper	TYCO Electronics AMP	5-826925-0
35	1	L1	WE74792023	WURTH Elektronik	742792023
36	9	L2, L3, L4, L5, L6, L7, L8, L9, L10	IND	Murata	BLM21BD601SN1D
37	1	L11	LPS4012-102NL	Coilcraft	LPS4012-102NL
38	2	L12, L13	LPS4012-222ML	Coilcraft	LPS4012-222ML
39	1	Q1	BC848CE6327	Infineon	BC848CE6327
40	1	Q2	BSH205	NXP	BSH205

Table 8. Semiconductors and crystals

#	Qty	Ref. description	Value	Manufacturer	Manufacturer P/N
65	1	U2	MT47H64M16 HR	MICRON	MT47H64M16HR-3E
66	1	U1	SPEAr300	STM	SPEAR300-2 V590BA
67	1	U3	ST2052	STM	ST2052
68	1	U4	STM811	STM	STM811SW16F
69	1	U5	M25P64	STM	M25P64-VMF6P
70	1	U6	NAND512X8	STM	Nand512W3A2CZA6
71	1	U7	M24C04	STM	M24C04-WMN6P

Table 8. Semiconductors and crystals (continued)

#	Qty	Ref. description	Value	Manufacturer	Manufacturer P/N
72	1	U8	M25P40	STM	M25P40-VMN6P
73	1	U9	STE100P	STM	STE100P
74	1	U10	ST3232-SO16	STM	ST3232CDR
75	1	U11	PM6641	STM	PM6641
76	1	U12	LD1117S25TR	STM	LD1117S25TR
77	1	Y1	24MHZ	RAKON	XTAL003325
78	1	Y2	32.768KHZ	FOX Electronics	NC26LF-327
79	1	Y3	25MHZ	FOX Electronics	FOXS/250F-20
80	6		Insulated jumper	WINSLOW Adaptics	W8010T50

Table 9. Resistors and switches

#	Qty	Ref. description	Value	Manufacturer	Manufacturer P/N
41	2	R1, R2	121K	PHYCOMP	P/N 232273461214
42	2	R3, R4	470	TYCO Electronics UK	CRG0603F470R
43	2	R9, R17	0	TYCO Electronics UK	CRG0603ZR
44	11	R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28	100	TYCO Electronics UK	CRG0603F100R
45	1	R29	43,2	TYCO Electronics UK	RN73C2A43R2BTG
46	14	R36, R37, R38, R39, R40, R41, R42, R43, R44, R46, R47, R48, R49, R107	1K	TYCO Electronics UK	CRG0603F1K0
47	17	R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66	10K	TYCO Electronics UK	CRG0603F10K
48	10	R67, R68, R69, R70, R71, R72, R73, R74, R75, R76	4.7K	TYCO Electronics UK	CRG0603F4K7
49	1	R77	390K	TYCO Electronics UK	CRG0603F390K
50	3	R78, R79, R80	10	TYCO Electronics UK	CRG0603F10R
51	4	R82, R83, R84, R85	2.2K	TYCO Electronics UK	CRG0603F2K2
52	1	R86	1M	TYCO Electronics UK	CRG0603F1M0

Table 9. Resistors and switches (continued)

#	Qty	Ref. description	Value	Manufacturer	Manufacturer P/N
53	5	R87, R88, R89, R90, R91	150	TYCO Electronics UK	CRG0603F150R
54	7	R92, R93, R94, R95, R96, R97, R98	68K	TYCO Electronics UK	CRG0603F68K
55	1	R99	27K	TYCO Electronics UK	CRG0603F27K
56	3	R81, R100, R101	150K	TYCO Electronics UK	CRG0603F150K
57	1	R102	47K	TYCO Electronics UK	CRG0603F47K
58	2	R103, R104	4,3	PHYCOMP	p/n 232270464308
59	1	R105	15K	TYCO Electronics UK	CRG0603F15K
60	1	R106	75K	PHYCOMP	p/n 232270467503
61	1	R109	270	TYCO Electronics UK	CRG0603F270R
62	1	SW1		OMRON Electronics	B3S-1000
63	1	SW2		APEM Components	DS06
64	1	SW3		APEM Components	DS04

Appendix A Licence agreements

DEMO PRODUCT LICENSE AGREEMENT

By using this Demonstration Product, You are agreeing to be bound by the terms and conditions of this agreement. Do not use this Demonstration Product until You have read and agreed to the following terms and conditions. The use of the Demonstration Product implies automatically the acceptance of the following terms and conditions.

LICENSE. STMicroelectronics ("ST") grants You the right to use the enclosed demonstration board offering limited features only to evaluate and test ST products, including any incorporated and/or accompanying demo software, components and documentation identified with the order code "STEVAL" (collectively, the "Demo Product") solely only for your evaluation and testing purposes. The Demo Product shall not be, in any case, directly or indirectly assembled as a part in any production of Yours as it is solely developed to serve demonstration purposes and has no direct function and is not a finished product. Certain demo software included with the Demo Product may be covered under a separate accompanying end user license agreement, in which case the terms and conditions of such end user license agreement shall apply to that demonstration software.

DEMO PRODUCT STATUS. The Demo Product is offering limited features allowing You only to evaluate and test the ST products. You are not authorized to use the Demo Product in any production system, and may not be offered for sale or lease, or sold, leased or otherwise distributed. If the Demo Product is incorporated in a demonstration system, the demonstration system may be used by You solely for your evaluation and testing purposes. Such demonstration system may not be offered for sale or lease or sold, leased or otherwise distributed and must be accompanied by a conspicuous notice as follows: "This device is not, and may not be, offered for sale or lease, or sold or leased or otherwise distributed".

OWNERSHIP AND COPYRIGHT. Title to the Demo Product, demo software, related documentation and all copies thereof remain with ST and/or its licensors. You may not remove the copyrights notices from the Demo Product. You may make one (1) copy of the software for back-up or archival purposes provided that You reproduce and apply to such copy any copyright or other proprietary rights notices included on or embedded in the demonstration software. You agree to prevent any unauthorized copying of the Demo Product, demonstration software and related documentation.

RESTRICTIONS. You may not sell, assign, sublicense, lease, rent or otherwise distribute the Demo Product for commercial purposes (unless you are an authorized ST distributor provided that all the other clauses of this DEMO

PRODUCT LICENSE AGREEMENT shall apply entirely), in whole or in part, or use Demo Product in production system. Except as provided in this Agreement or in the Demo Product's documentation, You may not reproduce the demonstration software or related documentation, or modify, reverse engineer, de-compile or disassemble the demonstration software, in whole or in part.

You warrant to ST that the Demo Product will be used and managed solely and exclusively in a laboratory by skilled professional employees of Yours with proven expertise in the use and management of such products and that the Demo Product shall be used and managed according to the terms and conditions set forth in the related documentation provided with the Demo Product.

According to European Semiconductor Industry Association (ESIA) letter, "ESIA Response on WEEE Review (May 2008) of the Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)"; Semiconductor products and evaluation & demonstration boards are not in the scope of the Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE). Consequently aforementioned products do not have to be registered nor are they subject to the subsequent obligations.

NO WARRANTY. The Demo Product is provided "as is" and "with all faults" without warranty of any kind expressed or implied. ST and its licensors expressly disclaim all warranties, expressed, implied or otherwise, including without limitation, warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights. ST does not warrant that the use in whole or in part of the Demo Product will be interrupted or error free, will meet your requirements, or will operate with the combination of hardware and software selected by You. You are responsible for determining whether the Demo Product will be suitable for your intended use or application or will achieve your intended results.

ST shall not have any liability in case of damages, losses, claims or actions anyhow caused from combination of the Demo Product with another product, board, software or device.

ST has not authorized anyone to make any representation or warranty for the Demo Product, and any technical, applications or design information or advice, quality characterization, reliability data or other services provided by ST shall not constitute any representation or warranty by ST or alter this disclaimer or warranty, and in no additional obligations or liabilities shall arise from ST's providing such information or services. ST does not assume or authorize any other person to assume for it any other liability in connection with its Demo Products.

All other warranties, conditions or other terms implied by law are excluded to the fullest extent permitted by law.

LIMITATION OF LIABILITIES. In no event ST or its licensors shall be liable to You or any third party for any indirect, special, consequential, incidental, punitive damages or other damages (including but not limited to, the cost of labour, re-qualification, delay, loss of profits, loss of revenues, loss of data, costs of procurement of substitute goods or services or the

like) whether based on contract, tort, or any other legal theory, relating to or in connection with the Demo Product, the documentation or this Agreement, even if ST has been advised of the possibility of such damages. In no event shall ST's aggregate liability to You or any third party under this agreement for any cause action, whether based on contract, tort, or any other legal theory, relating to or in connection with the Demo Product, the documentation or this agreement shall exceed the purchase price paid for the Demo Product if any.

TERMINATION. ST may terminate this license at any time if You are in breach of any of its terms and conditions. Upon termination, You will immediately destroy or return all copies of the demo software and documentation to ST.

APPLICABLE LAW AND JURISDICTION. In case of dispute and in the absence of an amicable settlement, the only competent jurisdiction shall be the Courts of Geneva, Switzerland. The applicable law shall be the law of Switzerland. The UN Convention on contracts for the International Sales of Goods shall not apply to these General Terms and Conditions of Sale.

SEVERABILITY. If any provision of this agreement is or becomes, at any time or for any reason, unenforceable or invalid, no other provision of this agreement shall be affected thereby, and the remaining provisions of this agreement shall continue with the same force and effect as if such unenforceable or invalid provisions had not been inserted in this Agreement.

WAIVER. The waiver by either party of any breach of any provisions of this Agreement shall not operate or be construed as a waiver of any other or a subsequent breach of the same or a different provision.

RELATIONSHIP OF THE PARTIES. Nothing in this Agreement shall create, or be deemed to create, a partnership or the relationship of principal and agent or employer and employee between the Parties. Neither Party has the authority or power to bind, to contract in the name of or to create a liability for the other in any way or for any purpose.

RECYCLING. The Demo Product is not to be disposed as an urban waste. At the end of its life cycle, differentiated waste collection must be followed, as stated in the directive 2002/96/EC.

In all the countries belonging to the European Union (EU Dir. 2002/96/EC) and those following differentiated recycling, the Demo Product is subject to differentiated recycling at the end of its life cycle, therefore:

It is forbidden to dispose the Demo Product as an undifferentiated waste or with other domestic wastes. Consult the local authorities for more information on the proper disposal channels.

It is mandatory to sort the demo product and deliver it to the appropriate collection centers, or, when possible, return the demo product to the seller.

An incorrect Demo Product disposal may cause damage to the environment and is punished by the law.

10-Nov-2008

SOFTWARE LICENSE AGREEMENT

This Software License Agreement ("Agreement") is displayed for You to read prior to downloading and using the Licensed Software. If you choose not to agree with these provisions, do not download or install the enclosed Licensed Software and the related documentation and design tools. By using the Licensed Software, You are agreeing to be bound by the terms and conditions of this Agreement. Do not use the Licensed Software until You have read and agreed to the following terms and conditions. The use of the Licensed Software implies automatically the acceptance of the following terms and conditions.

DEFINITIONS

Licensed Software: means the enclosed demonstration software and all the related documentation and design tools licensed in the form of object and/or source code as the case maybe.

Product: means a product or a system that includes or incorporates solely and exclusively an executable version of the Licensed Software and provided further that such Licensed

Software executes solely and exclusively on ST products.

LICENSE

STMicroelectronics ("ST") grants You a non-exclusive, worldwide, non-transferable (whether by assignment, law, sublicense or otherwise), revocable, royalty-free limited license to:

(i) make copies, prepare derivatives works, display internally and use internally the source code version of the Licensed Software for the sole and exclusive purpose of developing executable versions of such Licensed Software only for use with the Product;

(ii) make copies, prepare derivatives works, display internally and use internally object code versions of the Licensed Software for the sole purpose of designing, developing and manufacturing the Products;

(iii) make, use, sell, offer to sell, import or otherwise distribute Products.

OWNERSHIP AND COPYRIGHT

Title to the Licensed Software, related documentation and all copies thereof remain with ST and/or its licensors. You may not remove the copyrights notices from the Licensed Software.

You may make one (1) copy of the Licensed Software for back-up or archival purposes provided that You reproduce and apply to such copy any copyright or other proprietary rights notices included on or embedded in the Licensed Software. You agree to prevent any unauthorized copying of the Licensed Software and related documentation.

RESTRICTIONS

Unless otherwise explicitly stated in this Agreement, You may not sell, assign, sublicense, lease, rent or otherwise distribute the Licensed for commercial purposes, in whole or in part purposes (unless you are an authorized ST distributor provided that all the other clauses of this DEMO PRODUCT LICENSE AGREEMENT shall apply entirely).

You acknowledge and agree that any use, adaptation translation or transcription of the

Licensed Software or any portion or derivative thereof, for use with processors manufactured by or for an entity other than ST is a material breach of this Agreement and requires a separate license from ST. No source code and/or object code relating to and/or based upon Licensed Software is to be made available by You to any third party for whatever reason.

You acknowledge and agrees that the protection of the source code of the Licensed Software warrants the imposition of security precautions and You agree to implement reasonable security measures to protect ST's proprietary rights in the source code of the Licensed Software. You shall not under any circumstances copy, duplicate or otherwise reproduce the source code of the Licensed Software in any manner, except as reasonably necessary to exercise Your rights hereunder and make one back-up copy. You are granted the right to make one archival or backup copy of the source code of the Licensed Software, which copy shall be marked as an archival copy and as the confidential information of ST. Access to the source code of the Licensed Software shall be restricted to only those of Your employees with a need-to-know for the purpose of this Agreement.

You will not under any circumstances permit the source code of the Licensed Software in any form or medium (including, but not limited to, hard copy or computer print-out) to be removed from your official premises as you have informed us. The source code of the Licensed Software must remain inside your official premises, as you have informed us. You will lock the source code of the Licensed Software and all copies thereof in a secured storage inside your official premises at all times when the source code of the Licensed Software is not being used as permitted under this Agreement.

You will inform all Your employees who are given access to the source code of the Licensed Software of the foregoing requirements, and You will take all reasonable precautions to ensure and monitor their compliance with such requirements. You agree to promptly notify ST in the event of a violation of any of the foregoing, and to cooperate with ST to take any remedial action appropriate to address the violation. You shall keep accurate records with respect to its use of the source code of the Licensed Software. In the event ST demonstrates to You a reasonable belief that the source code of the Licensed Software has been used or distributed in violation of this Agreement, ST may by written notification request certification as to whether such unauthorized use or distribution has occurred. You shall reasonably cooperate and assist ST in its determination of whether there has been unauthorized use or distribution of the source code of the Licensed Software and will take appropriate steps to remedy any unauthorized use or distribution.

You agree that ST shall have the right (where ST reasonably suspects that the terms and conditions of this Agreement with reference to Restriction clause have not been complied with) upon reasonable notice to enter Your official premises in order to verify your compliance with this Restriction clause.

NO WARRANTY

The Licensed Software is provided "as is" and "with all faults" without warranty of any kind expressed or implied. ST and its licensors expressly disclaim all warranties, expressed, implied or otherwise, including without limitation, warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights. ST does not warrant that the use in whole or in part of the Licensed Software will be interrupted or error free, will meet your requirements, or will operate with the combination of hardware and software selected by You.

You are responsible for determining whether the Licensed Software will be suitable for your intended use or application or will achieve your intended results. ST has not authorized anyone to make any representation or warranty for the Licensed Software, and any technical, applications or design information or advice, quality characterization, reliability data or other services provided by ST shall not constitute any representation or warranty by ST or alter this disclaimer or warranty, and in no additional obligations or liabilities shall arise from ST's providing such information or services. ST does not assume or authorize any other person to assume for it any other liability in connection with its Licensed Software.

Nothing contained in this Agreement will be construed as:

(i) a warranty or representation by ST to maintain production of any ST device or other hardware or software with which the Licensed Software may be used or to otherwise maintain or support the Licensed Software in any manner; and

(ii) a commitment from ST and/or its licensors to bring or prosecute actions or suits against

third parties for infringement of any of the rights licensed hereby, or conferring any rights to bring or prosecute actions or suits against third parties for infringement. However, ST has the right to terminate this Agreement immediately upon receiving notice of any claim, suit or proceeding that alleges that the Licensed Software or your use or distribution of the Licensed

Software infringes any third party intellectual property rights.

All other warranties, conditions or other terms implied by law are excluded to the fullest extent permitted by law.

LIMITATION OF LIABILITIES

In no event ST or its licensors shall be liable to You or any third party for any indirect, special, consequential, incidental, punitive damages or other damages (including but not limited to, the cost of labour, re-qualification, delay, loss of profits, loss of revenues, loss of data, costs of procurement of substitute goods or services or the like) whether based on contract, tort, or any other legal theory, relating to or in connection with the Licensed Software, the documentation or this Agreement, even if ST has been advised of the possibility of such damages.

In no event shall ST's liability to You or any third party under this Agreement, including any claim with respect of any third party intellectual property rights, for any cause of action exceed

100 US$. This section does not apply to the extent prohibited by law. For the purposes of this section, any liability of ST shall be treated in the aggregate.

TERMINATION

ST may terminate this license at any time if You are in breach of any of its terms and conditions. Upon termination, You will immediately destroy or return all copies of the software and documentation to ST.

APPLICABLE LAW AND JURISDICTION

In case of dispute and in the absence of an amicable settlement, the only competent jurisdiction shall be the Courts of Geneva, Switzerland. The applicable law shall be the law of Switzerland.

SEVERABILITY

If any provision of this agreement is or becomes, at any time or for any reason, unenforceable or invalid, no other provision of this agreement shall be affected thereby, and the remaining provisions of this agreement shall continue with the same force and effect as if such unenforceable or invalid provisions had not been inserted in this Agreement.

WAIVER

The waiver by either party of any breach of any provisions of this Agreement shall not operate or be construed as a waiver of any other or a subsequent breach of the same or a different provision.

RELATIONSHIP OF THE PARTIES

Nothing in this Agreement shall create, or be deemed to create, a partnership or the relationship of principal and agent or employer and employee between the Parties. Neither Party has the authority or power to bind, to contract in the name of or to create a liability for the other in any way or for any purpose.

Revision history

Table 10. Document revision history

Date	Revision	Changes
25-Sep-2009	1	Initial release.
25-Feb-2010	2	Updated *Figure 4*. Corrected code names in *Section 6.12: LCD Interface*. Changed the title of *Section 6.13: SDIO interface*. Updated the *Note: on page 13* and *Note: on page 14*. Changed the title of the document. Minor text changes

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com