Turbo uPSD DK3300 User Manual

WELCOME TO THE DK3300 DESIGN KIT

The DK3300 board is a demo board for the uPSD3300 family which is a series of 8051 class microcontrollers (MCUs) that contain a new fast Turbo 8032 core with a large Dual Bank Flash memory, a large SRAM, many peripherals, programmable logic and a JTAG Debug / In System Programming (ISP) port.

The DK3300 contains all the items needed to explore the Turbo uPSD3300 MCU. Included in the kit are demonstration application examples along with an evaluation copy of the tools needed to develop and compile code for the uPSD3300. The kit also contains the adapters necessary for programming the Flash inside the uPSD and for accessing the built-in JTAG debug port. Please find or locate the following items:

Figure 1. DK3300 Kit Contents

1. DK3300 Board
2. DK3300 CD
3. 110V/220V AC adapter
4. Plug adapters
5. RS232 Serial Cross-Over Cable
6. USB R-LINK Adapter
7. USB ULink Adapter
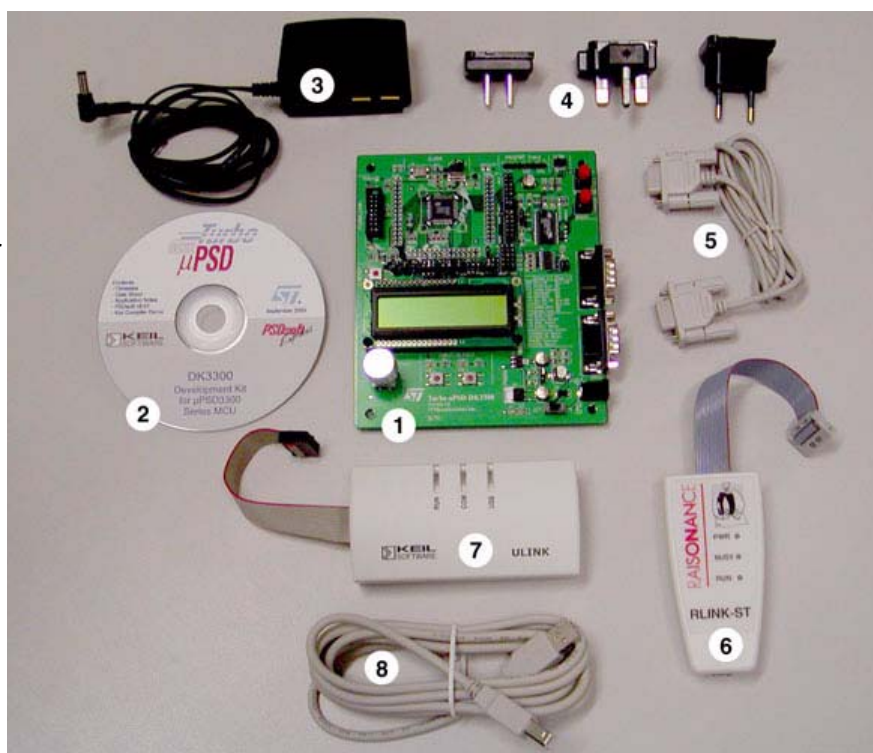8. USB Cable
9. Quick Start Flyer (not shown)

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GETTING STARTED

Please insert the CD that comes with the Kit and print the following documents. These documents will help you become familiar with the CD contents, the DK3300 Users Guide and an Application Note that will walk you through a design example.

■ Read me text file (Readme.txt)

■ DK3300 Users Guide (UM0087.PDF)

■ AN1763 Example Design (AN1763.PDF)

■ Any errata file that may exist (*errata*.PDF)

Before you can use the uPSD

You will need to install some software on your PC system before you can program the DK3300. This includes PSDSoft Express and the Keil uVision Integrated Development Environment. Please follow the following steps to get started using the DK3300:

Step 1 - Install PSDsoft Express. Install the latest version of PSDsoft Express (from the Raisonance CD).

Note: PSDSoft Express is required to configure the µPSD device. Please check the ST Website for the Latest PSDSoft version: **www.st.com/micropsd**

If you already have PSDSoft Express installed, then please install the update file by first unzipping the file called Update_ExpressXXX.zip. This update file will automatically update your version of PSDSoft to support the Turbo µPSD3300.

If you do **not** have PSDSoft Express installed, then please install it by first unzipping the file called InstallExpressXXX.zip. This will install the software needed to configure and optionally program the Flash inside the µPSD3300 product.

Step 2 - Install Keil uVision2. Install the latest version of Keil uVision2 Integrated Development Environment (ver 2.39 or greater). or the latest version of Raisonance's Ride Environment.

Note: The Keil IDE or Raisonance IDE is required in order to make use of the JTAG debug feature built-into the µPSD3300. Please check the Keil website for the latest version: **www.keil.com**, or Raisonance website: **www.raisonance.com**

If you already have uVision2 Integrated Development Environment from Keil Software Inc., and your Keil software maintenance period has not expired, just update your uVision2 by double-clicking the file UP51XXXX.exe located in the Keil directory on the CD.

If you do **not** have uVision2 Integrated Development Environment, you should install the trial version from Keil in order to compile the example application described in AN1763. To install the trial version double-click the file EK51XXXX.exe located in the Keil directory on the CD.

Step 3 - Connecting the DK3300 Board. Connect the Cables to the DK3300 board (see Figure 2., page 5) by connecting the following cables from the DK3300 board to your PC system.

1. Connect the AC adapter to the DK3300 board. The DK3300 AC adapter will work on either 110V or 220V, and contains several different plug adapters to fit popular European AC outlets. Please set up your AC adapter to fit your AC plug type and plug in the AC adapter. Then plug the small power plug into the DK3300 9V DC input.

2. Connect the R-LINK adapter to a USB port on your PC system by using the supplied USB cable.

3. Next, connect the small ribbon cable on the R-LINK adapter to the 14 pin JTAG connector on the DK3300 board.

4. Start the PSDsoft application on your PC.

5. Make sure that you have selected R-LINK in the PSDsoft environment.

6. Test the R-LINK connection to ensure that PSDsoft and the R-LINK cable is communicating with your DK3300 board.

7. Follow the Design Guide to program the desired design/demo in the uPSD using R-LINK and JTAG port.

8. Verify that the correct application or demo is installed by viewing the LCD.

    Note: The DK3300 may come with a pre-programmed demo described in AN1763.

9. Refer to the Design Guide and application notes for more details.

Step 4 - Try Your DK3300 Board. Your DK3300 board comes pre-programmed with the ADC demo application that is discussed in AN1763. To test your DK3300 board, you should have the AC adapter power plugged in and connected to the 9V DC input on the DK3300 board.

Once you have confirmed your connections physically, turn the DK3300 board on. You should see the DK3300 AC demo running in the LCD window. If you do not see it running, please verify that you have power by verifying the red power LED is on.

Note: Use the R-LINK adapter in conjunction with PSDsoft and Design guide to flash the other demos in the DK3300 Kit to configure/reconfigure the uPSD device and then switch to ULink adapter to debug and re-program the Flash as needed.

Step 5 - Starting a Debugging Session. To continue with the Raisonance debugging suite, leave the R-LINK connected, otherwise for starting the Keil Tool chain, swap the R-LINK adapter for the ULink adapter.

The ULink/R-LINK adapters provided with DK3300 kit are used to debug the µPSD3300 with the built-in JTAG debugger. It can optionally program the Flash in the µPSD3300 as well. This ULink/R-LINK adapter plugs into the **SAME** 14-pin JTAG connector. Follow the IDE environment and the associated user's guide for debugging the codes.

Step 6 - Following the AN1763 Example. Read and follow the example in application note AN1763 on the CD.

This Application Note will guide you through a design cycle of the ADC demo to help you familiarize yourself with PSDSoft Express (used to configure and program the uPSD device) and Keil's uVision2 (used to compose, compile, and debug firmware, as well as understand the architecture of the uPSD device).

DK3300 HARDWARE FEATURES

The uPSD3300 has many different IP features and the DK3300 board has a variety of hardware capabilities built into the demo board itself. Some hardware on the DK3300 board is provided to enable exploration by the customer and for future demo application software. Over time additional demo applications will be added, so please check the ST website below for the latest demo applications. Some of the DK3300 board hardware features include (see Figure 2):

■ I^2C Real Time Clock by ST with built in Crystal and Tamper Detect Logic

■ Tamper Detect switches connected to the ST RTC

■ Dual RS232 connectors driven by ST RS232 level shifter

■ SPI interface EEPROM

■ IrDA Transceiver

■ Two input switches and two output LED's

■ Rotary encoder with select switch

■ 2 Line by 16 Character LCD

Please check the ST uPSD website at **www.st.com/micropsd** for the latest updates to PSDSoft Express and Demo Applications for the DK3300 kit.

Figure 2. DK3300 Board Connections

1.   Switches and LEDs

2.   Rotary Encoder

3.   LCD Display

4.   Reset Switch

5.   JTAG LED

6.   14-pin JTAG Connector

7.   uPSD33XX

8.   Expansion Connectors

9.   IrDA Transceiver

10. Tamper Detect Switches

11. Real-Time Clock

12. EEPROM & Battery under LCD

13. RS232 Connectors

14. 9VDC Power Input

15. On-Off Switch and Power LED
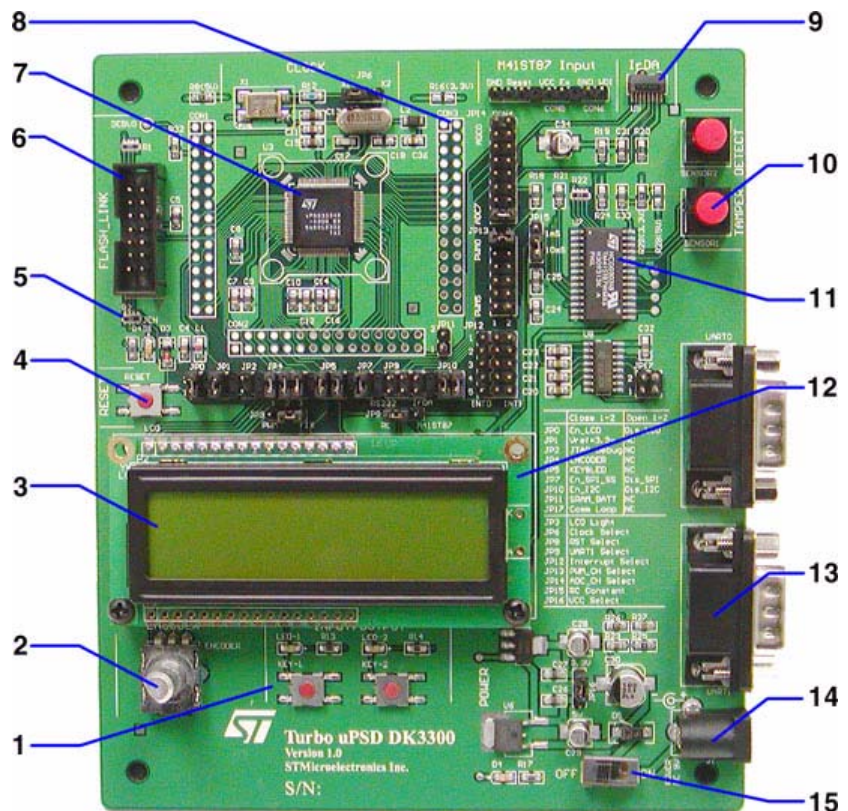
APPENDIX A. DK3300 JUMPERS

Verify JP0, JP1, JP3, JP13, JP14, and JP15 for the ADC demo. See DK3300 SCHEMATICS, page 7 for more information regarding the jumpers.

Table 1. DK3300 Jumpers

| Jumper No.	Description	Comments
JP0	LCD Enable/Disable	Normally closed to enable LCD
JP1	ADC V_{REF} Input	Normally closed to set V_{REF} = 3.3V
JP2	JTAG Debug I/O Pin	Should be OPEN
JP3	LCD Contrast	Normally closed in position 2-3 Position 1-2 used for PWM control
JP4	Encoder Connection to PB	Normally all 3 positions are closed to enable the encoder connection to port B
JP5	Switch / LED Connection to PB	Normally both positions are closed to enable the SW/LED connection to port B
JP6	MCU Clock Select	Normally closed in position 1-2 for Oscillator. Position 2-3 for Crystal
JP7	Enable SPI	Normally closed to enable SPI EEPROM
JP8	Reset Input Select	Normally closed in position 1-2 for reset switch input. Position 2-3 for RTC reset.
JP9	UART1 Select	Normally closed in position 1-3 and 2-4 to select the RS232 connector 1. Else can be se to position 3-5 and 4-6 to select the Urdu transceiver to be connected to UART1.
JP10	Enable I^2C	Normally both positions closed to enable I^2C access to RTC chip.
JP11	uPSD $V_{STANDBY}$ Input	Normally open. Used to enable backup power to uPSD if needed.
JP12	Interrupt Select for MCU	Used to map various Interrupt sources to the MCU. Normally open (see DK3300 SCHEMATICS, page 7).
JP13	PWM Channel Select	Selects what PWM channel connects the RC circuit on the board. Normally PWM0 is connected via position 1-2 closed.
JP14	ADC Channel Select	Selects what ADC channel connects the RC circuit on the board. Normally ADC7 is connected via position 15-16 closed.
JP15	PWM RC Constant	Selects PWM RC constant. Normally position 1-2 (1ms) is closed.
JP16	N/A	Not selectable – fixed at 3.3V
JP17	Used to connect UART0 and UART1 in loop back mode	Normally open. Can be connected positions 1-2 and 3-4 for loop back.

APPENDIX B. DK3300 SCHEMATICS

Figure 3. MCU
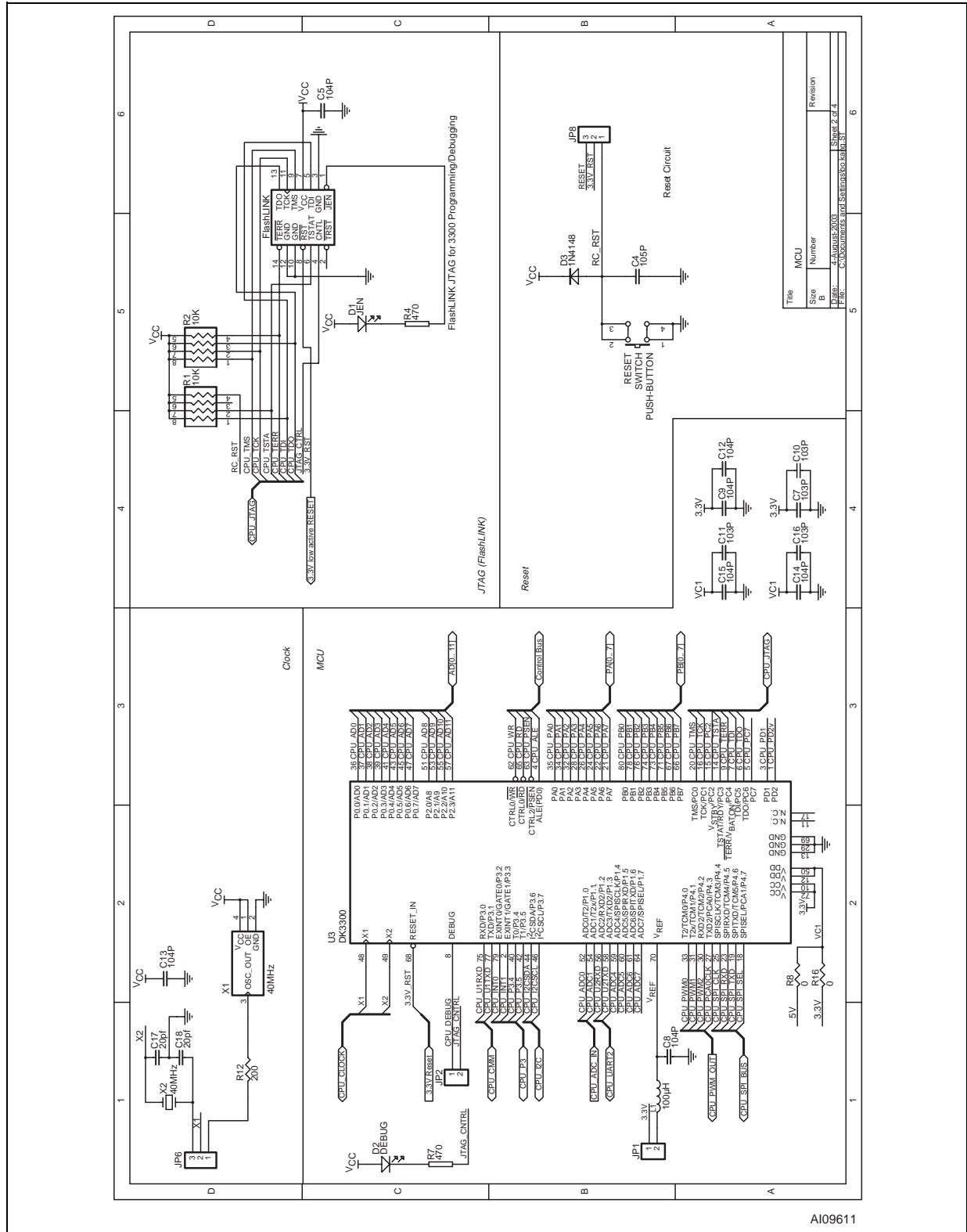
AI09611

Figure 4. Peripheral
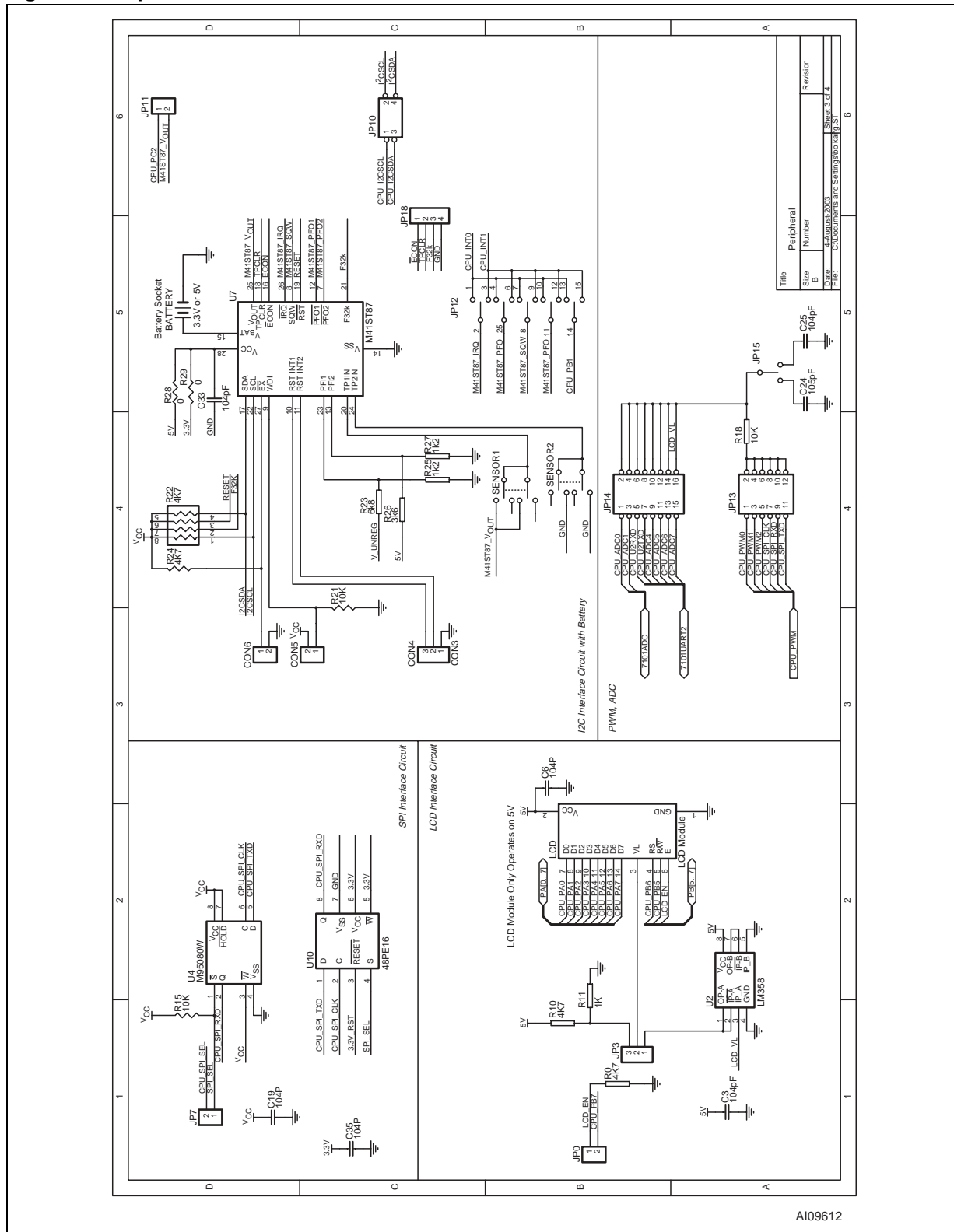
AI09612

Figure 5. Input/Output
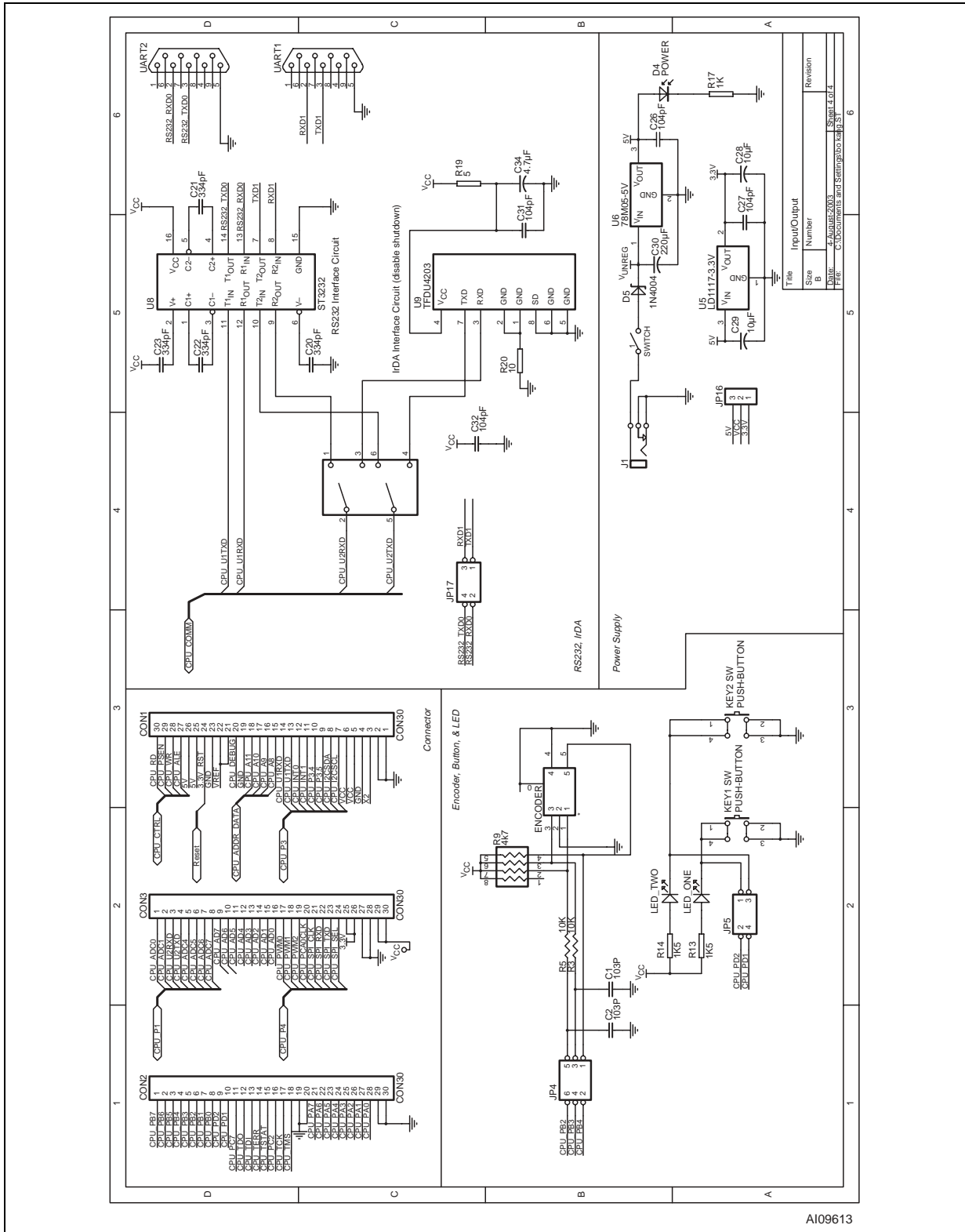
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REVISION HISTORY

Table 2. Document Revision History

Date	Version	Revision Details
May 7, 2004	1.0	First Issue

If you have any questions or suggestions concerning the matters raised in this document, please send them to the following electronic mail addresses:

ask.memory@st.com (*for general enquiries*)

Please remember to include your name, company, location, telephone number and fax number.