UM0442
User manual

Multiple application platform based on STR750FV2

Introduction

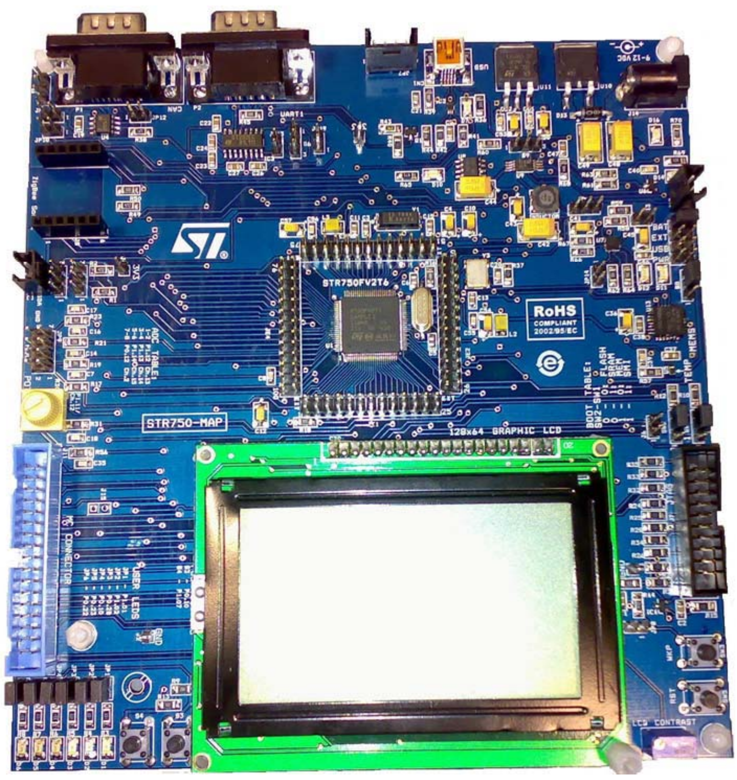
The system described in this user manual, Multiple application platform based on STR750FV2 - ARM7TDMI-S^{TM} 32-Bit MCU, is a development board implementing a very high number of powerful features.

Figure 1 below shows the main characteristics of the system which can be connected to other systems through the BSPI (Buffered SPI) connector and the I^2C connector. Advanced networking is also allowed by the new ZigBee® connector for radio link communication at 2.4 GHz. Standard serial connectivity can be established using the CAN connector (both 250 Kbps and 1 Mbps as maximum bus speed are supported), the UART connector (linked to the peripheral UART1 of the STR750FV2) and the mini-USB connector useful for data communication with a PC as well as supplying the system.

Another important feature is the 34-pin standard motor control connector and the possibility to switch between four different power sources.

Two on-board sensors are also available (inertial sensor and analog temperature sensor) in order to start with a wide application range.

Figure 1. Multiple application platform board based on STR750FV2 (STEVAL-IFS008V2)



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1 Definitions

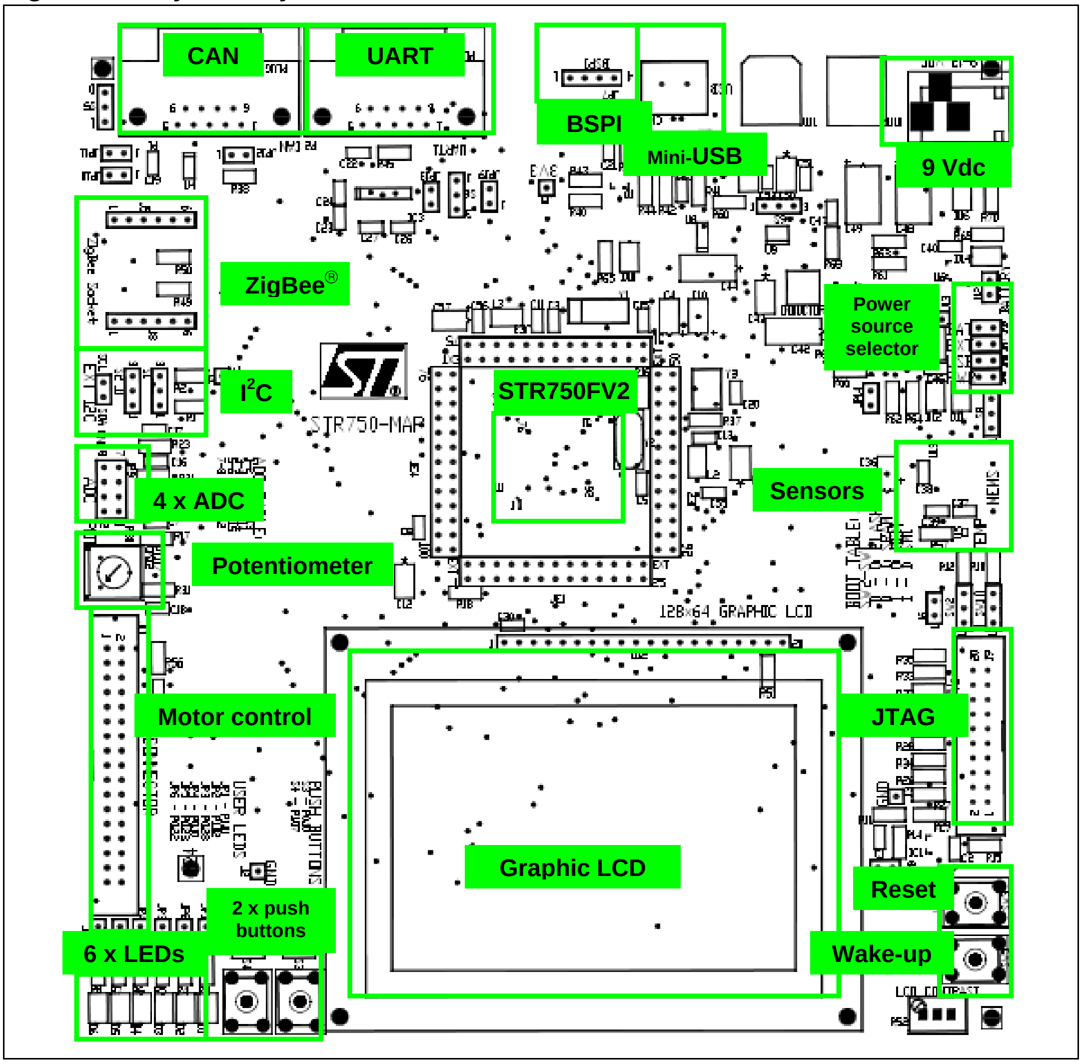
The list of definitions used in this user manual are as follows:

- STR750-MAP: Multiple Application Platform based on STR750FV2.
- ARM7TDMI-S™: 32-Bit RISC CPU with 16/32 bit instructions
- MEMS: Micro Electro Mechanical System
- MC: Motor Control

2 Board architecture

Figure 2 shows the board layout and architecture overview. The layout underlines the most important components and parts of the system.

Figure 2. System layout and architecture



3 List of features

The STR750-MAP is a system designed for a wide spectrum of high-end applications. Appreciable and innovative features are the new 12-pin socket for ZigBee® modules and the possibility to choose among four different power sources.

The board mounts the STR750FV2 microcontroller in LQFP100, 14x14 mm package. The pin-out of the STR750FV2 microcontroller is available to the users and placed around the microcontroller itself.

The list of features of the STR750-MAP board is as follows:

- STR750FV2 ARM7TDMI-S™ 32-Bit MCU
- ZigBee® socket for module based on SN260
- 34-pin Motor Control connector
- Mini-USB connector both for data and for board supply
- Battery pack connector for rechargeable battery
- 9÷12 Vdc standard power supply connector
- External 5 V power source to plug in the STR750FV2 pin-out
- 3-axis MEMS accelerometer LIS3LV02DQ
- Analog temperature sensor STLM20
- Graphic LCD strip line connector
- DB9 standard male CAN connector
- DB9 standard male RS232 connector
- JTAG connector for programming and debugging capabilities
- Reset and Wake-up push buttons
- 2 switches for memory boot capabilities
- I^2C connector
- BSPI connector
- 6 user LEDs
- Potentiometer on ADC channel
- 2 general purpose push buttons

Each of this features or functionalities is fully explained in this user manual.

4 Hardware configuration and functionality

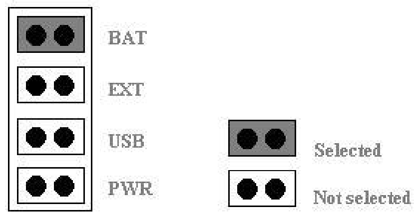
4.1 Power source selector

The STR750-MAP evaluation board is provided with a power source selector that allows the user to choose between four different ways to power the board including the possibility to recharge the external battery pack while the board is powered through the standard power 9 Vdc power supply or the mini-USB connector.

The configuration of the power source selector as appears in the silkscreen (consider the following abbreviations as a legend for the picture below) is as follows:

- BAT: the battery pack is selected as power source. To do this, close the related jumper and connect the battery pack by plugging in its connector as appropriate (see *Section 4.2: Battery pack power source*).
- EXT: the external 5 V power source is selected as power source.
- USB: plug in this jumper once the board is connected to a computer through the mini-USB connector in the upper side of the board.
- PWR: the standard 9 Vdc power connector is chosen and a voltage regulator (L7805AB) provides the 5 V supply to all the components in the board.

Figure 3. Power source selector and jumper legend



It is strongly recommended to not select more than one power source at a time. This is to prevent possible power source failures, with the consequence to propagate these failures to the board components.

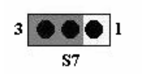
4.2 Battery pack power source

The battery pack is selected by closing the appropriate jumper as shown in the previous section.

In order to supply the STR750-MAP the following two steps are required:

- Plug the battery pack connector onto the STR750-MAP, using the 2-pin connector named BATTERY in the board silkscreen.
- Configure the 3-pin strip-line selector S7 as follows: close the middle point of the S7 selector with the point 3 (left side of the S7). In this way, the battery pack is linked to the L6920D step-up converter in order to furnish the right voltage to all the components (see *Figure 4*).

Figure 4. The selector S7 allows the STR750-MAP to be supplied from the battery pack



As an alert feature, an LED is placed to give a warning if a low battery level occurs (LED D10).

The two types of batteries that can be connected to the board to allow all features are the graphite anode single cell Li-Ion or Li-Polymer. The low threshold voltage detector is fixed at 2.7 V (considering the use of a battery pack at typically 3.7 V/1360 mAh).

When another power source (USB, 9 Vdc) is selected, it is possible to recharge the battery pack. The L6924D battery charger system performs this task.

4.2.1 How to charge the battery pack

It is possible to charge a battery pack connected to the STR750-MAP while the board is powered through the power supply or the USB connector. Although the first method is outlined, the procedure to implement the charge phase is the same for both ways.

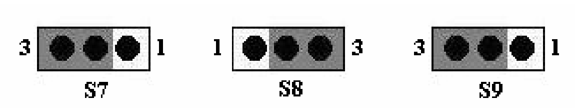
First of all, the STR750-MAP needs to be supplied. For example, plug in the 9÷12 Vdc power supply connector (closing the appropriate jumper).

As a second step, connect the battery pack to the connector, without closing the correspondent jumper in the power source selector.

To set up the recharging process, follow these steps:

1. Close the selector S7 in the position 1-2: this is to connect the battery to the recharging circuit.
2. Close the selector S8 in the position 2-3: this is in order to select 5 V standard power source.
3. Close the selector S9 in the position 1-2: by doing this, the L6920 and its circuitry is switched off in order to save power.

Figure 5. Selectors configuration to recharge the battery pack



4.3 External 5 V power sourcer

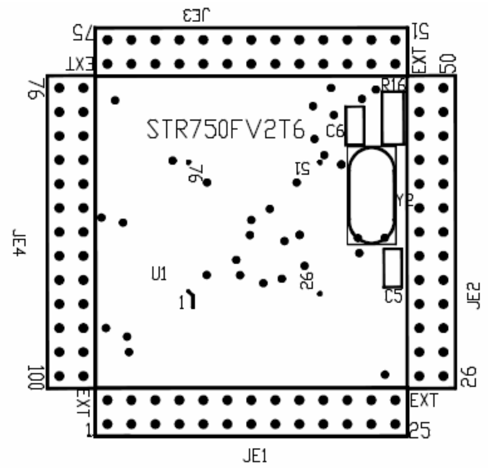
It is possible to plug in an external 5 V power source by closing the jumper EXT in the power source selector.

This feature makes the STR750-MAP highly versatile. Since this power source has no specific connectors, the only way to furnish 5 V to the STR750-MAP, comes directly from the STR750FV2 pin-out placed around the microcontroller itself.

In this way, the user can make his own interface board or connect it directly to the microcontroller's pins.

Take care to follow these simple steps: the external 5 V can operate only if the EXT (see *Figure 3*) jumper is closed. After this, the 26th pin of the connectors J1, J2, J3 and J4 placed around the microcontroller (see the following *Figure 6*), is available to receive the external supply. Pay attention when connecting boards outputting 600 mA as maximum current in order to preserve the STR750-MAP functionalities from damage.

Figure 6. STR750FV2 pin-out and EXT power source locations



4.4 Mini-USB connector power source

In order to use the mini-USB connector as power source, close the related jumper as described in *Section 4.1: Power source selector on page 5* (be sure that the other jumpers are open) and then plug the mini-USB cable onto the connector.

This feature can have an impact on the battery charge capabilities of the STR750-MAP as described in *Section 4.2*.

The USB unit integrates a 48 MHz clock for data management and a USBLC6-2P6 application specific device for very low capacitance ESD protection circuit (see the schematics in *Figure 23*).

4.5 Standard power supply connector

The standard power supply connector is named as PWR in the board silkscreen and, once closed, the STR750-MAP is powered using both laboratory equipment and a common 9÷12 Vdc power supply source.

This power source also impacts the battery charge capabilities of the board.

4.6 Memory boot

The STR750-MAP evaluation board allows the user to run the STR750FV2 choosing between 4 memory modes in order to perform the boot phase.

To make the appropriate choice for your application, refer to the boot table printed onto the board silkscreen. This table is given here with the associated selectors (see *Table 1*).

SW1 corresponds to Boot1/CS2 in the schematics, on the right side (boundary part of the board). SW2 corresponds to Boot0 pin in the microcontroller and in the schematics (refer to the related schematics in *Figure 22*).

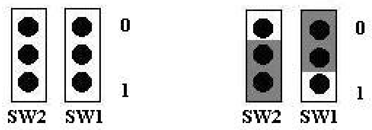
Following the STR750FV2 datasheet, the boot table given in *Table 1* and *Figure 7* could be useful to clarify the layout.

Table 1. Boot table

Memory model	SW2 - SW1
FLASH	0–0
SRAM	0–1
MEM	1–0
SMI	1-1

In *Table 1* above, the "0-0" configuration corresponds to the boot from the embedded FLASH memory sector "B0F0" mapped at 0h. The configuration "0-1" corresponds to the embedded SRAM mapped at 0h. The configuration "1-0" corresponds to the boot from the system memory mapped at 0h. Finally the configuration "1-1" corresponds to the boot from external SMI bank 0 mapped at 0h.

Figure 7. Memory boot selectors and example of configuration



The configuration chosen here corresponds to the MEM memory model.

4.7 STR750FV2 pin-out

To enhance debugging features as well as the possibility to easily connect a secondary board, the whole pin-out of the microcontroller is available to the users and located around the microcontroller.

The pin-out is arranged around the microcontroller with 4 connectors placed one per side.

Since the LQFP100 package is used, each connector is composed of 26 pins with the last pin as a spare for the STR750FV2 pin-out.

The 26^{th} of each connector is used as 5 V external power source when the jumper EXT in the power source selector is closed (see *Section 4.3* for details).

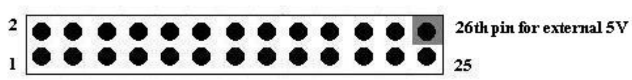
To facilitate the use of this pin-out, the pin correspondence is printed close to each connector.

Table 2 and *Figure 8* show the numbering for the connector related to pin 1 to 25 (connector JE1 in the layout). The same numbering is used for the other connectors, where the last pin is connected for the external 5 V supply. *Table 2* describes the connector/pin-out association.

Table 2. Connector to MCU pins correspondence table

Connector name	STR750FV2 pin correspondence
JE1	1÷25 (26^{th} pin used for external 5 V)
JE2	26÷50 (26^{th} pin used for external 5 V)
JE3	51÷75 (26^{th} pin used for external 5 V)
JE4	76÷100 (26^{th} pin used for external 5 V)

Figure 8. Pin numbering in each connector composing the pin-out of the STR750FV2



4.8 The motor control connector

The STR750FV2 is an MCU suited for Motor Control applications since it embeds timers which can be used for dead time generation and edge/center aligned waveform emergency stop. This feature makes it ideal for induction and brushless DC motor control.

The STR750-MAP is provided with a 34-pin fully featured connector (J11 in the board layout) dedicated to these kinds of applications.

Table 3 below lists the association between each connector pin and the related functionality and microcontroller pin correspondence.

Table 3. Motor control connector and STR750FV2 pins correspondence

Connector pin	Name	Function	STR750FV2 pin
1	MC_EMGCY	Emergency stop	80
2	None	Ground	-
3	PWM_UH	High side PWM for U phase	109
4	None	Ground	-
5	PWM_UL	Low side PWM for U phase	209
6	None	Ground	-
7	PWM_VH	High side PWM for V phase	208
8	None	Ground	-
9	PWM_VL	Low side PWM for V phase	207
10	None	Ground	-
11	PWM_WH	High side PWM for W phase	206
12	None	Ground	-
13	PWM_WL	Low side PWM for W phase	205

Table 3. Motor control connector and STR750FV2 pins correspondence

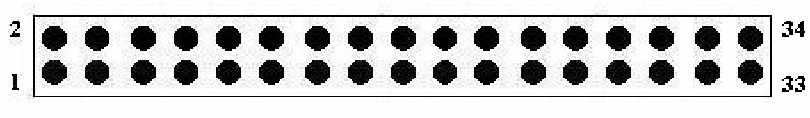
Connector pin	Name	Function	STR750FV2 pin
14		Bus voltage	27
15		Current phase A	108
16	None	Ground	-
17		Current phase B	106
18	None	Ground	-
19		Current phase C	104
20	None	Ground	-
21		NTC bypass relay	204
22	None	Ground	-
23		Dissipation brake PWM	100
24	None	Ground	-
25	VCC 5 V	5 V	-
26		Heat sink temperature	29
27		PFC (Power Factor Corrector) synchronization	31
28	+3V3	3.3 V	-
29		PFC PWM	30
30	None	Ground	-
31		Encoder A	3
32	None	Ground	-
33		Encoder B	33
34		Encoder index	1

In applications where the 5 V supply comes from the motor control connector, all the jumpers of the power selector must be open.

Of course, if the 5 V is furnished from the STR750-MAP to the MC, choose the appropriate supply from the power supply selector by closing the corresponding source.

Pay particular attention also when using jumper J15. It allows the user to provide 3.3 V to the MC connector, when it is closed (jumper J15 is open by default). In any case, 3.3 V cannot be supplied by the motor control connector.

Figure 9. 34-pin motor control connector



4.9 Mini-USB connector

The mini-USB connector provides both data management features as well as board supply operations (board supply and battery pack recharge), see *Figure 10* and *Table 4*.

Figure 10. Standard Mini-USB connector

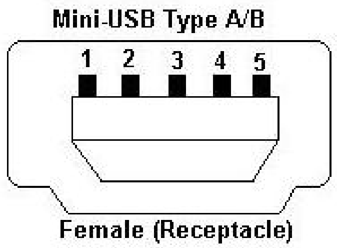


Table 4. Pins and signals correspondence for the Mini-USB connector

Pin number	Name	Colour	Notes
1	VBus	Red	Power
2	D-	White	Data -
3	D+	Green	Data +
4	ID	-	Type A – GND/Type B - NC
5	GND	Black	Ground

This standard connector is defined as part of the USB-OTG (USB On The Go) enhancement. It features a single connector type (A or B) and peer-to-peer operations.

The configuration present on the STR750-MAP is Type B, as pin 4 is not connected (NC in the table).

The USB-OTG is a supplement to the USB 2.0 (or USB 1.0) specifications that allow USB devices to have more flexibility in managing USB connections.

As known, the standard USB (USB 1.1/2.0) uses Master/Slave architecture. A USB host acts as a Master and a USB peripheral (aka USB Device) acts as a Slave. Only the USB host can schedule the configuration and data transfers over the link, while the USB peripherals cannot initiate data transfers. They only respond to instructions given by a Host.

The USB-OTG compatible devices are able to initiate the session, control the connection and exchange Host/Peripheral roles between each other.

With this new architecture, two new protocols are introduced: SRP (Session Request Protocol) and HNP (Host Negotiation Protocol).

Two new classes of devices are defined: OTG A-device and OTG B-device. This terminology defines which side supplies power (VBUS) to the link. The OTG A-device is a supplier and an OTG B-device (our case) is a consumer. The default link configuration is that A-device is Host and B-device is a Peripheral (this may be reversed later by using HNP).

These devices are fully backward compliant with USB 1.1/2.0 and behave as standard USB Hosts or Peripherals when connected to standard (no OTG) USB devices.

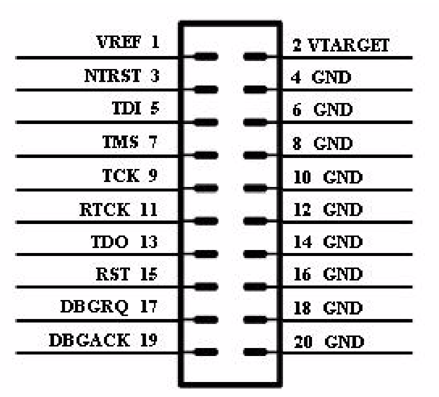
The USB-OTG standard defines only one-to-one connection. Contrary to the standard USB there are no USB Hubs defined by the USB-OTG. Connecting the USB hub between two OTG devices leads to losing all USB-OTG capabilities.

4.10 JTAG connector

To allow enabling of debug features as well as programming capabilities, the STR750-MAP is equipped with a standard JTAG connector.

Figure 11 below shows how the pins and the corresponding signals are placed in the JTAG connector.

Figure 11. The JTAG connector



4.11 On-board sensors

As described in the features list of the board, the STR750-MAP is provided with one 3-axis digital MEMS accelerometer (the LIS3LV02DQ) and one analog temperature sensor (the STLM20).

Both sensors are mounted with their package size (QFN28 and UDFN4 package respectively).

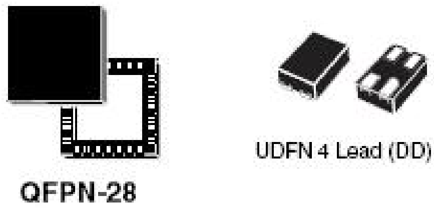
While the temperature sensor provides only the analog output (connected to the ADC channel 0, pin number 2 in the microcontroller pin-out), the accelerometer could output both I^2C and SPI digital serial output. As a design choice, the STR750-MAP allows the on-board accelerometer to communicate with the STR750FV2 using only the I^2C serial bus (the CS pin is fixed at 3.3 V).

The board offers the possibility to disconnect this I^2C bus from the accelerometer, allowing the microcontroller to communicate with external peripherals using this bus at 3.3 V as Vcc with both standard and fast protocol variants.

To manage these settings, refer to *Section 4.16: I2C and BSPI connectors on page 18* .

The packages are described in *Figure 12*, where on the left side is the QFN28 package of the accelerometer, and on the right side is the UDFN4 package of the temperature sensor. Refer to the device datasheet in the *Reference* section for further details.

Figure 12. The LIS3LV02DQ (on the left) and the STLM20 (on the right) packages



For the electrical connections refer to the schematics (see *Figure 26 on page 26*).

4.12 The ZigBee® connector

The ZigBee® connector is designed as two adjacent female connectors, each composed of six pins. It is made to host the ZigBee® module based on SN260 and adapter in the STR750-MAP.

This socket allows the access to the EZSP (Ember Zetanet Serial Protocol).

To localize the connector position inside the board, see the board architecture in *Section 3: List of features on page 5*.

The socket description is defined as follows: *Table 5* and *Table 6* show the pin-out of the connector (ZigBee® module interface connectors J8 and J9), while *Table 7* illustrates pin functionality.

By means of the ZigBee® connector, the EZSP may be accessed through the SPI protocol. *Table 5* and *Table 6* show the connectors J8 and J9.

Table 5. Connector J8 of the ZigBee® socket

Signal name	Pin no
VBRD	1
MOSI	2
MISO	3
SCLK	4
nSSEL	5
GND	6

Table 6. Connector J9 of the ZigBee® socket

Signal name	Pin no
VBRD	1
HOST_INT	2
WAKE	3
RSTB	4

Table 6. Connector J9 of the ZigBee® socket (continued)

Signal name	Pin no
GND	5
GND	6

Table 7. Signal description of the ZigBee® socket

Pin no	Signal name	Direction(1)	Description
J8.1	VBRD	Power	3.3 V power supply for ZigBee® module
J8.2	MOSI (P0.18)	Input	SPI data, Master Out/Slave In (from STR750FV2 to SN260)
J8.3	MISO (P0.17)	Output	SPI data, Master In/Slave Out (from SN260 to STR750FV2)
J8.4	SCLK (P0.16)	Input	SPI clock (STR750FV2 to SN260)
J8.5	nSSEL (P0.25)	Input	Active low SPI slave select (STR750FV2 to SN260)
J8.6	GND	Power	Ground connection
J9.1	VBRD	Power	3.3 V power supply for ZigBee® module
J9.2	HOST_INT (P1.05)	Output	Host interrupt (from SN260 to STR750FV2)
J9.3	WAKE (P0.24)	Input	Wake interrupt (from STR750FV2 to SN260)
J9.4	RSTB (P2.03)	Input	Active low chip reset (internal pull-up)
J9.5	GND	Power	Ground connection
J9.6	GND	Power	Ground connection

1. With respect to the ZigBee® module based on SN260 with adapter

The HOST_INT signal is at 3.3 V pull-up through a 4.7 kΩ resistor (R49) in series with a 0 Ω resistor (R50). In this way the HOST_INT does not bounce in an unknown state if the SN260 is in reset.

In each case the pull-up can be excluded by unsoldering the R50 resistor.

4.13 Graphic LCD strip-line connector

A standard 20-pin strip-line is dedicated to the control of a graphic 128x64 LCD.

The board is designed to host the LCD in the applications where it is needed, with the possibility to remove it when unnecessary, in order to save power.

Table 8 gives pin correspondence and *Figure 13* shows pin arrangement and organization.

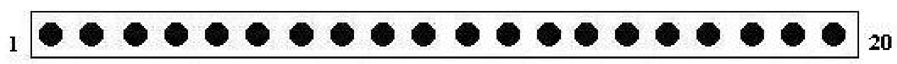
Table 8. LCD socket pin description

Pin no	Name	STR750FV2 pin
1	GND	-
2	Vcc 5 V	-
3	V0	-
4	D/I	219

Table 8. LCD socket pin description (continued)

Pin no	Name	STR750FV2 pin
5	RnotW	200
6	E	218
7	DB0	210
8	DB1	211
9	DB2	212
10	DB3	213
11	DB4	214
12	DB5	215
13	DB6	216
14	DB7	217
15	CS1	201
16	CS2	202
17	notRST	59
18	Vout	-
19	A	-
20	K	-

Figure 13. A female strip-line is used as LCD socket



4.14 CAN connector

The board is equipped with a standard DB9 male connector to enhance networking capabilities, especially in industrial and factory automation environments.

The physical layer of the CAN protocol is implemented through the L9616 transceiver. It allows the peripheral to reach standard communication speeds (up to 250 Kbps and up to 1 Mbps) which can be done by setting the selector S5 (located close to the CAN connector, see *Figure 2*) as appropriate. Taking the middle point of this selector as a reference, and closing this one with pin number 3 (0 in the board silkscreen), the device runs at 1 Mbps as maximum speed. Closing the middle point of S5 with pin number 1 in the layout (1 in the board silkscreen), the communication speed is limited to 250 Kbps.

Independently of the speed you select, you must close jumper JP12 to connect the termination resistor, in order to close the communication line on the STR750FV2 side.

Jumpers JP10 and JP11 also must be closed to allow communication. They connect the Tx and Rx pins of the transceiver with pins 64 and 63 of the microcontroller respectively, linking the peripheral to the physical layer of the communication protocol.

Refer to *Figure 14* and *Table 9* for further details of the connector.

Figure 14. DB9 male connector

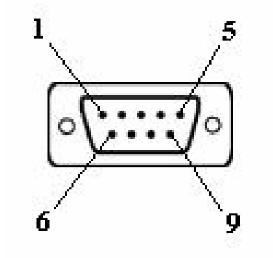


Table 9. Pin numbering for the CAN connector

Pin number	Function
1	NC
2	NC
3	GND
4	CAN_L
5	NC
6	NC
7	NC
8	CAN_H
9	GND

4.15 UART connector

Other networking capabilities are offered by the UART connector on the board. It is linked to the UART1 peripheral of the microcontroller through a ST202EC transceiver, using pins 11, 16 and 17 of the microcontroller itself, respectively for RTS, Tx and Rx capabilities.

The jumper JP19 near the transceiver, once closed, enables the CTS functionality. If open the corresponding shared pin of the microcontroller (pin 15) can be used by the EXT connector.

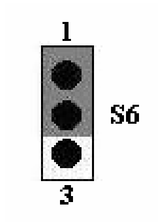
Before having a look at the pin correspondence *Table 10* (the connector is a DB9 male as the one used for CAN), a brief description of the S6 selector is needed.

If you close between the middle point and point 1 (upper side, near the connector), you enable the RTS functionality, at the same time the jumper JP13 must be closed. Elsewhere, if you close the middle pin with pin 3 you enable the NULL Modem mode (at the same time jumper JP13 must be opened).

Table 10. Pin numbering for the UART connector

Pin number	Function
1	-
2	Rx1
3	Tx1
4	-
5	GND
6	-
7	Tx2
8	Rx2
9	NC

Figure 15. S6 selector, this configuration allows RTS functionality



4.16 I^2C and BSPI connectors

Both the I^2C and BSPI connectors are shared with other devices placed on the board, but they are useful in order to allow on-system communication capabilities for the STR750-MAP.

The I^2C peripheral bus of the microcontroller shares the pin between the 3-axis accelerometer and the connector for external devices.

Starting from the microcontroller pin out, pins 29 and 30, SDA and SCL respectively, are connected to the middle points of two 3-pin strip-line selectors, S2 and S1 respectively. If both these selectors are closed between the middle point and the point 3, we connect the microcontroller to the I^2C bus of the accelerometer sensor. If we close between their middle point and point 1, the microcontroller is connected to the external I^2C connector, allowing communication with an external device respecting the I^2C standard protocol specifications.

The left diagram in *Figure 16* shows the configuration to select the accelerometer on the I^2C bus. The diagram on the right is extracted from the schematic.

Figure 16. Position of jumpers in order to choose the LIS3LV02DQ accelerometer

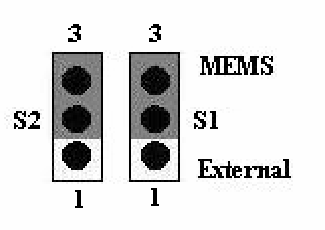
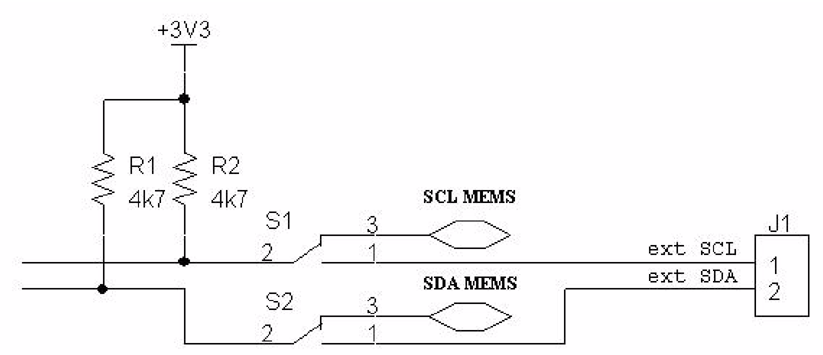


Figure 17. The I^2C bus schematic



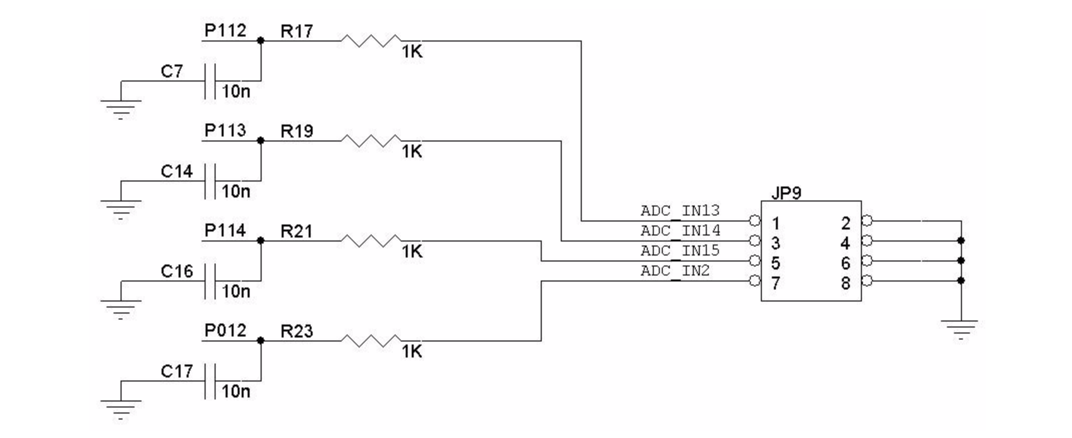
In order to allow capabilities such as system interconnectivity, the BSPI (Buffered SPI) connector is available to the users. It is located adjacent to the mini-USB connector (see *Figure 2* for the component placement) and the pin correspondance is described in the related schematics (see *Figure 22*).

4.17 ADC connector and potentiometer

The STR750-MAP offers the possibility to connect analog devices and/or signal generators, directly to the ADC peripheral by using a 4-input ADC connector.

These input channels are provided with a RC filter with parameters calculated using the lowest conversion time allowed by the STR750FV2: 3.75 µs. *Figure 18* shows the schematic of the connector and the corresponding pin-out.

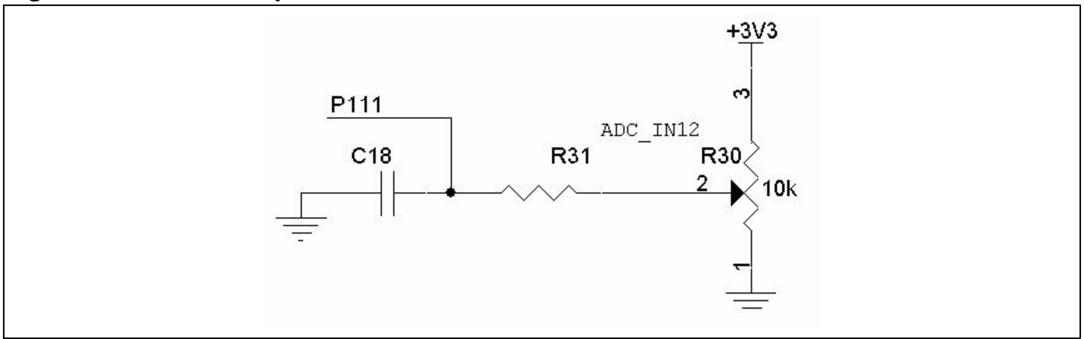
Figure 18. The ADC connector schematic



The ADC peripheral channels used for this connector are: 2, 13, 14 and 15, connected to pins P0.12, P1.12, P1.13 and P1.14 respectively.

The dedicated potentiometer (useful to test the peripheral features) is also present in the STR750-MAP layout adjacent to the connector. It is attached to the ADC channel 12 (pin P1.11): see *Figure 19* below.

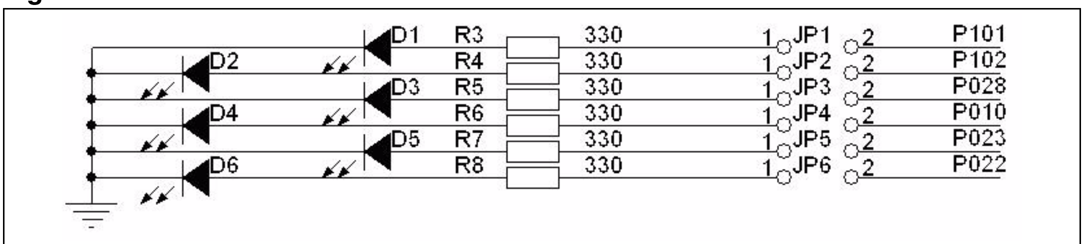
Figure 19. The ADC potentiometer schematic



4.18 User LEDs and push buttons

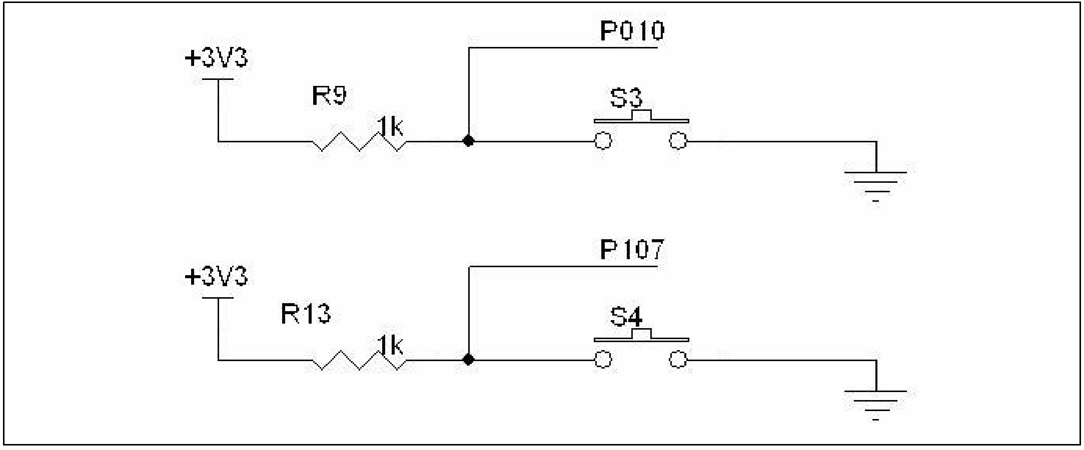
As well as the ADC connector and potentiometer, debugging and testing capabilities of the user specific applications are also supported by 6 on-board user LEDs and 2 push buttons. Each LED is accessible by connecting the correspondent jumper which is to minimize the load effects on the other peripherals that use the same pin-out (i.e. the user LEDs attached to pins P0.22 and P0.23 share this port with the UART connector circuit). These jumpers are given in *Figure 20* and are also illustrated in the board silkscreen.

Figure 20. User LEDs schematic



The two push buttons are attached to pins P0.10 and P1.07 (external interrupt 4 and 8 respectively), see *Figure 21*.

Figure 21. General purpose push buttons schematic



5 Board schematics

Figure 22. Main board schematic

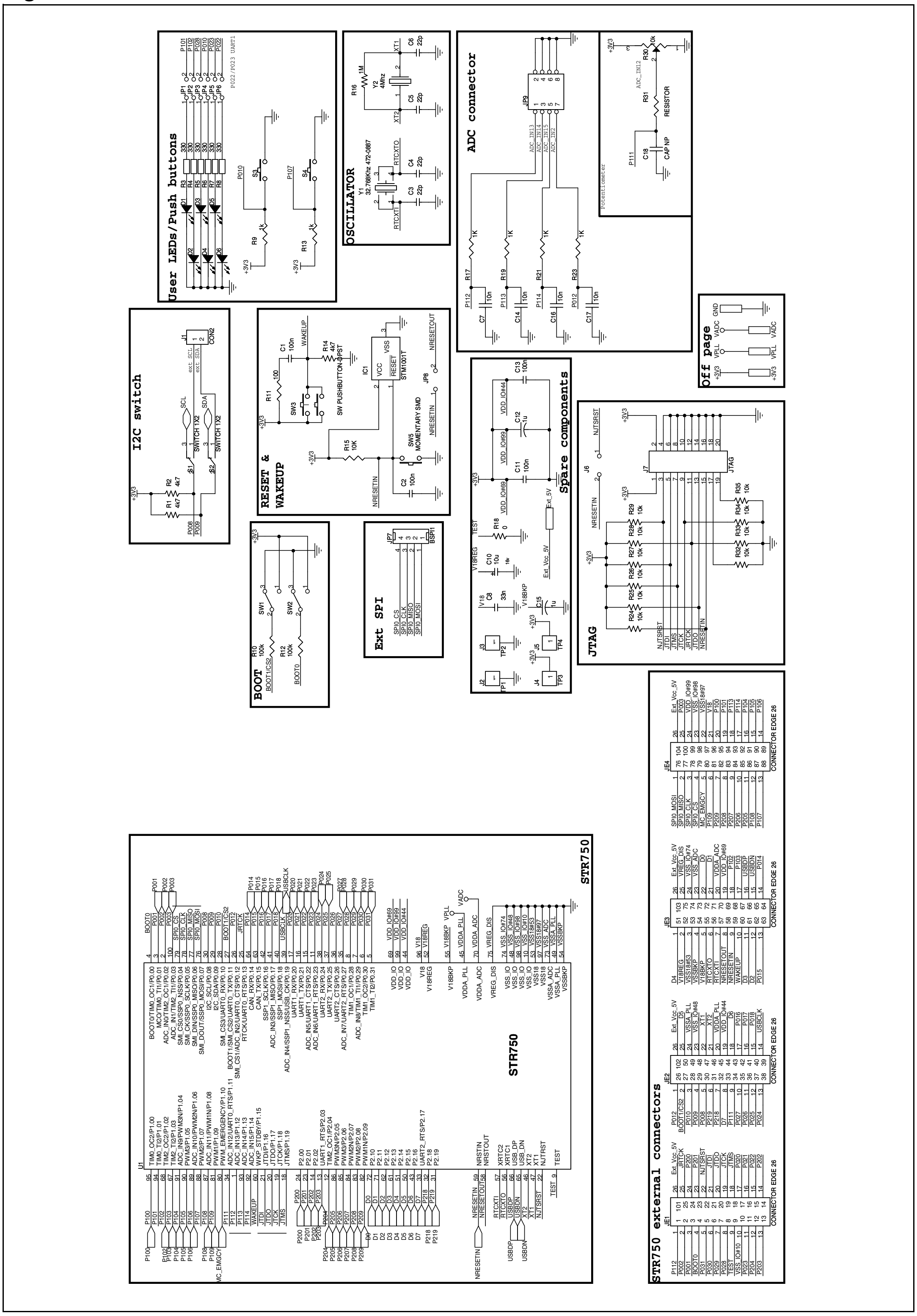


Figure 23. Communication interfaces schematic

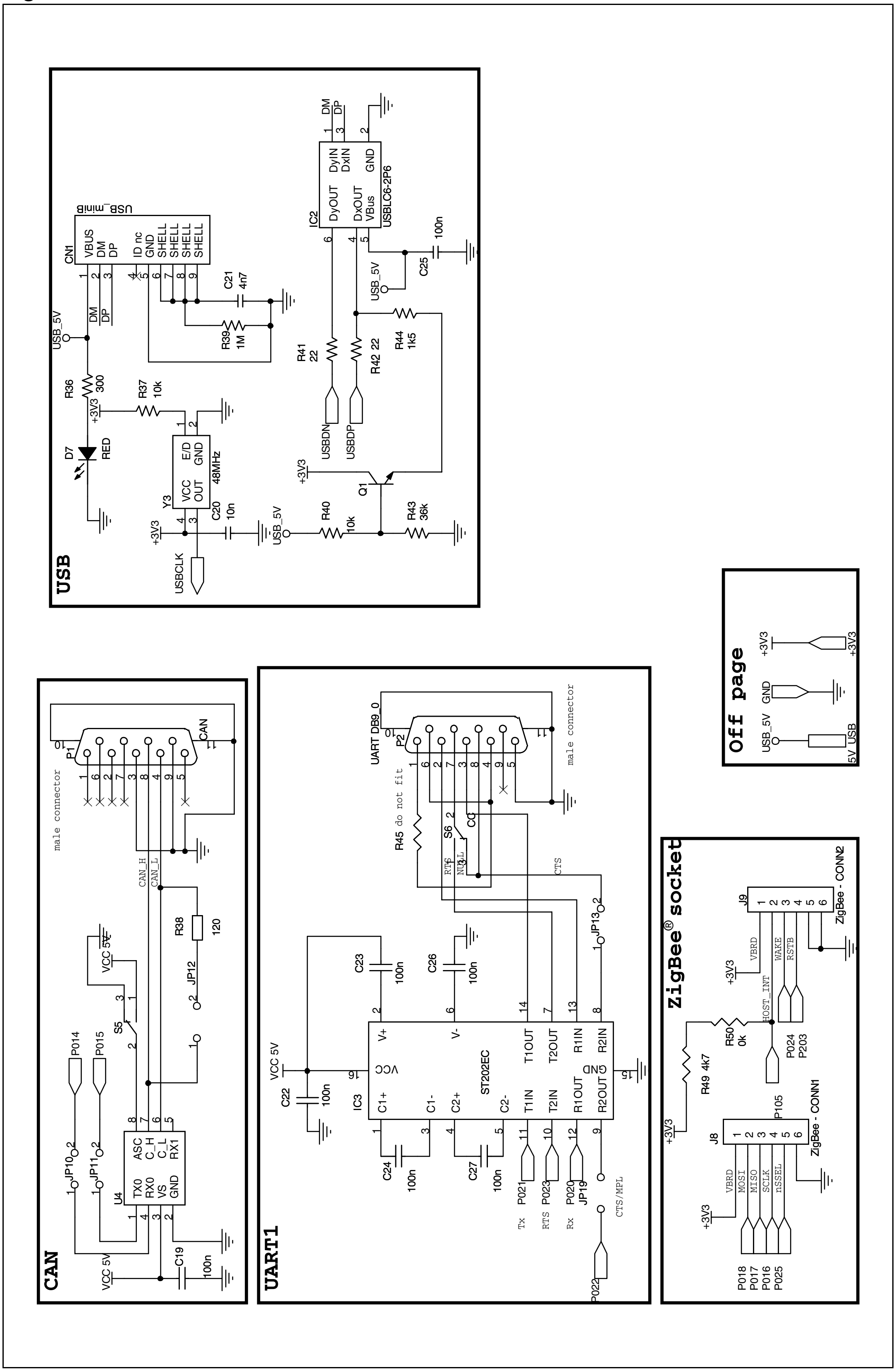


Figure 24. LCD schematic

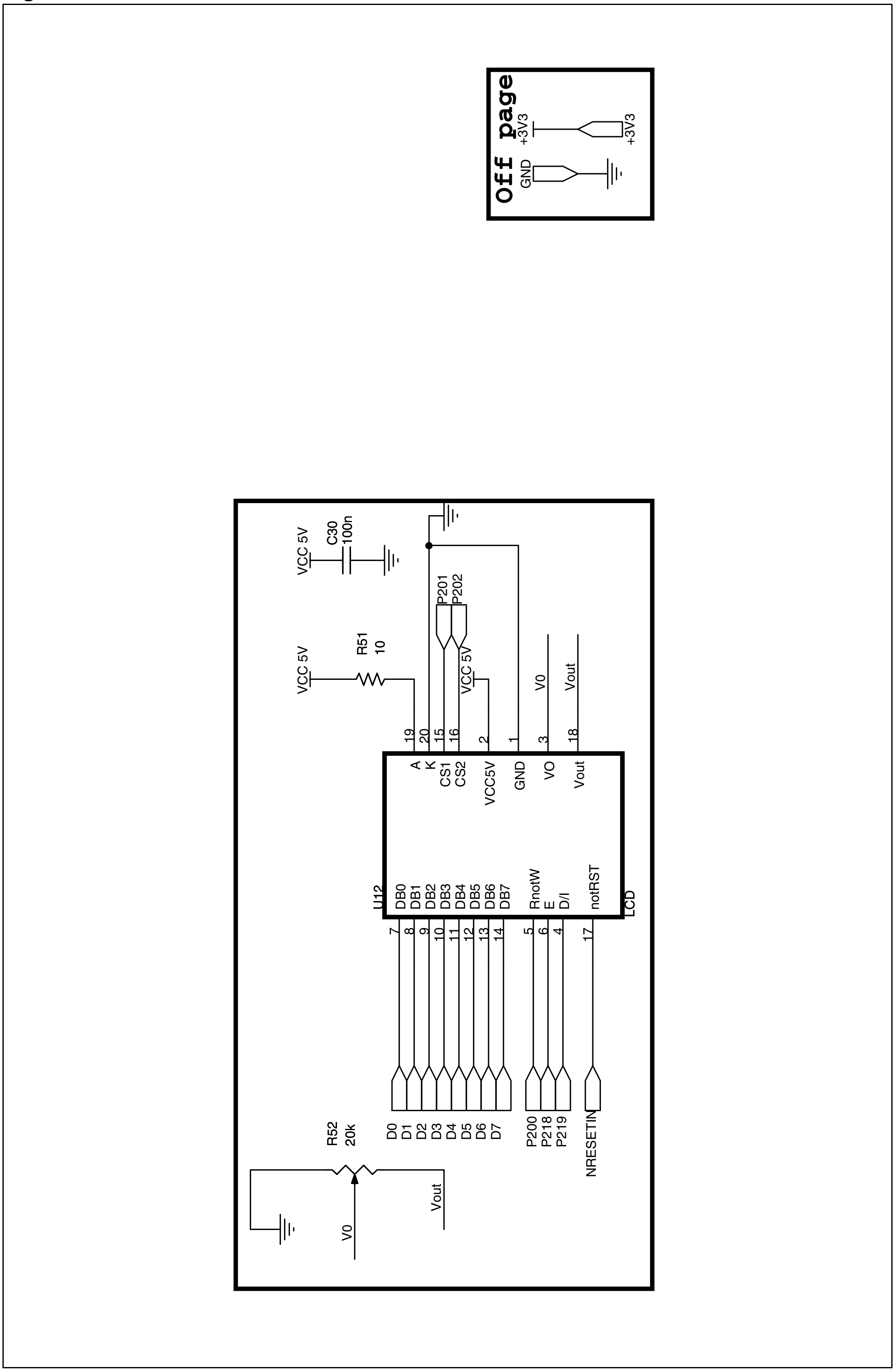


Figure 25. Motor control connector schematic

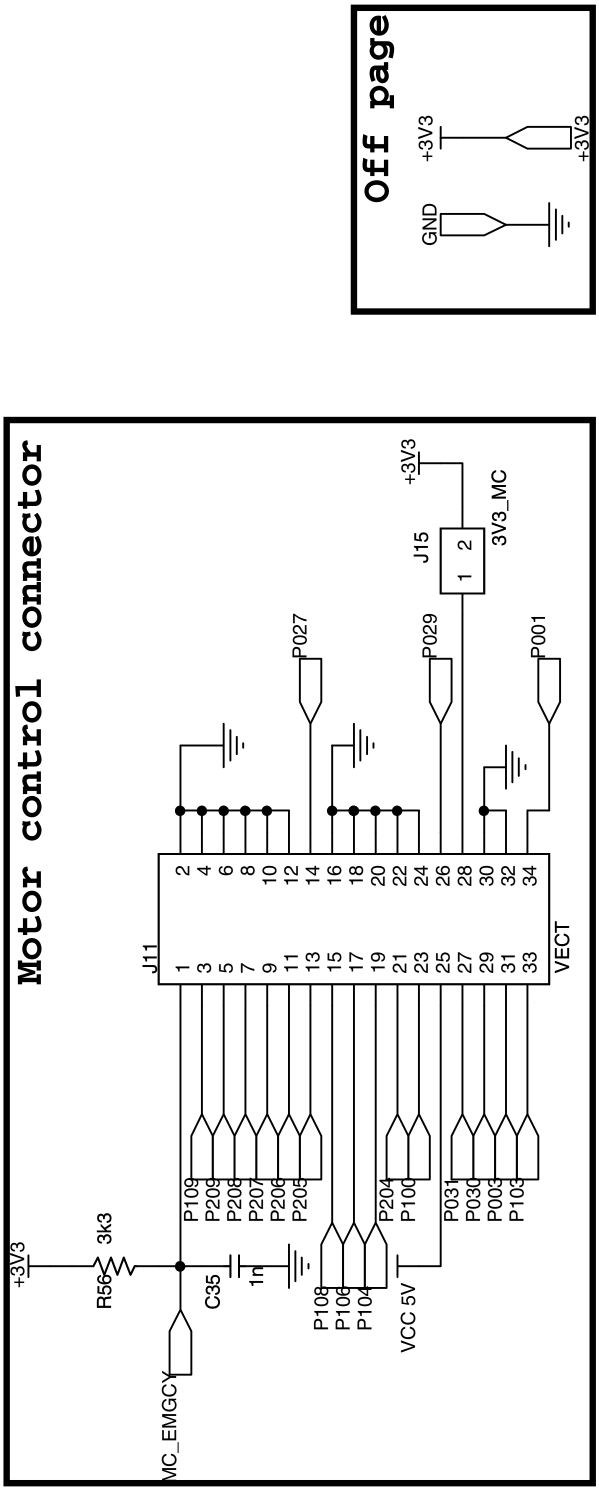
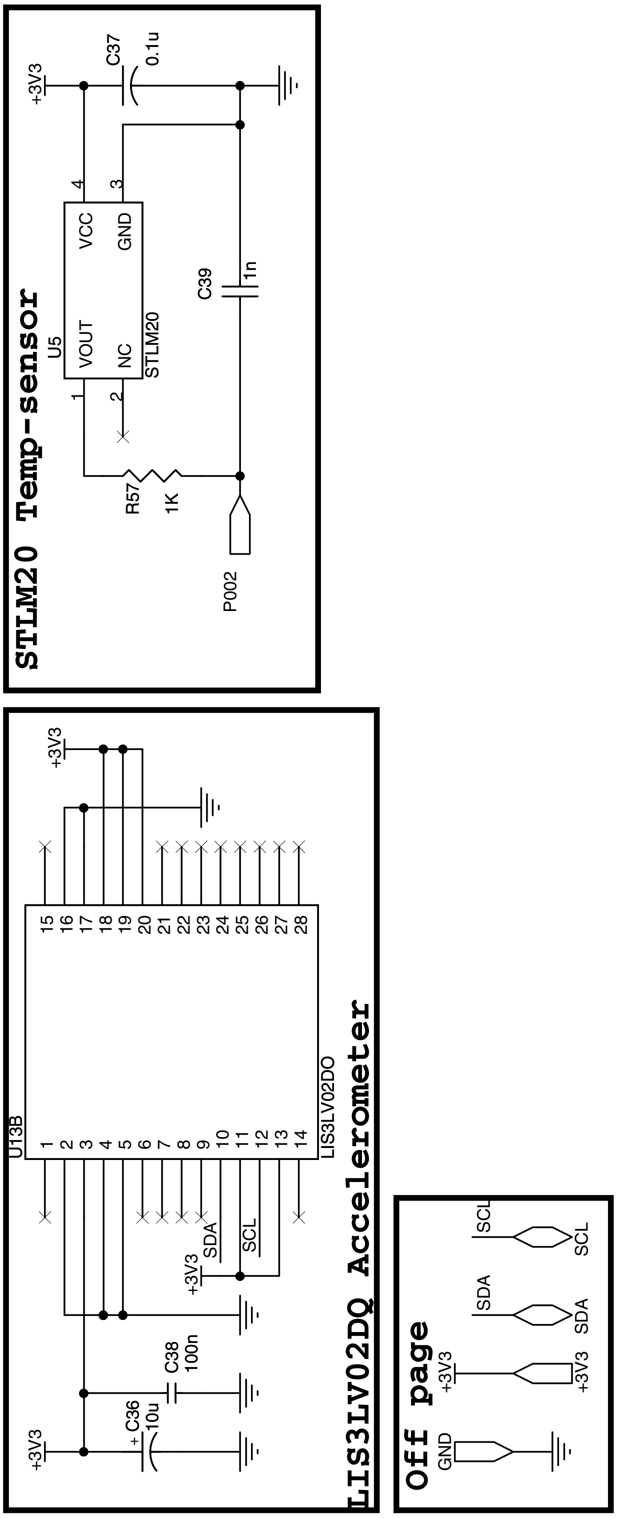


Figure 26. MEMS accelerometer and temperature sensor schematics



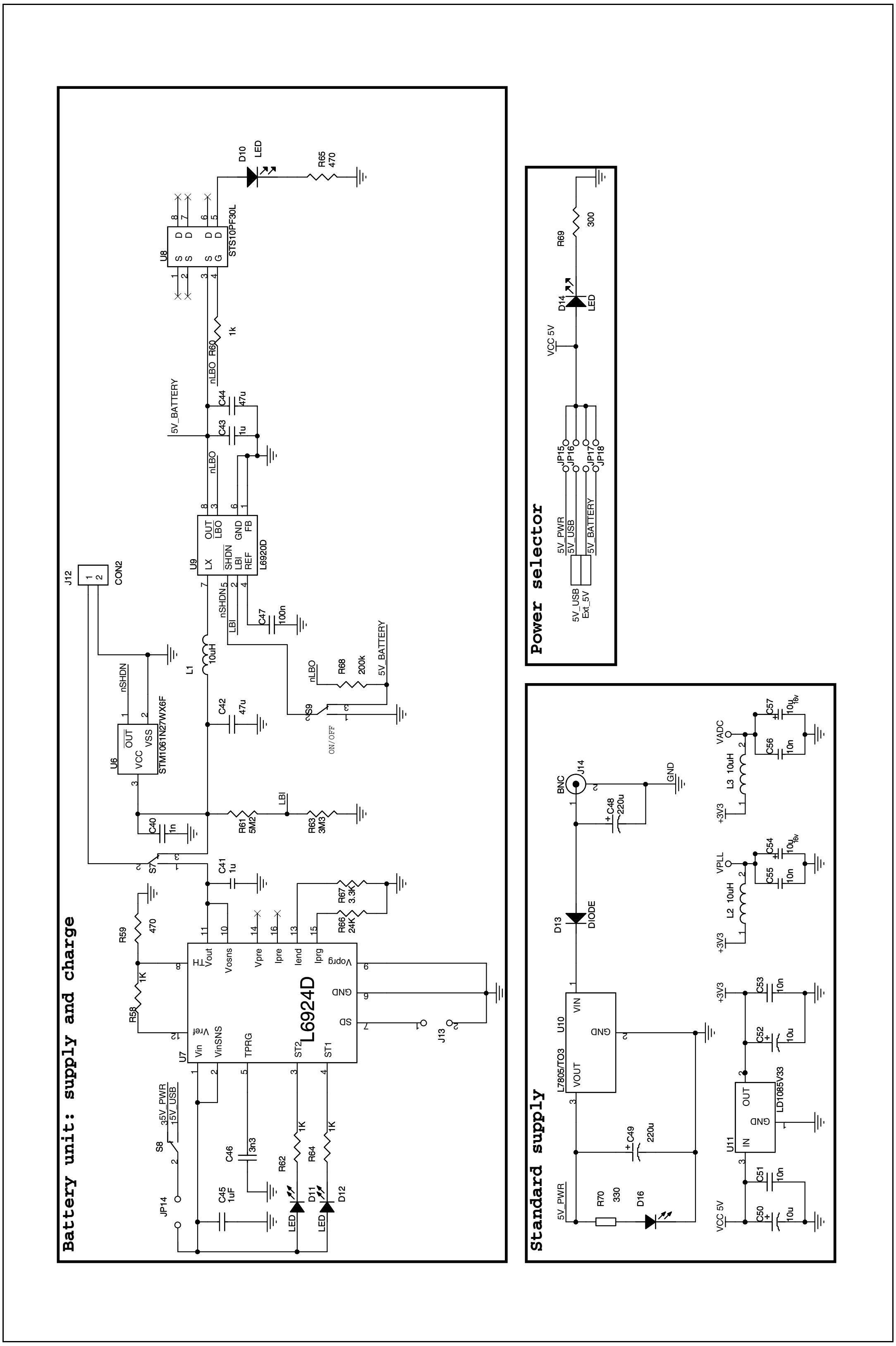


Figure 27. Battery charger unit, standard Power supply and power source selector schematics

6 List of jumpers and selectors

Table 11. List of jumpers and selectors

Type	Name	Function	Description	STR750FV2 pins
3-pin strip-line	SW1	STR750FV2 boot	GND/3.3 V selector	27
3-pin strip-line	SW2	STR750FV2 boot	GND/3.3 V selector	4
3-pin strip-line	S1	I^2C switch	MEMS/ext. SCL switch	30
3-pin strip-line	S2	I^2C switch	MEMS/ext. SDA switch	29
4-pin slide	SW4	BSPI switch	EXT/ext. BSPI switch	76,77,78,79
Push button	SW5	STR750FV2 reset	Device reset from user	59
Push button	SW3	STR750FV2 wakeup	Wake up from user	60
Jumper	JP1	User LED	Connect user LED D1	94
Jumper	JP2	User LED	Connect user LED D2	68
Jumper	JP3	User LED	Connect user LED D3	8
Jumper	JP4	User LED	Connect user LED D4	28
Jumper	JP5	User LED	Connect user LED D5	11
Jumper	JP6	User LED	Connect user LED D6	15
Push button	S3	Push button	User push button	28
Push button	S4	Push button	User push button	88
Jumper	J6	JTAG	JTAG reset signal	59
10-pin strip-line	JP9	External ADC	Enable the selected channel	1,93,92,26
Potentiometer	R30	Potentiometer	Pot. on ADC channel 12	34
1pin connector	TP1	Test point	Ground point	-
1pin connector	TP2	Test point	Ground point	-
1pin connector	TP3	Test point	3.3 V point	-
1pin connector	TP4	Test point	3.3 V point	-
Jumper	JP10	CAN	Connect L9616 Rx line	64
Jumper	JP11	CAN	Connect L9616 Tx line	63
Jumper	JP12	Termination	R38 to close the line	-
3-pin strip-line	S5	ASC pin select	Choose 250 kbps/1 Mbps	-
Jumper	JP13	UART1	NULL Modem/RTS	-
3-pin strip-line	S6	UART1	NULL Modem/RTS	-
Jumper	JP19	UART1	CTS/EXT pin sharing	15
Jumper	JP15	Power	Connect standard supply	-
Jumper	JP16	USB	Connect USB as supply	-
Jumper	JP17	EXT	Connect EXT as supply	-

Table 11. List of jumpers and selectors (continued)

Type	Name	Function	Description	STR750FV2 pins
Jumper	JP18	Battery	Li/Ion Battery pack	-
Male connector	J14	Power supply	9÷12 Vdc power supply	-
Jumper	J12	Battery pack	Connect battery to board	-
3-pin strip-line	S7	Battery	Recharge/supply switch	-
Jumper	JP14	Battery	Connect L6924 to source	-
3-pin strip-line	S8	Battery	Source switch USB/Power	-
3-pin strip-line	S9	Battery	On/Off Battery pack	-
Jumper	J13	Battery	Closed enable L6924	-
Jumper	J15	Motor control	To supply 3.3V to MC conn.	-
Jumper	JP8	Asynchronous reset	Reset AHB System each APB peripheral	58 - 59

Table 12. BOM (Bill Of Material)

ID	Qty	Part reference	Value	Device type	Manufacturer	Order code
1	1	CN1	USB_miniB	Mini-USB connector	Molex	54819-0578
2	14	C1,C2,C11,C13, C19,C22, C23,C24, C25,C26,C27,C30, C38,C47	100 nF		any	
3	4	C3,C4,C5,C6	22 pF		any	
4	10	C7,C14,C16,C17, C20,C51, C53,C55,C56,C18	10 nF		any	
5	1	C8	33 nF		any	
6	6	C10,C36,C50,C52, C54,C57	10 µF	16 V - SMD Tantalum Capacitor	AVX	TPSB106K016R0800
7	5	C12,C15,C41,C43, C45	1 µF	35 V - SMD Tantalum Capacitor	AVX	THJB105K035
8	1	C21	4.7 nF		any	
9	3	C35,C39,C40	1 nF		any	
10	1	C37	0.1 µF		any	
11	2	C42,C44	47 µF	25 V - SMD Tantalum Capacitor	AVX	TPSD476K025R0250
12	1	C46	3.3 nF		any	

Table 12. BOM (Bill Of Material) (continued)

ID	Qty	Part reference	Value	Device type	Manufacturer	Order code
13	2	C48, C49	220 µF	16 V - SMD Tantalum Capacitor	AVX	TPSV227K016R0075
14	3	D1,D2,D3	LED	SMD - blue	Avago	HSMN-C150
15	3	D4,D5,D6	LED	SMD – green	Avago	HSMG-C150
16	4	D10, D11,D12, D7	LED	SMD - red	Avago	HSMH-C150
17	2	D14,D16	LED	SMD - yellow	Avago	HSMY-C150
18	1	D13	diode		Philips	436-7341
19	4	R1,R2,R14,R49	4.7 kΩ		any	
20	7	R3,R4,R5,R6,R7, R8,R70	330 Ω		any	
21	12	R9,R13,R17,R19, R21,R23,R31,R57, R58,R60,R62,R64	1 kΩ		any	
22	2	R10,R12	100 kΩ		any	
23	1	R11	100 Ω		any	
24	1	R30	10 kΩ	Trimmer– 2.54 mm	Bourns	3386F1103T LF
25	13	R15,R24,R25,R26, R27,R28,R29,R32, R33,R34,R35,R37, R40	10 kΩ		any	
26	2	R16, R39	1 MΩ		any	
27	3	R18,R50,R45	0 Ω		any	
28	2	R36, R69	300 Ω		any	
29	1	R38	120 Ω		any	
30	2	R41, R42	22 Ω		any	
31	1	R43	36 kΩ		any	
32	1	R44	1.5 kΩ		any	
33	1	R51	10 Ω		any	
34	1	R52	20 kΩ	Trimmer- 2.54 mm	Bourns	3296W 20k
35	2	R56, R67	3.3 kΩ		any	
36	2	R59, R65	470 Ω		any	
37	1	R61	5.2 MΩ		any	
38	1	R63	3.3 MΩ		any	
39	1	R66	24 kΩ		any	
40	1	R68	200 kΩ		any	

Table 12. BOM (Bill Of Material) (continued)

ID	Qty	Part reference	Value	Device type	Manufacturer	Order code
41	1	J7	20-pin male connector	JTAG connector	Tyco	609-2027
42	1	J11	34-pin male connector	MC connector	Tyco	609-3427
43	2	P1, P2	DB9 male connector	CAN, UART	any	
44	2	L2, L3	10 µH	180 mA inductor	Epcos	RS code: 191-0122
45	1	L1	10 µH	1.4 A inductor	Wurth	7445510
46	4	JE1, JE2, JE3, JE4	header	26-pin (2x13), standard male 2.54 mm	any	
47	19	JP1,JP2,JP3,JP4, JP5,JP6,JP8,JP10, JP1,JP1, JP13,JP14,JP15, JP16,JP17,JP18, JP19,J6,J13	header	2-pin standard male 2.54 mm	any	
48	2	J1, J12	header	2-pin male connector	Tyco (AMP)	280370-1
49	1	JP7	header	4-pin male connector	Tyco (AMP)	280371-1
50	1	JP9	header	8-pin (2x4), standard male 2.54 mm	any	
51	4	J2,J3,J4,J5	header	1-pin standard male	any	
52	2	J8, J9	header	2-pin standard female 2.54 mm	any	
53	1	J14	connector	Standard power supply connector		RS code: 286-8779
54	1	Y1	oscillator	32.768 KHz oscillator		RS code: 547-6856
55	1	Y2	oscillator	4 MHz oscillator	Fox Electronics	FOXSD/040
56	1	Y3	oscillator	48 MHz	Epson	SG8002CAPCB48MHZ
57	9	SW1,SW2,S1,S2, S5,S6,S7,S8,S9	header	3-pin standard male 2.54 mm	any	
58	4	SW3,SW5,S3,S4		Push button	APEM Components	DTS61K
59	1	U1	STR750FV2T6	LQFP100 (14x14 mm)	STMicroelectronics	STR750FV2T6
60	1	U4	L9616D	SO-8	STMicroelectronics	L9616D

Table 12. BOM (Bill Of Material) (continued)

ID	Qty	Part reference	Value	Device type	Manufacturer	Order code
61	1	U5	STLM20DD9F	UDFN 4	STMicroelectronics	STLM20DD9F
62	1	U6	STM1061N27WX6F	SOT23-3	STMicroelectronics	STM1061N27WX6F
63	1	U7	L6924D	VFQFPN16	STMicroelectronics	L6924D
64	1	IC1	STM1001TWX6F	SOT23-3	STMicroelectronics	STM1001TWX6F
65	1	IC2	USBLC6-2P6	SOT-666	STMicroelectronics	USBLC6-2P6
66	1	IC3	ST202ECD	SOP-16	STMicroelectronics	ST202ECD
67	1	U9	L6920D	TSSOP8	STMicroelectronics	L6920D
68	1	U8	STS10PF30L	SO-8	STMicroelectronics	STS10PF30L
69	1	U10	L7805ABD2T-TR	D^2PAK	STMicroelectronics	L7805ABD2T-TR
70	1	U11	LD1085D2M33R	D^2PAK/A	STMicroelectronics	LD1085D2M33R
71	1	U13	LIS3LV02DQ	QFPN-28	STMicroelectronics	LIS3LV02DQ
72	1	Q1	BC846AL (MMBT2222)		any	
73	1	U12	header	20-pin standard female 2.54 mm		

7 Revision history

Table 13. Revision history

Date	Revision	Changes
30-Aug-2007	1	First issue