
EVAL-L9779WD-SPI demo board Hardware documentation

Introduction

The EVAL-L9779-SPI is a board designed to provide the user an evaluation tool of the device L9779WD-SPI, a Multifunction IC for engine management system. The board provides all the main input/output capabilities needed to drive all the supported loads and to interface the sensors in addition to diagnostic functionalities.

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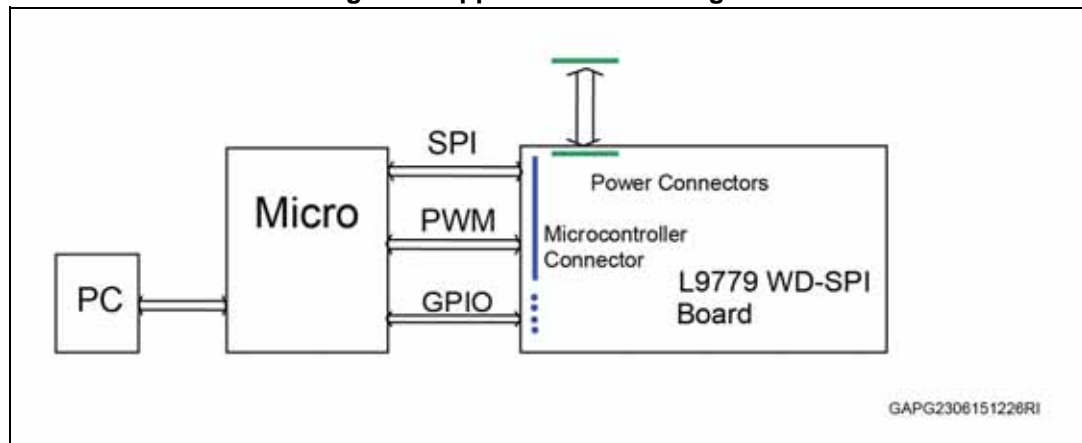
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1 Hardware description

The EVAL-L9779-SPI board provides maximum flexibility access to all pins to simplify the evaluation and debug.

1.1 Block diagram

Figure 1. Application block diagram

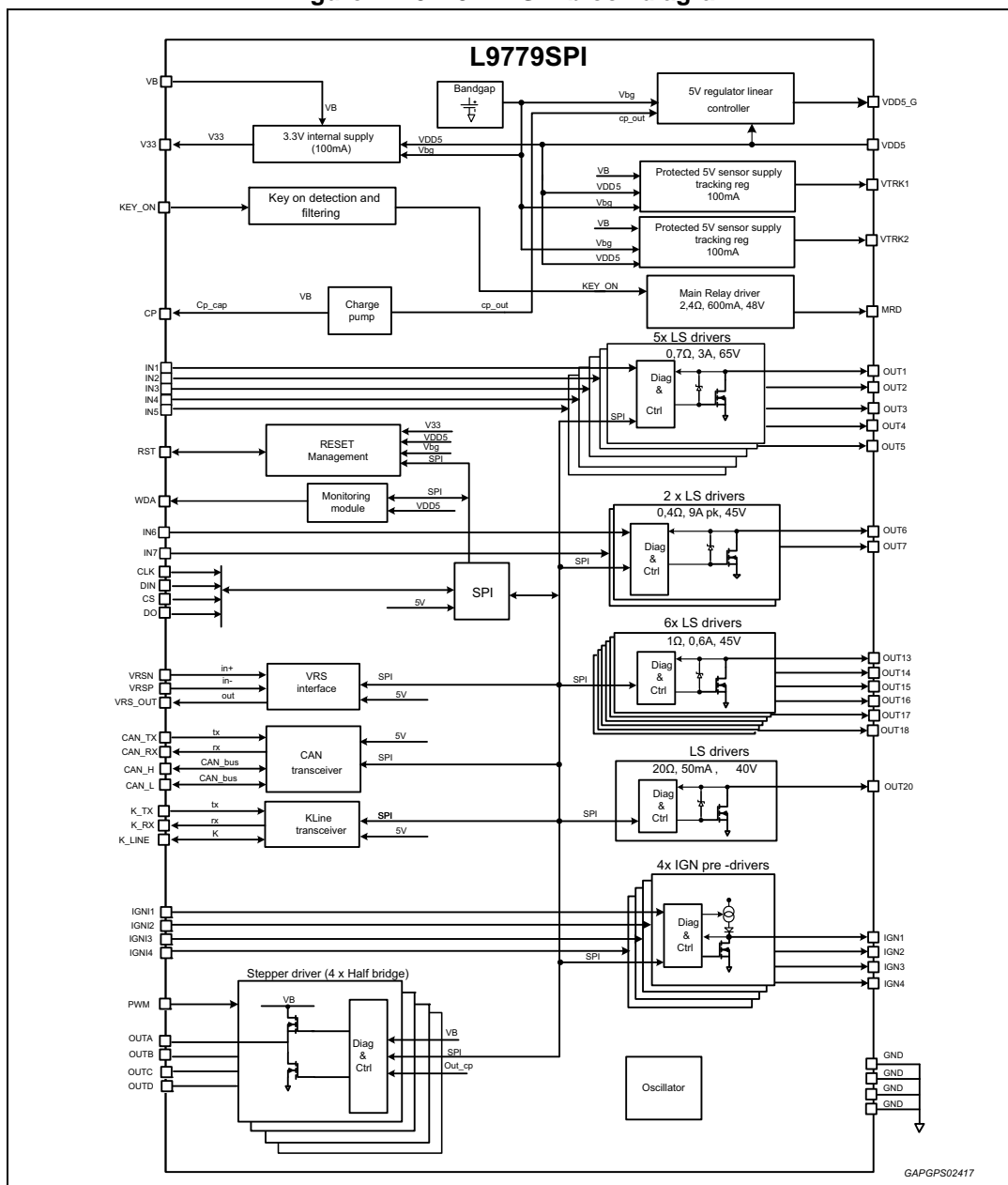


1.1.1 Microcontroller

- Standard APG connector 4 x 36.
- PWM output
- L9779WD-SPI via SPI
- Possibility to connect easily the board to other microcontroller boards through a wire adaptor

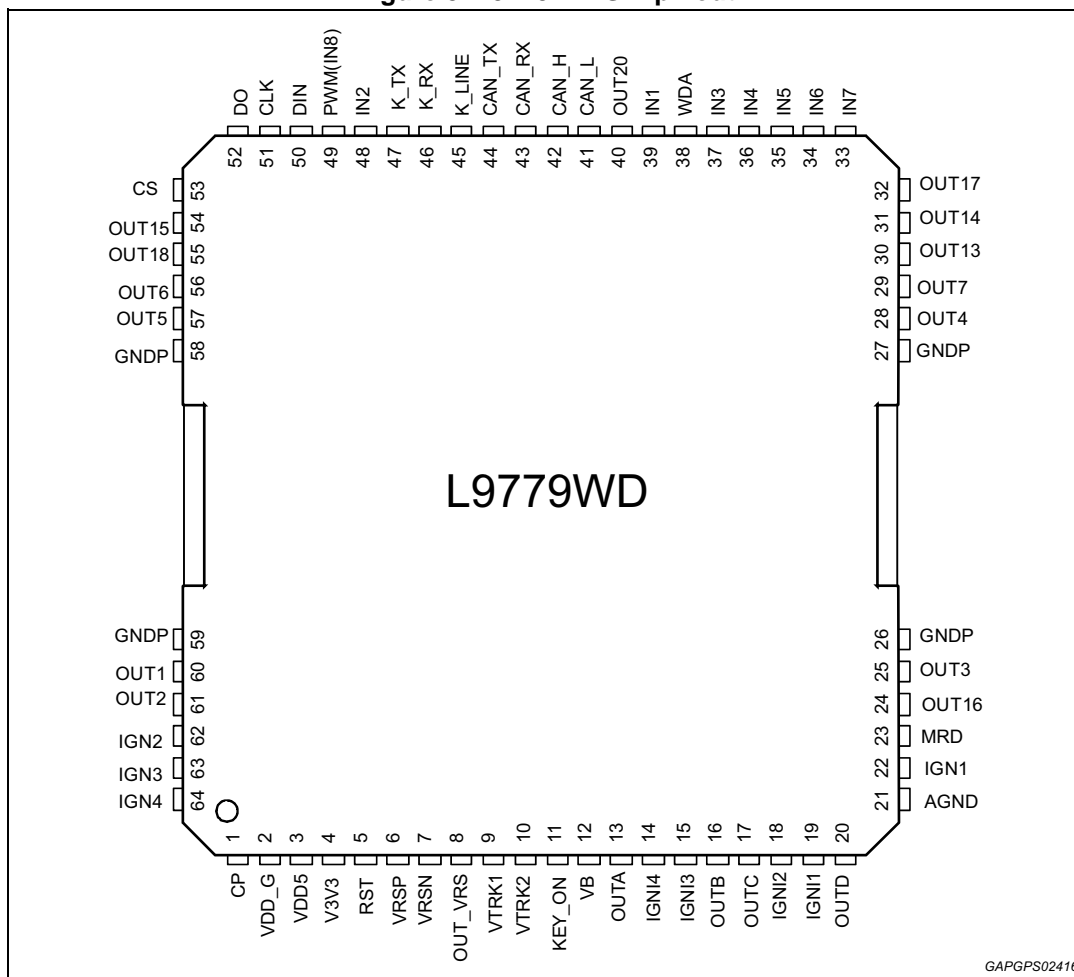
2 L9779WD-SPI block diagram

Figure 2. L9779WD-SPI block diagram



3 L9779WD-SPI pinout and pin description

Figure 3. L9779WD-SPI pinout



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Table 1. L9779WD-SPI: pin descriptions

Pin number	Pin name	Description	I/O Type
1	CP	Charge pump	-
2	VDD_G	External Mosfet gate driver for VDD5	O
3	VDD5	VDD5 feedback	I
4	V3V3	3.3 V voltage regulator output	O
5	RST	RESET	I/O
6	VRSP	VRS interface P input	I
7	VRSN	VRS interface N input	I
8	OUT_VRS	VRS interface output	O

Table 1. L9779WD-SPI: pin descriptions (continued)

Pin number	Pin name	Description	I/O Type
9	VTRK1	5V track voltage 1	O
10	VTRK2	5V track voltage 2	O
11	KEY_ON	Key on input	I
12	VB	Battery	I
13	OUTA	Stepper/CPS output	O
14	IGNI4	Ignition 4 predriver parallel input	I
15	IGNI3	Ignition 3 predriver parallel input	I
16	OUTB	Stepper/CPS output	O
17	OUTC	Stepper/CPS output	O
18	IGNI2	Ignition 2 predriver parallel input	I
19	IGNI1	Ignition 1 predriver parallel input	I
20	OUTD	Stepper/CPS output	O
21	AGND	Analog GND	GND
22	IGN1	Ignition 1 predriver output	O
23	MRD	Main relay low-side driver	O
24	OUT16	Low-side driver	O
25	OUT3	Low-side driver	O
26	GNDP	Power GND	GND
27	GNDP	Power GND	GND
28	OUT4	Low-side driver	O
29	OUT7	Low-side driver	O
30	OUT13	Low-side driver	O
31	OUT14	Low-side driver	O
32	OUT17	Low-side driver	O
33	IN7	Low-side driver parallel input	I
34	IN6	Low-side driver parallel input	I
35	IN5	Low-side driver parallel input	I
36	IN4	Low-side driver parallel input	I
37	IN3	Low-side driver parallel input	I
38	WDA	Watchdog interrupt signal	I/O
39	IN1	Low-side driver parallel input	I
40	OUT20	Low-side driver	O
41	CAN_L	CAN protocol power line	I/O
42	CAN_H	CAN protocol power line	I/O
43	CAN_RX	CAN protocol RX digital line	O

Table 1. L9779WD-SPI: pin descriptions (continued)

Pin number	Pin name	Description	I/O Type
44	CAN_TX	CAN protocol TX digital line	I
45	K_LINE	K-Line protocol power line	I/O
46	K_RX	K-line protocol RX digital line	O
47	K_TX	K-line protocol TX digital line	I
48	IN2	Low-side Driver parallel input	I
49	PWM(IN8)	Low-side driver parallel input/stepper motor PWM	I
50	DIN	SPI MOSI input	I
51	CLK	SPI CLK	I
52	DO	SPI MISO output	O
53	CS	SPI Chip Select	I
54	OUT15	Low-side driver	O
55	OUT18	Low-side driver	O
56	OUT6	Low-side driver	O
57	OUT5	Low-side driver	O
58	GNDP	Power GND	GND
59	GNDP	Power GND	GND
60	OUT1	Low-side driver	O
61	OUT2	Low-side driver	O
62	IGN2	Ignition 2 predriver output	O
63	IGN3	Ignition 3 predriver output	O
64	IGN4	Ignition 4 predriver output	O

4 Board layout

Figure 4. Board layout

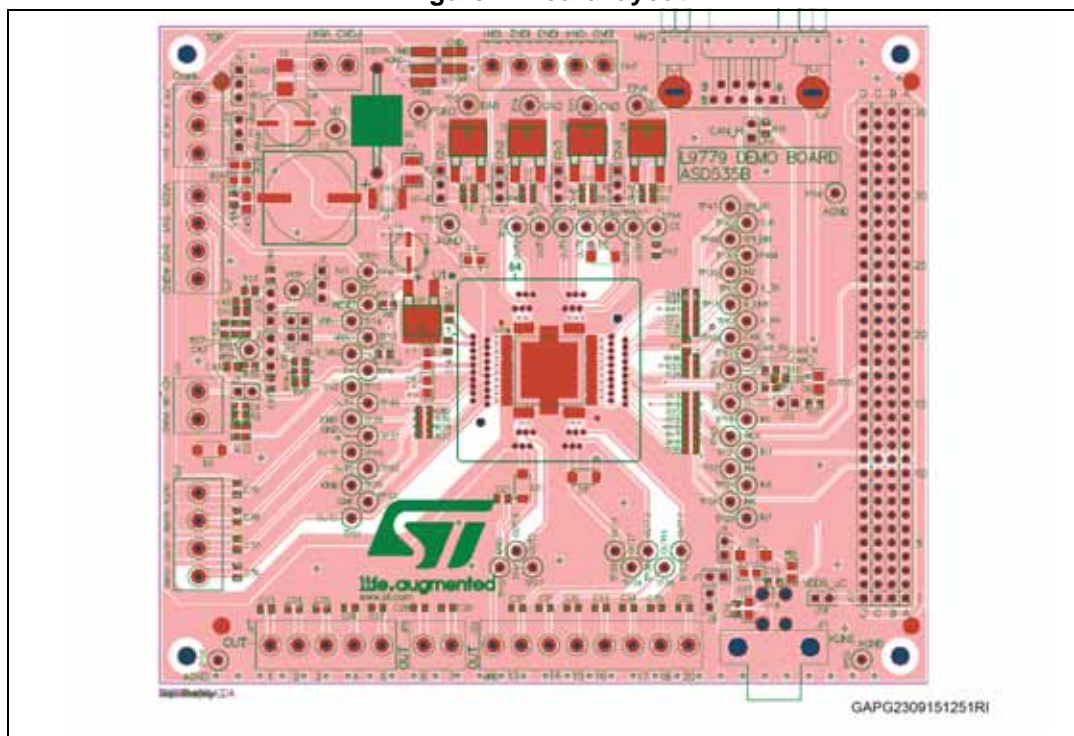


Figure 5. Board bottom side

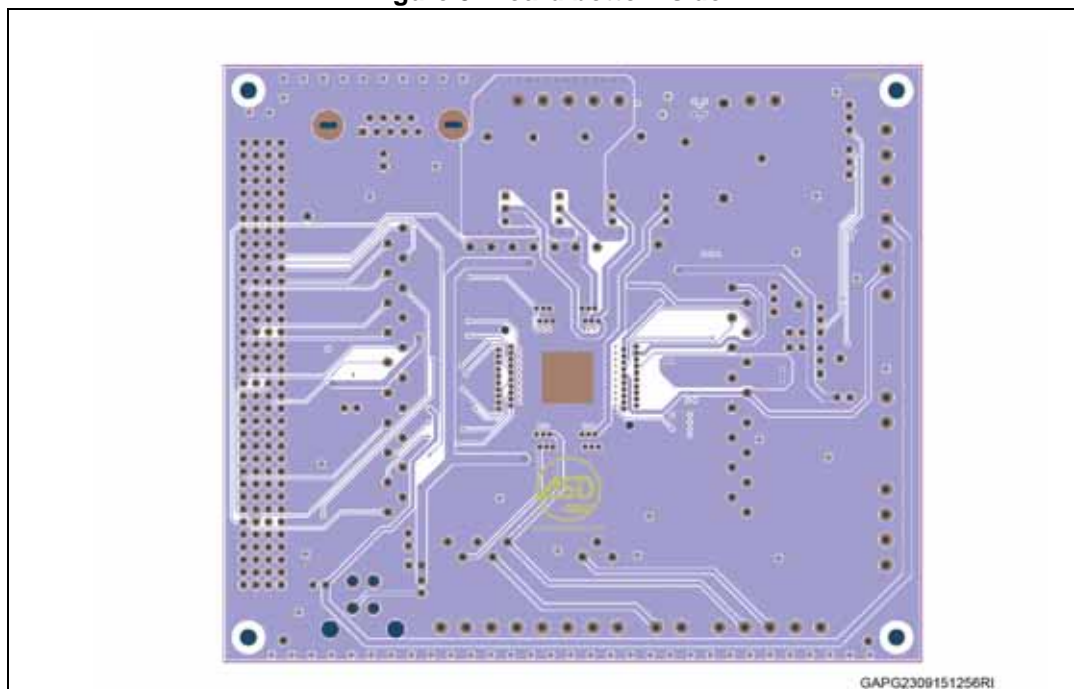
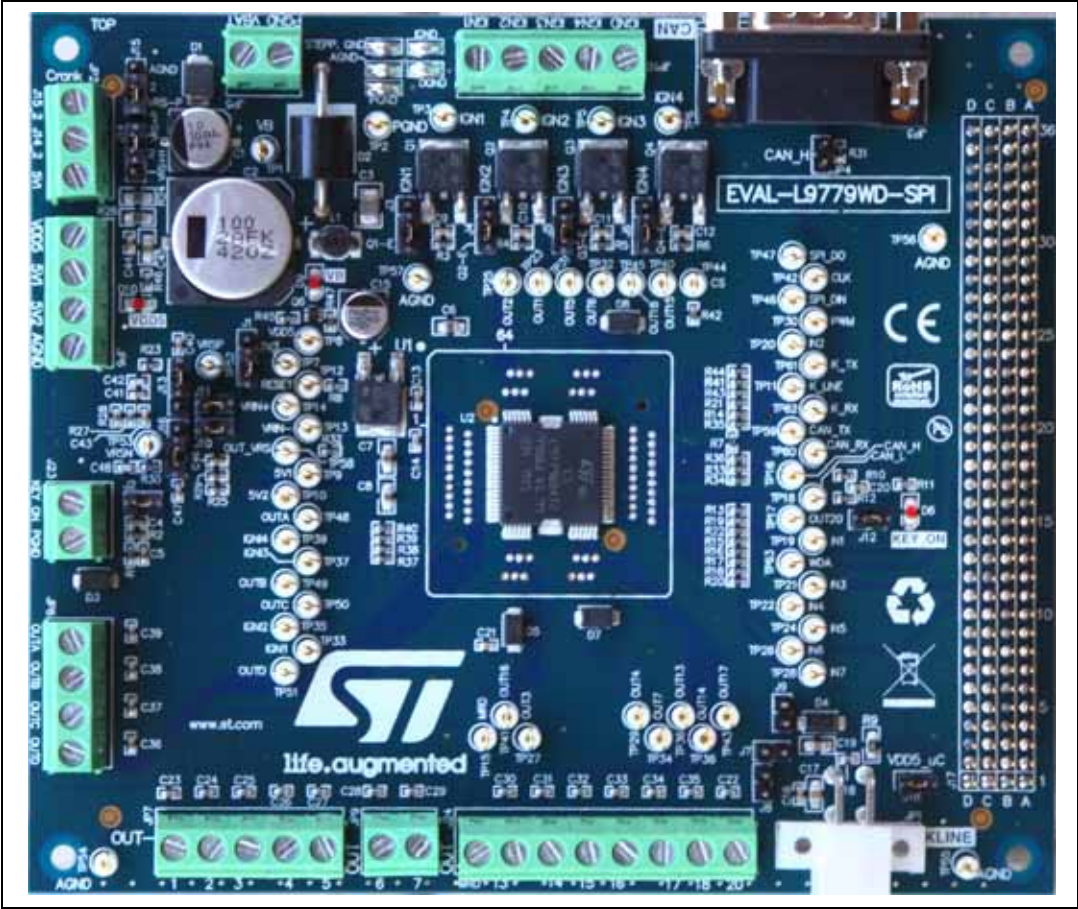
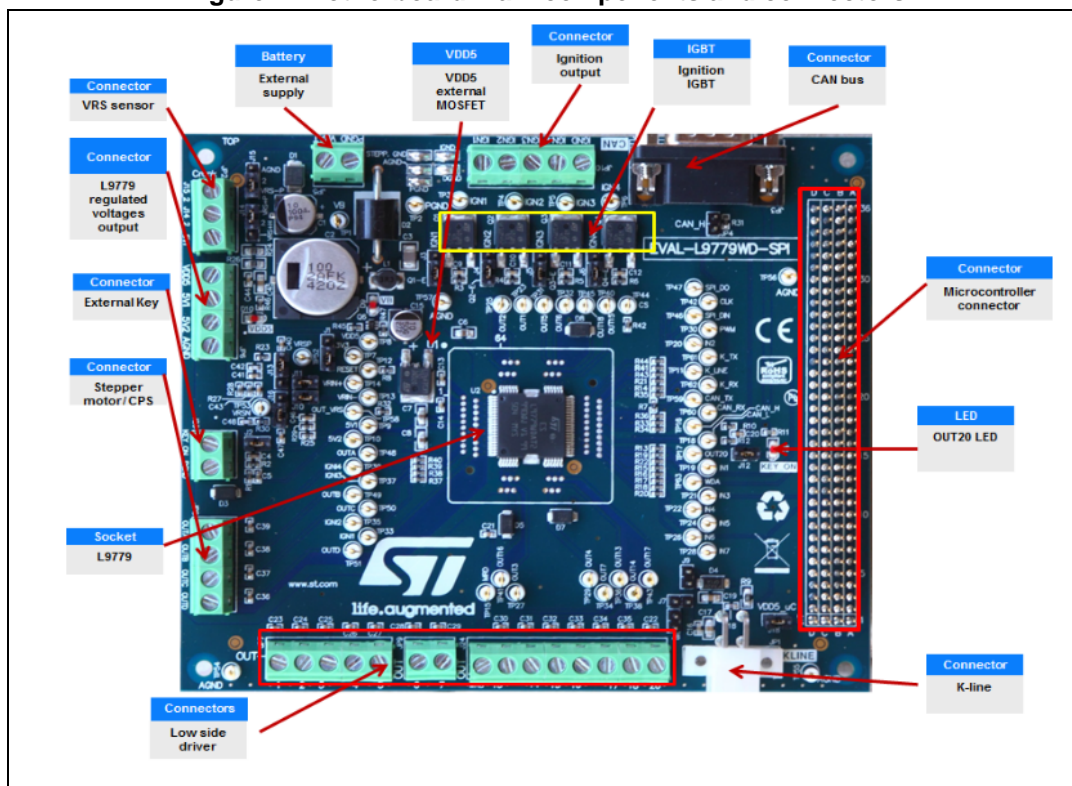


Figure 6. Motherboard front view



5 Evaluation board main components and connectors

Figure 7. Motherboard main components and connectors



6 Jumpers & connectors

6.1 Motherboard jumpers & connectors

Table 2. Motherboard jumpers and connectors

Name	Description	Type
J1	Reset connection – 1-2 Reset signal connected to microcontroller reset – 2-3 Reset signal connected to microcontroller general purpose I/O	2-positions jumper
J2	Key on jumper – OFF = Key on not connected – ON = Key on HIGH level	ON/OFF jumper
J3-J4-J5-J6	JP10 Ignition output source selector – 1-2= Ignition output JP10 directly connected to pre-driver – 3-2= Ignition output JP10 connected to IGBT driver	2-positions jumper
J7-J8-J9	K-line external component configuration	ON/OFF jumper
J10	VRSN pin connection – ON = VRSN pin connected to external preconditioning net – OFF = VRSN pin not connected to external preconditioning net	ON/OFF jumper
J11	VRSP pin connection – ON = VRSP pin connected to external preconditioning net – OFF = VRSP pin not connected to external preconditioning net	ON/OFF jumper
J12	– ON OUT20 connected to LED – OFF OUT20 not connected to LED	ON/OFF jumper
J13	VRS interface signal source – 1-2 = Hall sensor – 2-3 = VRS external preconditioning net	2-positions jumper
J14	VRS interface signal source – 1-2 = Hall sensor – 3-2 = VRS sensor terminal VRSP	2-positions jumper
J15	VRS interface signal source – 1-2 = Hall sensor – sensor terminal VRSN	2-positions jumper
J16	VRS interface signal source – 1-2 = VRS external preconditioning net – 2-3 = Hall sensor 3-2 = VRS sensor	3-positions jumper
J17	Microcontroller board connector	Multipin connector
J18	Microcontroller power supply selector – ON = Microcontroller supplied by L9779 VDD5 regulator – OFF = Microcontroller supplied by an external power supply	ON/OFF jumper

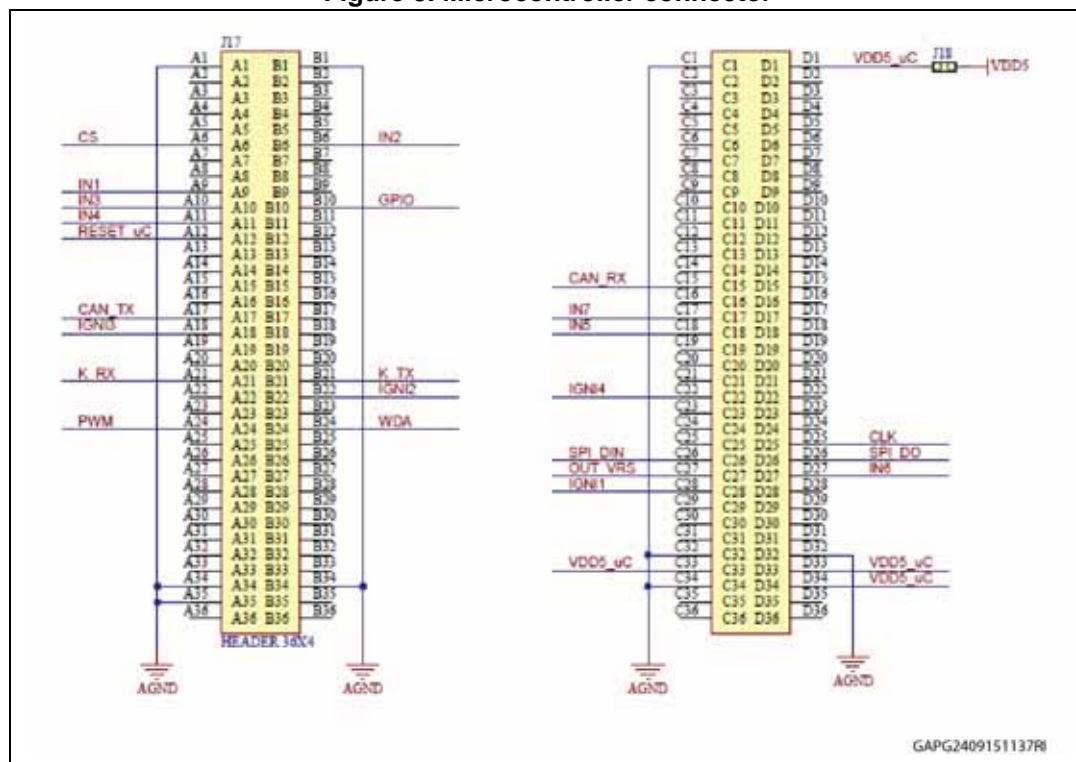
Table 2. Motherboard jumpers and connectors (continued)

Name	Description	Type
J19-J20-J21-J22	Ground planes one point connection	Solderable jumper
J23	External ignition key connector	Screw connector
J24	Low-side output 1. MRD (Main Relay Driver) 2. OUT13 3. OUT14 4. OUT15 5. OUT16 6. OUT17 7. OUT18 8. OUT20	Screw connector
JP1	K-line connector	4 pole connector
JP2	Speed sensor 1. 5 V from track 1 2. VRSp or Hall sensor+ 3. VRSm or Hall sensor GND	Screw connector
JP3	CAN bus connector 1,4,5,8,9 not connected 6,3,10,11 GND 2. CAN_L 7. CAN_H	DB9 connector
JP4	CAN terminator resistor – ON: 120 ohm terminator connected – OFF: terminator not connected	ON/OFF jumper
JP5	Power supply connector 1. Positive pole 2. GND	Screw connector
JP6	Regulated voltages 1. VDD5 2. 5 V track1 3. 5 V track2 4. Analog GND	Screw connector
JP7	Low-sideoutput 1. OUT1 2. OUT2 3. OUT3 4. OUT4 5. OUT5	Screw connector
JP8	Stepper motor/CPS connector	Screw connector

Table 2. Motherboard jumpers and connectors (continued)

Name	Description	Type
JP9	Low-side output 1. OUT6 2. OUT7	Screw connector
JP10	Ignition driver/pre-driver: 1. Ignition1 driver/pre-driver 2. Ignition2 driver/pre-driver 3. Ignition3 driver/pre-driver 4. Ignition4 driver/pre-driver 5. Ignition GND	Screw connector

Figure 8. Microcontroller connector



7 Functional description

7.1 Default jumper setting

Table 3. Configuration jumpers

Name	Description	Configuration
J1	L9779WD-SPI reset connected to uC GPIO	2-3
J2	Key ON	ON
J3	Ignition1 IGBT driver connected	2-3
J4	Ignition2 IGBT driver connected	2-3
J5	Ignition3 IGBT driver connected	2-3
J6	Ignition4 IGBT driver connected	2-3
J7,J8,J9	Kline bus configurations	open
J10	VRS preconditioning net connected on VRSN	ON
J11	VRS preconditioning net connected on VRSP	ON
J12	OUT20 LED connected	ON
J13	VRS sensor configuration	2-3
J14	VRS sensor configuration	2-3
J15	VRS sensor configuration	2-3
J16	VRS sensor configuration	1-2
J18	uC powered by L9779	ON
J19,J20,J21,J22	GND planes all connected	Soldered
JP4	CAN termination disconnected	OFF

7.2 Getting started

7.2.1 Start up

1. Configure all the jumper according to table 6
2. Connect Power supply to JP5 respecting the right polarity
3. Switch on the power supply
4. 5 V the L9779WD-SPI is working.
5. Connect uC and follow the related documentation to check the internal register status of L9779WD-SPI
6. Please refer to *EVAL-L9779WD-SPI Graphical User Interface (GUI)* (see [Section A.1: Document references](#)).

Figure 9. Evaluation board schematic-Part 1

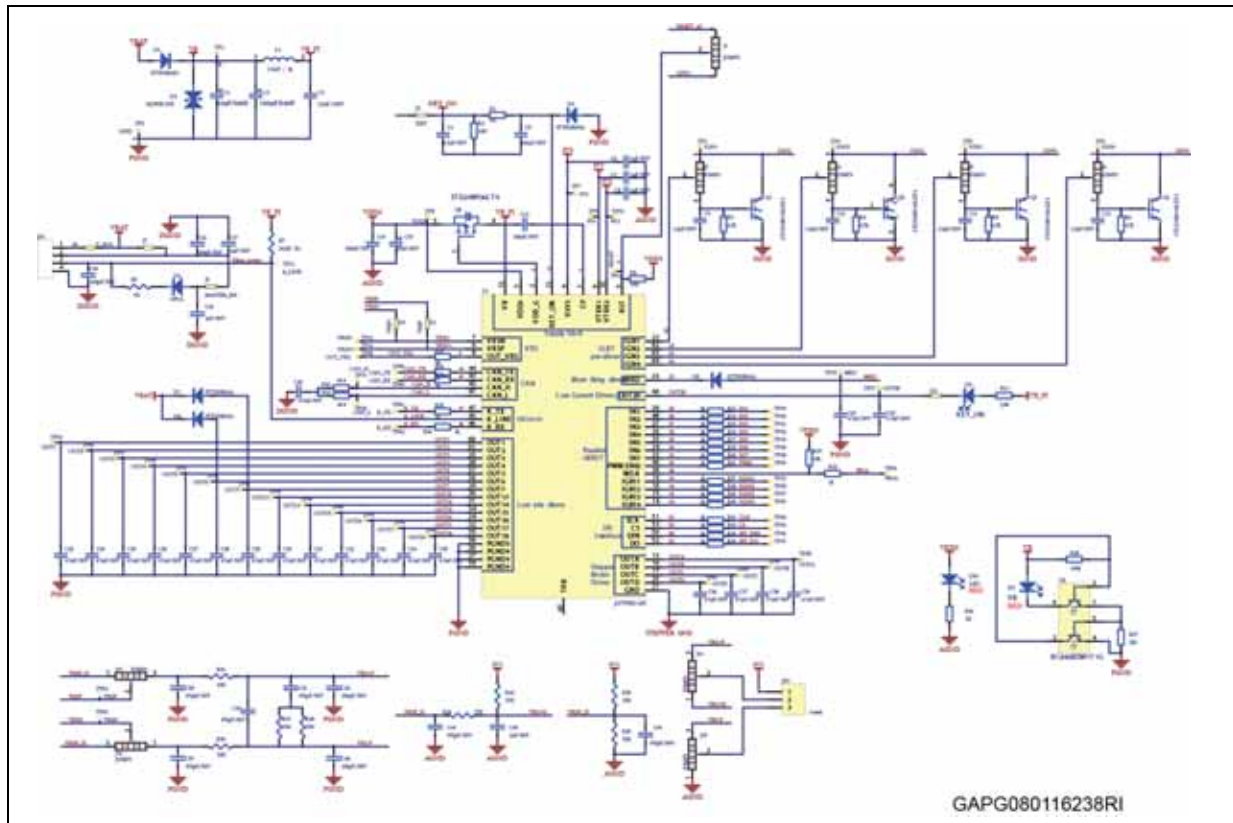


Figure 10. Evaluation board schematic-Part 2

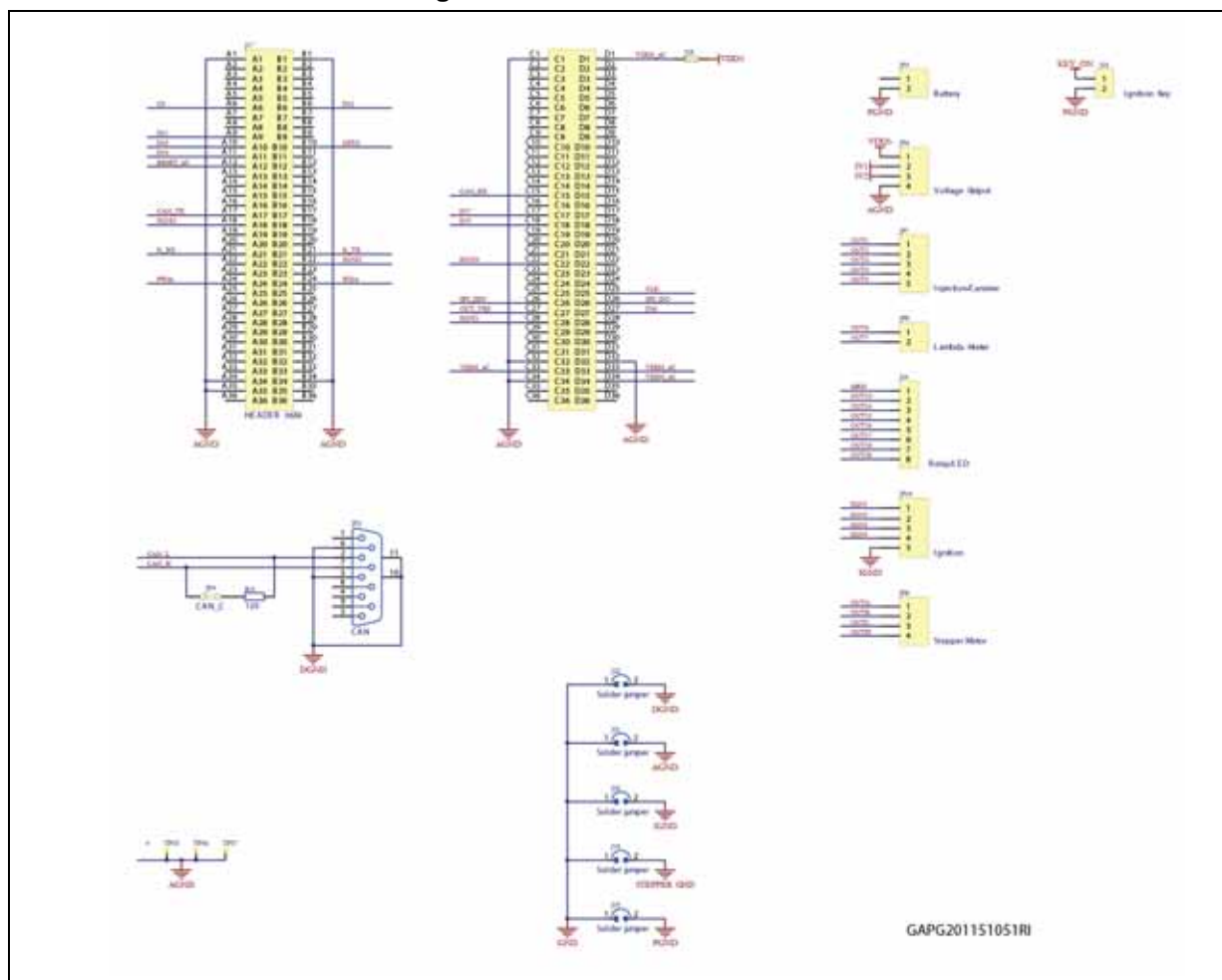
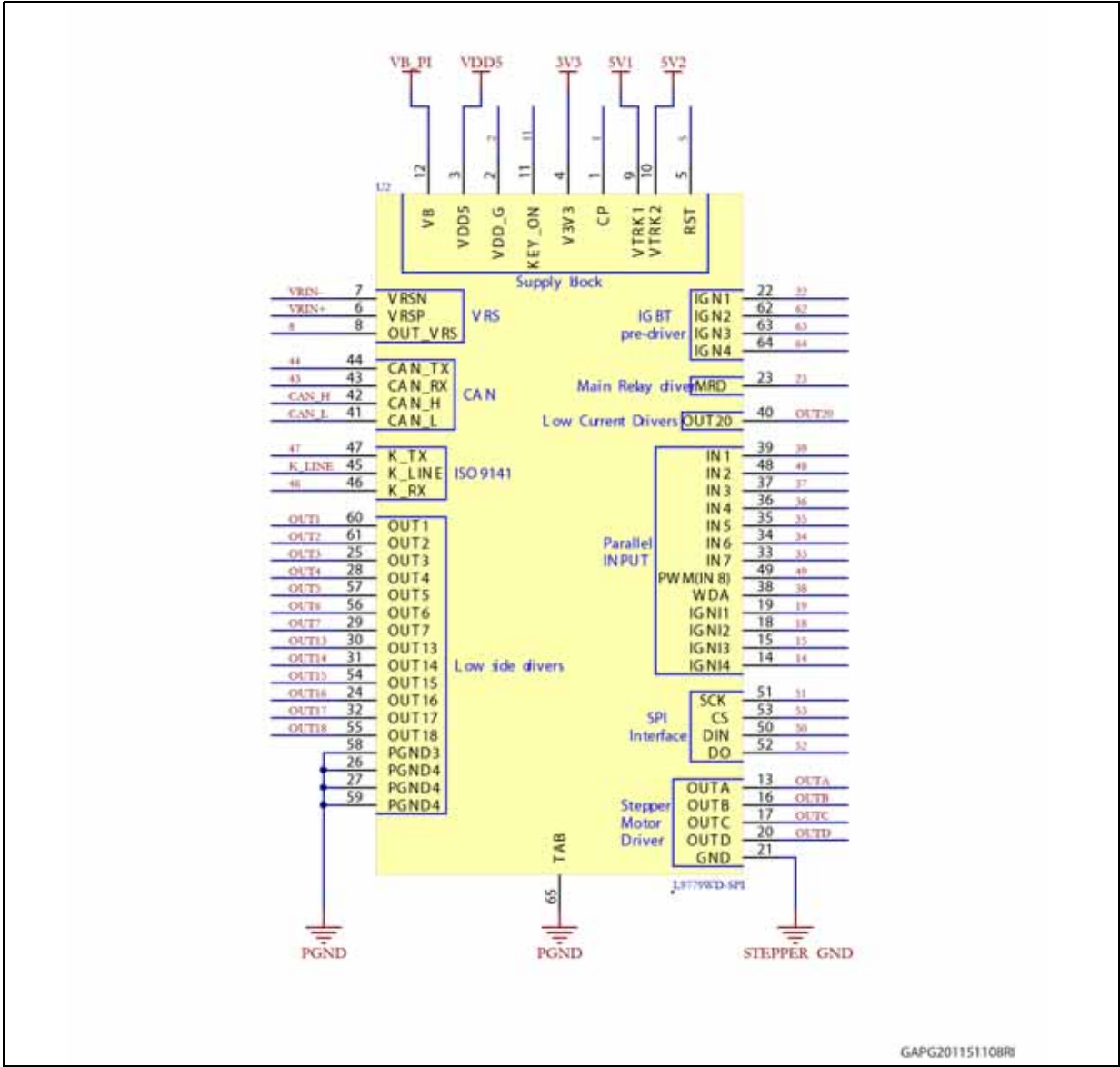


Figure 11. Evaluation board schematic - Part 3



GAPG201151108R0

Appendix A Further information

A.1 Document references

- EVAL-L9779WD-SPI Graphical User Interface (GUI) (UM1952, DocID28390).

Revision history

Table 4. Document revision history

Date	Revision	Changes
20-Jan-2016	1	Initial release.
11-Feb-2016	2	Typing errors and changed RPN in DMS properties.

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