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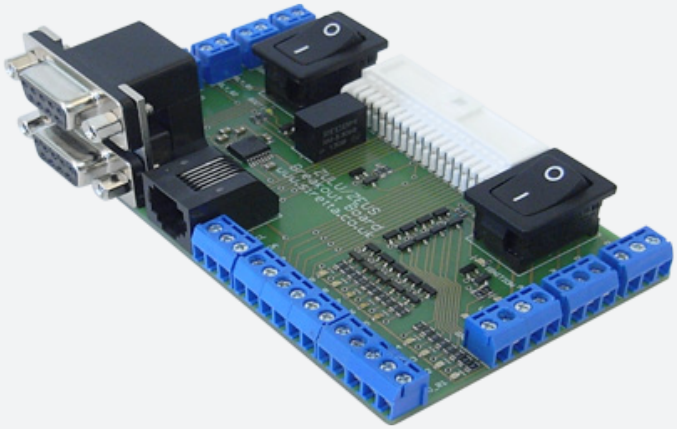

ZULU/ZEUS-EVK

Evaluation and Development Board for the ZULU/ZEUS Series Modems

User Manual

Rev 1.1

HYPER-TECH Systems

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Introduction

This document is intended to provide guidance when adding the ZULU/ZEUS-EVK to your system. The ZULU/ZEUS-EVK is an evaluation and development platform used to evaluate the ZULU/ZEUS series modems.

This document discusses the layout and functions of the ZULU/ZEUS-EVK.

About Siretta

Siretta, located in Reading, United Kingdom have been manufacturing antennas, cable assemblies and cellular modems for over 10 years. We supply our products globally to many of the world's leading organisations.

Whether you require an off the shelf or custom solution, Siretta has a wide portfolio of antenna, RF cable assemblies and modems to fit your application.

Our extensive knowledge and experience in the wireless market allows us to support a wide range of customer applications, focusing on frequencies typically within the 75MHz - 5.8GHz range. These encompass the HF, VHF, ISM, GSM/GPRS/3G/4G and GPS frequencies as well as industrial WLAN and VHF/UHF antenna/Wi-Fi antenna solutions.

With a heavy emphasis on design, we have a team of dedicated Application Engineers and Product Managers, backed up by Field Sales Engineers, who specialise in wireless applications.

We have made significant investments in R&D facilities which boast GPS hardware development equipment and a GSM Pico Cell on site, as well as development software and a comprehensive suite of Industrial, Scientific and Medical band, and non ISM band frequency products. We have many technology partners enabling us to keep at the forefront of the communications industry and offer class leading wireless solutions.

ZULU/ZEUS-EVK

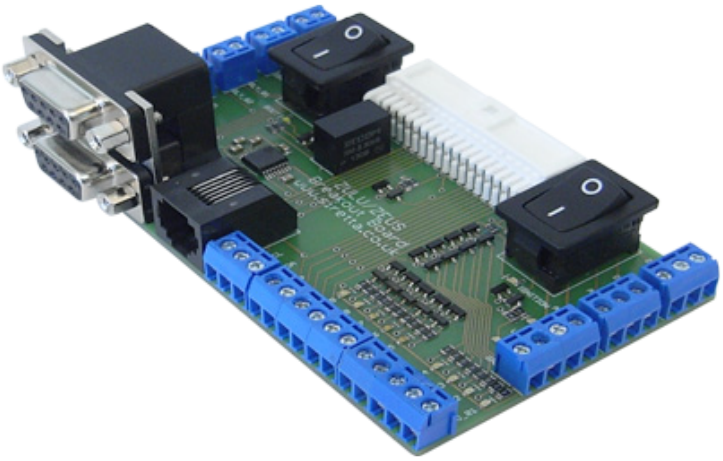
The ZULU/ZEUS-EVK evaluation and development board is the perfect way of working with the advanced ZULU/ZEUS modems.

The board offers access to all of the peripheral functions contained within the ZULU and ZEUS modems which helps greatly when developing an application using the integrated ARM Cortex processor.

The board provides simple access to the ZULU/ZEUS interfaces through the built in standard D-Sub serial connections and convenient terminal block connectors.

The board also provides 2 convenient switches which can be used for application development through the integrated ZULU/ZEUS bootloader for firmware reprogramming of the integrated GSM module, application programming of the ARM cortex processor, software version control and configuration NVM programming.

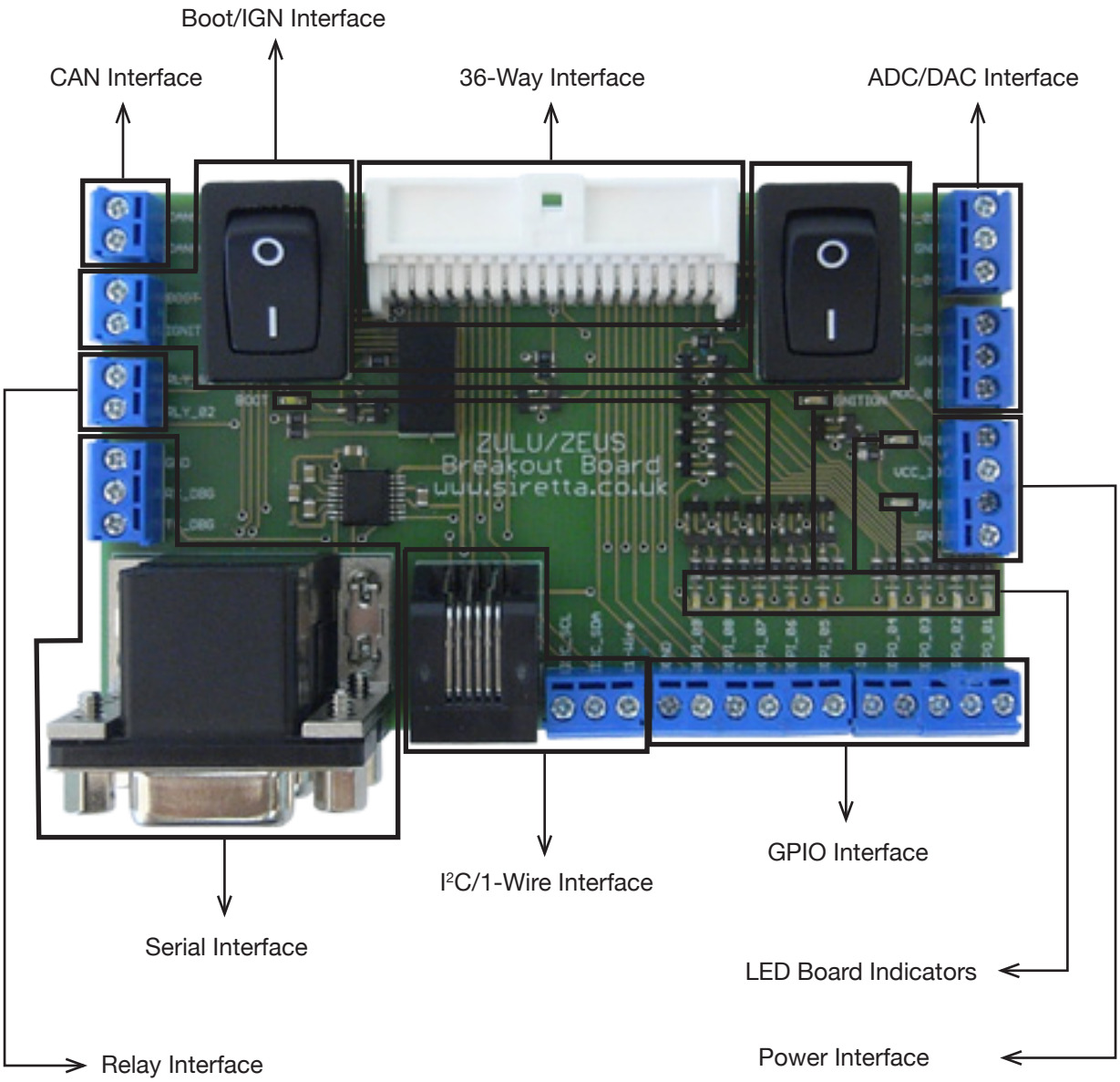
Figure 1. ZULU/ZEUS-EVK



ZULU/ZEUS-EVK Pinout

Below, figure 2 shows the EVK layout and descriptions for each of the sections.

Figure 2. ZULU/ZEUS-EVK layout



CAN Interface

Figure 3. CAN interface terminal

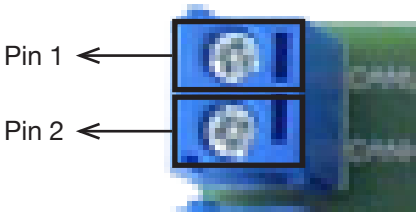


Table 1. CAN interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	CANL	Input/Output	CAN Low	3.3V
2	CANH	Input/Output	CAN High	3.3V

BOOT/IGN Interface

BOOT/IGN Terminal Interface

Figure 4. BOOT/IGN interface terminal

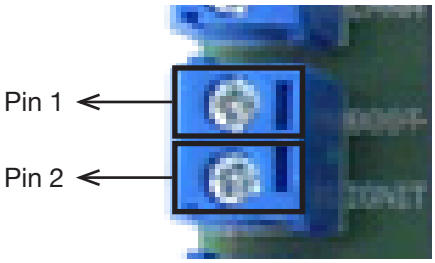


Table 2. BOOT/IGN interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	BOOT	Input	Boot loader (Active low)	0V
2	IGN	Input	Ignition	0 - 42V

BOOT/IGN Switch Interface

Figure 5. BOOT/IGN interface switch

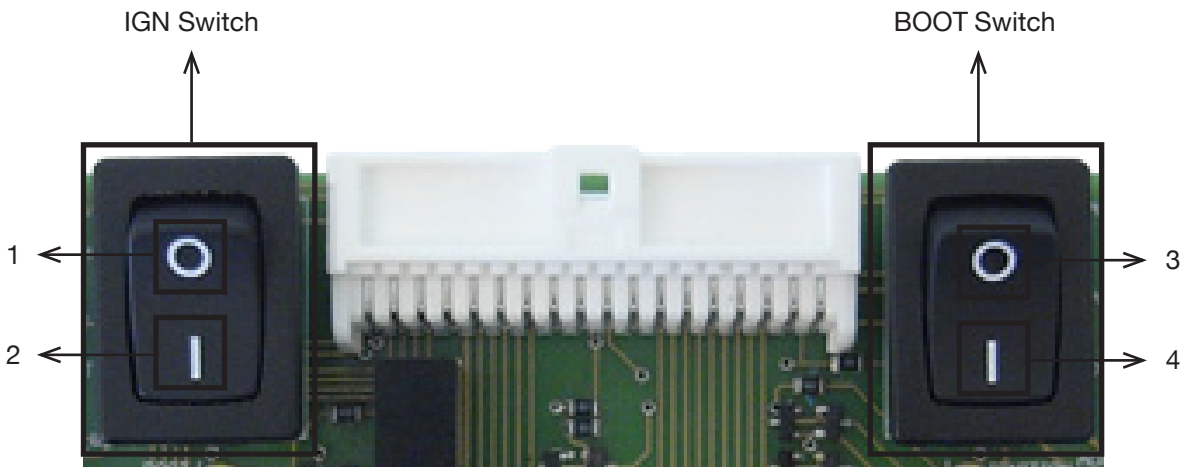


Table 3. BOOT/IGN switch interface pin functions

No.	Name	Direction	Description	Voltage Level
IGN Switch				
1	Off	Input	IGN not enabled	Logic high
2	On	Input	IGN enabled	Logic high
BOOT Switch				
3	Off	Input	BOOT not enabled	Logic high
4	On	Input	BOOT enabled	Logic low

Use of the BOOT/IGN Switch

The BOOT switch can be used to trigger the ZULU/ZEUS to enter bootloader mode. This will provide access to a simple menu system displayed on the serial port.

The IGN switch can be used to determine and automate the operation of the bootloader.

This allows you to perform the following functions:

- Enter low level AT command mode to communicate directly with the GSM module
- Program the ZULU/ZEUS with applications designed to operate with the ZULU/ ZEUS
- Program the ZULU/ZEUS with application updates
- Program the ZULU/ZEUS with customer designed applications
- Allow simple user application updates in the field
- Configure/Modify/Set application settings for ZULU/ZEUS products and applications
- Update GSM module firmware

The boot loader application allows for custom development and provides a simple programming interface for programming mass devices in production.

The boot loader mode runs automatically at power up of the ZULU/ZEUS irrespective of any other application installed.

Once the terminal is powered up, the status of the boot switch and ignition swicth determines whether the ZULU/ZEUS stays within boot loader mode or enters the installed application.

BOOT/IGN Switch Status

Table 4. BOOT/IGN switch status

Status*	BOOT Switch	IGN Switch	Action
At power up	High	Low	Enter bood loader mode
At power up	High	High	Enter module firmware programming mode
At power up	Low	Low	Execute programmed application
Running state 1	High	Low	Shut down Siretta application and enter boot loader mode
Running state 1	High	High	Shut down Siretta application and enter boot loader mode
Running state 1	Low	Low	Normal operation
Running state 1	Low	High	Normal operation with ignition input high
Running state 2	High	Low	Depends on customer application settings
Running state 2	High	High	Depends on customer application settings
Running state 2	Low	Low	Depends on customer application settings
Running state 2	Low	High	Depends on customer application settings

***Table status definitions**

At Power Up
Is the status of the pins when power is applied to the unit

Running State 1
Is where the device has powered up normally and is now running a Siretta developed application in the unit

Running State 2
Is where the device has powered up normally and is now running a customer developed application in the unit

Relay Interface

Figure 6. Relay interface terminal

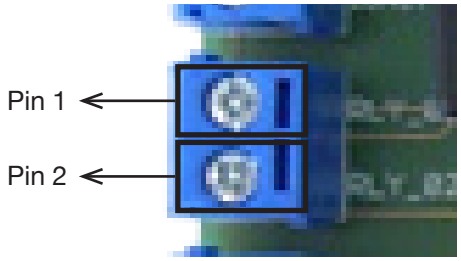


Table 5. Relay interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	RLY_01	Input/Output	Relay pole (NO)	0 - 60V
2	RLY_02	Input/Output	Relay pole (NO)	0 - 60V

Serial Interface

Trace Debug Port Interface

Figure 7. Trace debug port interface terminal

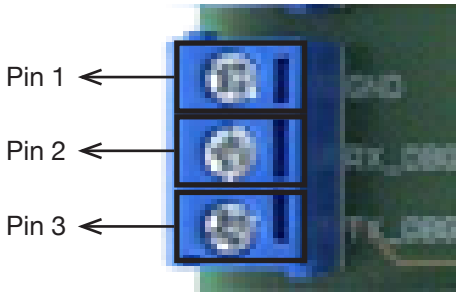


Table 6. Trace debug port interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	GND	Input/Output	Power ground (0V)	0V
2	RX_DBG	Output	Trace receive	3.3V
3	TX_DBG	Input	Trace transmit	3.3V

DB9 Serial Port Interface

The dual height DB9 serial port connector allows you to access the RS232 port of the terminal through the convenient connector on the breakout board. The top port provided is shared with the RS232 port on the ZULU/ZEUS terminal so only one port should be used at a time for talking to the terminal.

The debug port is connected to the bottom port of the dual height DB9 connector and can be used for talking to the GSM module directly within the terminal for debugging Python scripts, Real Time Debugging and as a second serial port.

Figure 8. DB9 serial port interface connectors

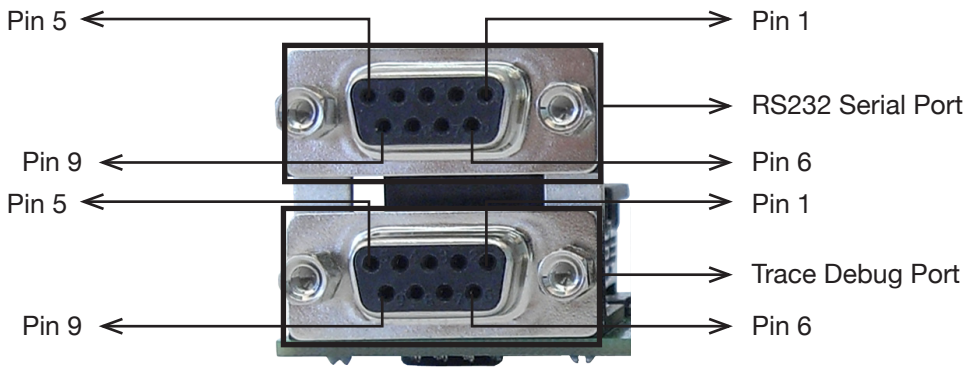


Table 7. DB9 serial port interface connector pin functions

Pin	Name	Direction	Description	Voltage Level
DB9 Upper (RS232 Serial Port)				
2	RX	Output	RS232 RX	± 5.4V
3	TX	Input	RS232 TX	± 25V
5	GND	Input/Output	RS232 GND	0V
7	RTS	Input	RS232 RTS	± 25V
8	CTS	Output	RS232 CTS	± 5.4V
DB9 Lower (Trace Debug Port)				
2	RX	Output	TRACE RX	± 5.4V
3	TX	Input	TRACE TX	± 25V
5	GND	Input/Output	TRACE GND	0V

I²C/1-Wire Interface

RJ12 Sensor Interface

The RJ12 port on the breakout board has been designed to easily connect both I²C and 1-wire bus sensor devices to the ZULU/ZEUS hardware. This has been designed to accept both the standard connector based temperature only and temperature/ humidity sensors for convenient application development.

NOTE - This port must not be used with the standard RJ12 power supply connector.

Figure 9. RJ12 sensor interface connector

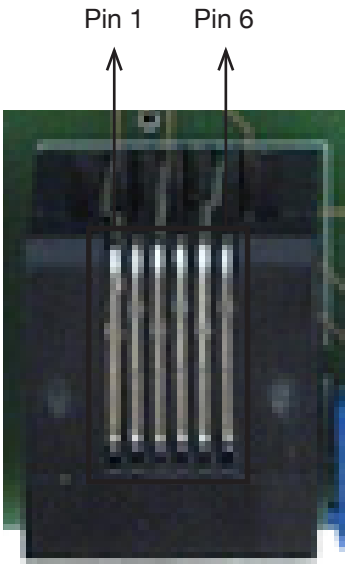


Table 8. RJ12 sensor interface connector pin functions

Pin	Name	Direction	Description	Voltage Level
1	I²C_SCL	Output	I²C_SCL clock	5V
2	1-Wire	Input/Output	1-Wire bus	0 - 5V
4	GND	Input/Output	GND	0V
5	3.3V	Output	3.3V voltage reference	3.3V
6	I²C_SDA	Input/Output	I²C_SDA data	5V

I²C / 1-Wire Interface

Figure 10. I²C/1-Wire interface terminal

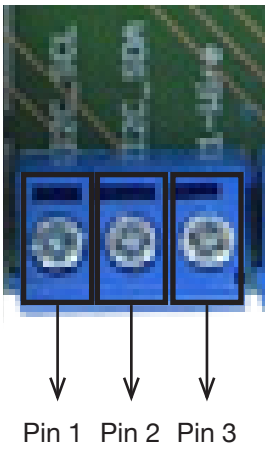


Table 9. I²C/1-Wire interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	I²C_SCL	Output	I²C_SCL clock	5V
2	I²C_SDA	Input/Output	I²C_SDA data	5V
3	1-Wire	Input/Output	1-Wire bus	0 - 5V

GPIO Interface

Figure 11. GPIO interface terminals

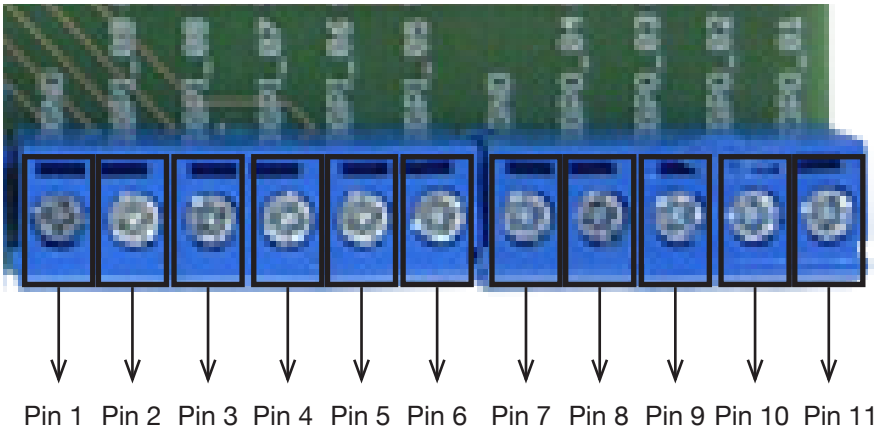


Table 10. GPIO interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
GPI Interface				
1	GND	Input/Output	GND	0V
2	GPI_09	Input	General Purpose Input 9	0 - 42V
3	GPI_08	Input	General Purpose Input 8	0 - 42V
4	GPI_07	Input	General Purpose Input 7	0 - 42V
5	GPI_06	Input	General Purpose Input 6	0 - 42V
6	GPI_05	Input	General Purpose Input 5	0 - 42V
GPO Interface				
7	GND	Input/Output	GND	0V
8	GPO_04	Output	General Purpose Output 4	0 - 42V
9	GPO_03	Output	General Purpose Output 3	0 - 42V
10	GPO_02	Output	General Purpose Output 2	0 - 42V
11	GPO_01	Output	General Purpose Output 1	0 - 42V

LED Board Indicators

The breakout board has a number of LED indicators to convey information the user. These can be useful for determining the state of the software if developing an application and for general debugging.

Figure 12. LED board indicators

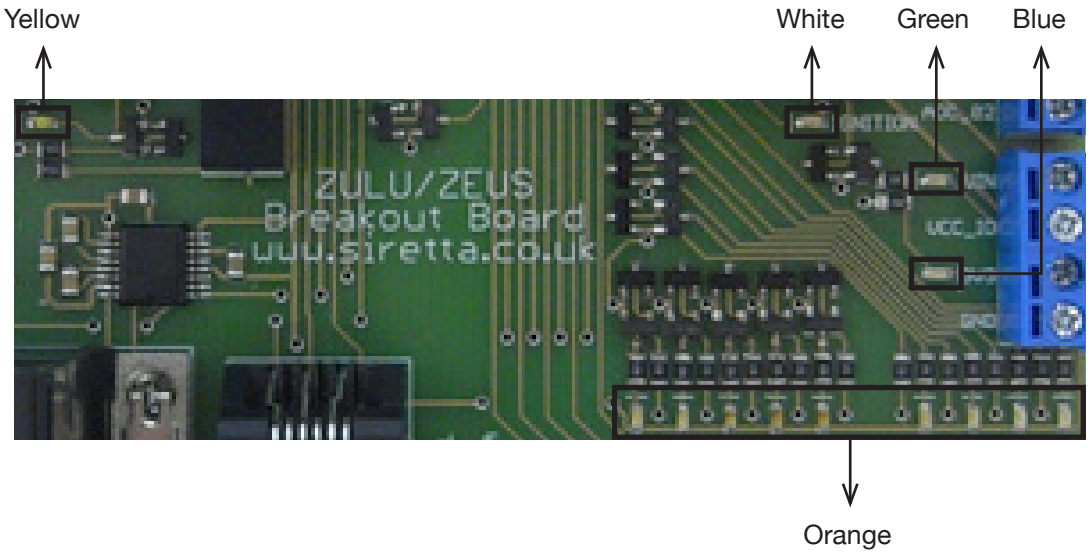


Table 11. LED board indicators functions

LED Colour	Group	Description
Green	Power	VIN active (5 - 42V)
Blue	Power	Low voltage power supply active (3.3V)
Yellow	Switch function	IGN input function active (Logic high)
White	Switch function	BOOT input function active (Logic low)
Orange	GPIO	GPIO active (Logic high)

Board Indication

» Orange LED - GPIO

Orange LED indicates a logic high is present on the selected input or output either driven from the ZULU/ZEUS terminal or being driven from an external source. Each LED is physically placed next to the relevant GPIO.

» Green/Blue LED - Power

Green/Blue LED's indicate the various power supplies are present on the board either from an external power source, internal battery or on board regulator.

» Yellow/White - Switch

Yellow/White indicate that the switch is active and will be affecting the operation of the unit software. Boot and Ignition can be used together to configure the terminal as per the logic table when running Siretta bootloader software.

Power Interface

Figure 13. Power interface terminal

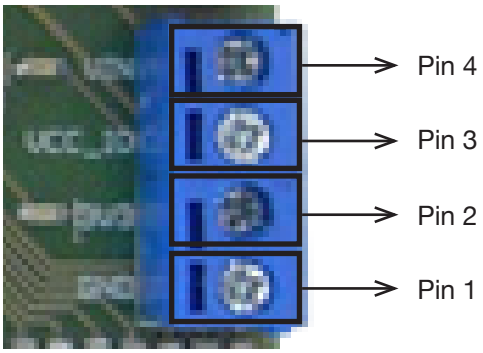


Table 12. Power interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	GND	Input/Output	Power GND	0V
2	3.3V	Output	Low voltage power supply	3.3V
3	Vcc_IO	Input	Power supply for GPO	0 - 42V
4	VIN	Input	Main power supply input	5 - 42V

ADC/DAC Interface

ADC Interface

Figure 14. ADC interface terminal

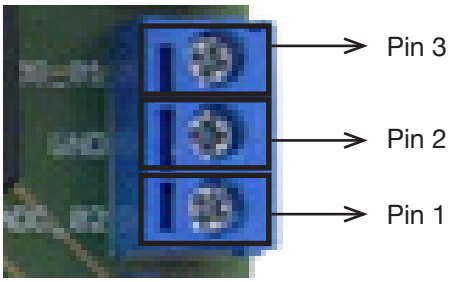


Table 13. ADC interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	ADC_02	Input	Analogue to Digial function 2	0 - 42V
2	GND	Input/Output	ADC GND	0V
3	ADC_01	Input	Analogue to Digital function 2	

DAC Interface

Figure 15. DAC interface terminal

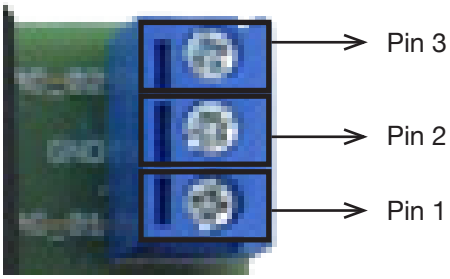


Table 14. DAC interface terminal pin functions

Pin	Name	Direction	Description	Voltage Level
1	DAC_02	Input	Digital to Analog function 2	0 - 2V
2	GND	Input/Output	DAC GND	0V
3	DAC_01	Input	Digital to Analog function 1	0 - 2V

36-Way Connector Interface

Figure 16. 36-way connector

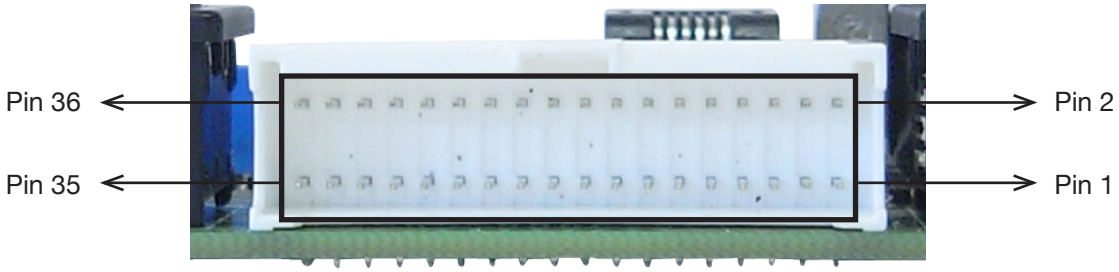


Table 15. 36-way connector interface pin functions

Pin	Name	Direction	Description	Voltage Level
1	GND	Input/Output	GND	0V
2	GND	Input/Output	GND	0V
3	RX	Output	RS232 RX	± 5.4V
4	RTS	Input	RS232 RTS	± 25V
5	TX	Input	RS232 TX	± 25V
6	CTS	Output	RS232 CTS	± 5.4V
7	GND	Input/Output	GND	0V
8	BOOT	Input	Boot loader (Active low)	0V
9	3.3V	Output	Low voltage power supply	3.3V
10	1-Wire	Input/Output	1-Wire bus	0 - 5V
11	TX	Input	TRACE TX	± 25V
12	I^2C_SDA	Input/Output	I^2C_SDA data	5V

13	RX	Output	TRACE RX	± 5.4V
14	I²C_SCL	Output	I²C_SCL clock	5V
15	CANH	Input/Output	CAN High	3.3V
16	RLY_02	Input/Output	Relay pole (NO)	0 - 60V
17	CANL	Input/Output	CAN Low	3.3V
18	RLY_01	Input/Output	Relay pole (NO)	0 - 60V
19	DAC_02	Input	Digital to Analogue function 2	0 - 2V
20	ADC_02	Input	Analogue to Digital function 2	0 - 42V
21	DAC_01	Input	Digital to Analogue function 1	0 - 2V
22	ADC_01	Input	Analogue to Digital function 1	0 - 42V
23	GPO_04	Output	General Purpose Output 4	0 - 42V
24	GPI_09	Input	General Purpose Input 9	0 - 42V
25	GPO_03	Output	General Purpose Output 3	0 - 42V
26	GPI_08	Input	General Purpose Input 8	0 - 42V
27	GPO_02	Output	General Purpose Output 2	0 - 42V
28	GPI_07	Input	General Purpose Input 7	0 - 42V
29	GPO_01	Output	General Purpose Output 1	0 - 42V
30	GPI_06	Input	General Purpose Input 6	0 - 42V
31	IGN	Input	Ignition	0 - 42V
32	GPI_05	Input	General Purpose Input 5	0 - 42V
33	GND	Input/Output	GND	0V
34	GND	Input/Output	GND	0V
35	VIN	Input	Main power supply input	5 - 42V
36	Vcc_IO	Input	Power supply for GPO	0 - 42V

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Definitions

Term	Definition
ADC	Analog to Digital Converter
CAN	Controller Area Network
CTS	Clear to Send
DAC	Digital to Analog Converter
EVK	Evaluation Kit
GND	Ground
GPI	General Purpose Input
GPIO	General Purpose Input Output
GPO	General Purpose Output
GSM	Global System for Mobile Communications
I^2C	Multimaster serial single-ended computer bus
IDE	Integrated Development Environment
IGN	Ignition
IO	Input/Output
LED	Light Emitting Diode
NVM	Non-volatile Memory
RS232	Radio Sector
RTS	Request to Send
RX	Receive Signal
SCL	Serial Clock Line
SDA	Serial Data Line
TX	Transmit Signal
Vcc	Positive Power Supply
VIN	Input voltage

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