NE310H2

INTERFACES USER GUIDE

1VV0301617 Rev. 2 – 2019-10-03

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TECHNICAL
DOCUMENTATION

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APPLICABILITY TABLE

NE310H2 Interface TLB	Code 3990251921

Contents

1. INTRODUCTION

1.1. Scope

The Aim of this document is the handling description of the Interfaces for the NE310H2 products.

1.2. Audience

This document is intended for Telit customers, especially system integrators, about to implement their applications using the Telit module.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com

Alternatively, use:

http://www.telit.com/support

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- Telit Evaluation Board (EVB) User Guide, 1VV0301249
- NE310H2 HW Design Guide, 1VV0301608
- NE310H2 AT Commands Reference Guide, 1VV0301611

2. OVERVIEW

The Telit EVB provides a robust, future-proof and flexible environment to streamline all application development based on Telit GSM/GPRS, UMTS/HSPA, CDMA 1x/EV-DO, and LTE module families, significantly reducing time-to-market.

The EVB kit includes a motherboard where to connect the Interface board of a Telit module.

This concept allows the EVB to be used across various form factors and product generations, both present and future.

The motherboard includes the basic interfaces such as power input, SIM card holder, audio monitor outputs, RS-232, and USB; as well as a Reset button and power switch.

The circuit implemented in the EVB motherboard is based on the recommended reference design for the module's peripheral components and I/O connections.

Adapter boards are available for all the different module families.

The interface boards convert the module connection technology (board-to-board or BGA soldering) into a PTH pin connector. The part of the basic interfaces is served by the motherboard, whereas specific interfaces according to the type of the module (antenna, general purpose inputs/outputs GPIO, ADC/DAC, UART) are available on the adapter board to connect it to the user applications, extension boards, measurements equipment or other tools.

This document is describing the available Adapter Boards for the modules based on the NE310H2 form factor.

3. NE310H2 TLB INTERFACE FOR EVB

3.1. Description

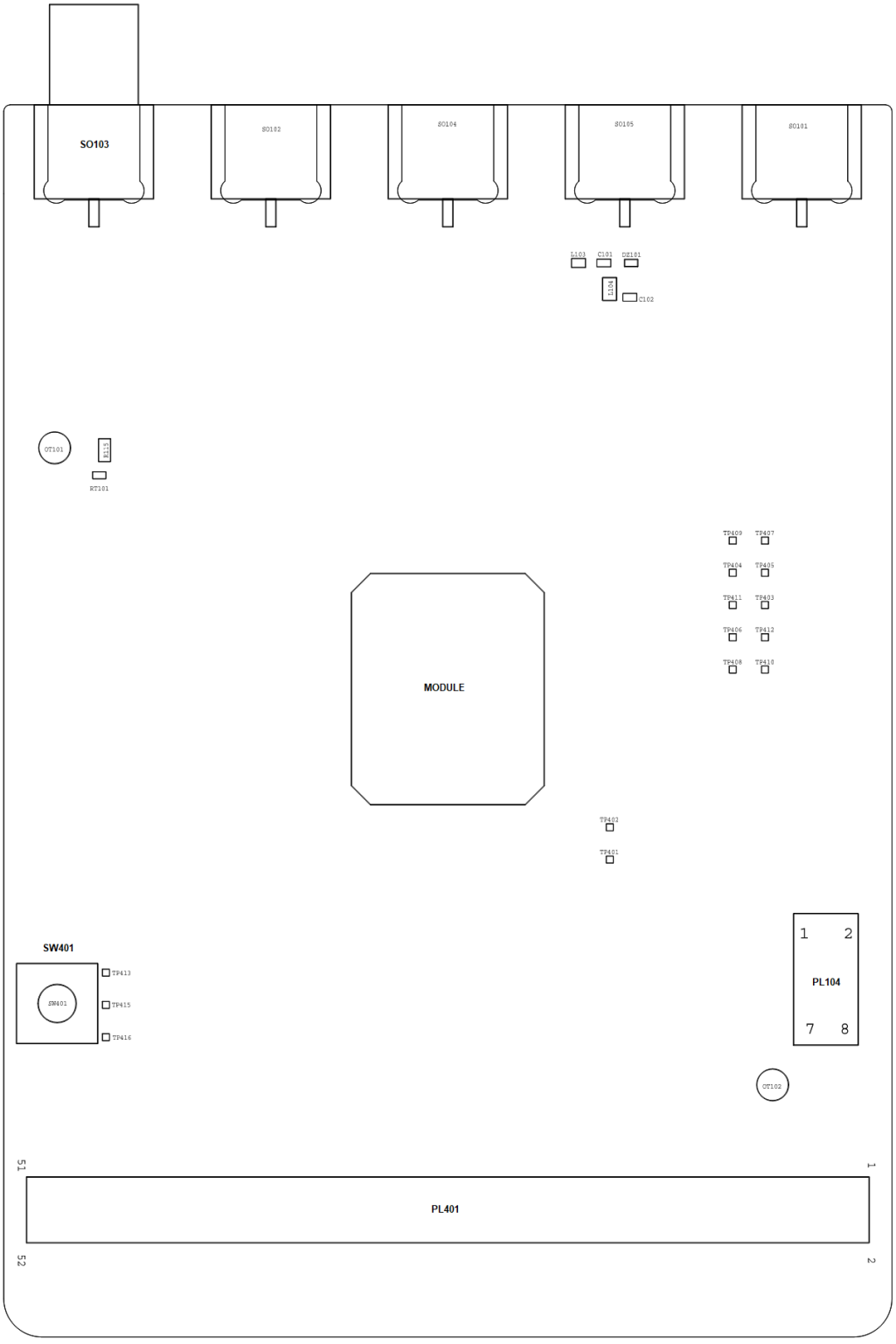
This board allows easily interfacing the NE310 modules with the Telit Evaluation Board (EVB) and testing their functionalities.

3.2. Physical Dimensions

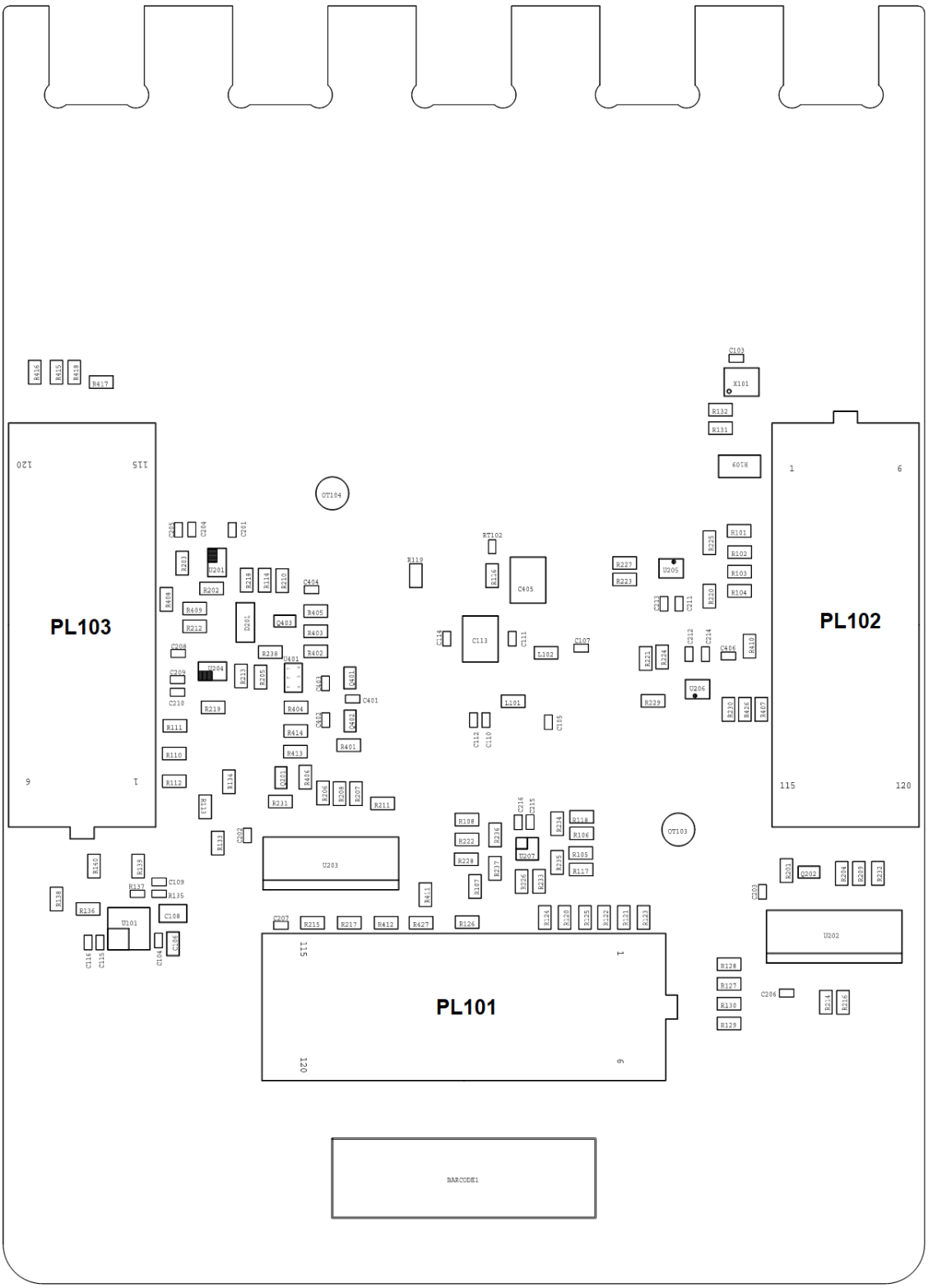
Item	Value
Length	100 mm
Width	70 mm
Height	25 mm

3.3. Interface Details

3.3.1. Connectors Position



TOP SIDE

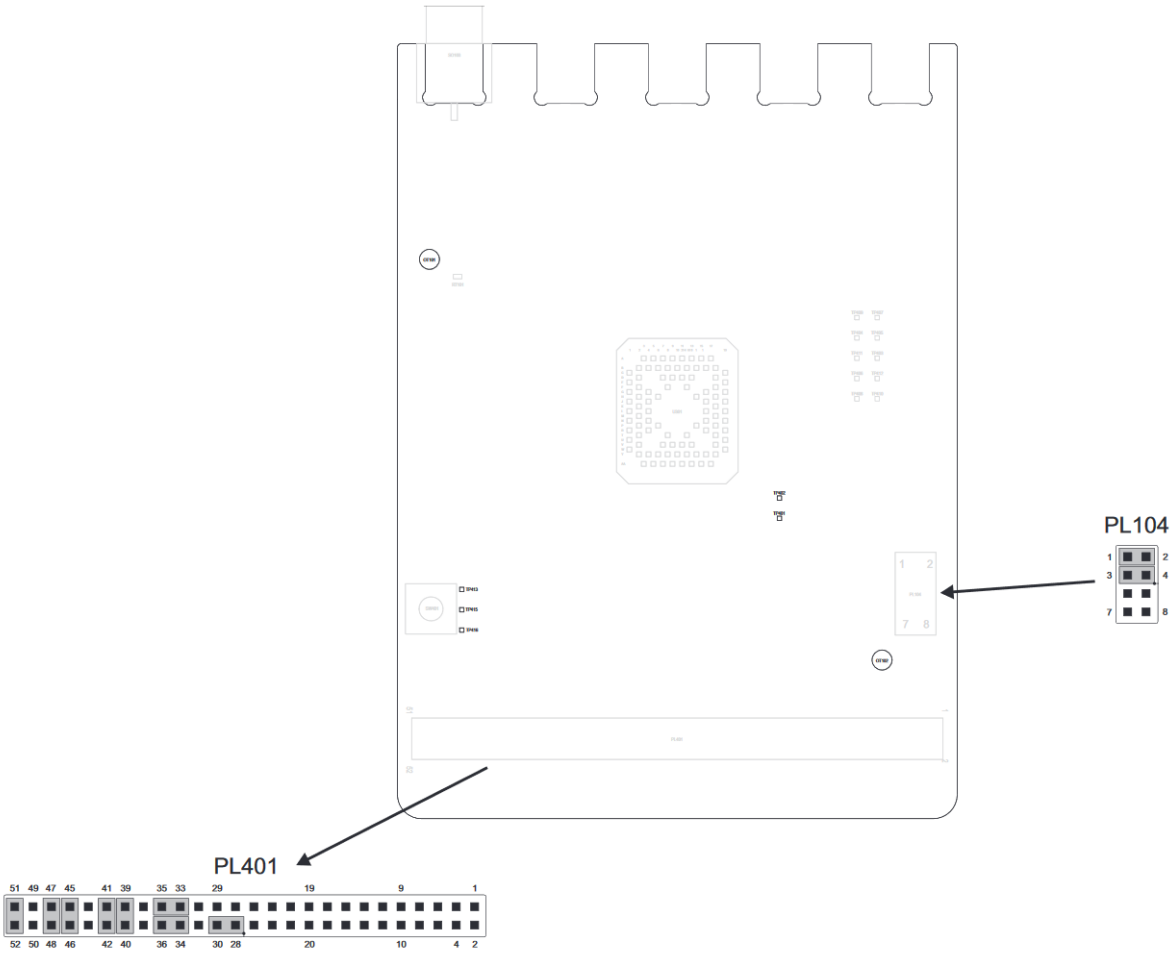


BOTTOM SIDE

3.3.2. Jumpers Setting

The following picture shows the jumpers placement and their default settings.

Details in the following paragraphs.



3.3.3. PL101, PL102, PL103 – EVB Connection

The connections between the Interface and the EVB is done through three 6x20 pin connectors present on the bottom (PL101, PL102 and PL103).

The connector is a Semtec SEAM Series - .050" (1.27 mm) High Speed/High Density Open Pin Field with p/n is SEAM-20-03.5-L-06-2-A-K-TR

Theirs pin functions are listed in the following tables:

PL101											
1	GND	2	GND	3	NC	4	NC	5	GND	6	NC
7	NC	8	GND	9	Reserved	10	GPIO_06	11	NC	12	NC
13	NC	14	GND	15	GPIO_05	16	Reserved	17	NC	18	GND
19	GND	20	GND	21	VREG_MSME	22	VREG_MSME	23	GND	24	NC
25	NC	26	GND	27	NC	28	NC	29	NC	30	NC
31	NC	32	GND	33	NC	34	Reserved	35	NC	36	GND
37	GND	38	NC	39	NC	40	GPIO_04	41	GND	42	NC
43	Reserved	44	GPIO_02	45	GPIO_03	46	Reserved	47	NC	48	NC
49	VAUX/PWRMON	50	VAUX/PWRMON	51	NC	52	Reserved	53	NC	54	NC
55	NC	56	NC	57	GPIO_01	58	NC	59	NC	60	NC
61	NC	62	NC	63	NC	64	NC	65	NC	66	NC
67	Reserved	68	Reserved	69	Reserved	70	Reserved	71	NC	72	NC
73	Reserved	74	Reserved	75	Reserved	76	Reserved	77	NC	78	NC
79	GND	80	GND	81	Reserved	82	Reserved	83	NC	84	NC
85	NC	86	NC	87	NC	88	NC	89	C104/RXD1	90	NC
91	NC	92	NC	93	NC	94	NC	95	C103/TXD1	96	NC
97	NC	98	NC	99	NC	100	Reserved	101	NC	102	NC
103	Reserved	104	Reserved	105	Reserved	106	C105/RTS0	107	NC	108	NC
109	C104/RXD0	110	Reserved	111	C103/TXD0	112	C106/CTS0	113	Reserved	114	NC
115	NC	116	NC	117	NC	118	NC	119	NC	120	NC

PL102											
1	Reserved	2	GND	3	Reserved	4	NC	5	GND	6	NC
7	GND	8	GND	9	GND	10	GND	11	GND	12	NC
13	NC	14	NC	15	GND	16	NC	17	NC	18	NC
19	GND	20	GND	21	GND	22	GND	23	GND	24	GND
25	NC	26	NC	27	GND	28	NC	29	NC	30	GND
31	NC	32	NC	33	NC	34	NC	35	NC	36	NC
37	GND	38	GND	39	NC	40	NC	41	GND	42	GND
43	NC	44	GND	45	GND	46	GND	47	GND	48	GND
49	NC	50	GND	51	GND	52	Reserved	53	Reserved	54	ADC_IN1
55	NC	56	NC	57	NC	58	NC	59	NC	60	NC
61	Reserved	62	Reserved	63	Reserved	64	Reserved	65	Reserved	66	GND
67	GND	68	GND	69	GND	70	GND	71	GND	72	NC
73	GND	74	GND	75	GND	76	GND	77	SIMVCC1	78	SIMVCC1
79	Reserved	80	NC	81	SIMCLK1	82	SIMIN1	83	SIMIO1	84	SIMRST1
85	NC	86	Reserved	87	NC	88	NC	89	NC	90	NC
91	Reserved	92	Reserved	93	NC	94	NC	95	NC	96	NC
97	GND	98	GND	99	NC	100	NC	101	NC	102	NC
103	Reserved	104	GND	105	NC	106	NC	107	NC	108	NC
109	Reserved	110	GND	111	NC	112	NC	113	NC	114	NC
115	GND	116	GND	117	NC	118	NC	119	NC	120	NC

PL103											
1	VBATT	2	VBATT	3	VBATT	4	VBATT_PA	5	VBATT_PA	6	VBATT_PA
7	VBATT	8	VBATT	9	VBATT	10	VBATT_PA	11	VBATT_PA	12	VBATT_PA
13	VBATT	14	VBATT	15	VBATT	16	VBATT_PA	17	VBATT_PA	18	VBATT_PA
19	NC	20	NC	21	NC	22	VBATT_PA	23	VBATT_PA	24	VBATT_PA
25	NC	26	NC	27	NC	28	NC	29	NC	30	NC
31	NC	32	NC	33	NC	34	NC	35	NC	36	NC
37	NC	38	NC	39	NC	40	NC	41	NC	42	NC
43	NC	44	NC	45	NC	46	NC	47	NC	48	NC
49	NC	50	NC	51	NC	52	NC	53	NC	54	NC
55	NC	56	NC	57	NC	58	NC	59	NC	60	NC
61	NC	62	NC	63	NC	64	NC	65	NC	66	NC
67	NC	68	NC	69	NC	70	NC	71	NC	72	NC
73	NC	74	NC	75	NC	76	NC	77	NC	78	NC
79	GND	80	GND	81	GND	82	GND	83	GND	84	GND
85	GND	86	GND	87	GND	88	GND	89	GND	90	GND
91	RESET	92	ON_OFF	93	STAT_LED	94	NC	95	NC	96	NC
97	GND	98	GND	99	GND	100	GND	101		102	NC
103	NC	104	NC	105	NC	106	GND	107		108	NC
109	GND	110	GND	111	GND	112	GND	113	Reserved	114	Reserved
115	Reserved	116	Reserved	117	Reserved	118	Reserved	119	Reserved	120	Reserved

3.3.4. Antenna Connectors

3.3.4.1. SO103 – MAIN Antenna Connector

The MAIN Antenna is available on SO103 and it is a female SMA connector.

A NBIoT compatible antenna (Refer to the product's HW Design guide) must be connected to SO103.

3.3.5. SIM Holder

The Interface is using the SIM Holder available on the EVB mainboard.

3.3.6. RESET

The module could be reset using the related button on EVB mainboard.

3.3.7. PSM WAKE

The module could be waked up from PSM using the WAKE button on the TLB (SW401)

3.3.8. STAT LED

The EVB Interface is provided by a LED controlled by the STAT LED line of the module.

Please refer to the Module's HW user guide for its use and behaviour.

3.3.9. Expansion Connectors

3.3.9.1. PL401

The connector carries the following signals:

Pin	Signal	Function
1	VBATT_AUX	Interface Power supply
2	Reserved	Reserved
3	NC	
4	GPIO_06	General Purpose IO #6
5	GPIO_05	General Purpose IO #5
6	NC	
7	GPIO_04	General Purpose IO #4
8	GPIO_03	General Purpose IO #3
9	GPIO_02	General Purpose IO #2
10	GPIO_01	General Purpose IO #1
11	Reserved	Reserved
12	GND	Ground
13	Reserved	Reserved
14	ALARM	ALARM output from Module
15	Reserved	Reserved
16	Reserved	Reserved
17	Reserved	Reserved
18	VAUX/PWRMON	VAUX/PWRMON from module
19	Reserved	Reserved

20	Reserved	Reserved
21	Reserved	Reserved
22	GND	Ground
23	Reserved	Reserved
24	Reserved	Reserved
25	Reserved	Reserved
26	Reserved	Reserved
27	Reserved	Reserved
28	Reserved	Reserved
29	VBATT_AUX	VBATT input to supply the Interface circuitery
30	Reserved	Reserved
31	RXD1	Serial data output (RXD) to DTE (Main UART)
32	TXD1	Serial data input (TXD) from DTE (Main UART)
33	TX UART (EVB)	Serial data output (RXD) to EVB
34	RX UART (EVB)	Serial data input (TXD) from EVB
35	RX	Third UART (RX Data from DTE)
36	TX	Third UART UART (TX Data to DTE)
37	RXD1	Serial data output (RXD) to DTE (Main UART)
38	TXD1	Serial data input (TXD) from DTE (Main UART)
39	GPIO_04	General purpose IO 4
40	SIMIN	SIM detection line from the SIM Holder of EVB
41	C104/RXD	RXD control line (EVB)

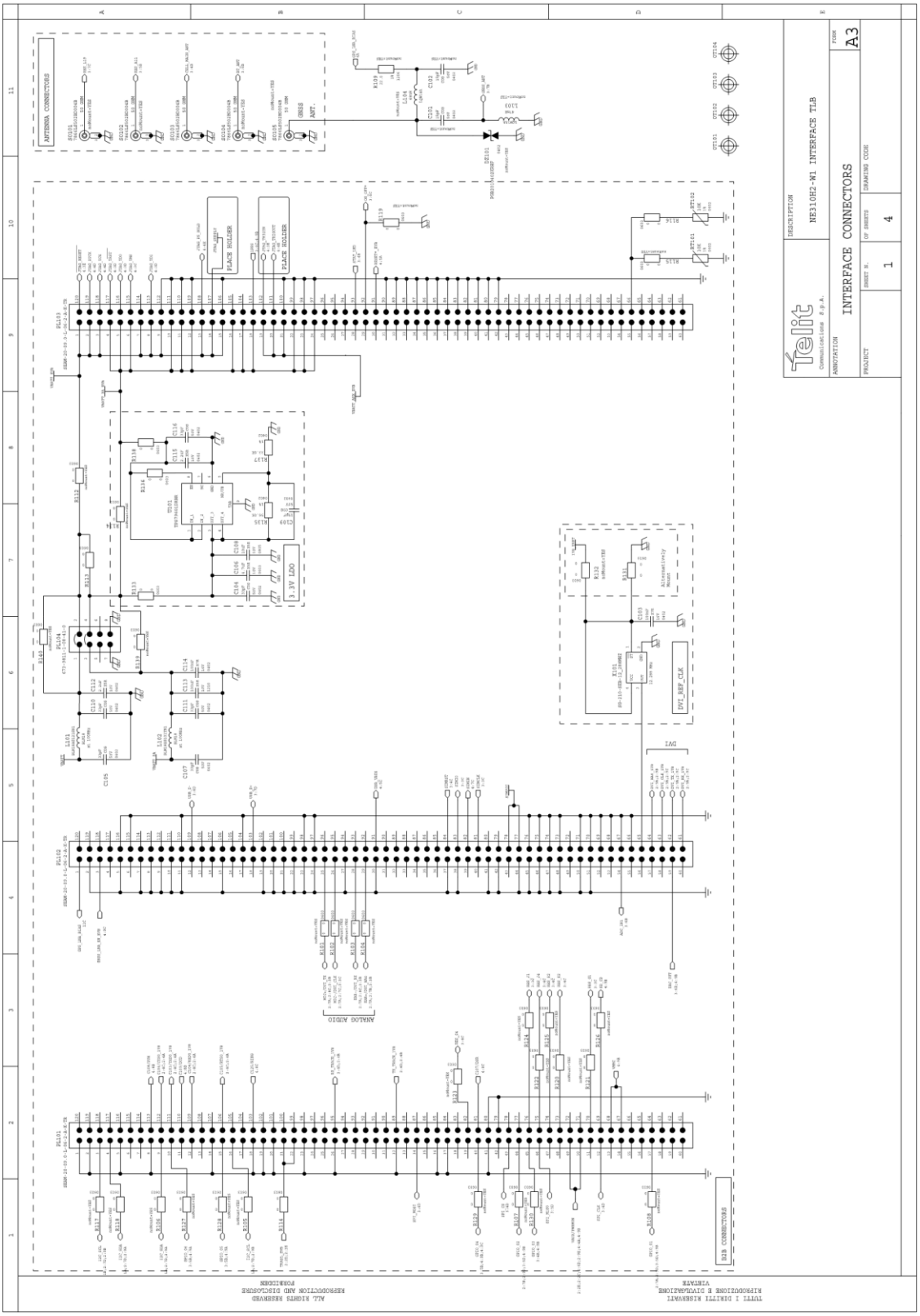
42	C104/RXD0	Serial data output (RXD) to DTE (Main UART)
43	C104/RXD1	Serial data output (RXD) to DTE (Secondary UART)
44	C106/CTS1	Clear To Send (CTS) (Secondary UART)
45	C106/CTS0	Clear To Send (CTS) (Main UART)
46	C106/CTS	Clear To Send (CTS) (EVB)
47	C103/TXD	Serial data (TXD) (EVB)
48	C103/TXD0	Serial data input (TXD) from DTE (Main UART)
49	C103/TXD1	Serial data input (TXD) from DTE (Secondary UART)
50	C105/RTS1	Request to Send (RTS) (Secondary UART)
51	C105/RTS0	Request to Send (RTS) (Main UART)
52	C105/RTS	Request To Send (RTS) (EVB)

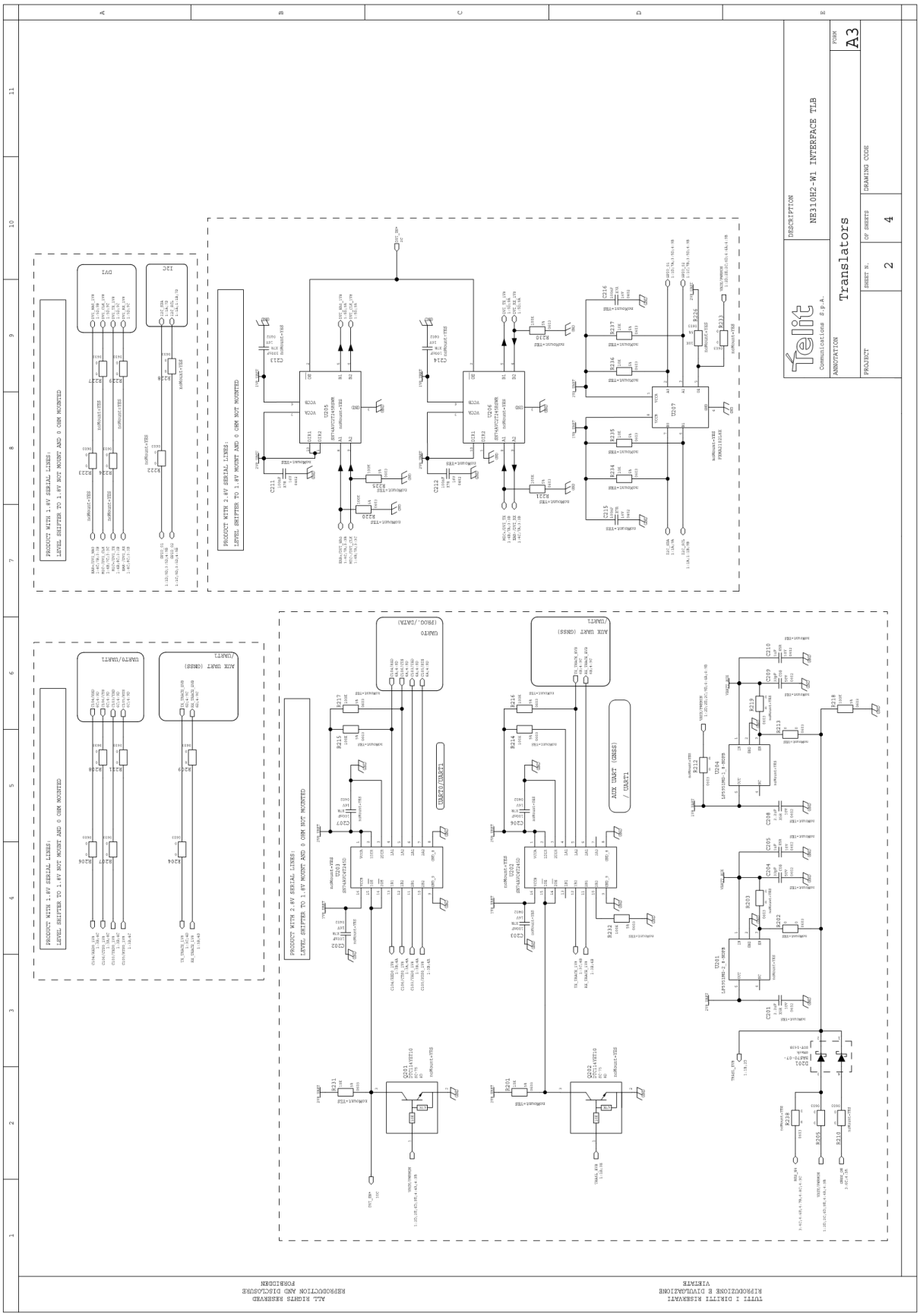
3.4. FIRMWARE UPDATE

You can update the Telit Module firmware through the MAIN UART.

4. INTERFACE SCHEMATICS

4.1. TLB Interface Schematics




DESCRIPTION
NE310H2-W1 INTERFACE TLB
Translators
Telit Communications S.p.A.
FORM
A3
SHEET N.
2
OF SHEETS
4
DRAWING CODE
PROJECT
ANNOTATION
PRODUCT WITH 1.8V SERIAL LINES:
LEVEL SHIFTER TO 1.8V NOT MOUNT AND 0 OHM MOUNTED
PRODUCT WITH 2.8V SERIAL LINES:
LEVEL SHIFTERS TO 1.8V MOUNT AND 0 OHM NOT MOUNTED
I2C
DV1
UART0 (FOTA)
AUX UART (GNSS)
UART1
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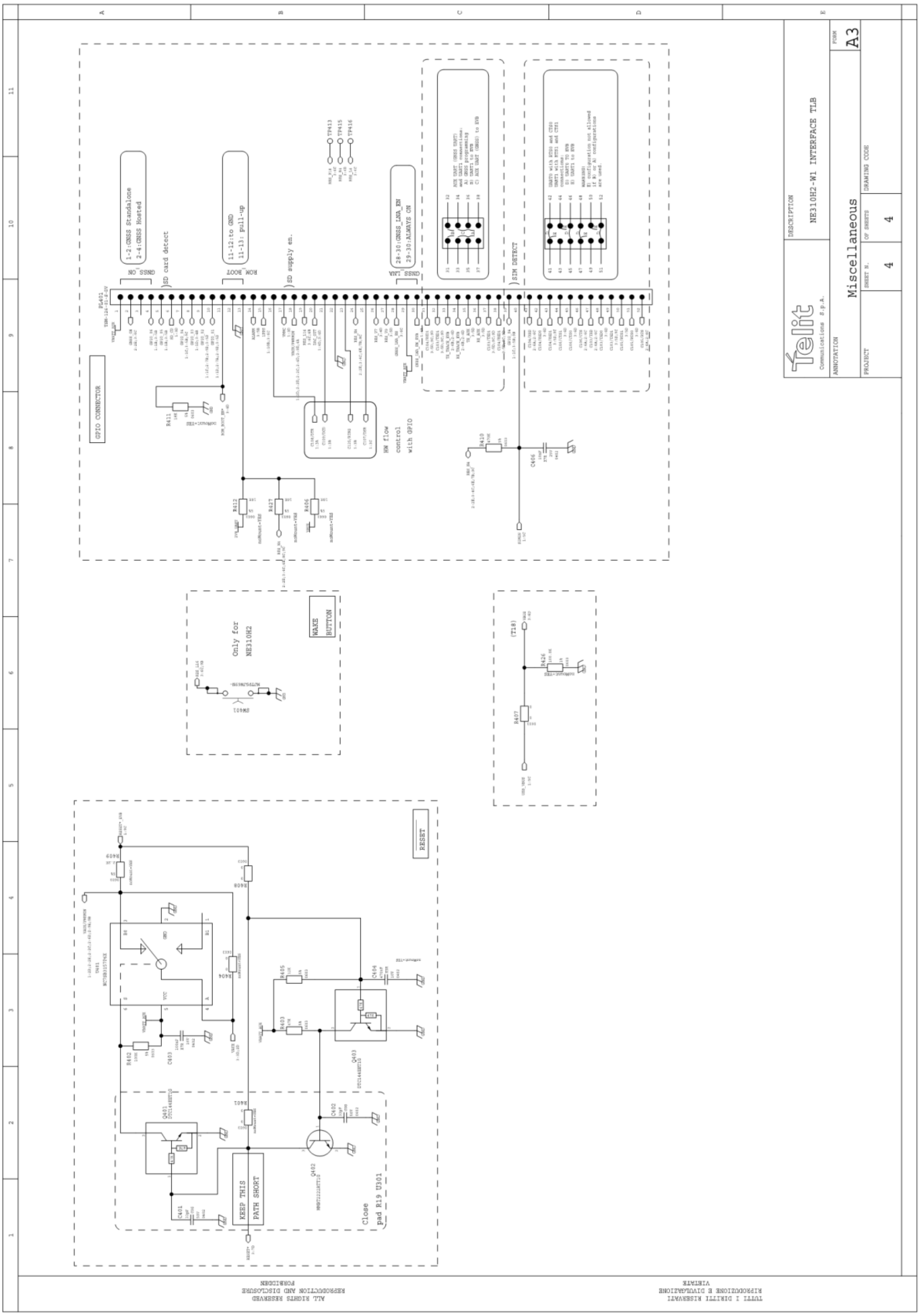
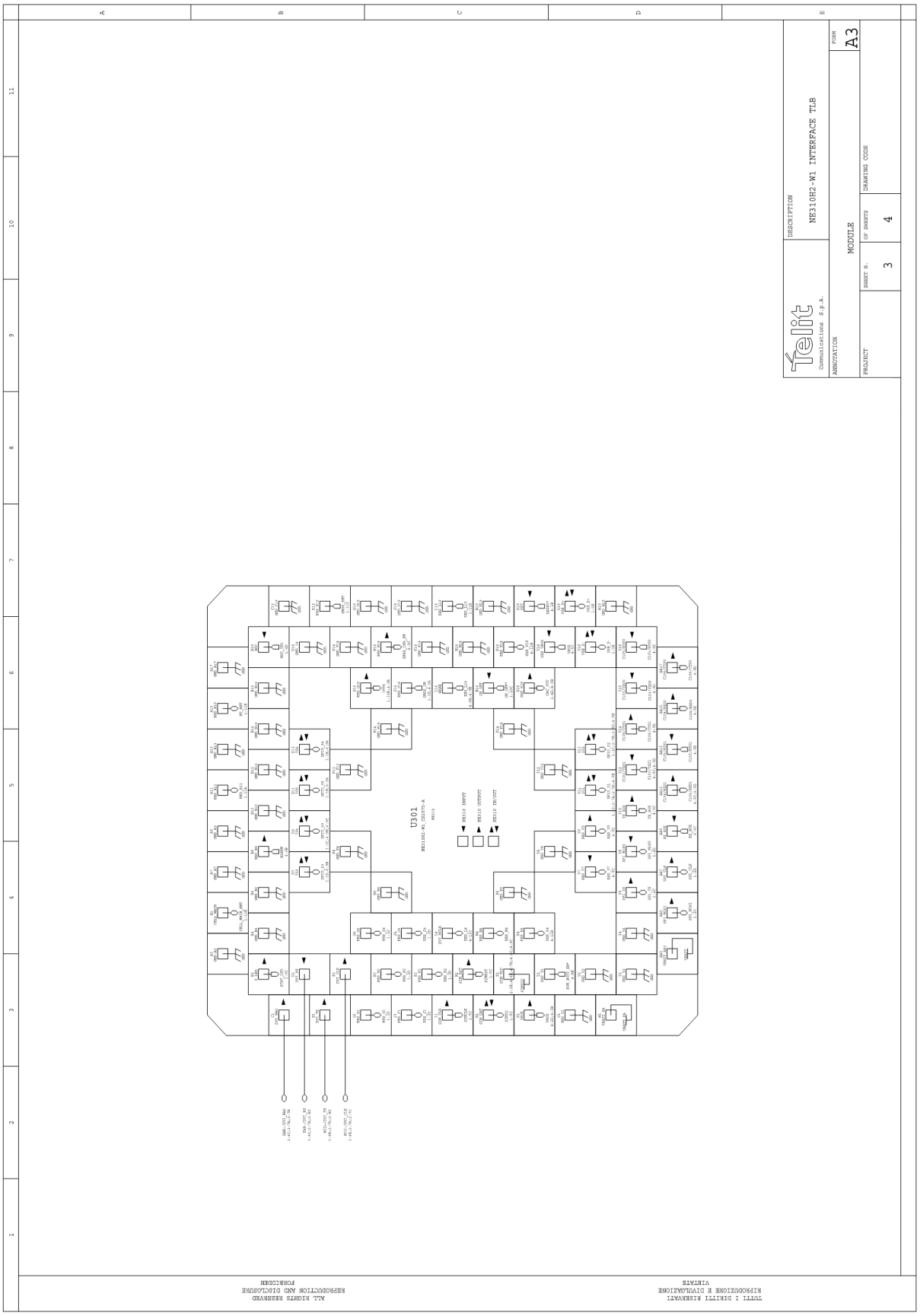
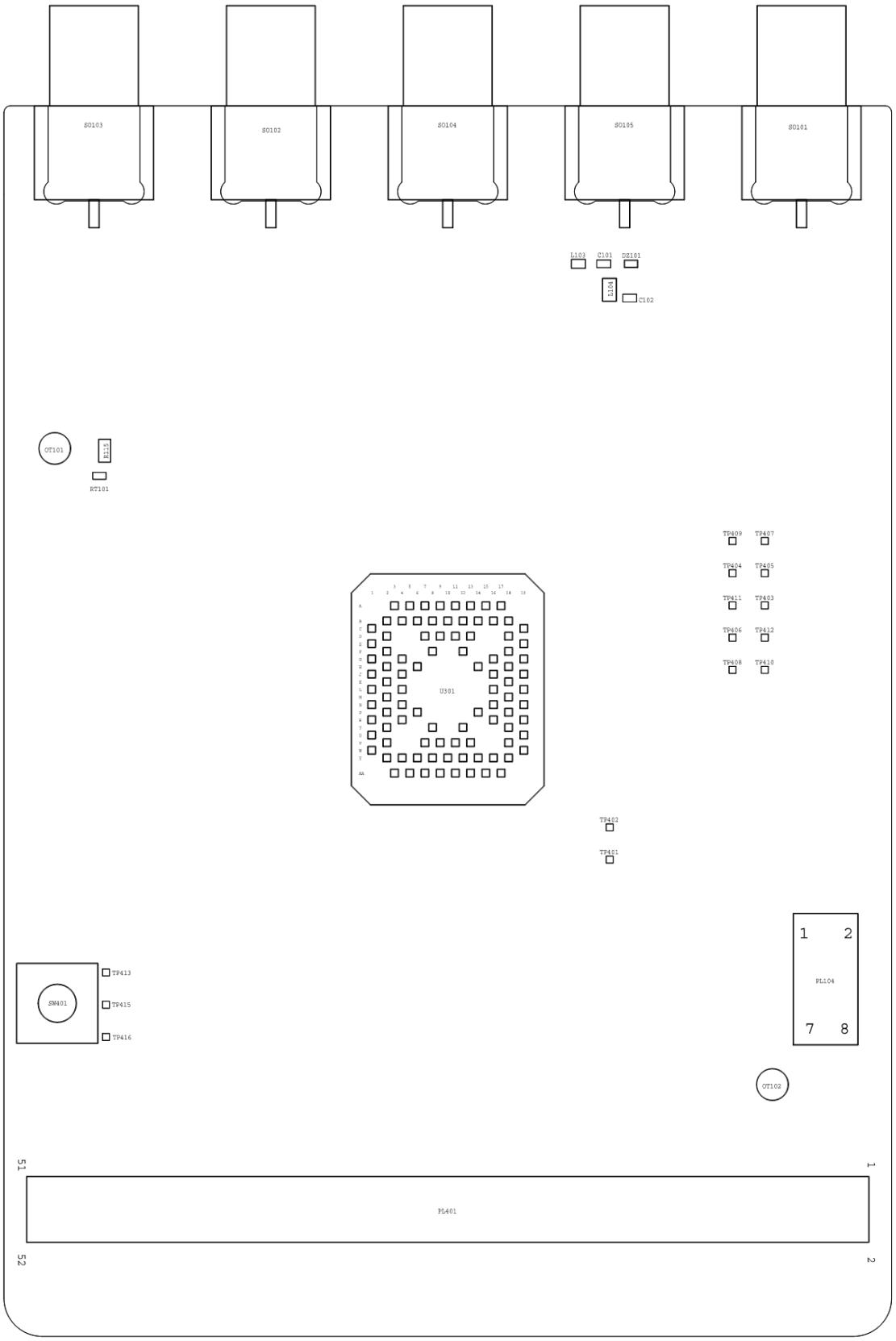
FORBIDDEN
TUTTI I DIRITTI RISERVATI
RIPRODUZIONE E DIVULGAZIONE
VIETATE

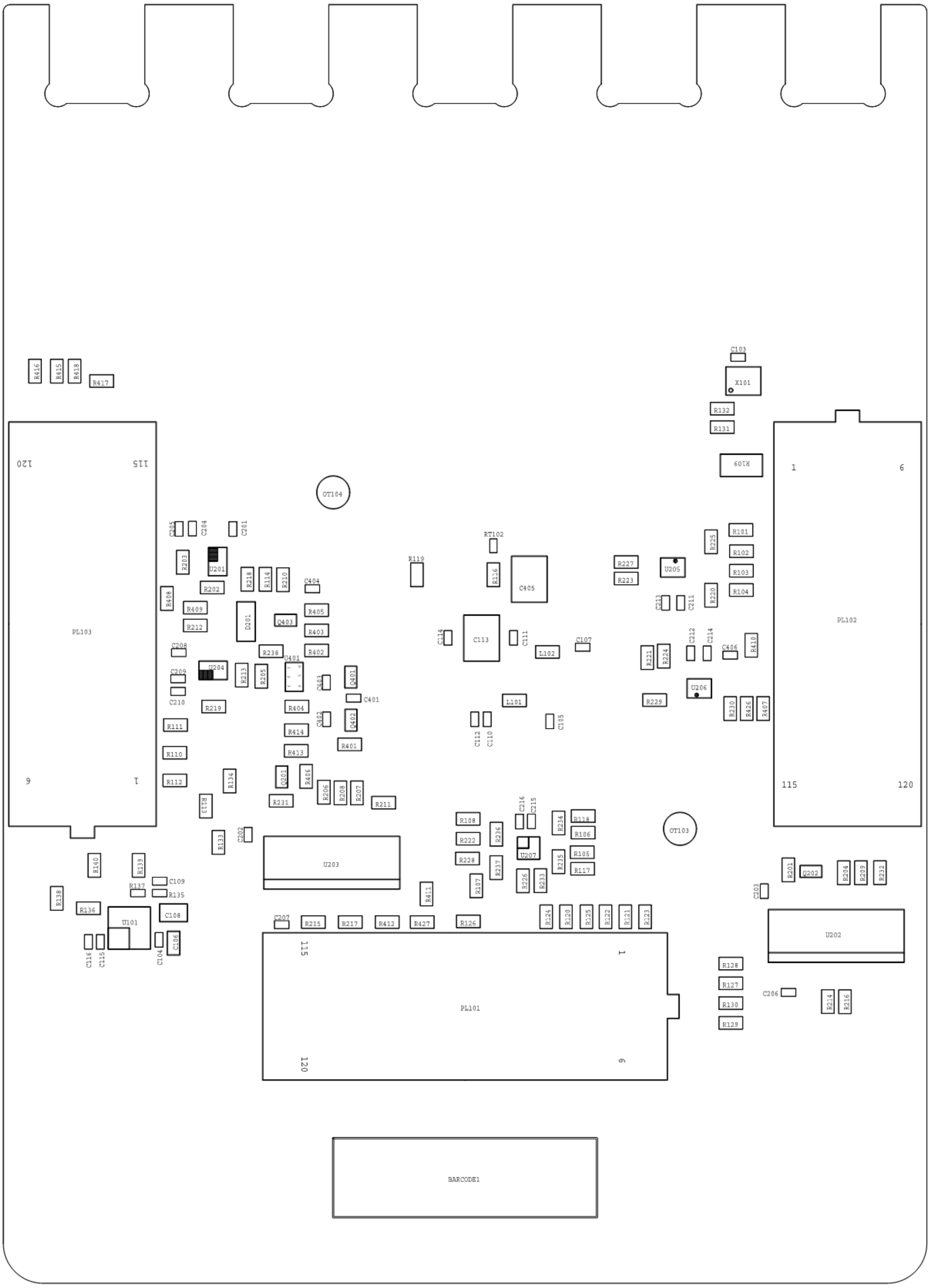

GPIO CONNECTOR
NE310H2-W1 INTERFACE TLB
Miscellaneous
WAKE BUTTON
Only for NE310H2
RESET
KEEP THIS PATH SHORT


DESCRIPTION
NE310H2-W1 INTERFACE TLB
MODULE
PROJECT
ANNOTATION
SHEET n.
3
OF SHEETS
4
DRAWING CODE
FORM
A3
U301

4.2. TLB Interface Components Layout



TOP



BOTTOM

5. SAFETY RECOMMENDATIONS

5.1. READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.
- Where there is risk of explosion such as gasoline stations, oil refineries, etc. It is the responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conformed to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible for the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as any project or installation issue, because the risk of disturbing the LTE network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipment introduced on the market. All of the relevant information is available on the European Community website:

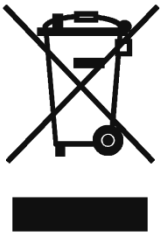
http://ec.europa.eu/enterprise/sectors/rtte/documents/

The text of the Directive 99/05 regarding telecommunication equipment is available,

while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/sectors/electrical/

5.2. Disposal of this product in the European Union



According to the WEEE Directive 2012/19/EU, the crossed-out wheeled bin symbol on the product or on its packaging indicates that the product must not be disposed of with your other household waste.
For equipment in private household, it's user's responsibility to dispose of his waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. For more information about where you can drop off your waste equipment from private household for recycling, please contact your local city office, your household waste disposal service or the retailer where you purchased the product. As a producer of electronic devices, TELIT provides for the financing of the treatment and recycling of waste returned through the designated collection points in accordance with local requirements. If you have professional electronic equipment that you purchased directly from TELIT that you wish to have picked up for recycling, please contact us to receive necessary information and instructions. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

Reference Directives:

2012/19/EU Directive of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

5.3. Disposal of this product in other countries outside the European Union

Please dispose of this product in accordance with local requirements; contact your local authorities or dealer and ask for the correct method of disposal.

6. REFERENCE TABLE OF RF BANDS CHARACTERISTICS

Band	Freq. Tx (MHz)	Freq. Rx (MHz)
B1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz
B2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz
B3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz
B4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz
B5	824 MHz – 849 MHz	869 MHz – 894 MHz
B8	880 MHz – 915 MHz	925 MHz – 960 MHz
B12	699 MHz – 716 MHz	729 MHz – 746 MHz
B13	777 MHz – 787 MHz	746 MHz – 756 MHz
B17	704 MHz – 716 MHz	734 MHz – 746 MHz
B18	815 MHz – 830 MHz	860 MHz -875 MHz
B19	830 MHz – 845 MHz	875 MHz – 890 MHz
B20	832 MHz – 862 MHz	791 MHz -821 MHz
B25	1850 MHz – 1915 MHz	1930 MHz -1995 MHz
B26	814 MHz – 849 MHz	859 MHz – 894 MHz
B28	703 MHz – 748 MHz	758 MHz – 803 MHz
B66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz
B71	663 MHz – 698 MHz	617 MHz – 783 MHz
B85	698 MHz – 716 MHz	728 MHz – 746 MHz

7. ACRONYMS

TTSC	Telit Technical Support Centre
USB	Universal Serial Bus
HS	High Speed
DTE	Data Terminal Equipment
UMTS	Universal Mobile Telecommunication System
WCDMA	Wideband Code Division Multiple Access
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
UART	Universal Asynchronous Receiver Transmitter
HSIC	High Speed Inter Chip
SIM	Subscriber Identification Module
SPI	Serial Peripheral Interface
ADC	Analog – Digital Converter
DAC	Digital – Analog Converter
I/O	Input Output
GPIO	General Purpose Input Output
CMOS	Complementary Metal – Oxide Semiconductor
MOSI	Master Output – Slave Input

MISO	Master Input – Slave Output
CLK	Clock
MRDY	Master Ready
SRDY	Slave Ready
CS	Chip Select
RTC	Real Time Clock
PCB	Printed Circuit Board
ESR	Equivalent Series Resistance
VSWR	Voltage Standing Wave Radio
VNA	Vector Network Analyzer

8. DOCUMENT HISTORY

Revision	Date	Changes
Rev 0	2019-07-25	First issue
Rev 1	2019-08-20	Updated Overall document
Rev 2	2019-10-03	Updated chapter 3.3.9.1

SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

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