Hardware User Guide

STM32 Nucleo-144 Adapter Board

Version 1.0

Revision History

Version	Date	Notes	Contributors	Approver
0.1	9 June 2025	Initial release	Dave Neperud	Andy Ross
0.2	25 June 2025	Added STM32 Nucleo-144 information	Dave Neperud	Andy Ross
0.3`	11 July 2025	Fixed logos on hardware photos. Preliminary release.	Dave Drogowski	Andy Ross
1.0	11 July 2025	Initial release.	Dave Drogowski	Andy Ross

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1 Overview

The Ezurio STM32 to M.2 2230 adapter board connects STM32 Nucleo-144 development boards with the Ezurio lineup of M.2 2230 radio modules for adding connectivity. The adapter board provides an interface for rapid development using the STMicro STM32 MCUs and the STM32 software development environment. This document describes the Adapter board hardware, highlighting the setup and interfaces available to maximize user flexibility in developing these applications.

2 STM32 Nucleo-144 Adapter Board Part Numbers

Part Number	Product Description
453-00376	Adapter, STM32 Adapter, M.2 2230
See Note	Adapter, STM32 Adapter, NX611 Integrated Antenna
See Note	Adapter, STM32 Adapter, TI351 Integrated Antenna

Note: Adapter board options with a Sona NX611 or TI351 Integrated antenna module soldered directly on-board are available only by contacting Ezurio directly.

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3 STM32 Adapter Board

3.1 Understanding the Adapter Board

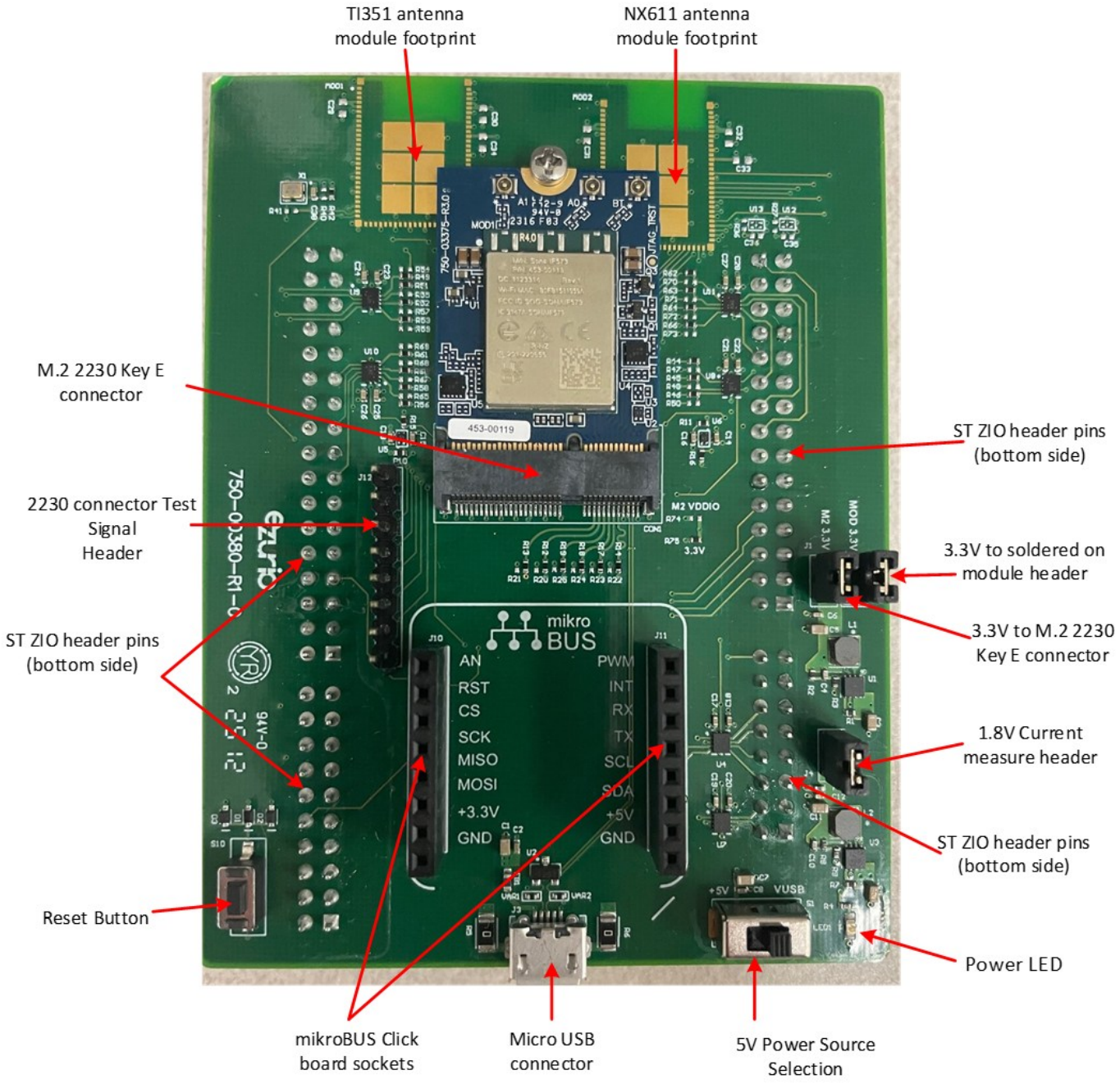

Figure 1: Adapter Board, STM32 Nucleo-144 to M.2 2230 connector

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Table 1: Adapter User Interfaces

Item	Designator	Description
M.2 2230 Key E Connector	CON1	Connector for adding an Ezurio M.2 2230 radio module card. Leave empty if using a soldered-down on board module version of the adapter board.
ST ZIO header pins (bottom side)	J6, J7, J8, J9	Connectors to plug adapter board into host STM32 Nucleo-144 board headers providing access to host MCU.
2230 Connector Test Signal Header	J12	Test header to access M.2 2230 connector pins (if used). • 1.8V • COEX_TXD • COEX_RXD • COEX3 • Vendor_defined (Pin 38) • LED2# • LED1# • Ground
Reset Button	S10	Press button to force W_DISABLE1#, W_DISABLE2#, and SDIO_RESET# lines to radio modules low.
mikroBUS Click Board Sockets	J10, J11	mikroBUS socket for insertion of click boards™ and other mikroBUS add-on boards to expand the functionality of the adapter board.
MicroUSB connector	J3	microUSB connector for providing power to adapter board and/or supporting M.2 2230 modules that support USB interface.
5V Source Selection	S1	Selects the 5V supply source to power the adapter board and Ezurio module. • +5V from PC connected to J3 – microUSB connector • +5V from STM32 Nucleo board
1.8V Current Measurement Header	J4	Remove jumper to isolate 1.8V supply and enable a module current measurement across the header pins. **Only available for soldered on-board modules.**
3.3V Header to M.2 2230 connector	J2	Connects the 3.3V supply to the M.2 2230 Key E connector. • Remove the jumper if using a on-board soldered down module. • Remove jumper to enable a current measurement of 3.3V to the M.2 2230 module across the header pins.
3.3V Header to On-board modules	J1	Connects the 3.3V RF supply to the module on board. • Remove the jumper if inserting a module into the M.2 Key connector • Remove jumper to enable a current measurement of 3.3V to the on-board soldered module across the header pins.
3.3V Power LED	LED1	Lights green when power is supplied to the adapter board.
NX611 antenna module footprint	MOD2	453-00180 module (if placed).
TI351 antenna module footprint	MOD1	453-00200 module (if placed).

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3.2 Using the Adapter Board with an STM Nucleo-144 board

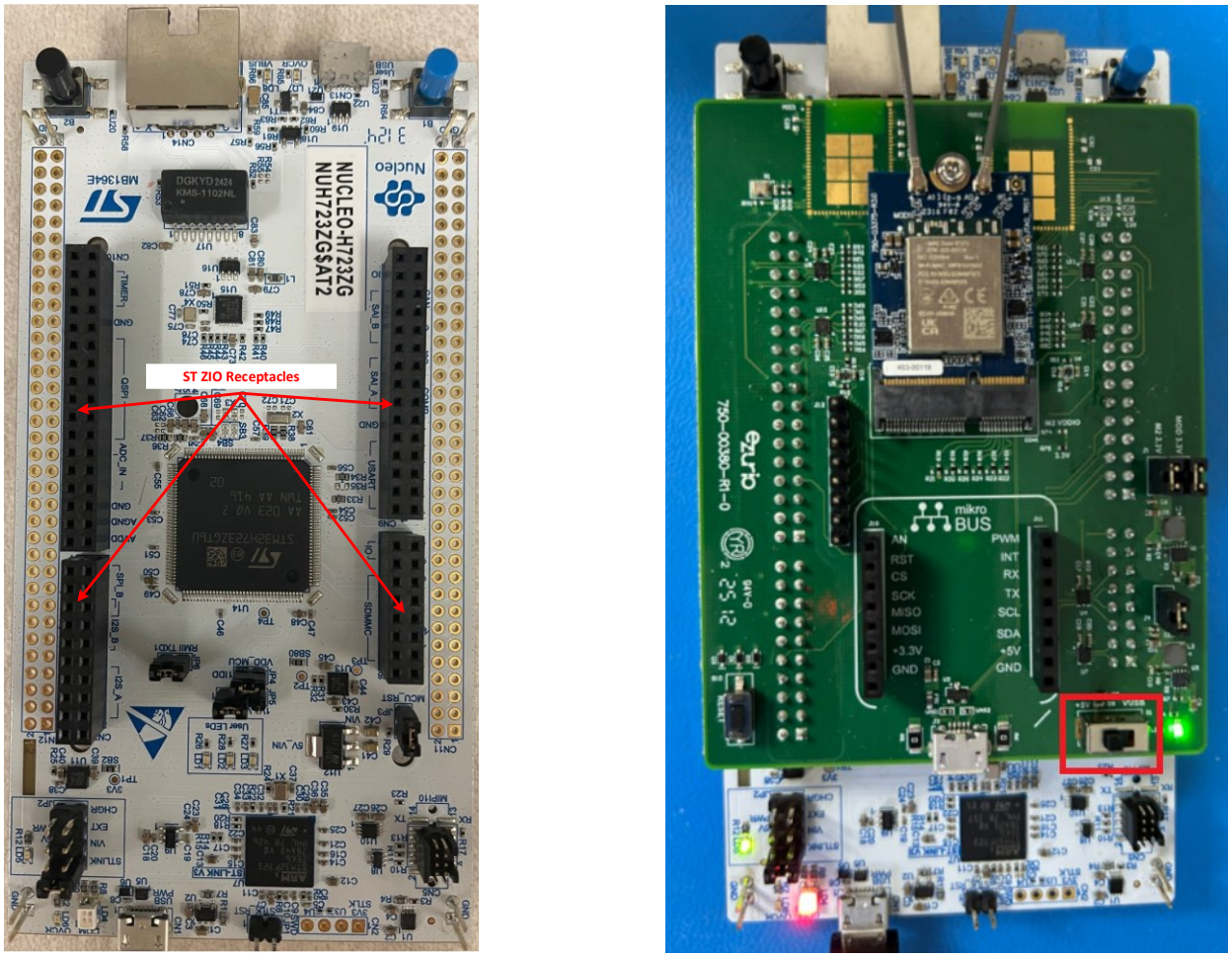
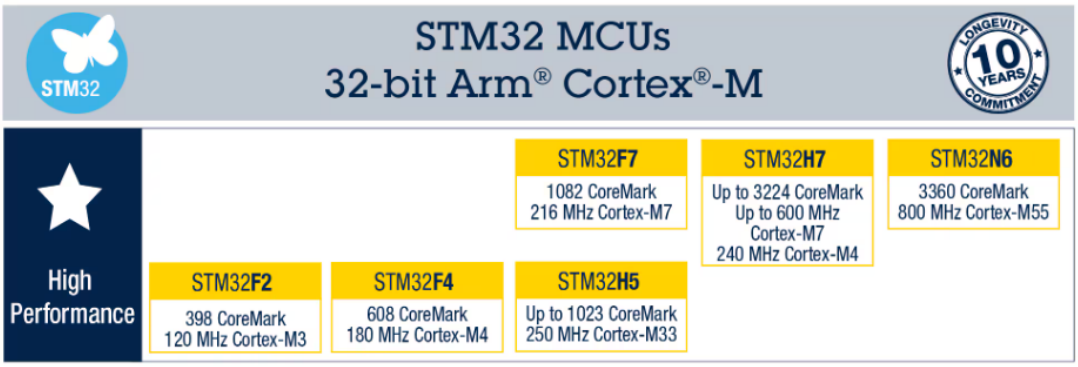


Figure 2: STM32 Nucleo-144 board without and with adapter board installed

To use the Ezurio adapter board, a STM32 Nucleo-144 board with the ST-ZIO receptacles must be used. A list of available boards can be found on the STMicroelectronics website.
STM32 Nucleo boards - STMicroelectronics

The STM32 Nucleo board must support SDIO (Secure Digital Input/Output) for interfacing with the Ezurio M.2 2230 radio module. The STM32 high performance MCU products support SDIO.



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3.3 STM32 to M.2 2230 Adapter Board Schematics

3.3.1 STM32 to M.2 2230 Adapter Board - Block Diagram

Below is a block diagram which illustrates the circuitry found on the adapter board.

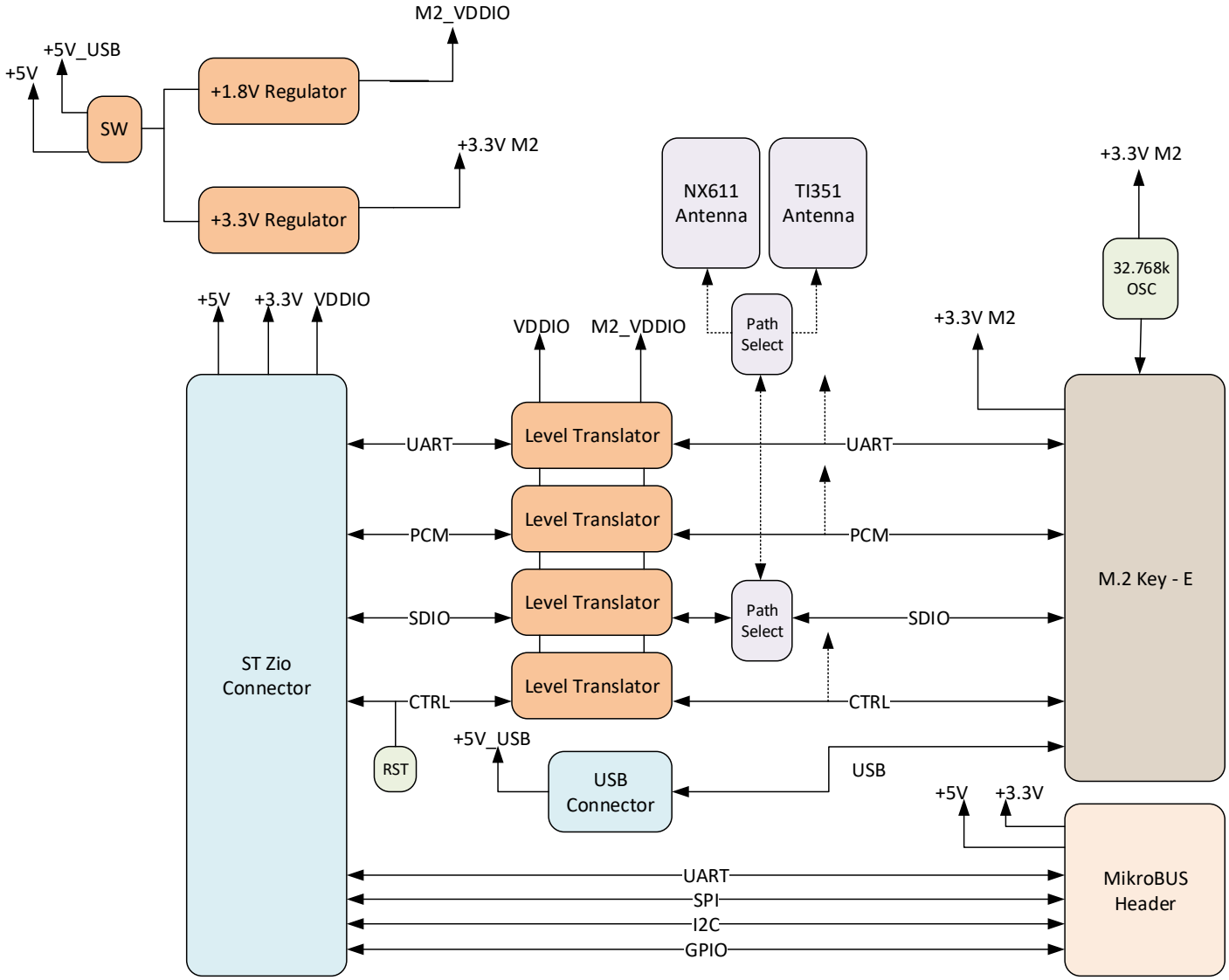

Figure 3: STM32 to M.2 2230 Adapter Board Block Diagram

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3.3.2 STM32 to M.2 2230 Adapter Board – ST ZIO connector and MikroBUS socket schematic

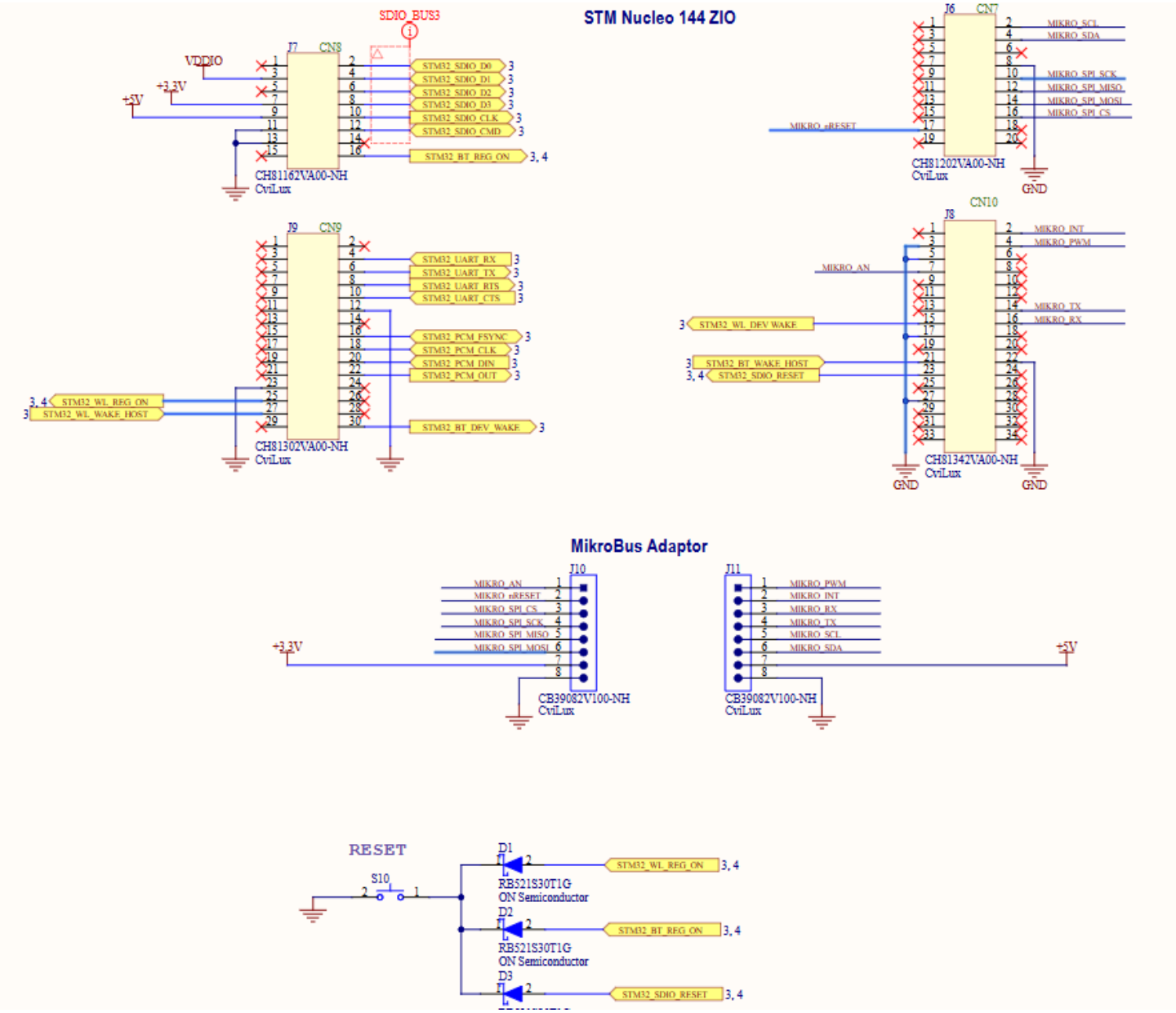

Figure 4: STM32 to M.2 2230 Adapter Board – ST ZIO connector and MikroBUS socket schematic

Table 2: Key Components of ST ZIO connector and MikroBUS socket schematic

Component	Description
J6, J7, J8, J9	Connectors to plug adapter board into host STM32 Nucleo-144 board headers providing access to host MCU.
J10, J11	mikroBUS socket for insertion of click boards™ and other mikroBUS add-on boards to expand the functionality of the adapter board.
S10	Press button to force W_DISABLE1#, W_DISABLE2#, and SDIO_RESET# lines to radio modules low.

3.3.3 STM32 to M.2 2230 Adapter Board – Power Supply Schematic

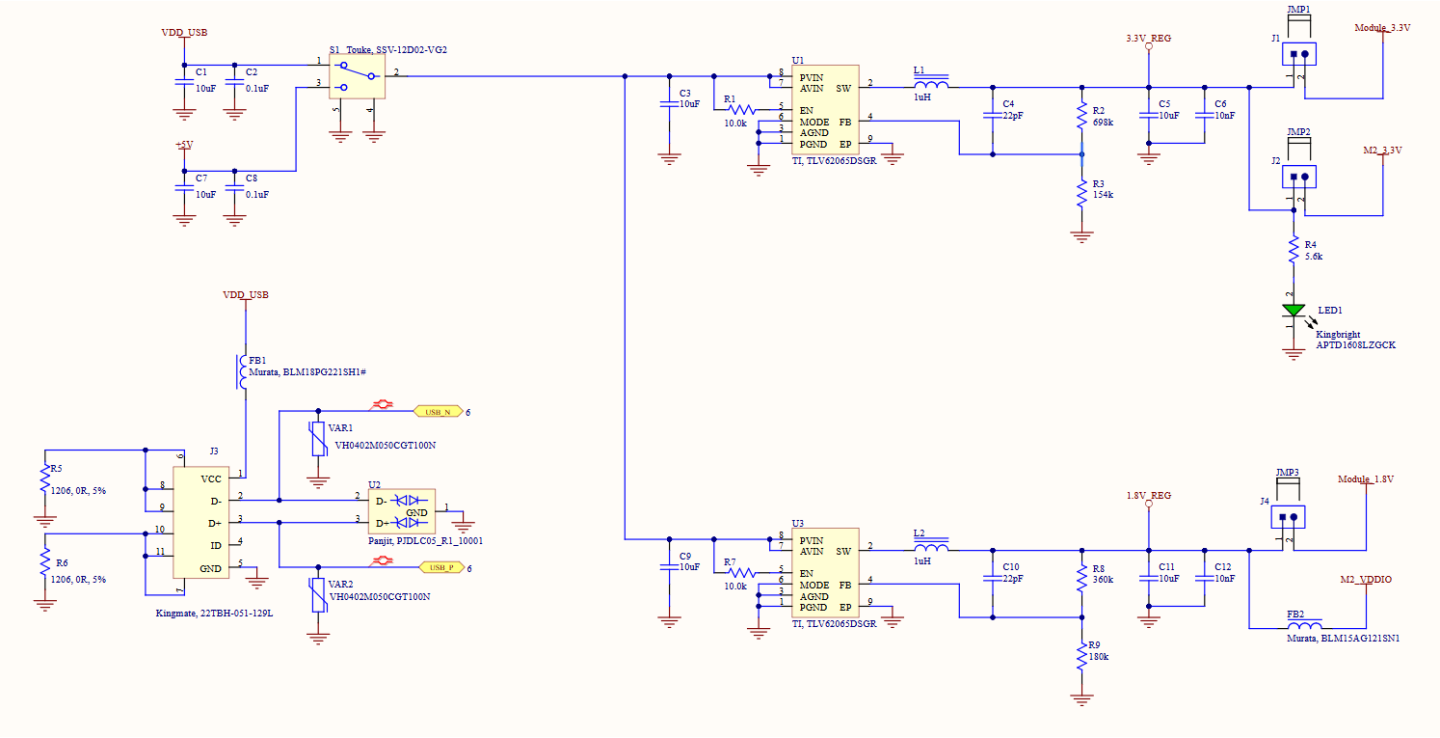

Figure 5: STM32 to M.2 2230 Adapter Board – Power Supply Schematic

Table 3: Key Components Power Supply Schematic

Component	Description
J3	microUSB connector • Option for powering the adapter board • Provides USB interface through M.2 2230 connector to modules that support USB communications.
S1	Selects the 5V supply source to power the adapter board and Ezurio module. • +5V from PC connected to J3 – microUSB connector • +5V from STM32 Nucleo board
U1	3.3V switching regulator
U3	1.8V switching regulator
J1/JMP1	Connects the 3.3V RF supply to the module on board. • Remove the jumper if inserting a module into the M.2 Key connector • Remove jumper to enable a current measurement of 3.3V to the on-board soldered module across the header pins.
J2/JMP2	Connects the 3.3V supply to the M.2 2230 Key E connector. • Remove the jumper if using a on-board soldered down module. • Remove jumper to enable a current measurement of 3.3V to the M.2 2230 module across the header pins.
J4/JMP3	Remove jumper to isolate 1.8V supply and enable a module current measurement across the header pins. **Only sources soldered on-board modules.**

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3.3.4 STM32 to M.2 2230 Adapter Level Shifters Schematic

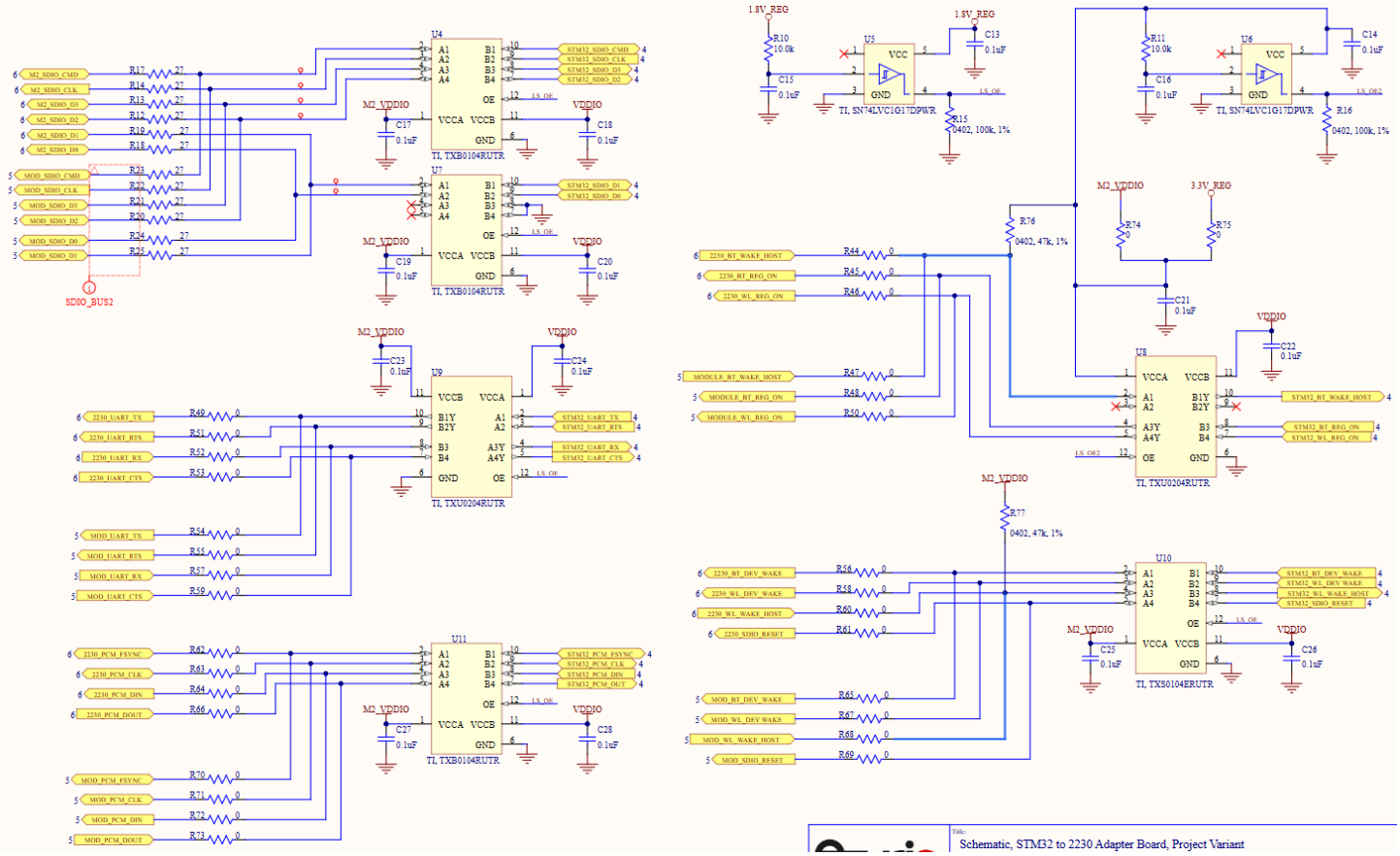

Figure 6: STM32 to M.2 2230 Adapter Board Level Shifters Schematic

Table 4: Key Components Level Shifters Schematic

Component	Description
U4, U7, U8, U9, U10, U11	Level shifters between STM32 MCU (ST-ZIO connector pins) and Ezurio radio module interface lines.
U5, U6	Logic gates to control enabling of level shifters.

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3.3.5 STM32 to M.2 2230 Adapter Board - M.2 2230 Key E Interface Schematic

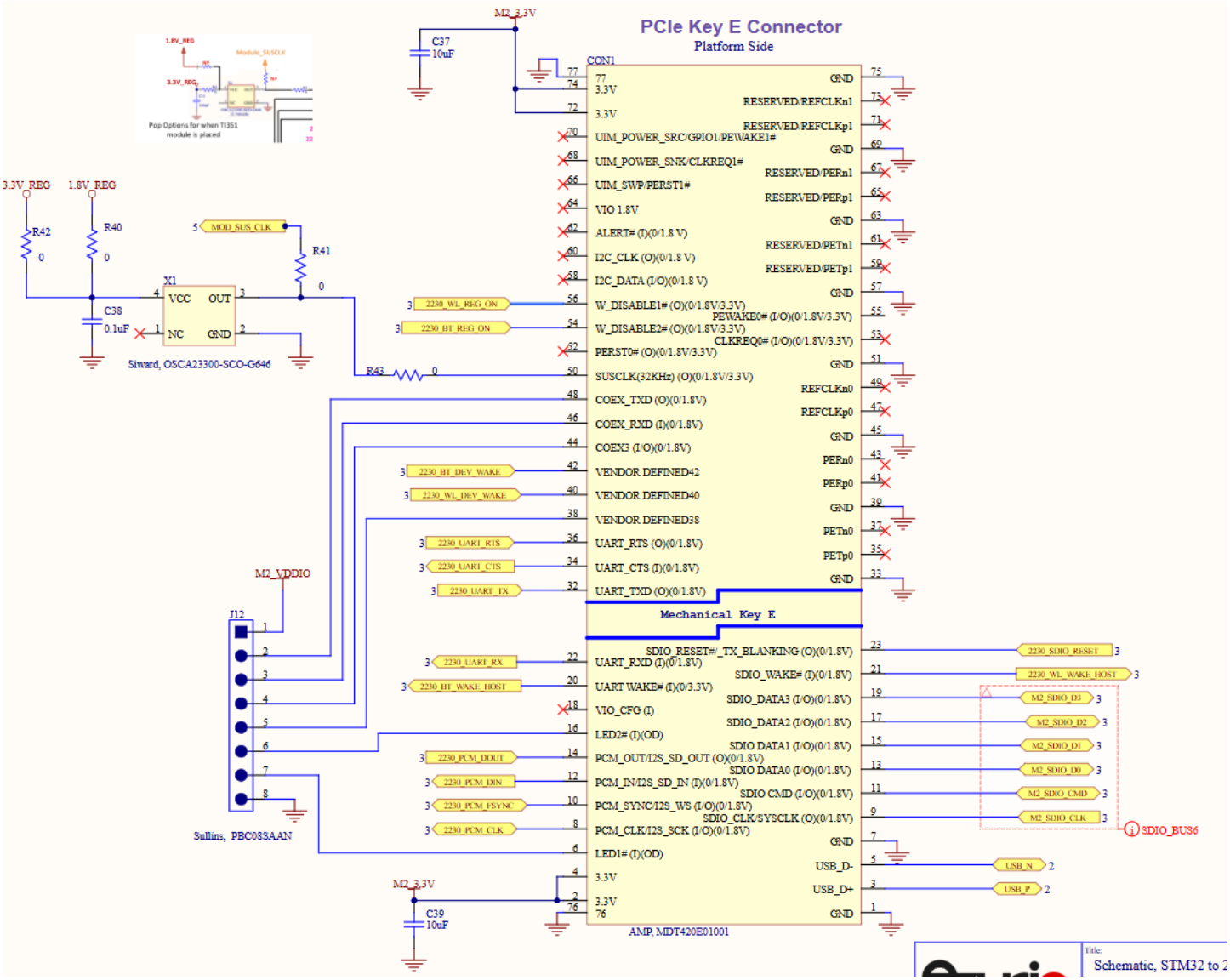

Figure 7: STM32 to M.2 2230 Adapter Board – M.2 2230 Module Connector Schematic

Table 5: Key Components M.2 2230 Connector Schematic

Component	Description
CON1	M.2 Key-E connector for Ezurio M.2 Modules.
J12	Test header for M.2 2230 Key E interfaces (if supported)
X1	32.768 kHz oscillator for slow clock support.

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3.3.6 STM32 to M.2 2230 Adapter Board – On board antenna module schematic

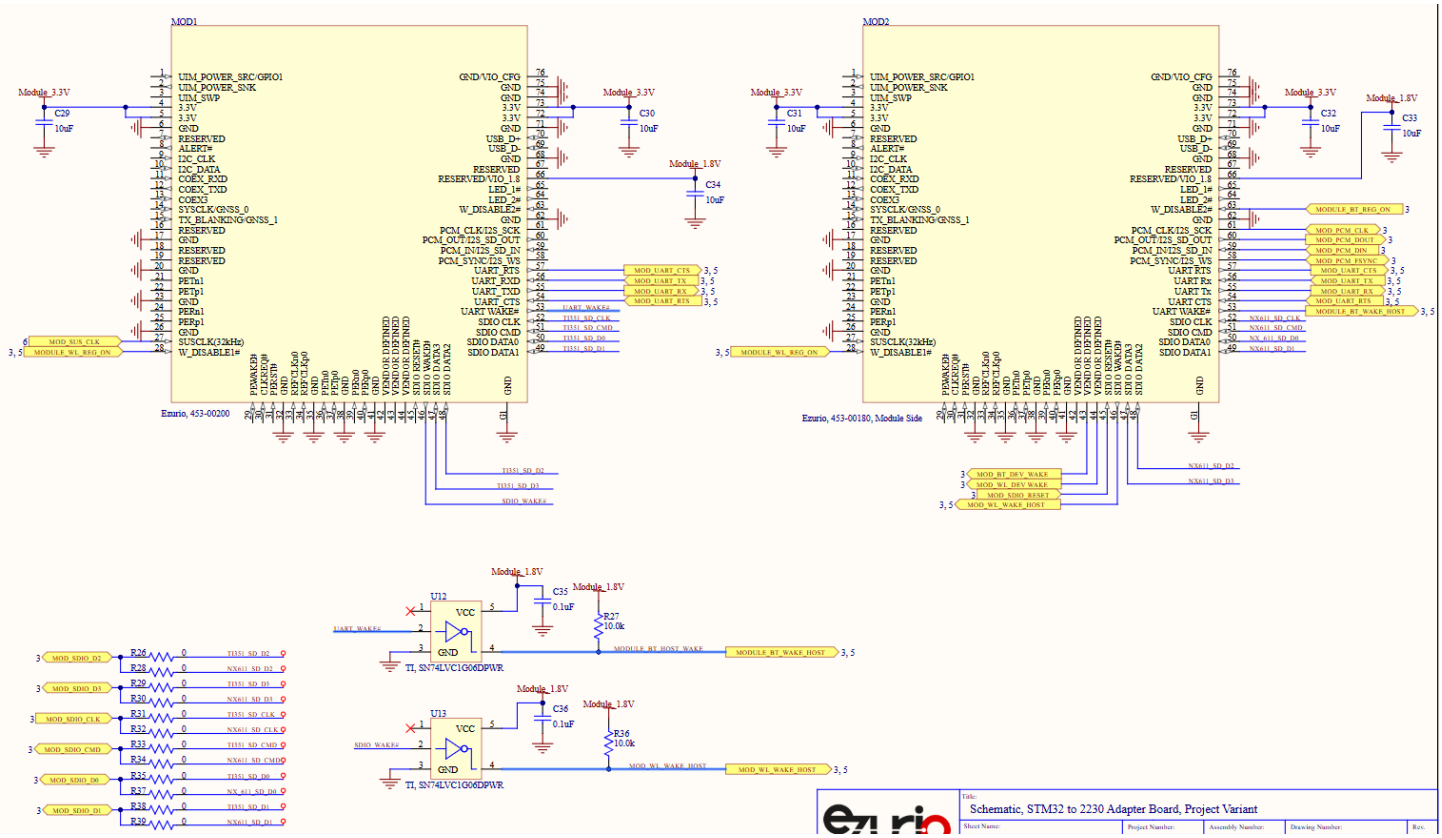

Figure 8: STM32 to M.2 2230 Adapter Board – On board antenna module schematic

Table 1: Key Components of Board Cable Connector

Component	Description
MOD1	(Optional) Ezurio 453-00200. Sona TI351, 1216 module, Integrated Antenna
MOD2	(Optional) Ezurio 453-00180. Sona NX611, 1218 module, Integrated Antenna
U12, U13	Inverters for TI351 wake lines.

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4 Additional Assistance

Ezurio offers a variety of documentation and ancillary information to support our customers through the initial evaluation process and ultimately into mass production.

Please contact your local sales representative or our support team for further assistance:

Headquarters	Ezurio 50 S. Main St. Suite 1100 Akron, OH 44308 USA
Website	http://www.ezurio.com
Technical Support	http://www.ezurio.com/resources/support
Sales Contact	http://www.ezurio.com/contact

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