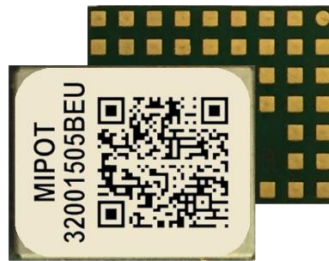


Wireless Protocol Modules MiP Series Single Core Module

Communication Interface



Description

This document presents connection methodologies for communicating with a single core module.

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1. Communication interface

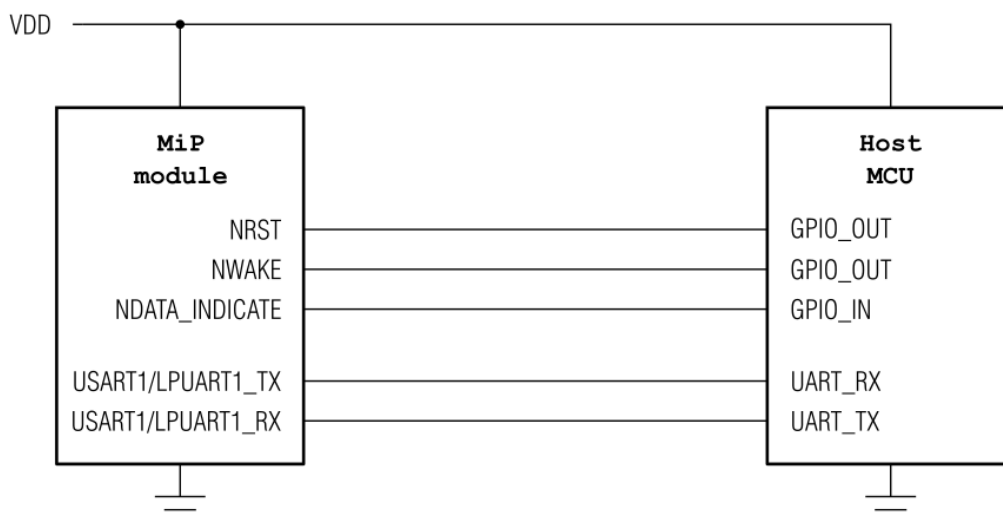
The term ‘single core module’ indicates a host based module needing an external microcontroller to configure and operate it. The communication interface between the module and the external microcontroller can be one among available SPI, I²C or UART, depending on user application needs.

1.1. SPI/I²C/UART interface

SPI/I²C/UART interface allows Host both to configure the module and to exchange LoRa radio frame data messages.

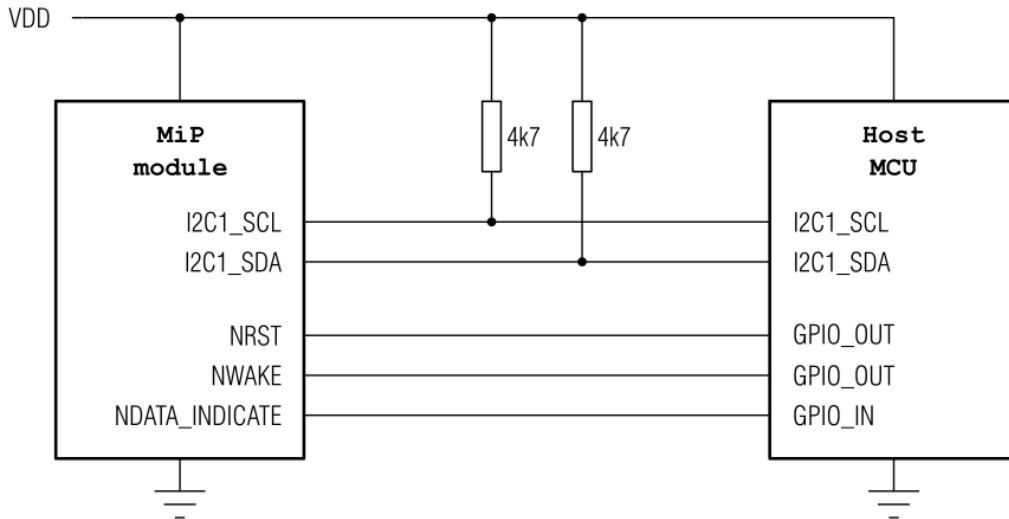
One among available SPI, I²C or UART interfaces can be chosen. There is no need to preliminary configure the interface to use. After reset the module listens for messages on each of the available ports and automatically elects as communication interface the channel where the first valid message is received.

1.2. Connection with USART1 or LPUART1



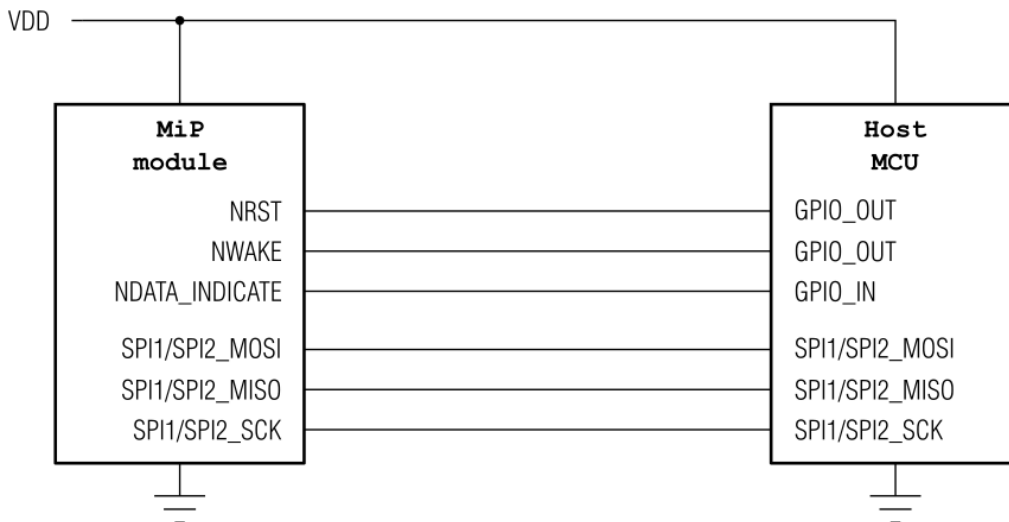
The serial port uses the DTE terminology and direction

1.3. Connection with I2C1



The I2C interface requires an external pullup on the communication lines.

1.4. Connection with SPI1 or SPI2



The NWAKE pin can be used as the SPI's NSS signal.

2. Communication interface: SPI/UART

SPI/UART interface allows Host both to configure the module and to exchange LoRa radio frame data messages.

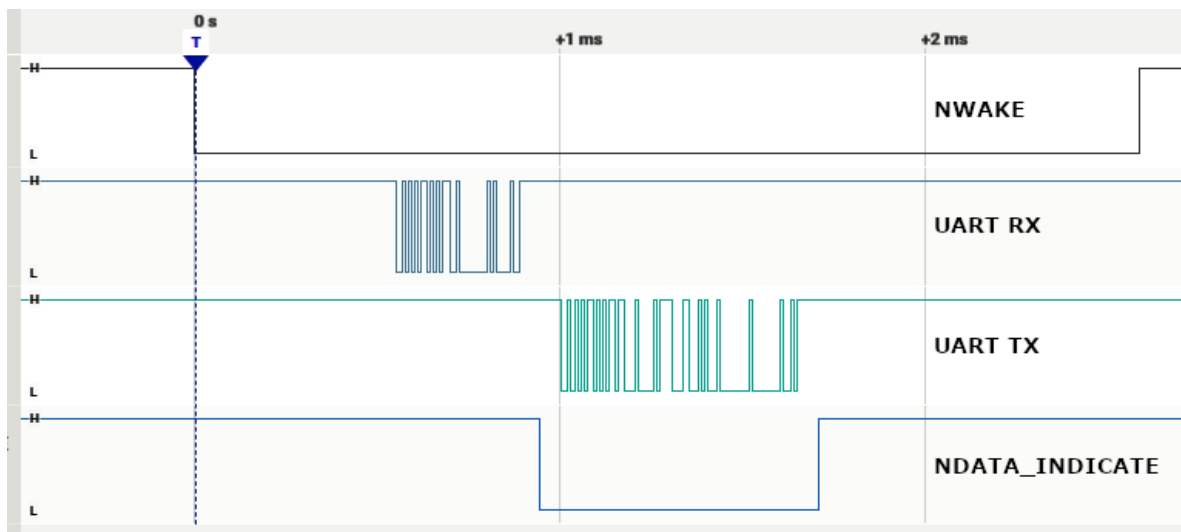
2.1. Detailed Signal Flow

The module enters sleep mode as soon as possible therefore, before initiating a UART session, the host shall wake it up by setting the NWAKE pin LOW and then setting it back HIGH at the end of the session.

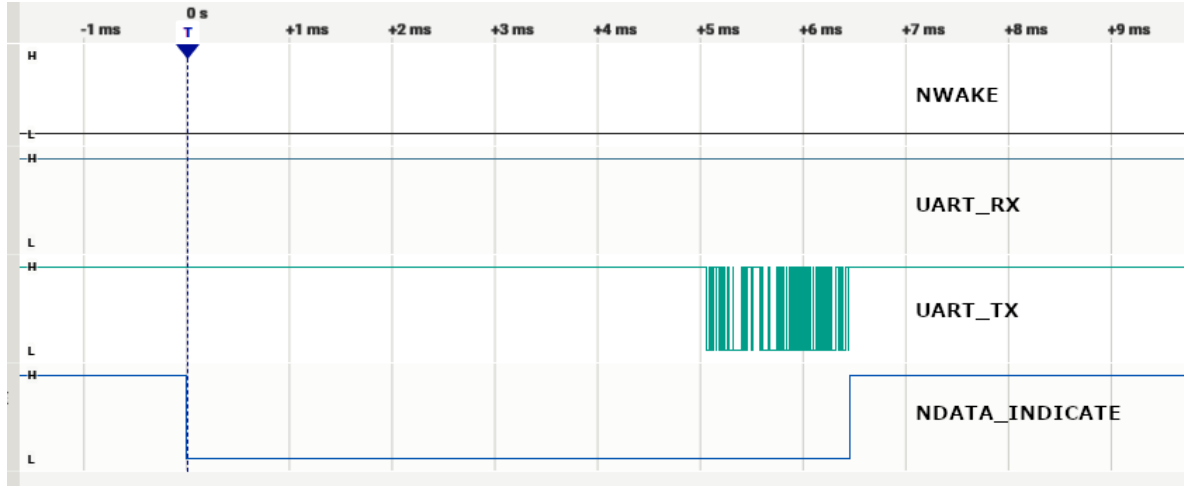
When the module receives a valid command and the checksum is correct, the module sets NDATA_INDICATE LOW, transmits the answer through UART TX pin and then sets NDATA_INDICATE HIGH.

When transferring a received radio frame to the host microcontroller, the module set NDATA_INDICATE LOW, wait for DATA_INDICATE_TIMEOUT expiration, and then send the message on UART TX pin. DATA_INDICATE_TIMEOUT represents the time (in ms) between the instant when NDATA_INDICATE pin goes LOW and the start of transmission on UART TX pin. NDATA_INDICATE pin must return HIGH before performing the next transmission.

2.2. Example of UART command session (Host -> Module):



2.3. Example of UART RX indicate message session (DATA_INDICATE_TIMEOUT = 5ms) (Module -> Host):



3. Revision History

Revision	Date	Description
0.1	22.01.2025	First version
0.2	07.01.2026	Introduced the concept of 'single core module'