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AK-RS485/422-FD

Reference manual

Contents

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About this document

Revision history

The table below displays the revision history for the chapters in this manual.

Chapter	Date	Revision	Changes made
All	March, 2016	1.0	First publication
All	March, 2022	1.1	3.3V and 5V versions

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Specifications

General description

The AK-RS485/422-FD is a RS485/RS422 physical driver to enable a single UART to send/receive data over an EIA 485/422 network in full-duplex mode. The board comes in two versions supporting input power supply of 3.3V and 5V.

The Artekit AK-RS485/422 board uses the MaxLinear SP491ECN-L IC for the 5V version, and the Renesas/Intersil ISL3173EIBZ for the 3.3V version.

Environmental requirements

The AK-RS485/422-FD board must be stored between -65ºC to +150ºC. The recommended operating temperature is between -40ºC and +85ºC.

The AK-RS485/422-FD board can be damaged without proper anti-static handling.

Handling the board

When handling the board, it is important to observe the following precaution:

Static discharge precaution – Without proper anti-static handling the board can be damaged. Therefore, take anti-static precautions while handling the board.

Board overview

Pin description

VCC	Power Supply (3.3V or 5V)
RXD	Output, connect to MCU RXD pin
RXE	Input, 0=Enable data reception, 1=Disable data reception
TXE	Input, 1=Enable data transmission, 0=Disable data transmission
TXD	Input, connect to MCU TXD pin
GND	Power supply ground
A	Input, negative signal A
B	Input, positive signal B
Z	Output, negative signal Z
Y	Output, positive signal Y

Board dimensions in millimeters (inches)
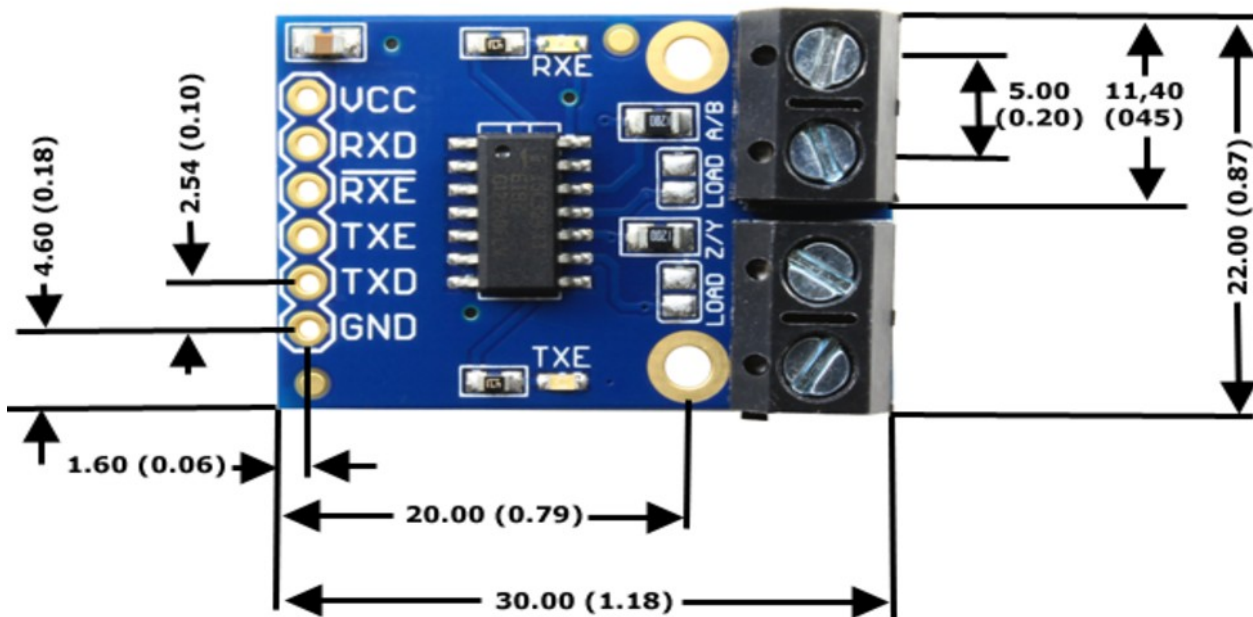
Electrical characteristics

Test conditions

Unless otherwise specified, all voltages are referenced to GND.

Minimum and maximum values

Unless otherwise specified, the minimum and the maximum values are guaranteed in the worst conditions of ambient temperature, supply voltage and frequencies by tests in production on 100% of the devices with an ambient temperature TA = 25ºC.

Typical values

Unless otherwise specified, typical data are based on TA = 25ºC, VCC = 5V.

Absolute maximum ratings

SYMBOL	RATINGS	MIN	MAX	UNIT
VCC	External main supply voltage respect to GND	-0.3V	+7	V

WARNING Exceeding values beyond these absolute maximum values may cause permanent damage to the device. Operating at absolute maximum rating conditions for extended periods may affect the device reliability.

Normal operating parameters

SYMBOL	PARAMETER	VALUE	UNIT
VCC	Power supply applied to VCC pin	3.3V or 5.5V*	V

* Depends on the purchased version: 3.3V or 5V.

Board usage

MCU connection modes

NOTE: Because the AK-RS485/422 is a full duplex board, we recommend the "No flow control mode" (Mode 3) connection, because allows the TX and RX to be connected and used to send and receive at the same time
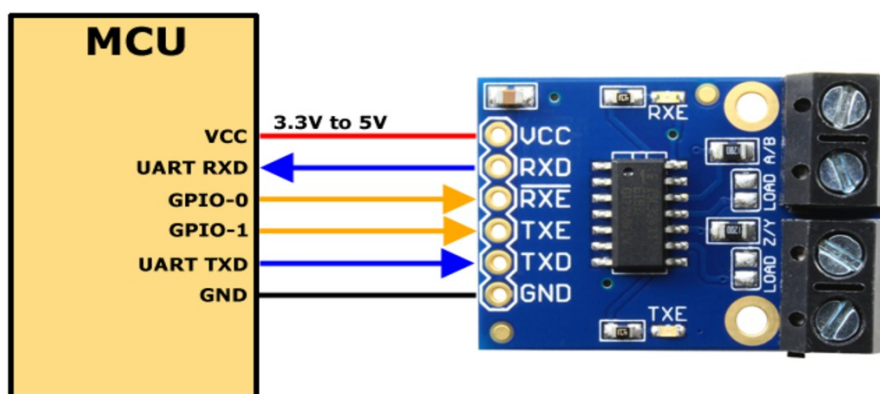
Mode 1: RTS manages the data flow

When the UART RTS is in passive mode (logical 1) the reception is disabled and the transmission is enabled. When the UART RTS is in active mode (logical 0) the reception is enabled and the transmission is disabled.
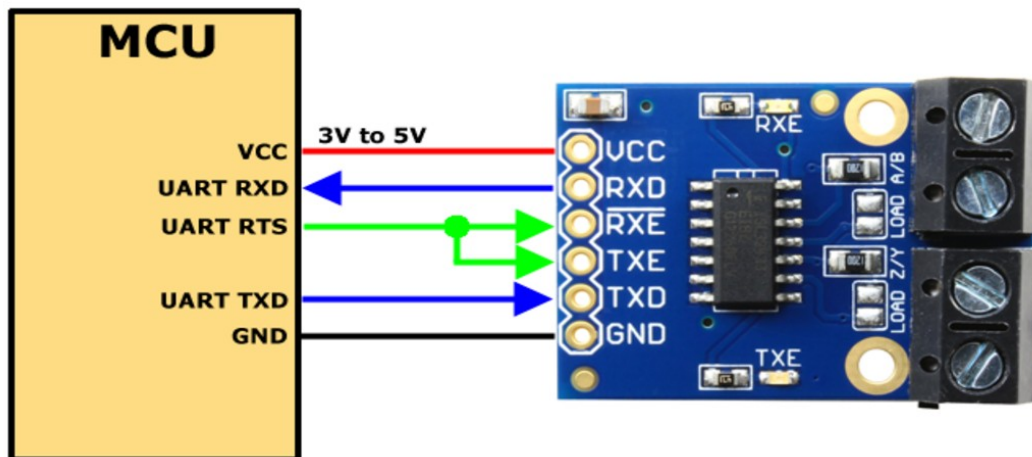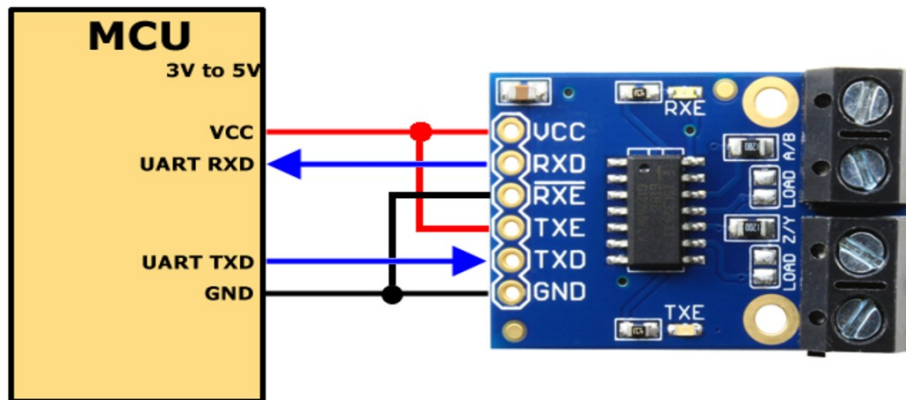

Mode 2: MCU with full flow control.

GPIO-0 control the RXD data flow and the GPIO-1 control the TXD data flow.
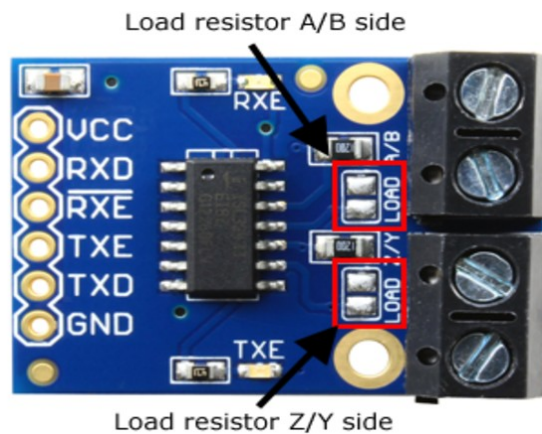
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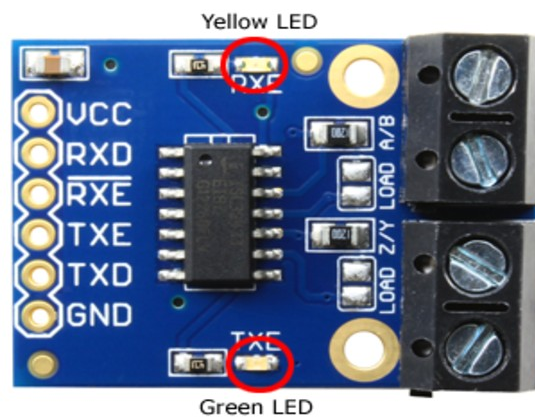## Mode 3: No flow control. TXD and RXD are always active.

Load resistors

The AK-RS485/422 has two solder jumpers to enable a 120 Ohm load resistor in parallel on the each bus lines. Drop some solder to create a short circuit on the LOAD pads. This option must be implemented only on the first and the last boards in the network.
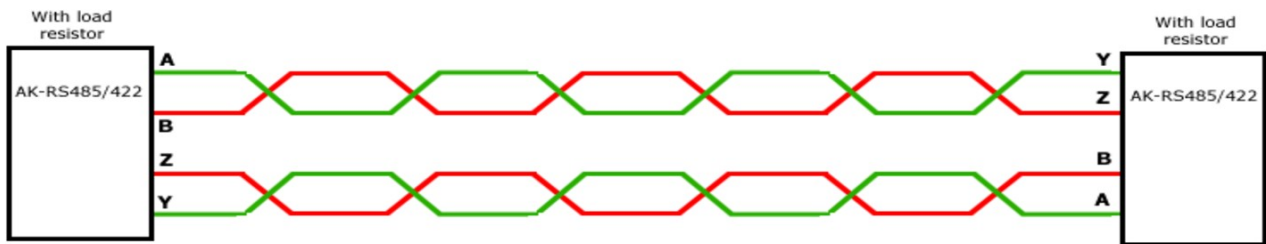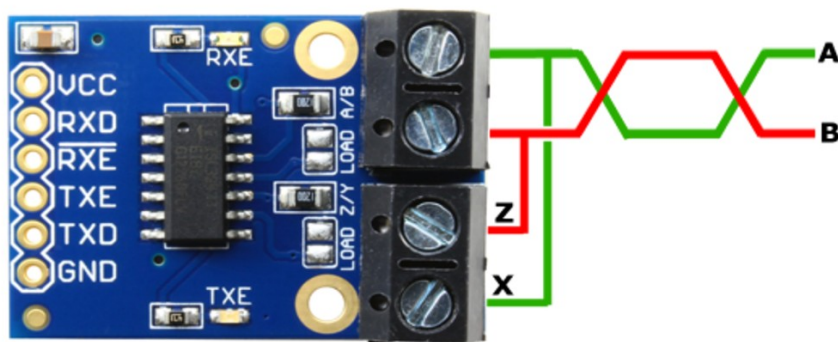

Indication LEDs

Yellow LED, when ON indicates that he reception is enabled. Green LED, when ON indicates that the transmission is enabled.

Connecting two boards in a RS-485/422-FD full-duplex line

Connecting the AK-RS485/422-FD board to create a Half Duplex link

The AK-RS485/422-FD board can be connected in the following way to obtain a half-duplex link:

Testing the board

To test the board follow the next steps:

1) Disconnect the board from the RS485/422 .
2) Connect A to Y and B to Z as in the picture here below.
3) Connect the board to the MCU as in the Mode **3: No flow control** example.
4) Send a character through MCU UART.
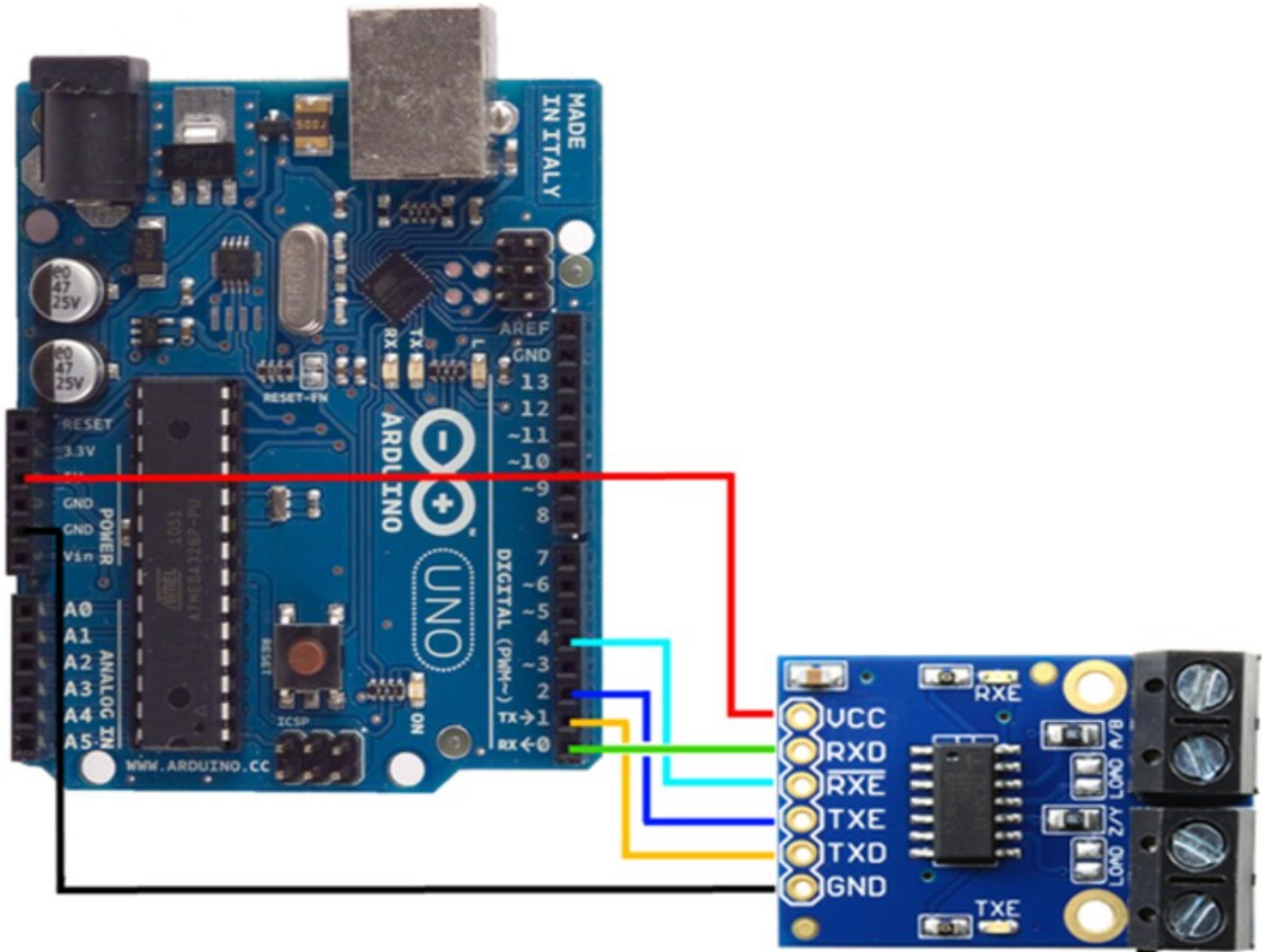5) Check if the character sent is read back by the MCU UART.

If the sent character is read back by the MCU, the board is working properly.
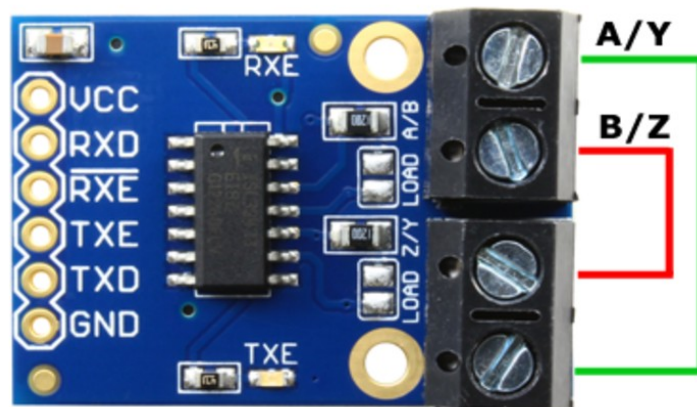
Connecting the AK-RS485/422-FD to the Arduino Uno board

The following example shows how to connect the AK-RS485/422-FD board (5V version) to an Arduino UNO board.

AK-RS485/422-FD PIN NAME	Arduino Uno PIN NAME	DETAILS
VCC	5V	5V
GND	GND	Ground
TXD	TX->	UART TXD
RXD	RX<-	UART RXD
nRXE	4	RXD Flow Control
TXE	2	TXD Flow Control