

# **TWIN232**

## **Ground Isolated Converter & Isolator Owner's Manual**

**TWIN232-001**

# CONTENTS

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## **Chapter 1. Introduction**

|                       |    |
|-----------------------|----|
| 1-1 Introduction..... | 01 |
|-----------------------|----|

## **Chapter 2. System Setup**

|  |    |
|--|----|
| 2-1 Introduction.....                  | 02 |
| 2-2 RS422/RS485 interface setting..... | 02 |
| 2-3 Installation Procedure.....        | 03 |

## **Chapter 3. Connector Pin Definition**

|  |    |
|--|----|
| 3-1 RS232 connector pin definition .....       | 04 |
| 3-2 DC Power input .....                       | 05 |
| 3-3 RS422/RS485 connector pin definition ..... | 05 |
| 3-4 The signal relationship in TWIN232 .....   | 06 |

## **Appendix A. accessories for TWIN232 box**

|   |    |
|---|----|
| A-1 A102 cable for PC COM port and TWIN232 box..... | 07 |
| A-2 Power adapter for multiple TWIN232 box.....     | 07 |

## **Appendix B. Troubleshooting procedure for TWIN232 box.....08**

## **Appendix C. RMA procedure for TWIN232 box .....10**

## -----Chapter 1----- Introduction

### 1-1. Introduction :

TWIN232 converter box is one device to support one set ground isolated RS232 to RS232 isolator and RS232 to RS422/RS485 converter.

When user needs to send data over long distance, we may use RS422 interface for full-duplex data transmission or RS485 interface for half-duplex data transmission. TWIN232 converter box can set the target RS422 or RS485 interface type by DIP SWITCH.

Traditionally RS232 is used within 50 feet range. And RS232 is common ground structure. Every device use RS232 cable to connect may have same signal ground pin. In normal application environment we may have small voltage difference in both device's signal ground. In some rigid application environment we may have very large ground bounce in both connected device. Then such voltage difference may damage equipment connected in same ground pin. So we need ground isolator for such application environment. TWIN232 box will separate the signal ground pin in both RS232 device. The ground bounce in one equipment may not transfer to the other equipment.

## -----Chapter 2----- System Setup

### 2-1. Introduction

We have one DIP SWITCH to setup the interface type for RS422/RS485.



### 2-2. RS422/RS485 interface setting

We have one 4bit DIP SWITCH to set the interface type and terminator resistor insert or not.

When we need to set in RS422 interface type, we need to set bit1,2,3 of DIP SWITCH in OFF location.

When we need to set in RS485 interface type, we need to set bit1,2,3 of DIP SWITCH in ON location.

When we need to insert 120 ohm terminator resistor in RS422/485 interface, we need to set bit4 of DIP SWITCH in ON location.

When we don't need to insert 120 ohm terminator resistor in RS422/485 interface, we need to set bit4 of DIP SWITCH in OFF location.

\*\*\*NOTE : Because RS485 network can only insert terminator resistor in both end of device. So we do not insert terminator resistor in TWIN232 box normally.

## **2-3. Installation procedure**

Please use following procedure to install TWIN232 in your system.

- STEP 1 : set the Interface DIP switch for Isolated RS422/RS485 port as target RS422 or RS485 interface type.
- STEP 2 : wire the terminal block for RS422 or RS485 interface. Or connect the isolated RS232 device to isolated RS232 connector.
- STEP 3 : insert the power adapter or wire the power input in terminal block. Please keep in mind that we can only have one for power input.
- STEP 5 : connect Common Ground RS232 device to Common Ground RS232 connector.
- STEP 6 : You can test TWIN232 function now.

## -----Chapter 3----- Connector Pin Definition

### 3-1. RS232 connector pin definition.

Isolated RS232 interface is DB9 male connector with following DTE type pin definition.

- Pin 1 : No Connection.
- Pin 2 : RXD (input) signal input from external RS232 device.
- Pin 3 : TXD (output) signal output to external RS232 device.
- Pin 4 : short to Pin 6 internally.
- Pin 5 : Isolated GND
- Pin 6 : short to Pin 4 internally.
- Pin 7 : RTS (output) signal output to external RS232 device.
- Pin 8 : CTS (input) signal input from external RS232 device.
- Pin 9 : No Connection.

Common Ground RS232 interface is DB9 female connector with following DCE type pin definition.

- Pin 1 : 1Kohm resistor to +5V power source.
- Pin 2 : RXD (output) signal output to external RS232 device.
- Pin 3 : TXD (input) signal input from external RS232 device.
- Pin 4 : short to Pin 6 internally.
- Pin 5 : GND (common signal ground of DC power input)
- Pin 6 : short to Pin 4 internally.
- Pin 7 : RTS (input) signal input from external RS232 device.
- Pin 8 : CTS (output) signal output to external RS232 device.
- Pin 9 : No Connection. (user may ask this pin 9 as DC power input).

### **3-2. DC Power input.**

We can have two method to offer DC POWER input. One is 9VDC or 12VDC power adapter input from POWER JACK. The inner side is +9VDC and the outer side is ground.

The other is +9VDC -- 32VDC input from TERMINAL BLOCK. Pin 1 is +VDC input and Pin 2 is ground. It is suitable for industrial +24VDC or +12VDC power.

The power ground is common ground signal for Common Ground RS232 interface.

For OEM based user we can also use pin 9 of Common Ground RS232 DB9 female connector as +VDC power input. The VDC range will be +9VDC -- +32VDC. (This is not in standard product).

### **3-3. RS422/RS485 connector pin definition.**

RS422/RS485 interface has 10 signal pin in TERMINAL BLOCK.

RS422/RS485 interface has isolated ground signal with other circuitry.

So you have isolated ground signal for Isolated RS232 and RS422/RS485 interface.

RS422/RS485 interface is in pin3 -- pin12 of TERMINAL BLOCK.

Pin 3 = 422TXD- (Output) signal.

Pin 4 = 422TXD+ (Output) signal.

Pin 5 = 422RXD- (input) or 485DATA- signal.

Pin 6 = 422RXD+ (input) or 485DATA+ signal.

Pin 7 = isolated GND

Pin 8 = 422RTS- (Output) signal.

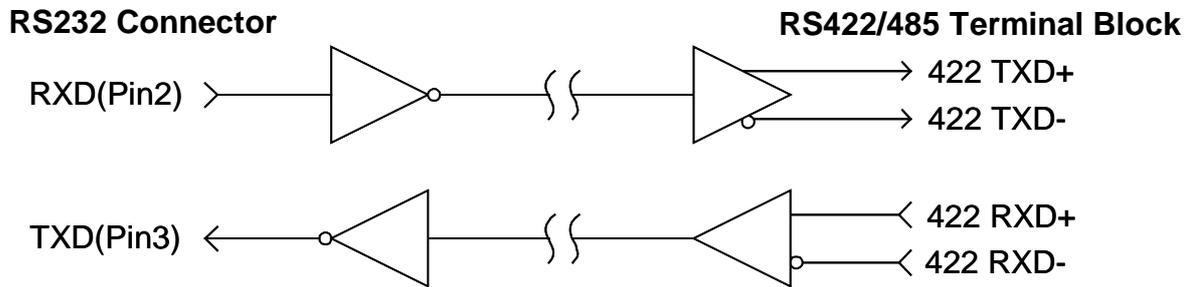
Pin 9 = 422RTS+ (Output) signal.

Pin 10 = 422CTS- (input) signal.

Pin 11 = 422CTS+ (input) signal.

Pin 12 = isolated GND

### 3-4. The signal relationship in TWIN232.



In Config. 1 is the signal relationship for RS232 interface and RS422/RS485 interface. Because RS422/RS485 interface is differential signal with plus signal name and minus signal name. And different company may have different meaning for such signal name. So user need to confirm the signal for TWIN232 box and other RS422/RS485 device.

In Config. 1 we can find the signal from RS232 interface connector will be inverted by RS232 interface chip and send to RS422/RS485 interface chip with same phase in plus signal and invert phase in minus signal.

When we have MARK state (-12V) in RS232 interface, we will have larger voltage level in plus signal than minus signal.

When we have SPACE state (+12V) in RS232 interface, we will have less voltage level in plus signal than minus signal.

## -----Appendix A----- Accessories for TWIN232 Box

### A-1. A102 cable for PC COM port and TWIN232 box.

PC COM port is DB9 male connector. The Common Ground RS232 port in TWIN232 box is DB9 female connector. So we need DB9 male to female extension cable for PC COM port and TWIN232 RS232 port. A102 cable is the cable for PC COM port to connect with TWIN232 box.

The pin definition for A102 cable as following :

| DB9 female connector | DB9 male connector |
|----------------------|--------------------|
| =====                | =====              |
| pin 1 _____          | pin 1              |
| pin 2 _____          | pin 2              |
| pin 3 _____          | pin 3              |
| pin 4 _____          | pin 4              |
| pin 5 _____          | pin 5              |
| pin 6 _____          | pin 6              |
| pin 7 _____          | pin 7              |
| pin 8 _____          | pin 8              |
| pin 9 _____          | pin 9              |

### A-2. Power adapter for multiple TWIN232 box

When we need to use one power adapter to support multiple TWIN232 box, we need to check the power capacity in power adapter.

Because one TWIN232 need about 2.5W input. For one standard 12VDC @ 500mA power adapter it is no problem to support two TWIN232 boxes and may be three TWIN232 boxes. For one standard 12VDC @ 1000mA power adapter it is no problem to support four TWIN232 boxes and may be five TWIN232.

When you use one power adapter to support multiple TWIN232 box. We will plug power adapter to one TWIN232. Then we will connect every TWIN232 box daisy chained together in terminal block.

## -----Appendix B----- Troubleshooting Procedure for TWIN232 Box

### **B-1. Please confirm your system structure firstly.**

- a) The DIP switch to set the interface type of TWIN232 is correct or not. DIP switch bit 1 is in ON location for RS485 interface mode. In this mode DIP switch bit 2 and 3 must be in ON location. Normally DIP switch bit 4 is in OFF location. When you set in ON location, you must confirm no more terminator resistor in RS485 interface. DIP switch bit 1 is in OFF location for RS422 interface mode. In this mode DIP switch bit 2 and 3 must be in OFF location.
- b) The power input is from power adapter or terminal block. Please confirm the inner pin of power adapter is positive voltage input and the outer pin of power adapter is ground. Please confirm the pin 1 of terminal block is positive voltage input and pin 2 of terminal block is ground. Please don't use power adapter input and terminal block input simultaneously.

### **B-2. Troubleshooting procedure**

- a) When we confirm that we have correct DIP switch setting in TWIN232 box, we can insert power adapter. In normal condition the POWER LED indicator will be ON. If POWER LED were not ON, then we may have DC/DC converter in TWIN232 box damaged. Or you may have wrong power adapter to use. Please use multimeter to check the voltage level in terminal block pin 1 and pin 2 is between 9V and 30V. The voltage level under 9V may not have enough power for TWIN232. The voltage level over 30V may damage the DC/DC converter in TWIN232. Please keep in mind that we use DC type power adapter in TWIN232 box. Please don't use AC type power adapter in TWIN232 box.

- b) When we send/receive data from RS232 port, there are TXD and RXD LED indicator flash in normal condition. If TXD and RXD LED indicator were not ON, then we may have RS232 interface IC failed in TWIN232. Please confirm that you have correct cable between TWIN232 box's Common Ground DB9 female connector and your RS232 device or Isolated DB9 male connector and your RS232 device.
- c) When we set RS422 interface mode in TWIN232 box, we can set DIP switch bit 2 and 3 in ON location for loopback test. When we send/receive data in RS232 port. In normal condition we can see the echo data in console. If there were no echo data in console, then we may have RS422 interface IC damaged or DC/DC converter damaged in TWIN232. Please use multimeter to check the voltage level in TXD+ and TXD- signal. If the voltage level for such signal and ground pin were about 0V, then we may have isolated DC/DC converter damaged.

## -----Appendix C----- RMA procedure for TWIN232 Box

### C-1. RETURN MATERIAL AUTHORIZATION (RMA or RA)

RAYON requires that you provide the following information :

- \* Model number
- \* RAYON serial number
- \* The reason for returning the products

#####

# We strongly suggest that you can check with RAYON by E\_mail before #  
# you can confirm the reason for returning the products. Because some #  
# problem may be due to wrong software usage or setup. #  
# [rayon@ms1.hinet.net](mailto:rayon@ms1.hinet.net) #

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- \* Your purchase-order number

You will be given the following information from your RAYON Service Representative :

- \* Your Return Material Authorization Number (RMA or RA Number)
- \* Information regarding applicable charges
- \* The address to which you will return the products

## **C-2. REPAIR CHARGES**

All RAYON products have a one year warranty. Products that are damaged or modified are not covered.

This limited warranty covers defects in materials and workmanship in your RAYON-branded hardware products. This limited warranty does not cover problems that result from :

- \* external causes such as accident, abuse, misuse, or problems with electrical power.
- \* Servicing not authorized by us.
- \* Usage that is not in accordance with product instructions.
- \* Failure to follow the product instructions or failure to perform preventive maintenance.

Products that are covered under the original warranty and that are found defective by RAYON will be repaired at no cost. A standard handling and testing charge will be assessed for products returned for warranty repair that are found to be operating properly.

Products that are no longer covered under warranty will be repaired, if deemed repairable, for a flat rate charge regardless of the repair work required.

Please contact the nearest RAYON Service Center for current pricing information.