RS232
CURRENT LOOP CONVERTER
OPERATION MANUAL
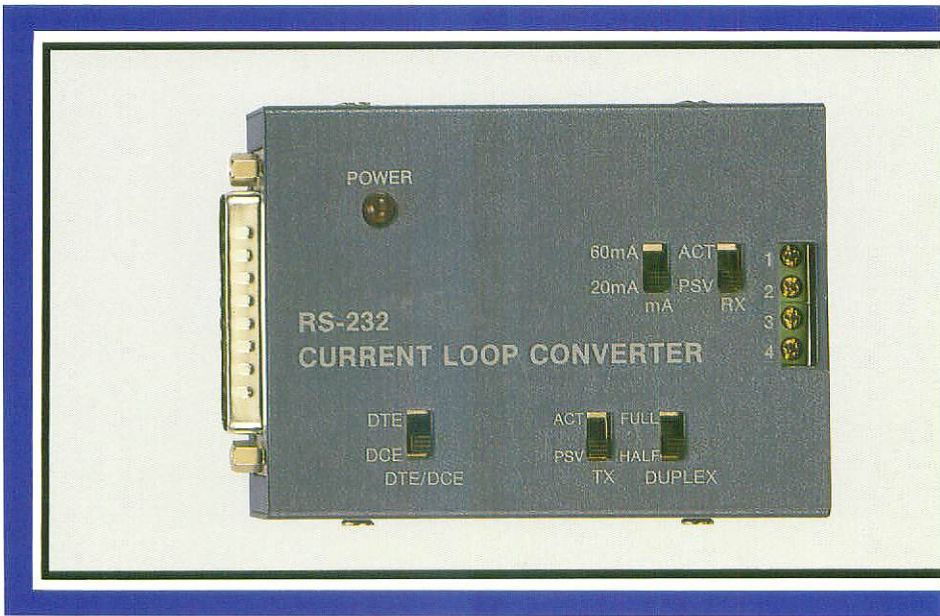
RS232 CURRENT LOOP CONVERTER

USER'S MANUAL

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Rev. Date : 1996, FEB. 21

CHAPTER 1 INTRODUCTION

The RS232 current loop converter provides an expandable current loop communication for standard RS232 interface.

The features of RS232 current loop converter are:
* Standard EIA RS-232C communication protocol.
* Passive or active current loop selectable.
* One DB-25 female RS232 connector.
* Terminal block connector for long haul cable.
* DCE, DTE, or loopback selectable.
* 4 wire full duplex or 2 wire half duplex selectable.
* Using DC 9V external power or supported by pin 9 of RS -232C.
* One pair (two converters) is needed for two connected devices.
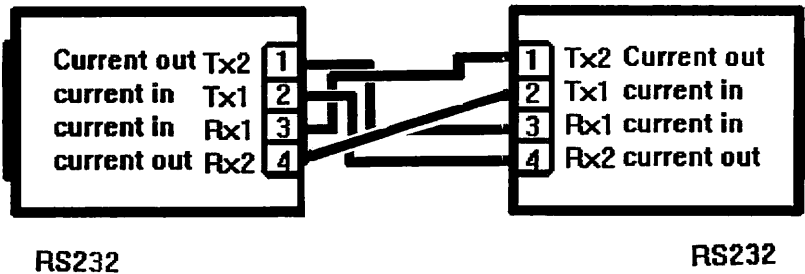* 20mA or 60mA selectable.
* Compact size.

The package contains:
* Two (or One) RS232 current loop converters.
* User's manual.

CHAPTER 2 HARDWARE CONFIGURATION

2.1 Block Diagram

Observe the figure shown in the following, the RS232 current loop converter contains five switches, one terminal block, and one RS232 DB-25 male connector.

RS232   RS232

2.2 Switch Setting

1. SW1 (device mode selection)
>   DCE
>   DTE

The SW1 is used to select device mode.

DCE: The RS232 current loop converter is set to DCE mode, and it must be connected to DTE device.

DTE: The RS232 current loop converter is set to DTE mode, and it must be connected to DCE device.

2. SW2 (active current selection)
>   20mA
>   60mA

The SW2 is used to select Tx active current.

3. SW3 (transmit/receive mode selection)
>   Full Duplex
>   Half Duplex

The SW3 is used to select full duplex, half duplex for transmit or receive mode.

4. SW4 (Tx passive or active selection)
>   Passive
>   Active

The SW4 is used to select Tx passive or active.

5. SW5 (Rx passive or active selection)
>   Passive
>   Active

The SW5 is used to select Rx passive or active.

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2.3 Terminal Block

1	2	3	4
Tx2	Tx1	Rx1	Rx2

The terminal block is used to connect two RS232 current loop converters. The signal assignment is shown in the follow.

Connector	Name	Description
#1	Tx2	Tx current out
#2	Tx1	Tx current in
#3	Rx1	Rx current in
#4	Rx2	Rx current out

For full duplex application, please connect it as figure below.

Tx2	1----------3	Rx1
Tx1	2----------4	Rx2
Rx1	3----------1	Tx2
Rx2	4----------2	Tx1

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2.4 Signal Assignments for DB25

1. DTE mode (standard)

Pin	Name	Description	Direction
1	GND	Chassis Ground	Common
2	**Tx**	**Transmit Data**	**Output**
3	**Rx**	**Receive Data**	**Input**
4	RTS	Request to Send	Output
5	CTS	Clear to Send	Input
6	DSR	Data Set Ready	Input
7	SG	Signal Ground	Common
8	DCD	Data Carrier Detect	Input
20	DTR	Data Terminal Ready	Output

2. DCE mode

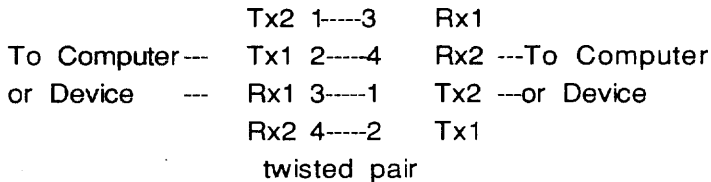| Pin	Name	Description	Direction
1	GND	Chassis Ground	Common
2	**Rx**	**Receive Data**	**Input**
3	**Tx**	**Transmit Data**	**Output**
4	CTS	Clear to Send	Input
5	RTS	Request to Send	Output
6	DTR	Data Terminal Ready	Output
7	SG	Signal Ground	Common
8	DCD	Data Carrier Detect	Input
20	DSR	Data Set Ready	Input

* The pin 4 (CTS) and pin 5 (RTS) are shorted together, and the pin 6 (DTR) and pin 20 (DSR) are shorted together in this converter.
* Some applications need short pin 6 (DTR) and pin 8 (DCD).

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CHAPTER 3 DEVICE CONNECTION

3.1 Installation

To use RS232 current loop converter, you must connect it by 4 wire line (24 AWG two twisted pairs), then connect both DB-25 female connector to PC or devices (we call DEVICE in the follow). Please note that, you must set DCE or DTE mode correctly, otherwise it can not work. Suppose the DEVICE is DTE mode, you must set the RS232 current loop converter to DCE, otherwise if the DEVICE is DCE mode, you must set the RS232 current loop converter to DTE.

The full duplex connection of two RS232 current loop converters are shown in the follow.

```
                Tx2 1-----3     Rx1
To Computer---  Tx1 2-----4     Rx2 ---To  Computer
or  Device   ---  Rx1 3-----1   Tx2 ---or  Device
                Rx2 4-----2     Tx1
                  twisted  pair
```

If needed, plug in power adapter to RS232 current loop converter.

3.2 Loop Back Test

To test the RS232 current loop converter, please follow the steps:

1. Set SW1 to DCE. (suppose RS232 port of your computer is DTE)

2. Connect Tx2(#1) to Rx1(#3).

3. Connect 50 to 100 OHM resistor from Tx1(#2) to Rx2(#4).

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4. Set the SW4 to Tx active and SW5 to Rx passive.

5. Set the SW3 to full duplex.

6. Run CURTEST.EXE program (which is in the distribution diskette).

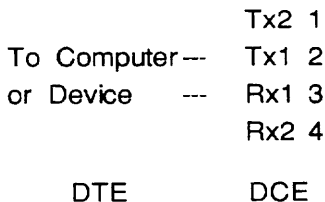7. Key in data, you may see the key in data are shown in the monitor.

NOTE

* Do not forget to connect resistor in this test stage, otherwise it will damage the devices.

* You may set SW4 to Tx passive and SW5 to Rx active, to test another function.
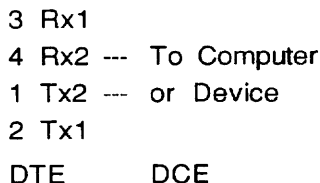
3.3 Hardware Connection

In the following, we will introduce how to connect DB-25 from computer to computer/device, and also show the signal flow of both RS232 current loop converters.

1. DCE Mode

```
                      Tx2 1
    To Computer ---   Tx1 2
    or Device   ---   Rx1 3
                      Rx2 4

        DTE          DCE
```

2. DTE Mode

```
              3 Rx1
              4 Rx2 --- To Computer
              1 Tx2 --- or Device
              2 Tx1
              DTE       DCE
```

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3. Full Duplex

```
                    Tx2  1----3     Rx1
To Computer---      Tx1  2----4     Rx2 --- To Computer
or Device   ---     Rx1  3----1     Tx2 --- or Device
                    Rx2  4----2     Tx1
                       twisted pair
```
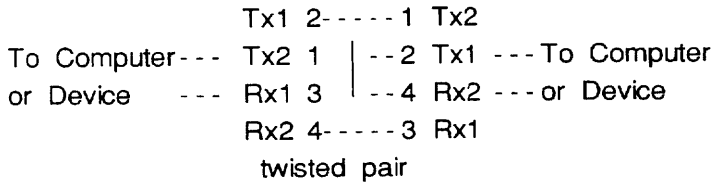
          Side 1   Side 2

Side 1	Side 2
DTE or DCE	DTE or DCE
Full Duplex	Full Duplex
Tx Active Rx Active or Tx Passive Rx Passive	Tx Passive Rx Passive Tx Active Rx Active
20mA or 60mA	20mA 60mA

* To select DTE or DCE, please see the section of DTE mode
and DCE mode.

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4. Simplex Application

The side 1 is set to receiver and the side 2 is set to sender.

```
                 Tx1 2-----1 Tx2
To Computer--- Tx2 1 | --2 Tx1 ---To Computer
or Device    --- Rx1 3 | --4 Rx2 ---or Device
                 Rx2 4-----3 Rx1
                   twisted pair

       Side 1           Side 2
```

Side 1	Side 2
DTE or DCE	DTE or DCE
Full Duplex	Full Duplex
Tx Active Rx Active	Tx Passive Rx Passive
20mA or 60mA	20mA 60mA

5. Half Duplex Application

```
                    Tx2 1        1 Tx2
To Computer ----- Tx1 2        2 Tx1 --- To Computer
or Device    ----- Rx1 3----- 4 Rx2 --- or Device
                    Rx2 4----- 3 Rx1
                    twisted pair

        Side 1            Side 2
```

Side 1	Side 2
DTE or DCE	DTE or DCE
Half Duplex	Half Duplex
20mA or 60mA	20mA 60mA

Case   1:

  Side 1 is sender, and side 2 is receiver.

```
    Side 1              Side 2
Tx Active          Tx Passive
Rx Passive         Rx Passive
```

Case   2:

  Side 2 is sender, and side 1 is receiver.

```
    Side 1              Side 2
Tx Passive         Tx Active
Rx Passive         Rx Passive
```

APPENDIX A WARRANTY INFORMATION

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NOTE:

NOTE: