

ICC-11

INTERFACE CONVERTER

RS-232C <-> RS-422/485
CONVERTER



User's Manual

1. GENERAL DESCRIPTION

This unit is a bidirectional interface converter for RS-232C and RS-422/RS-485 which is capable of either point-to-point or multidrops operation. Each unit contains both DRIVER (Transmitter) and RECEIVER function. The RS-232C signals are obtained at normal SUB-D25 connector side and differential signals are obtained at the opposite side. Besides the normal 4 screws terminal used for RS-422/485 signals, it has a RJ-11 6P4C Modular Jack which is very easy for wire installation and cost low for the cabling. User can use either one to install loopback pack.

It can be also powered from RS-232C port's pin #9 or an external 9V DC 100mA adapter. The regular DC power plug, as figure 1, will not cause temporary short-circuit problems during plug in or pull out.

Refer to figure 2, the POWER LED shows the unit is ON or OFF, and two extra LEDs simply indicate TXD and RXD of RS-232C status. This device contains three slide switches which used to configure 1.) the DTE/DCE assignment of the RS-232C wiring of the converter and 2.) the MONITOR/SIMULATE operation mode 3.) Contention control of Transmitter and Receiver to avoid data collision.

In general applications, user can use it to extend the distance between two RS-232C device (needs two sets) or to hook-up another system which merely has the opposite interface. In the latter case it needs only one unit to bridge the two different interfaces.



Figure 1

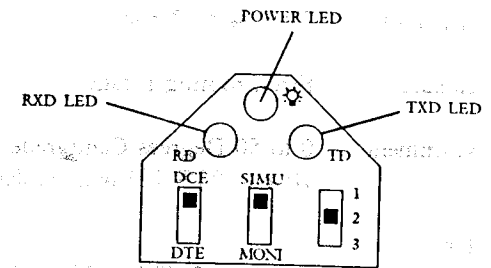


Figure 2

2. SPECIFICATIONS

Power DC 9V 100mA adapter
or DC 9V 60mA from the RS-232C pin #9

Switches- SW1. DTE or DCE
Selection SW2. MONITOR or SIMULATE mode
SW3. Transmitter (TX) and Receiver (RX)
Contention Control

Position	TX	RX	NOTES
3	RTS	ON	(*1)
2	ON	ON	(*2)
1	RTS	/RTS	(*3)

Table 1

Signal Connectors 1. RS-232C : DB-25 male or female
 2. RS422/485 : RJ-11 6P4C Jack
 3. RS422/485 : 4 Screw Terminal

Data Rate up to 115k bps
 Line Length within 4000 ft.

Dimensions 77 * 54 * 22 mm

Enclosure Fire-Proofing Plastic

Environment 0 to 50 Degrees Centigrade
 10% to 90% RH non-condensing

Notes:

- *1 : Switch set to position 3, TX enabled when RTS ON i.e. RTS presents +3V above.
- *2 : Switch set to position 2, TX and RX are always enabled.
- *3 : Switch set to position 1, TX enabled when RTS ON, RX enabled when RTS OFF.

3. SWITCH CONFIGURATION

3.1 Select DTE or DCE wiring of RS-232C

The DTE/DCE slide switch is essentially swapping pin #2 and pin #3 of RS-232C DB-25. The TD LED always indicates the pin #2 status in spite of the switch setting and RD LED indicates the pin #3 in the same manner. Refer to table2.

Select DTE position , pin #2 is configured as transmit data out (TXD) , and pin #3 as receive data in (RXD).

Select DCE position , pin #2 is configured as receive data in (RXD), and pin #3 as transmit data out (TXD).

(RS-232C Wiring)

Position	Configure	(TD LED) Pin #2	(RD LED) Pin #3
DTE	DTE	TXD	RXD
DCE	DCE	RXD	TXD

Table 2

3.2 Operation Mode

The MONI/SIMU slide switch basically configures the converter as either two receivers or one transmitter and one receiver respectively.

In the MONITOR mode , switch slid to MONI position, the converter is configured as two receivers. The data is received from either the RJ-11 6P4C Jack or the 4-screws terminal in-pairs. The device converts the received data into RS-232C signals which outputs from pin #16 and pin #2 or pin #16 and pin #3 of DB-25 connector, the swapping of pin #2 and pin #3 is according to the DTE/DCE switch selection.

* This mode is usually used with monitoring device which can analyze on-line data format.*

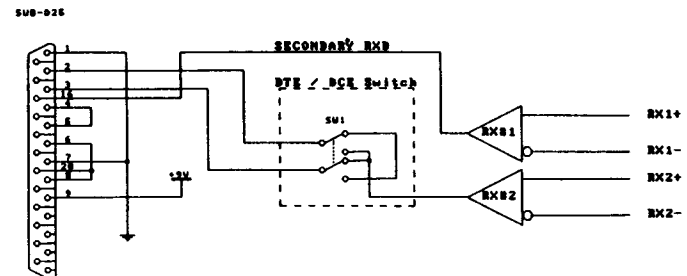


Figure 3

In the SIMULATION mode, switch slid to SIMU position, the converter is configured as one transmitter and one receiver which is capable of asynchronous bi-directional converting data. The RS-232C data is in and out from DB-25 connector pin #2 and pin #3 according as the DTE/DCE switch setting; set as DTE : transmit data out through pin #2 and receive data in from pin #3; set as DCE : receive data in through pin #2 and transmit data out from pin #3. The RS-422/485 signals are obtained through both RJ-11 Jack and 4-screws terminal in pairs, refer to figure 4 and table 3 as details.

* In general, this mode is applied to the real applications.

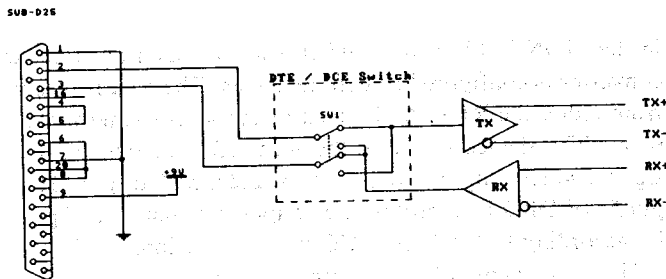


Figure 4

(RS-232C)

Position	Mode	Pin #2	Pin #3
MONI	Monitor	TXD out	TXD out
SIMU	Simulation		
	DTE	TXD out	RXD in
	DCE	RXD in	TXD out

Table 3

4. PIN DEFINITIONS

4.1 RS-232C DB-25 Connector:

Pin	DTE	DCE	Description
1	PG	0V	Protective ground
2	TXD	OUT	Transmitted data
3	RXD	IN	Received data
4	RTS	OUT	Request to send
5	CTS	IN	Clear to send
6	DSR	IN	Data set ready
7	GND	0V	Signal ground
8	DCD	IN	Received line signal detector
9	+9V	IN	DC +9V power supply input
16	SRXD	OUT	Secondary received data
20	DTR	OUT	Data terminal ready

* There are three internal jump-wires on:

- pin #4, pin #5
- pin #1, pin #7
- pin #6, pin #8, pin #20.

4.2 Four screws terminal

There are two different definitions for the terminal just according to the operation mode setting.

- MONITOR mode : Two receivers. Terminal #1 and #2 are defined as receiver #1. Terminal #3 and #4 are defined as receiver #2.
- SIMULATION mode : 1 transmitter and 1 receiver. Terminal #1 and #2 defined as transmitter, and terminal #3 and #4 defined as receiver.

4-screws Terminal	Monitor	Simulation	RJ-11 Jack
#1	RX+ (RX#1)	TX+	#2
#2	RX- (RX#1)	TX-	#1
#3	RX+ (RX#2)	RX+	#3
#4	RX- (RX#2)	RX-	#4

Table 4

4.3 RJ-11 6P4C Modular Jack / Plug & Cable

Pin definition of the RJ-11 Jack is similar to 4 screws terminal, but pin #1 and pin #2 are swapped due to the crossed pinning RJ-11 4-wire cable. To accomplish the cable installation is easy, just plug and go. (refer to above table)

4.3.1 RJ-11 6P4C Jack



Pin	
1	TX-
2	TX+
3	RX+
4	RX-

Figure 5

4.3.2 RJ-11 6P4C Plug

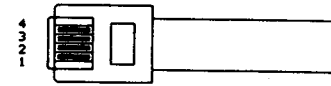


Figure 6

4.3.3 RJ-11 4-wire crossed-pinning cable

TX- #1	<----->	#4	RX-
TX+ #2	<----->	#3	RX+
RX+ #3	<----->	#2	TX+
RX- #4	<----->	#1	TX-

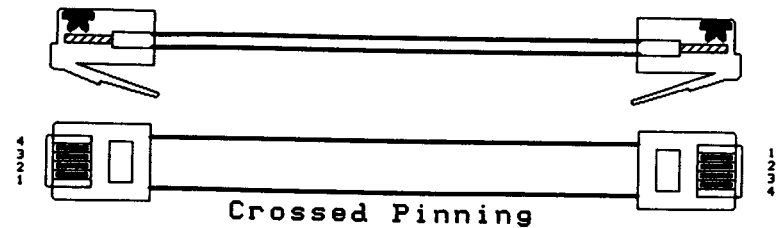


Figure 7

5. LOOPBACK

(Please prepare two AWG #24 wires about 10-cm long and clipping tool or wire-stripper if needed. Strip off the PVC cover on the both ends of the wires.)

5.1 RJ-11 LoopBack Plug for RJ-11 Jack

First wire short RJ-11 pin #1 and pin #4, and second wire short pin #2 and pin #3.

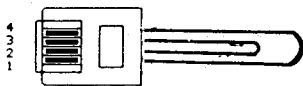


Figure 8

5.2 LoopBack on 4-screws Terminal

First wire short Terminal pin #1 and pin #3, and second wire short pin #2 and pin #4.

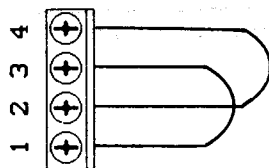


Figure 9

6. INSTALLATION

First of all ,as reference ,we define the nearest side as "Local End" and the farrest side as "Remote End" . Then you have to get a 4-wire cable which is long enough to connect these two ends. A RJ-11 4-wire crossed-pinning cable is the most recommended for its convenience. If the electro-magnetic noise interference of the environment is much worse than normal situation, a double shielded 4-wire cable is recommended to overcome such noisy problem.

- a.) Make sure the switches are set to proper position as above explained.
- b.) Plug this unit to the communication port of "Local End" , and another unit to communication port of "Remote End". This device can directly plug in or through an extend cable. (up to 30 M).
- c.) Connect "Local End" to "Remote End" with the prepared cable. The normal connection pinning should be TX+ to RX+ and Tx- to Rx-.
- d.) If these units are not powered internally, just plug in the proper DC 9V 100ma adapter to wall outlet individually. The POWER LED will light on that means the converter is ready to service.

7. SELF-DIAGNOSTIC (TROUBLE-SHOOTING)

The converter is actually a passive interface which can not diagnose itself. The following steps will lead you to accomplish the testament:

- a.) Set MONI/SIMU switch of both ends to SIMU position. (1 Tx and 1 Rx each).

- b.) Slide DTE/DCE switch to DCE position. Generally, the Terminal (HOST) is DTE configuration, if not ,simply slide to the opposite position (DTE). Please keep in mind that two same kind of configuration will not communicate with each other.
- c.) Place an external loopback (refer section 5) at "Local End" on either Terminal or RJ-11 Jack.
- d.) Set Terminal to full duplex mode and enter data , each data will echo back to screen. If data is the same as previously entered , and TD and RD LEDs blinking while continuously entering data , that means this converter's circuitry is functional well.
- e.) Install the connection cable to "Local End", and place an external loopback on the cable at "Remote End". Refer to figure 9 mark B.
- f.) Repeat above step (d.). If everything goes well that means this device including the connection cable is good. Otherwise ,there is a "BUG" with the cabling. Please correct it first before going to the next step.
- g.) Tag a short wire on pin #2 and pin #3 of RS-232C DB-25 on the "Remote End" converter. Refer to figure 9 mark C. Make sure that unit is powered on, and don't plug to any device.
- h.) Repeat above step (d.). If data echoes back exactly, then the whole linking is correct.
- i.) Remove the short tag placed on step (g). Setup the "Remote End" with proper configuration and same communication protocol; things like DTE or DCE, baud rate, parity check, data length, and stop bits etc... Now the two ends can talk with each other.

- j.) If you go through all the above steps and couldn't establish the communication link, please direct connect with those two ends as possible as you can and try it all over again. If it is fine then you have to consult knowledgeable people to solve the puzzle.

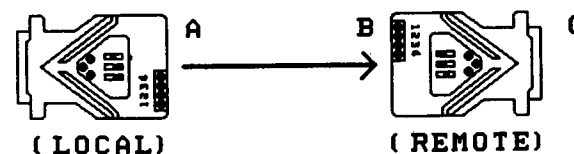


Figure 10

8. APPLICATIONS

8.1 Point to Point / 4-Wire Full-Duplex

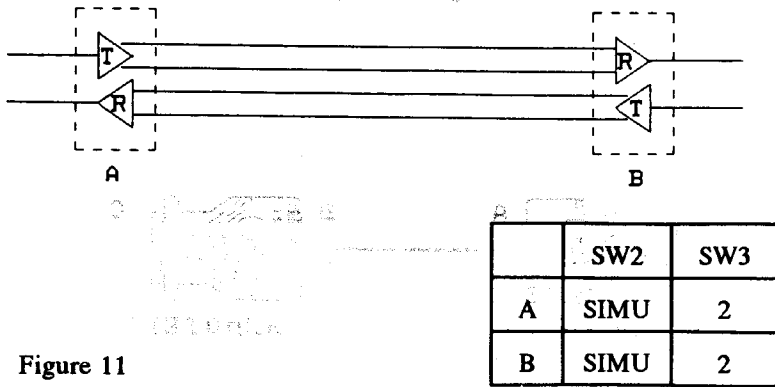


Figure 11

8.2 Point to Point / 2-Wire Half-Duplex

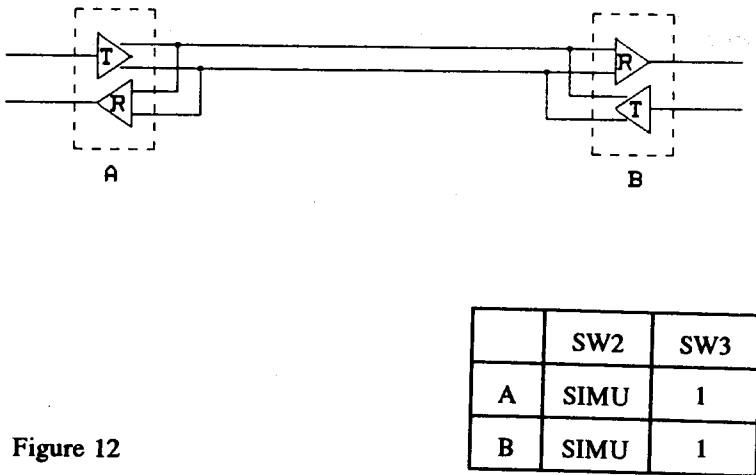


Figure 12

8.3 Multidrops / 4-Wire Full-Duplex

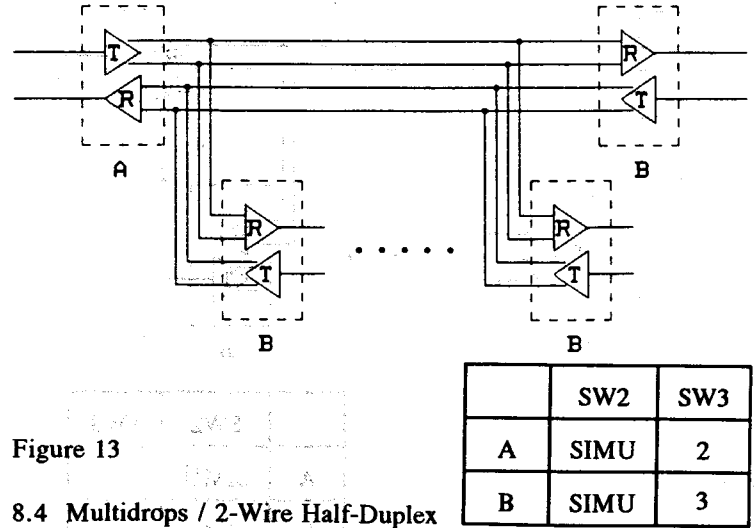


Figure 13

8.4 Multidrops / 2-Wire Half-Duplex

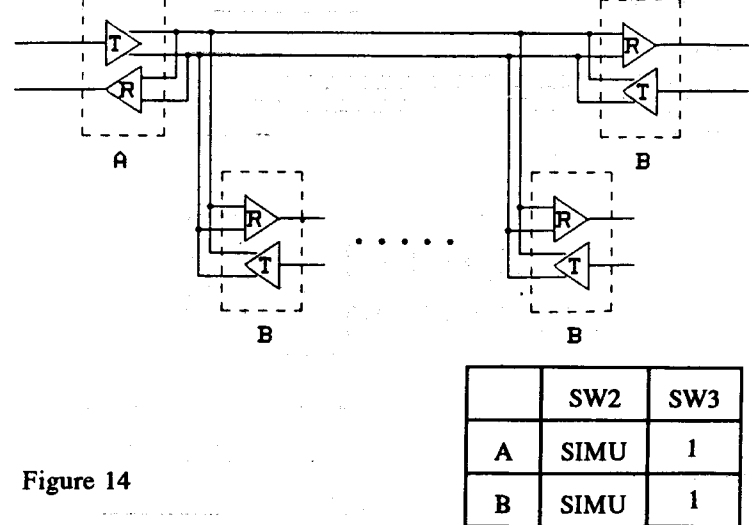


Figure 14

8.5 Simplex / 2-Wire / 1 Transmitter to Multi-Receiver

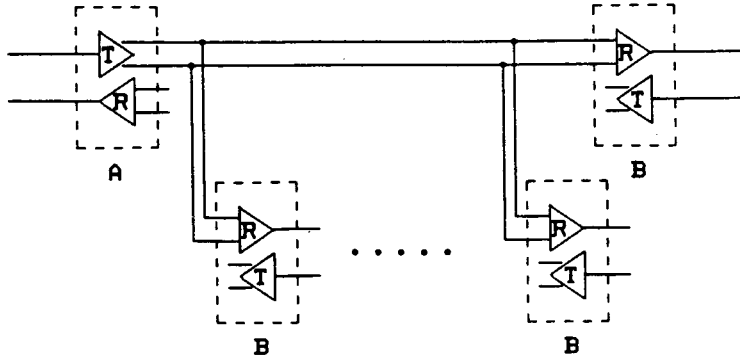


Figure 15

	SW2	SW3
A	SIMU	2
B	SIMU	2

8.6 Monitoring

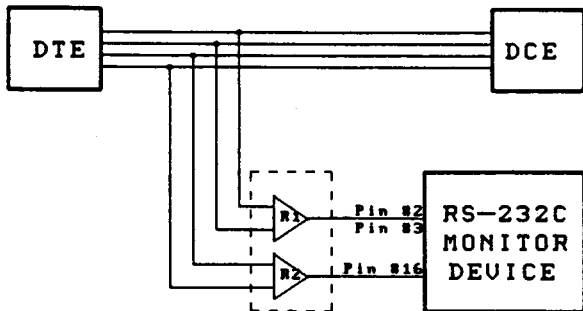


Figure 16

	SW2	SW3
A	MONI	X