

# RS-232C LINE DRIVER IC-150

## User's Manual

### PACKAGE CHECKLIST

When you purchase this product, it should contain the following elements:

- A Line Driver IC-150
- An IC-150 User's Manual

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Manual part NO. PAPE-0076-100

## 1 FUNCTION OVERVIEW

### 1-1 Introduction

The nonpowered Line Driver facilitates efficient transmission and reception of serial data without requiring an external power source. The unit drives your data at various speeds up to 19,200 bps over distances up to 0.5 miles using 24-gauge wire (transmitting at 110 bps over distances up to 6.3 miles).

This compact unit plug directly into the back of your asynchronous terminal, which saves the space that a stand alone unit would use, and also eliminates the bulk and cost of a RS-232 interface (which must have a +12V DC source) and therefore requires no separate outlet or power supply. It provides 1,500VAC lightning surge protection and excellent noise rejection through the use of differential circuitry. The unit is switch-selectable for DCE/DTE. The Line Driver provides asynchronous transmission and operates full-duplex over four wires. At slower speeds, the distance increases. Transmission performance may vary depending on operating conditions and wire gauge.

## TABLE OF CONTENTS

<b>1 FUNCTION OVERVIEW</b> .....	<b>1</b>
1-1 Introduction .....	1
1-2 Function Specifications .....	2
1-3 Description .....	4
<b>2 INSTALLATION</b> .....	<b>5</b>
2-1 Installation .....	5
2-2 Switch Function Description .....	6
<b>3 OPERATING PROCEDURE</b> .....	<b>8</b>
<b>APPENDIX</b> .....	<b>12</b>
Trouble Shooting .....	12
RS-232 Pin-Out .....	14
Preventing Radio & TV Interference .....	16

We suggest you take a few minutes to read the following instructions to assure you the maximum benefits and convenience your Line Driver offers.

### 1-2 Function Specifications

Function	Specifications
Power Supply	No external power required. Power derived from RS-232C interface.
Data Rate	Up to 19,200 bps under 0.5 miles.
Connector	SW1: DCE, DTE, LOOP BACK selection SW2: Full Duplex, Simplex.
Enclosure	Plastic
Weight	60 gm
Dimensions	54 x 74.5 x 18.5 mm

Table 1-2.1 Specifications Table

Data Rate(bps)	Transmission Distance		Wire Used
	km(s)	mile(s)	
110	10	6.3	24 AWG two twisted pairs
1200	7	4.4	
2400	5	3.1	
4800	3.5	2.2	
9600	2	1.3	
19200	0.8	0.5	

Table 1-2.2 Distance and Data Rate Table

## 1-3 Description

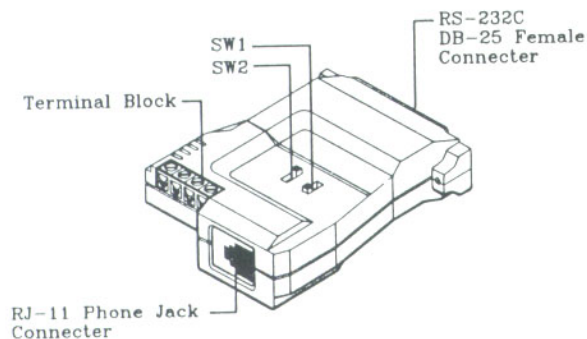


Figure 1-3.1 External View

## 2-2 Switch Function Description

Refer to the location of the SW1 and SW2, please see Table 2-2.1.

Position	SW1	SW2
1	DCE	Full Duplex
2	DTE	DCE, Tx or DTE, Rx
3	Loop Back	DCE, Rx or DTE, Tx

Table 2-2.1 Switch Function

### SW1: Device Mode Selection

Position 1: DCE means the IC-150 is set at DCE mode and it must be connected to a DTE device.

Position 2: DTE means the IC-150 is set at DTE mode and it must be connected to a DCE device.

# 2 INSTALLATION

## 2-1 Installation

Before installing the IC-150 you will need a 4-wire cable. This cable must go from your location to the place you want to connect to.

### Installation Procedure:

1. Before installing the IC-150 to the PC. Please check Chapter 3 OPERATION PROCEDURE for correct slide switch settings and phone wires connection, then connect IC-150 to the PC.
2. Turn on PCs.

Position 3: Loop Back means the IC-150 is set at monitor mode and it is used to monitor the phone line signals.

SW2: Full duplex/Tx-only/Rx-only.

Position 1: Full duplex, IC-150 may transmit and receive simultaneously.

Position 2: If SW1 selects DCE, IC-150 transmits only.  
If SW1 selects DTE, IC-150 receives only.

Position 3: If SW1 selects DCE, IC-150 transmits only.  
If SW1 selects DTE, IC-150 receives only.

Note: DTE means Data Terminal Equipment.  
DCE means Data Communication Equipment.  
More detailed information, please refer to the Appendix.

### 3 OPERATING PROCEDURE

- Note the digital interface is RS-232C/CCITT V.24.
- When in Full Duplex, only software handshake (i.e. Xon/Xoff or ETX/ACK) is APPLICABLE via TD and RD.
- When in Simplex, only hardware handshake DTR/DSR is applicable.
- The unit is powered from host RS-232C interface (MC1488, SN75188 or equivalent ICs). The interface must provide power source above +9V.
- In addition to the TD line, the computer or terminal must also support at least either the RTS line or the DTR line or both lines.

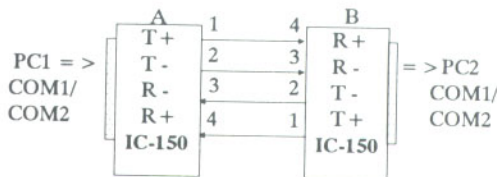


Figure 3-1.1 IC-150 Configuration

SW1 \ SW2	DCE		DTE	
	T+/T-	R+/R-	T+/T-	R+/R-
Full Duplex	Rx pin 2	Tx pin 3	Rx pin 3	Tx pin 2
Tx(DCE) or Rx(DTE)	Rx pin 2	DTR pin 6	DSR pin 6	Tx pin 2
Rx(DCE) or Tx(DTE)	DSR pin 20	Tx pin 3	Rx pin 3	DTR pin 20

Table 3-1.1 SW1 and SW2 Set-up

DCE device	FUNCTION		DTE device	DCE device
IC-150 A				
SW1 SW2	SW1	SW2	SW1 SW2	SW1 SW2
2 1	1	1	(1) A	←→ B
2 3	1	2	(2) A	→ B
2 2	1	3	(3) A	← B
2 1	1	1	(4) A	□ B

Table 3-1.2 IC-150 Function Table

- Function (1): Full Duplex: A and B may transmitted and received, but only use software handshake.
- Function (2): Simplex: A is Transmitter, B is receiver.
- Function (3): Simplex: A is receiver, B is transmitter.
- Function (4): Loop Back, device A monitor the phone line data transmission. (for self-test use only)

NOTE: SW1 means the DCE/DTE switch.

SW2 means the Full Duplex or Simplex switch.

"x" means don't care.

In Simplex mode, only hardware handshake DTR/DSR is applicable.

Please check with the device for DTE/DCE and transmit/receive, then set SW1 and SW2 of IC-150 A and IC-150 B accordingly.

# APPENDIX

## TROUBLE SHOOTING

The Line Driver is a well designed quality product. For maximum performance:

1. Check to see if the DTE/DCE mode has been correctly configured.
2. Perform a regular check to see if the connections of wires and connectors are correct and the cable is well-maintained.
3. Check if any of the pins 4,5,6,8 and 20 carry  $\pm 9V$  DC.

If you still have problems after following the steps in the above section, you should seek qualified help rather than risking damage to the unit by experimenting. The Line Driver is a sensitive electronic instrument, do not attempt to repair it yourself. Avoid operating under harsh environments where high voltage, heat,

## RS-232 PIN-OUT

1. DTE Mode.

Pin No.	Name	Function
1	PG	Protective Ground
2	TD	Transmitted Data
3	RD	Received Data
4	RTS	Request to Send (connected with pin 5)
5	CTS	Clear to Send (connected with pin 4)
6	DSR	Data Set Ready
7	SG	Signal Ground
8	CD	Received Line Signal Detector
20	DTR	Data Terminal Ready

Table A-1 DTE Mode Pin-Out

humidity and electromagnetic interference prevails. Do not use harsh solvents.

If you still have problem after aforesaid solutions, please contact your dealer for help.

2. DCE Mode.

Pin No.	Name	Function
1	PG	Protective Ground
2	RD	Received Data
3	TD	Transmitted Data
4	CTS	Clear to Send (connected with pin 4)
5	RTS	Request to Send (connected with pin 5)
6	DTR	Data Terminal Ready
7	SG	Signal Ground
8	CD	Received Line Signal Detector
20	DSR	Data Set Ready

Table A-2 DCE Mode Pin-Out

## PREVENTING RADIO & TV INTERFERENCE

Warning this equipment generates, uses and radiates radio frequency energy and if not installed and used in accordance with the instruction manual may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient the receiving antenna.
2. Relocate the computer with respect to the receiver.

3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that computer and receiver are on different branch circuits.
5. Ensure that the mounting screws, attachment connector screws and ground wires are tightly secured.
6. Ensure that good quality, shielded and grounded cables are used for data communications

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

IC-150 PAPE-0076-100  
PRINTED IN TAIWAN 10/90