Milestone™

RS232C-Line Driver

MODEL: LD-12A, LD-14A, LD1214A

Introduction

Milestone Line Drivers are designed for high speed data transmission between computer system and or peripherals over long distance under high noise conditions. They provide dual line interface per signal.

There are two models of Line Drivers available.

1. Model LD-12A- Two Wire Asynchronous with Opto-isolation
2. Model LD-14A – Four Wire Synchronous with Opto-isolation
3. Model LD-1214A Six Wire Synchronous with Opto-isolation

ASYNCHRONOUS TRANSMISSION - LD-12A

In asynchronous transmission, only TxD and RxD signals are used. Each signal is converted to two wire signal. Transmit signal is converted to + Tx and –Tx and received signal is converted to +Rx and –Rx signal. Line Driver output will have correspondingly 2 pairs of wires +Tx output from one line driver is connected to +Rx of remote line driver, while –Tx is connected to –Rx.

SYNCHRONOUS TRANSMISSION - LD-14 A & LD-1214A

Synchronous transmission uses additionally handshaking signals. Normally, DTR and DSR signal are used. Each signal is converted to 2-wire signal. Hence, Line Driver output will require 4 pair twisted wires. Typical RS 232 cable connections are shown in TABLE III. In some systems, RTS and CTS signals are used for handshaking. Cable connections for such system are given in TABLE IV.

Application:

Application for Line Driver can be for factory automation, programmable logic controllers, attendance recording systems, Bar Code Readers, remote data transmission, remote terminals, EPABX etc.

Specifications:	
Input	RS232 D25 Female connector
Output	Two-wire differential output for each signal-D25 Male Connector/Terminal Strip with Opto-Isolation, Surge and Fuse protection
Signals	➢ Asynchronous Model LD-12 A (Supports Tx & Rx) ➢ Synchronous Model LD-14 A (Supports Tx, Rx, DTR &DSR) ➢ Synchronous Model LD-1214A (Supports Tx, Rx, DTR, DSR RTS & CTS
Max. Distance	2.5Kms @ 19,200 bps 6.0Kms @ 9,600 bps
Output Cable	Shielded twisted pair cable –90 ohms/km
Transient Protection	2500 V Peak
Front Panel LED	TX, RX, LS, PWR (TC, RC)
Test Facility	Switch on the rear panel for local loop-back test
Power Supply	Mains input –230V AC, 50 Hz
Power	Max. 20 VA Built-In Power Supply

INSTALLATION

Generally, when it is required to communicate between two remotely located systems; a pair of Line Driver is to be installed near each system.

The Front Panel consists of LED indicators showing the status of various transmitted and received signals. The LED blinks when the particular signal is received or transmitted. 'TD' and 'RD' indicate transmit and Receive signals respectively. TC and RC indicate DTR & DSR signals. 'LS' indicates line status when remote Line Driver is connected with Power On condition.

The back panel consists of RS232 port and Line Driver (LD port) port. The Tables I and II give the details of each pin of respective ports. A 2-way slide switch is also provided on the rear panel. “NOR” position is kept for normal working. “LOOP” position is kept while testing in loop-back as explained in Test Procedure.

Typical RS232 cable and Line Driver cable connections are shown in Table III, IV and V.

TEST PROCEDURE

1. Connect one Line Driver to a terminal using proper compatible cable on Input RS232 port.

2. Local Loop-Back Test: Put the rear panel slide switch to “NOR” Position. Plug in a loop connector (D25 Female connector) with its pins shorted in following manner on Line Driver O/P port (LD O/P).

   Pin 3 shorted to Pin 6,
   Pin 4 shorted to Pin 5,
   Pin 9 shorted to Pin 11,
   Pin 10 shorted to Pin 12,

   Switch on the Line Driver and Terminal and transmit characters from terminal. If everything is normal, echo-back character is received on the terminal. Otherwise the unit is faulty. If it is OK, go to the next step.

3. Connect another Line Driver at remote end through Line Driver cable making sure of proper connections between two Line Drivers as shown in TABLE V.

4. **Remote Loop–Back Test :**
   Switch on the remote Line Driver also. Put the switch on rear panel of remote Line Driver to “Loop” position. Now transmit characters from Terminal at Local Line Driver. If both the Line Drivers along with cable connecting two Line Drivers are OK echo-back characters also will appear on the Terminal Screen.

5. Put the switch on rear panel of Remote Line Driver back to “NOR” position and connect it to remote device using appropriate RS232 cable. Check data communication between the two devices.

TABLE I: Unit RS 232 Port – D25 Female Connector

Pin No.	Signal Name	In / Out
2	Rx	Input
3	Tx	Output
6* ^	DTR	Output
7	Signal Ground	-
20*^	DSR	Input
4^	CTS	Input
5^	RTS	Output

*Used for Synchronous Models LD-14A
^ Used for Synchronous Model LD-1214A

TABLE II: Line driver output port - LD 12A/14A/1214A D25 male connector

Line Driver O/P Port	Signal Name
3	-Rx
4	+Rx
5	+Tx
6	-Tx
9*^	-DTR
10*^	+DTR
11*^	-DSR
12*^	+DSR
20^	Frame Ground
15^	-CTS
16^	+CTS
17^	+RTS
18^	-RTS

(1.) * = Used for LD-14A
(2.) ^ = Used for LD-1214A

TABLE III: RS 232 Cable – LD-12A, LD-14A,LD-1214A

Using DTR-DSR & RTS-CTS handshaking

Computer End			Line Driver RS232 Port	
Pin No. (D-25)	Pin No. (D-9)	Signal	Pin No. (D-25) Male	Signal
2	3	TX	2	RX
3	2	RX	3	TX
6*	6	DSR	6	DTR
7	5	GND	7	Sig. Gnd.
20*	4	DTR	20	DSR
4*^	7	RTS	4	CTS
5*^	8	CTS	5	RTS

*Used for Synchronous Models LD-14A
^Used for Synchronous Model LD-1214A

TABLE IV: RS 232 cable LD-12A, LD-14A

using RTS & CTS handshaking

Computer End				Line Driver RS232 Port	
Pin No. (D-25)	Pin No. (D-9)	Signal		Pin No. (D-25) Male	Signal
2	3	TX		2	RX
3	2	RX		3	TX
4	7	RTS	*	20	DSR
7	5	GND		7	Sig Gnd.
5	8	CTS	*	6	DTR
6	6	DSR			
20	4	DTR			

*Used these signals for Model: LD-14A
Above connections is for standard PC COM port verify connections for other systems or terminal before making cable.

LONG DISTANCE CABLE LAYING

Long distance cable between two line drivers must be twisted pair shielded cable. The pair should be used for each signal type+ and – Signal. This gives high common mode noise rejection. While laying the cable, care should be taken not to lay this cable parallel to power line cables. The cable resistance should not be more than 90 ohms/1000 meters. The cable should be run through conduit pipe for physical protection.

Table V: Line Driver Cable

Line Driver 1	Line Driver 2
-Rx	-Tx
+Rx	+Tx
+Tx	+Rx
-Tx	-Rx
-DTR*	-DSR
+DTR*	+DSR
-DSR*	-DTR
+DSR*	+DTR
-CTS^	-RTS
+CTS^	+RTS
+RTS^	+CTS
-RTS^	-CTS
(1.) * = Used for LD-14A (2.) ^ = Used for LD-1214A	