



GE Motors & Industrial Systems

LAN TERMINAL BOARD

531X307LTB_ _G_

These instructions do not purport to cover all details or variations in equipment, nor to provide every possible contingency to be met during installation, operation, and maintenance. If further information is desired or if particular problems arise that are not covered sufficiently for the purchaser's purpose, the matter should be referred to GE Motors & Industrial Systems.

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FUNCTIONAL DESCRIPTION

WARNING

This equipment contains a potential hazard of electric shock or burn. Only adequately trained persons who are thoroughly familiar with the equipment and the instructions should install or maintain this equipment.

INTRODUCTION

The 531X307LTB LAN Terminal Board (LTB) is located within the drive (or exciter) cabinet. The LTB provides an interface between control devices (such as drives) and external devices, such as contactors, indicator lights, pushbuttons, and interlocks. The LTB does not contain any adjustable hardware. See Figure 1 for a layout diagram that shows the location of the connector terminals, connector plugs, and LEDs on the LTB.

There are two groups of the LTB, G1 and G2.

- The G1 LTB provides eight 24 V dc configurable control input plugs, CI1PL – CI8PL. These inputs are connected to 8PL that carries I/O signals between LTB, the NTB/3TB terminal board, and the drive control board. See Table 3.
- The G2 LTB omits input plugs CI1PL – CI8PL and the 8PL connector. The G2 LTB can only be used with dc input signals at connector terminals IN1 – IN8.

SAFETY SYMBOL LEGEND

WARNING

Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in personal injury or death.

CAUTION

Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment

NOTE Indicates an essential or important procedure, practice, condition, or statement.

CAUTION

Do not connect inputs across an inductive device. Doing so may damage the circuit.

The LTB provides eight sets of input terminals for 24 – 240 V ac or dc input signals. The input signals are converted to 24 V dc logic signals for use by the drive control board. Note that ac input signals cannot be used on the G2 version LTBs. See Table 1.

The LTB control outputs consist of seven low voltage, low current, form C relay contact connectors, OT1 – OT7, with three terminals each. Also, pilot contact connections function to actuate the seven high voltage, high current relays, such as on the 531X191RTB (RTB) or DS200RTBA (RTBA) relay terminal boards. See Table 2.

NOTE

When the LTB and RTBA are used together, relay contacts from both boards are available.

APPLICATION DATA

CONNECTOR TYPES

The LTB contains two types of connectors: plug-in connectors for ribbon cables and terminal board connectors for individual wires.

- Plug-in connectors, identified by *PL* in its name, carry signal and power I/O within the control device.
- Terminal board connectors, identified by *TB* in its name, provide connections for wires from both internal and external devices.
- See Tables 1 – 6 for definitions of all connections.

INPUT SPECIFICATIONS

Input voltage and current specifications for terminals IN1 – IN8 are as follows:

Nominal Voltage Range	Current Range
24 – 230 V ac, 60 Hz (G1)	4 – 10 mA peak
115 – 230 V ac, 50 Hz (G1)	4 – 10 mA peak
24 – 250 V dc (G1 and G2)	4 – 8 mA

ON heat dissipation per terminal point is as follows:

Input Voltage	Heat Dissipation
24 V	0.2 watt
115 V	0.9 watt
230 V	1.8 watt

Revision 531X307LTBAGG1 and later have the following ON/OFF specifications:

- Turn-On Threshold: 9 V, 4.6 mA ac/dc peak
- Turn-Off Threshold: 6 V, 1.0 mA ac/dc peak

NOTE

Devices connected in series with an input that has a dc leakage current greater than 1.0 mA or ac peak leakage current greater than 4.0 mA can cause the input to be continuously in the ON state.

All other revision LTBs have the following ON/OFF specifications:

- Turn-On Threshold: 6 V, 0.5 mA ac/dc peak
- Turn-Off Threshold: 6 V, 0.5 mA ac/dc peak

NOTE

Devices connected in series with an input that has an ac/dc leakage current greater than 0.5 mA can cause the input to be continuously in the ON state.

OUTPUT SPECIFICATIONS

Output voltage and current specifications for the relay outputs (form C contacts, non-fused) at terminal points OT1 – OT7 are as follows:

Voltage	Current
125 V ac	0.6 A
110 V dc	0.6 A
30 V dc	2.0 A

RTB and RTBA pilot outputs are form A contacts.

I/O TERMINAL WIRING

All I/O terminal wire must be size 28 – 14 AWG.

- The maximum length of a 26-conductor ribbon cable is 20 feet.
- The maximum length of input and output wiring depends on the application.

NOTE

Do not route I/O ribbon cables with power cables. In ac applications, capacitive coupling of connection wires can cause I/O input (IN1 – IN8) leakage.

LED INDICATORS

The LTB provides 15 LED indicators that function as follows:

Indicator	Description
LED1 – LED8	ON when the source is applied to circuits IN1 – IN8, respectively
LED17 – LED23	ON when relays RX1 – RX7 are energized, respectively

I/O CONNECTOR TABLES

The LTB connects to the drive control board via connector 8PL (G1 only), to the LAN control board or drive/LAN control board via connector 10PL, to the NTB/3TB terminal board via connector OPTPL, and to the RTB or RTBA relay terminal boards via connector RPL.

Tables 3 – 6 list the I/O pin signals of the different connectors on the LTB. These tables are organized as follows:

- **Table 3** – 8PL, I/O between the NTB/3TB terminal board (NTB), the drive control board (SDCC or LDCC), and LTB
- **Table 4** – 10PL, I/O between the LAN control board or drive/LAN control board (SLCC or LDCC) and LTB
- **Table 5** – OPTPL, I/O between the NTB/3TB terminal board (NTB) and LTB
- **Table 6** – RPL, I/O between the relay terminal board (RTB or RTBA) and LTB

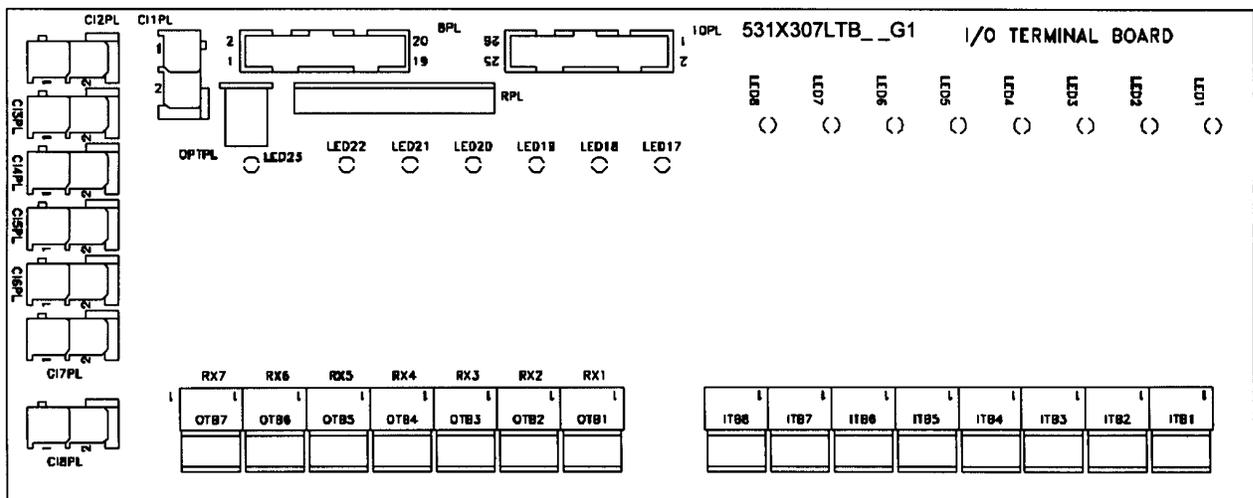


Figure 1. LTB Board Layout Diagram

Table 1. Connectors IN1 – IN8,
Inputs to LTB

Terminal	Nomenclature	Description
1 (-)	IN _x *	Low input for signal In _x 24 – 240 V ac or dc input logic signal is brought in on In _x + and In _x - where + is for the high side and – is for the low or ground side. Each input draws 6 mA maximum current. The signal is converted to a 24 V dc logic signal for the drive control board.
2	-----	Not connected
3 (+)	IN _x *	High input for signal In _x 24 – 240 V ac or dc input logic signal is brought in on In _x + and In _x - where + is for the high side and – is for the low or ground side. Each input draws 6 mA maximum current. The signal is converted to a 24 V dc logic signal for the drive control board.

* _x corresponds to the input circuit number, IN1 – IN8.

Table 2. Connectors OT1 – OT7,
LTB Form C Relay Contact Outputs

Terminal	Nomenclature	Description
1 (CM)	OT _x *	Relay RX _x * common connection - contact ratings are 0.6 A @ 125 V ac, 0.6 A @ 110 V dc, or 2.0 A @ 30 V dc
2 (NC)	OT _x *	Relay RX _x * normally closed connection - contact ratings are 0.6 A @ 125 V ac, 0.6 A @ 110 V dc, or 2.0 A @ 30 V dc
3 (NO)	OT _x *	Relay RX _x * normally open connection - contact ratings are 0.6 A @ 125 V ac, 0.6 A @ 110 V dc, or 2.0 A @ 30 V dc

* _x corresponds to the relay (RX1 to RX7) or relay output circuit number (OT1 – OT7).

Table 3. Connector 8PL,
I/O Between LTB and Drive Control Board

Pin No.	NTB Terminal	Nomenclature	Description
1	6	FA	Non-inverting RS-422 half-duplex serial data line from the drive control board's Motor Control Processor (MCP) UART.
2	8	FB	Inverting RS-422 half-duplex serial data line from MCP UART.
3	10	DCOM	Signal return for EXSY (at COM potential).
4	12	EXSY	External sync input to MCP.
5	----	----	Not connected.
6	1	E0AB	Encoder interface Channel A non-inverted differential input.
7	3	/E0AB	Encoder interface Channel A inverted differential input. (Tie to COM for single-ended encoders.)
8	5	E0BB	Encoder interface Channel B non-inverted differential input.
9	7	/E0BB	Encoder interface Channel B inverted differential input. (Tie to COM for single-ended encoders.)
10	9	E0MB	Encoder interface marker channel non-inverted differential input.
11	11	/E0B	Encoder interface marker channel inverted differential input. (Tie to COM for single-ended encoders.)
12	----	----	Not Connected.
13	14	CI1PL	CI1PL – CI8PL are general-purpose control inputs, ± 24 V dc maximum with 27 k Ω input impedance.
14	16	CI2PL	See CI1PL (pin 13).
15	18	CI3PL	See CI1PL (pin 13).
16	20	CI4PL	See CI1PL (pin 13).
17	22	CI5PL	See CI1PL (pin 13).
18	24	CI6PL	See CI1PL (pin 13).
19	26	CI7PL	See CI1PL (pin 13).
20	28	CI8PL	See CI1PL (pin 13).

Table 4. Connector 10PL,
I/O Between LTB and LAN Control Board or Drive/LAN Control Board (SLCC or LDCC)

Pin No.	Nomenclature	Description
1	P24	+24 V dc
2 – 8	1I2 – 1I8	±24 V logic lines to the drive
9 – 16	-----	Not Connected
17	N24	-24 V dc
18	1I1	±24 V logic lines to the drive
19 – 25	1O1 – 1O7	Relay control lines 0 – 6
26	P24	+24 V dc

Table 5. Connector OPTPL,
I/O Between LTB and NTB/3TB Board

Pin No.	Nomenclature	Description
1	X2	Return for CFX1 120 V ac loads (isolated from COM) – Same as NTB/3TB pin 85.
2	CFX1	120 V ac, ±15%, from NTB/3TB board, fused at 500 mA, including internal fans (isolated from COM) – Same as NTB/3TB pin 83.

Table 6. Connector RPL,
I/O Between LTB and Relay Terminal Board (RTB or RTBA)

Pin No.	Nomenclature	Description
1	115 V	115 V ac RTBA relay common
2	-----	Not Connected
3	RX1	RTBA relay K6 pilot output 0
4	-----	Not Connected
5	RX2	RTBA relay K7 pilot output 1
6	-----	Not Connected
7	RX3	RTBA relay K8 pilot output 2
8	-----	Not Connected
9	RX4	RTBA relay K9 pilot output 3
10	-----	Not Connected
11	RX5	RTBA relay K10 pilot output 4
12	-----	Not Connected
13	RX6	RTBA relay K11 pilot output 5
14	-----	Not Connected
15	RX7	RTBA relay K12 pilot output 6
16	-----	Not Connected

RENEWAL/WARRANTY REPLACEMENT

BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the LAN terminal board is identified by part number 531X307LTBcrG#.

The *531X307LTB* portion is the base number that specifically identifies the printed wiring board. The *c* and *r* digits are alphabetic characters that indicate the board configuration and revision level, respectively. The *G#* identifies a group, which is a variation of a particular board. The LTB has two groups, *G1* and *G2*.

NOTE

All digits are important when ordering or replacing any board.

WARRANTY TERMS

The GE Motors & Industrial Systems Terms and Conditions brochure details product warranty information, including the **warranty period** and **parts and service** coverage.

The brochure is included with customer documentation. It may also be obtained separately from the nearest GE Sales Office or authorized GE Sales Representative.

WARRANTY PARTS AND SERVICE

This board has no fuses or other end-user serviceable parts. If it fails, it needs to be replaced as a unit.

To obtain a replacement board, or service assistance, contact the nearest GE Service Office.

Please have the following information ready to exactly identify the **part** and **application**:

- GE requisition or shop order number
- Equipment serial number and model number
- Board number and description

PROCEDURE FOR REPLACING BOARDS

WARNING

To prevent electric shock, turn off power to the board, then test to verify that no power exists in the board before touching it or any connected circuits.

CAUTION

To prevent equipment damage, do not remove boards or connections, or re-insert them, while power is applied to the drive.

Treat all boards as static-sensitive. Use a grounding strap when changing boards and always store boards in anti-static bags or boxes they were shipped in.

To replace an LTB board:

1. **Turn off the power to the drive**, then wait several minutes for all the capacitors to discharge. Test any electrical circuits before touching them to ensure the power is off.
2. Open the drive's cabinet door to access the board. (The LTB is typically located below the drive's board rack.)
3. Carefully disconnect all cables from the LTB board as follows:
 - For ribbon cables, grasp each side of the cable connector that mates with the board connector and gently pull the cable connector loose.
 - For cables with pull tabs, carefully pull the tab.
 - For wires attached to terminals, loosen the screw located at the top of each terminal and carefully pull each wire free. (Ensure that wires are labeled to simplify reconnection.)
4. Remove the four screws that secure the LTB to the four standoffs and remove the board.

CAUTION

Avoid dropping mounting hardware into the unit, which could cause damage.

NOTE

Because of upgrades, boards of different revision levels may not contain identical hardware. However, GE Motors & Industrial Systems ensures backward compatibility of replacement boards.

5. Orient the new LTB in the same position as the one removed and install the new board on the four stand-offs with the four screws removed in step 4.
6. Reconnect all cables disconnected in step 3, ensuring that each connector is properly seated at both ends.
7. Reconnect all individual wires disconnected in step 3 (as labeled), ensuring that each wire is properly secured in the terminal.



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