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Object of Declaration: EVB-LAN7800LC

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This declaration of conformity is issued by the manufacturer.
The development/evaluation tool is designed to be used for research and development in a laboratory environment. This
development/evaluation tool is not a Finished Appliance, nor is it intended for incorporation into Finished Appliances that are
made commercially available as single functional units to end users under EU EMC Directive 2004/108/EC and as supported by
This development/evaluation tool complies with EU RoHS2 Directive 2011/65/EU.
This development/evaluation tool, when incorporating wireless and radio-telecom functionality, is in compliance with the
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Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA.

Derek Carlson  VP Development Tools

Date: 11-NOV-16
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INTRODUCTION

This chapter contains general information that will be useful to know before using the LAN7800. Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- The Microchip Web Site
- Development Systems Customer Change Notification Service
- Customer Support
- Document Revision History

DOCUMENT LAYOUT

This document describes how to use the EVB-LAN7800LC Evaluation Board as a development tool for the LAN7800, USB 3.0 to Gigabit Ethernet Controller.

- Chapter 1. “Overview” – Provides a brief description of the EVB-LAN7800LC Evaluation Board.
- Chapter 2. “Board Details & Configuration” – Includes instructions on how to get started with the EVB-LAN7800LC Evaluation Board.
- Appendix A. “EVB-LAN7800LC Evaluation Board” – This appendix shows the physical EVB-LAN7800LC Evaluation Board.
- Appendix B. “EVB-LAN7800LC Schematics” – This appendix shows the EVB-LAN7800LC Evaluation Board schematics.
- Appendix C. “EVB-LAN7800LC BOM” – This appendix includes the EVB-LAN7800LC Evaluation Board Bill of Materials (BOM).
- Appendix D. “EVB-LAN7800LC Silk Screen” – This appendix includes the EVB-LAN7800LC Evaluation Board silk screen.
CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

<table>
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<th>DOCUMENTATION CONVENTIONS</th>
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<td>Italic Courier New</td>
</tr>
<tr>
<td>Square brackets [ ]</td>
</tr>
<tr>
<td>Curly brackets and pipe character: {</td>
</tr>
<tr>
<td>}</td>
</tr>
</tbody>
</table>
| | Represents code supplied by user | void main (void) {
| | | ... } |
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• **Emulators** – The latest information on Microchip in-circuit emulators. This includes the MPLAB REAL ICE and MPLAB ICE 2000 in-circuit emulators.
• **In-Circuit Debuggers** – The latest information on the Microchip in-circuit debuggers. This includes MPLAB ICD 3 in-circuit debuggers and PICkit 3 debug express.
• **MPLAB IDE** – The latest information on Microchip MPLAB IDE, the Windows Integrated Development Environment for development systems tools. This list is focused on the MPLAB IDE, MPLAB IDE Project Manager, MPLAB Editor and MPLAB SIM simulator, as well as general editing and debugging features.
• **Programmers** – The latest information on Microchip programmers. These include production programmers such as MPLAB REAL ICE in-circuit emulator, MPLAB ICD 3 in-circuit debugger and MPLAB PM3 device programmers. Also included are nonproduction development programmers such as PICSTART Plus and PIC-kit 2 and 3.

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• Field Application Engineer (FAE)
• Technical Support
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Technical support is available through the web site at:
http://www.microchip.com/support

DOCUMENT REVISION HISTORY

<table>
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<tr>
<th>Revisions</th>
<th>Section/Figure/Entry</th>
<th>Correction</th>
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<td>Rev. x (12-07-16)</td>
<td>Initial release.</td>
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Chapter 1. Overview

1.1 INTRODUCTION

The EVB-LAN7800LC is a USB Type-C™ dongle for demonstration and evaluation of the LAN7800 USB 3.1 Gen 1 Gigabit Ethernet Controller on a 4-layer RoHS-compliant Printed Circuit Board (PCB). This board has been developed to allow the user to gain an understanding of the product and accelerate the integration of the LAN7800 into the their design. The LAN7800 is compliant with the USB 3.1 USB Specification and supports Super-Speed (SS), High-Speed (HS), Full-Speed (FS), and Low-Speed (LS) USB signaling for complete coverage of all defined USB operation speeds. It also supports 10BASE-T/100BASE-TX/1000BASE-T Ethernet (Full-Duplex Support), 802.3az Energy Efficient Ethernet, VLAN tagging, and is available in commercial and industrial temperature ranges. The EVB-LAN7800LC is configured for operation through internal default settings and supports custom configurations through the external 4Kbit EEPROM device or internal OTP. The EVB-LAN7800LC demonstrates driver compatibility with Microsoft® Windows® 10, Windows 8x, Windows 7, Mac OS® X 10.4+, and Linux® hub drivers.

The EVB-LAN7800LC provides the following features:

- LAN7800 in a 48-pin SQFN 6x6 mm RoHS compliant package
- USB 3.1 Gen 1 compliant (SS, HS, FS, and LS operation)
- 10BASE-T/100BASE-TX/1000BASE-T Ethernet support
- Optional on-board EEPROM for external downloadable firmware
- USB Type-C connector for USB 3.1
- Low-cost 4-layer space-saving design
- Operates from VBUS
- On-board 25 MHz crystal
- Power, Ethernet link/activity and duplex/collision LED indicators
- PME event also available in hardware for Wake-on-LAN

FIGURE 1-1: EVB-LAN7800LC FUNCTIONAL BLOCK DIAGRAM
1.2 REFERENCES

Concepts and materials available in the following documents may be helpful when reading this document. Visit www.microchip.com for the latest documentation.

- LAN7800 Datasheet
- EVB-LAN7800LC Schematics
Chapter 2. Board Details & Configuration

2.1 INTRODUCTION

The Microchip EVB-LAN7800LC is designed for flexible configuration solutions. It can be configured via default internal register settings or by downloadable external firmware to an on-board EEPROM.

Figure 2-1 displays the EVB-LAN7800LC evaluation board.

![EVB-LAN7800LC](image)

2.2 POWER SOURCE

The EVB-LAN7800LC is designed for bus-powered operation. There are no configuration jumpers on the board.

2.3 CLOCK

The EVB-LAN7800LC utilizes an on-board 25 MHz 30 ppm crystal to drive its internal oscillator circuit.
2.4 BOARD FEATURES AND CONFIGURATION

The following sections describe the board connectors and main components. Figure 2-2 provides a top view of the EVB-LAN7800LC.

FIGURE 2-2: EVB-LAN7800LC TOP VIEW

2.4.1 External EEPROM / Internal OTP

At power-up, the LAN7800 searches for an external EEPROM. If an external EEPROM is detected the LAN7800 configuration is loaded from it. If no EEPROM is found, the device checks for OTP. If there is no OTP, the device will use default CSR settings. The EEPROM stores the default values for the USB descriptors and the MAC address. The EEPROM is always present and enabled in the EVB-LAN7800LC.
2.4.2 Link Status LEDs

There are two LED indicators on the RJ45 connector, as shown in Figure 2-3.

- **Link/Act**: LED is ON with network activity.
- **Duplex/Collision**: LED is ON in full-duplex mode. LED is OFF in half-duplex mode. LED is blinking during collision.

![FIGURE 2-3: ENABLE LINK STATUS LEDS](image)

2.4.3 PME Operation

The LAN7800 support PME (Power Management Events) for WoL (Wake-on-LAN). To enable PME operation, follow these steps:

1. TP1 is connected to the PME_MODE pin. Connect this pin to the embedded controller via fly-wire (see Figure 2-4).
2. Solder a 10 KΩ resistor at R12 and solder a wire from PME_N net to external embedded controller (see Figure 2-5).

![FIGURE 2-4: PME_MODE TEST POINT TP1](image)
FIGURE 2-5: PME_N PULL-UP

- Place 10k at R12
- Connect wire from here to EC
Appendix A. EVB-LAN7800LC Evaluation Board

A.1 INTRODUCTION

This appendix shows the EVB-LAN7800LC Evaluation Board.

FIGURE A-1: EVB-LAN7800LC EVALUATION BOARD
Appendix B. EVB-LAN7800LC Schematics

B.1 INTRODUCTION

This appendix includes the EVB-LAN7800LC Evaluation Board schematics.
FIGURE B-1: EVB-LAN7800LC EVALUATION BOARD SCHEMATIC

Upstream Facing USB Type-C™ Port

USB Type-C Plug
## Appendix C. EVB-LAN7800LC BOM

### C.1 INTRODUCTION

This appendix shows the EVB-LAN7800LC Evaluation Bill of Materials:

<table>
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<td>D1</td>
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<td>Lite-On</td>
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<td>CON MODULAR RJ45 MAGJACK® TH R/A</td>
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<td>U1</td>
<td>LAN7800 SuperSpeed USB 3.1 Gen110/100/100 Ethernet Controller</td>
<td>Microchip Technology</td>
<td>LAN7800/V5X</td>
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<td>MIC5525-3.3YMT-TR</td>
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<td>Microchip Technology</td>
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<td>Murata Electronics North America</td>
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Appendix D. EVB-LAN7800LC Silk Screen

D.1 INTRODUCTION

This appendix shows the EVB-LAN7800LC Top and Bottom Silk Screen images.

FIGURE D-1:  EVB-LAN7800LC TOP SILK SCREEN

FIGURE D-2:  EVB-LAN7800LC BOTTOM SILK SCREEN