Application Report
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DLP-7970ABP Hardware Update Overview

Ralph Jacobi, JD Crutchfield, and Josh Wyatt *NFC/RFID Applications*

ABSTRACT

Texas Instruments and DLP Design, Inc. have released an updated design for the TRF7970A NFC/RFID BoosterPack™ plug-in module – the DLP-7970ABP.

This updated design includes new feature additions to support Ultra-Low Power (ULP) Wakeup and Special Direct Mode functionality.

Contents

1 How Do I Know Which BoosterPack I Have? 2
2 Hardware Changes 3
3 New Features 3
4 New DLP-7970ABP Pinout Table 4

List of Figures

1 Comparison of New (Left, v4.5) and Old (Right, v4.3) DLP-7970ABP BoosterPack Boards 2

List of Tables

1 Pinout for the New Version of the DLP-7970ABP 4
2 Pinout for Older Version of the DLP-7970ABP 4

1 How Do I Know Which BoosterPack I Have?

The easiest way to determine if this document applies for a certain BoosterPack is to check the version number for the BoosterPack (highlighted by the light blue box in Figure 1). The modified design for the DLP-7970ABP applies for version 4.5 (v4.5) and newer. This guide does not apply for v4.4 or older. Alternatively, the new BoosterPack no longer covers the LaunchPad™ development kit buttons as seen in Figure 1 (highlighted by the green box) when attached to the top of a LaunchPad.

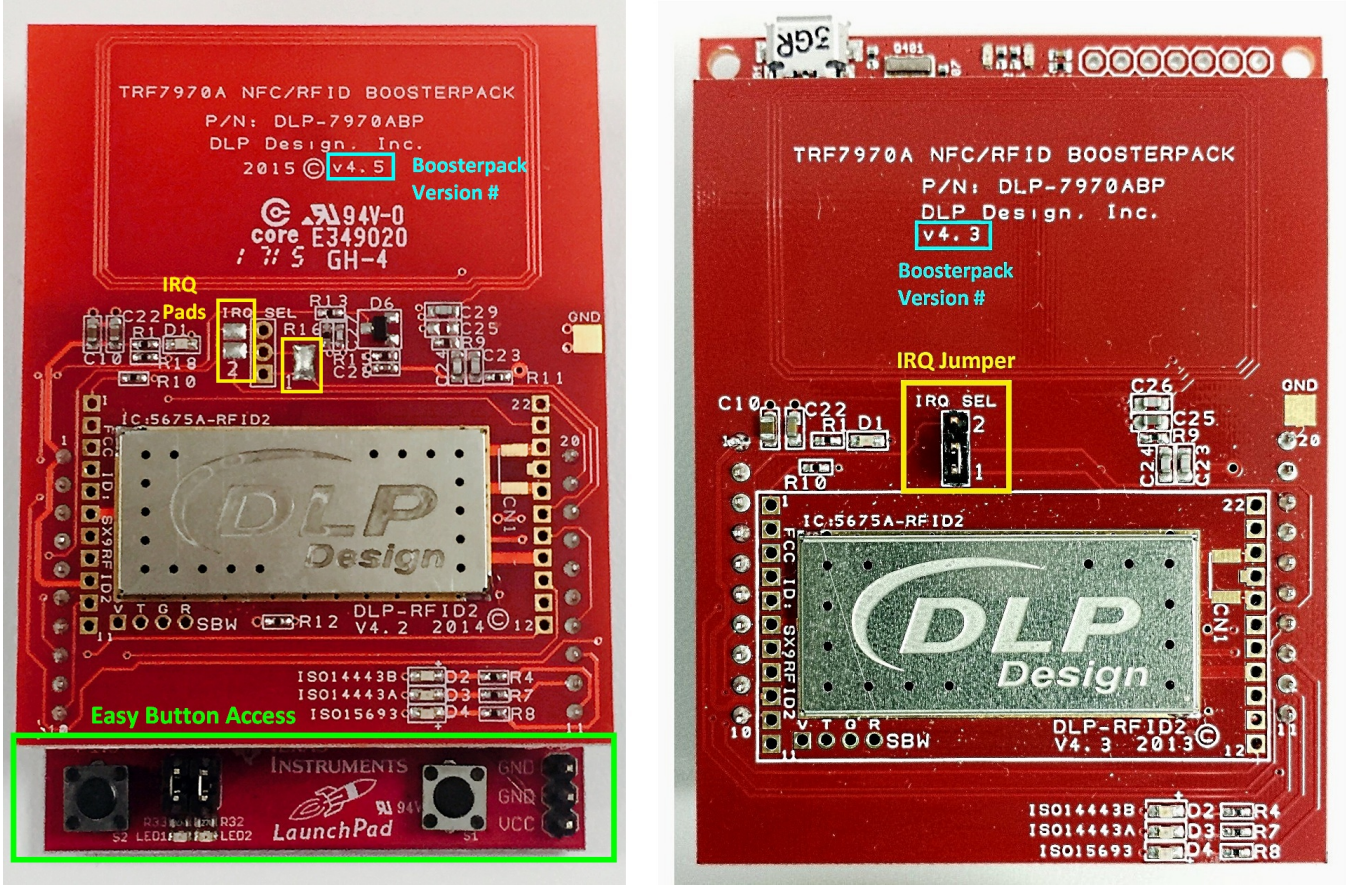

Figure 1. Comparison of New (Left, v4.5) and Old (Right, v4.3) DLP-7970ABP BoosterPack Boards

2 Hardware Changes

- The physical BoosterPack design has been modified to allow users much easier access to the push button inputs for TI LaunchPad boards.
- The IRQ header has been removed to make it easier for users to interact with the BoosterPack antenna when using other NFC/RFID devices such as personal handsets or other development kits. 0-Ω resistors can be used instead to switch between the IRQ lines while providing a lower profile (highlighted by the yellow box in Figure 1).
- The revised pinout (see Table 1) enables developers to use additional features for the TRF7970A, such as using Special Direct Mode to read proprietary RFID tags.
- Some additional passive components have been added to support the addition of the ULP Wakeup feature.

3 New Features

- **ULP Wakeup**
  - The new BoosterPack design has been updated to support Ultra-Low Power NFC/RFID Card Presence Detection which can be used to minimize power consumption for reading from and writing to NFC/RFID tags.
  - For details on how to use this new feature, see the application report *NFC/RFID Reader Ultra-Low-Power Card Presence Detect With MSP430 and TRF79xxA* (SLOA184).
- **Special Direct Mode**
  - The new BoosterPack pinout has been set up to give access to the I/O_2, I/O_3, and I/O_5 GPIO lines, which are required to use the Special Direct Mode (SDM) feature of the TRF7970A.
  - SDM can be used to communicate with certain non-ISO standard RFID tags such as MIFARE® Classic tags, as well as other proprietary RFID protocols.
  - For details on how to use this new feature, see the application report *Using Special Direct Mode With the TRF7970A* (SLOA214).

4 New DLP-7970ABP Pinout Table

To understand all of the pinout changes for the new DLP-7970ABP layout, refer to Table 1. For comparison, the pinout for the older versions of the DLP-7970ABP is provided in Table 2.

The tables have been colored to provide general guidelines for users who need to use a Logic State Analyzer (LSA), such as from Saleae, for debug purposes.

When using the Special Direct Mode functionality of the TRF7970A, be sure to attach LSA lines to the I/O_2, I/O_3, and I/O_5 pins for debugging.

The IRQ line defaults to pin 18 on all new BoosterPack kits. The routing of the IRQ line can be changed to pin 8 by resoldering the IRQ pads (boxed in yellow in Figure 1).

Table 1. Pinout for the New Version of the DLP-7970ABP

NEW BoosterPack Pinout Diagram			
TRF7970A Function	**Header 1**	**Header 2**	**TRF7970A Function**
3VDC	1	20	GND
ULP Wakeup(1)	2	19	I/O_3
UART RX	3	18	IRQ (1) (default)
UART TX	4	17	TEST / SBWTCK
I/O_5	5	16	RST / NMI / SBWTDIO
I/O_2	6	15	MOSI
SPI_CLK	7	14	MISO
IRQ (2)	8	13	ISO15693 LED
SLAVE_SELECT	9	12	ISO14443A LED
ENABLE	10	11	ISO14443B LED

(1) ULP Wakeup requires a comparator to use.

Table 2. Pinout for Older Version of the DLP-7970ABP

OLD BoosterPack Pinout Diagram			
TRF7970A Function	**Header 1**	**Header 2**	**TRF7970A Function**
3VDC	1	20	GND
ANALOG IN	2	19	GPIO / PWM / XIN
UART RX	3	18	IRQ (1)
UART TX	4	17	TEST / SBWTCK
GPIO	5	16	RST / NMI / SBWTDIO
ANALOG IN	6	15	MOSI
SPI_CLK	7	14	MISO
IRQ (2)	8	13	ISO15693 LED
SLAVE_SELECT	9	12	ISO14443A LED
ENABLE	10	11	ISO14443B LED

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