

# 14-24-NL-Logic-EVM Evaluation Module

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## ABSTRACT

This user's guide contains support documentation for the 14-24-NL-Logic Evaluation Module (EVM). Included is a description of how to set up and configure the EVM, the printed circuit board (PCB) layout, and the bill of materials (BOM) of the 14-24-NL-Logic-EVM.

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## Trademarks

All trademarks are the property of their respective owners.

## 1 Introduction

The 14-24-NL-Logic-EVM is a generic EVM developed to support non-leaded (NL) logic and translation devices in the BQA, BQB, RGY, RSV, RHL, and RJW packages. This EVM can be used to evaluate any device in the package family and pin counts listed in [Table 1-1](#). The PCB can be broken down into nine sections with each section supporting the package indicated on the board. This EVM allows the user to have a great amount of flexibility when evaluating NL logic and translation devices.

**Table 1-1. Package and Pin Support Table**

TI Package Name	Package Family	# of Pins
BQA	WQFN	14
BQB	WQFN	16
RGY	VQFN	14, 16, 20, 24
RSV	UQFN	16
RHL	VQFN	24
RJW	UQFN	24
RKS	VQFN	20

### 1.1 Kit Contents

[Table 1-2](#) lists the EVM kit contents.

**Table 1-2. 14-24-NL-Logic-EVM Kit Contents**

Item	Description	Quantity
14-24-NL-Logic-EVM	PCB	1
Headers	12 position, 100-mil (2.54 mm), thru-hole	12
Red Test Points	Thru-hole, red test point	4
Black Test Points	Thru-hole, red test point	4

### 1.2 Features

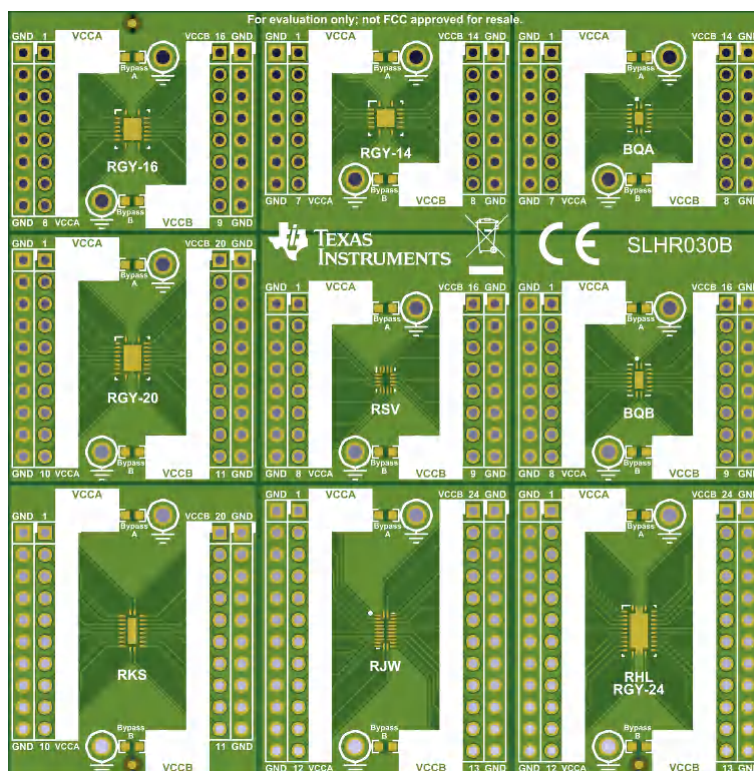
The 14-24-NL-Logic-EVM has the following features:

- Multiple package support (9 total)
- Breadboard compatible
- Easy-to-use, flexible evaluation
- Support for both single supply and dual supply devices
- Small form factor for system integration

## 2 Hardware

### 2.1 PCB Overview

Figure 2-1 shows the EVM PCB.



**Figure 2-1. 14-24-NL-Logic-EVM PCB**

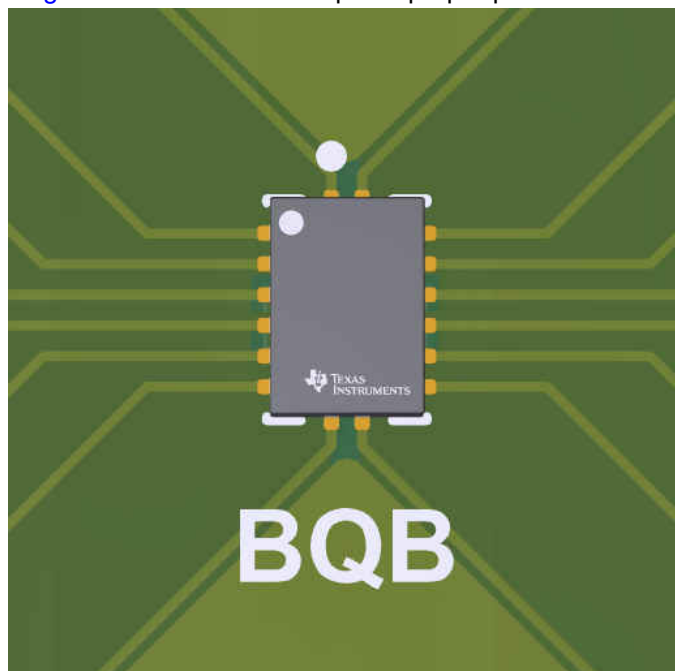
The 14-24-NL-Logic-EVM PCB is designed to be straightforward for new users to begin evaluating NL logic and translation devices. This section highlights a few aspects of the PCB, which are as follows:

- Board is breakable into smaller sections with the inclusion of v-scored grooves
- Each section has headers connected to device pins,  $V_{CCA}$ ,  $V_{CCB}$ , and GND
- Designated supply inputs with included thru-hole test points
- Bypass capacitor footprints included for device supplies (capacitors not included in kit)
- Option for single supply or dual supply evaluation with easy configuration

## 2.2 Hardware Setup

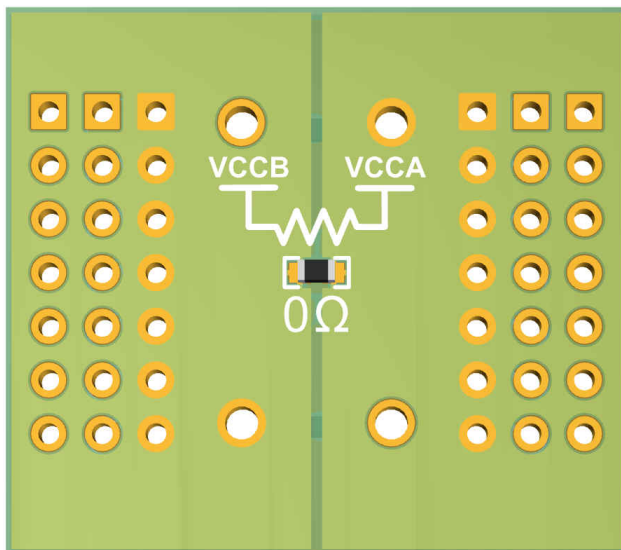
This section covers the five steps needed to get started when using this EVM to evaluate an NL logic or translation device, which are as follows:

1. Identify the desired package for the device being evaluated. As stated previously, this EVM has nine sections each of which contains a footprint for one of the packages mentioned. Break off the selected section (optional).
2. Solder down the device. [Figure 2-2](#) shows an example of proper placement.



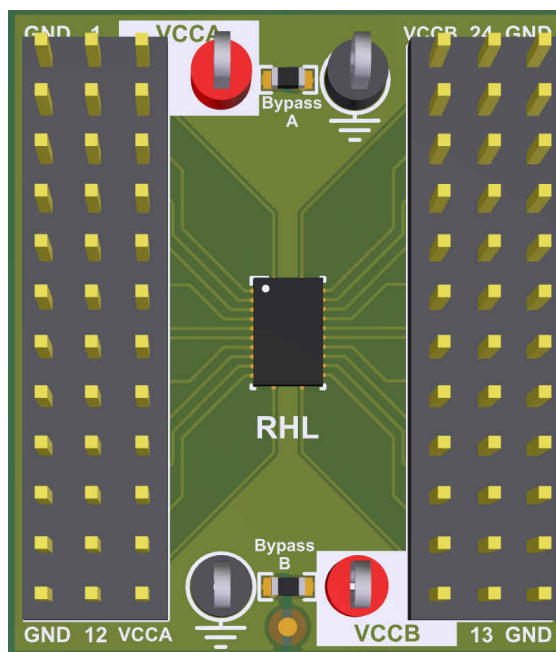
**Figure 2-2. BQB Placement Example**

3. Ensure the EVM is configured accordingly for dual supply or single supply device. The EVM comes default configured for dual supply devices, but is easily configured using a 0- $\Omega$  resistor for single supply devices.  
[Figure 2-3](#) shows how this is done.



**Figure 2-3. Single Supply Configuration**

4. Interface with device pins. The kit includes twelve 12-pin headers and eight supply test points which will allow the user to fully populate two sections (headers can be broken apart for lower pin counts). An example of this, with the addition of bypass capacitors for the supplies, as shown in [Figure 2-4](#).



**Figure 2-4. Fully Populated Section**

5. Before applying power to the EVM, ensure the proper supply configuration is in place to avoid shorting two supplies together.



## 2.3 Hardware Conclusion

Overall, this board is designed with ease-of-use and flexibility in mind. There is no one way to use this EVM to evaluate the multitude of devices it can support. Some users may find using the headers easy for them to interface with test equipment or connect to an external board, others will see benefit in using through-hole passive components to simulate expected loads for their system.

Some of the packages have thermal pads which were taken into account with this board design. These thermal pads were either grounded or left floating (depending on clearance constraints) which is the appropriate method for the devices being supported.

## 3 Board Layout

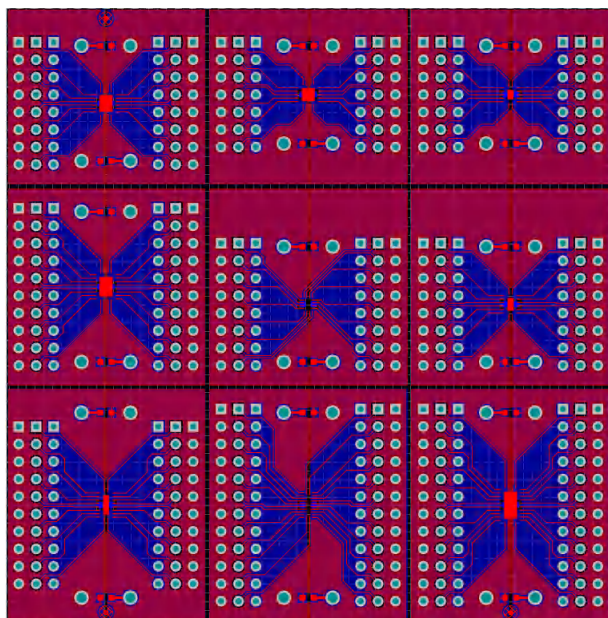


Figure 3-1. 14-24-NL-Logic-EVM Layout (Top Layer)

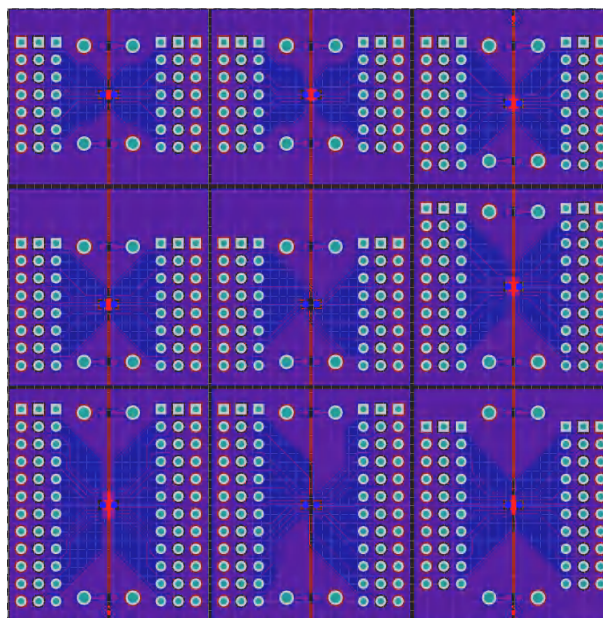


Figure 3-2. 14-24-NL-Logic-EVM Layout (Bottom Layer)

## 4 Bill of Materials

Table 4-1 provides information on the components that can be used with the 14-24-NL-Logic-EVM. Other components can be used as long as they are able to fit the provided plated holes and pads.

Table 4-1. Bill of Materials

Item	Description	Package Reference	Part Number	Manufacturer
Bypass Capacitor	CAP, CERM, 0.1 $\mu$ F, 25 V, $\pm$ 10%, X7R, 0603	0603	C1608X7R1E104K080AA	TDK
Header	Header, 100 mil, 4x1, Tin, TH	Header, 12x1, 100mil, TH	TSW-112-07-G-S	Samtec
Red Test Point	Test Point, Multipurpose, Red, TH	Red Testpoint	5010	Keystone
Black Test Point	Test Point, Multipurpose, Black, TH	Black Testpoint	5011	Keystone

## 5 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (August 2020) to Revision A (September 2022)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.....	<a href="#">2</a>
• Updated the <i>14-24-NL-Logic-EVM PCB</i> figure.....	<a href="#">3</a>
• Updated the <i>14-24-NL-Logic-EVM Layout Top Layer</i> and <i>14-24-NL-Logic-EVM Layout Bottom Layer</i> figures.	<a href="#">6</a>

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This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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#### **FCC Interference Statement for Class A EVM devices**

*NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

#### **FCC Interference Statement for Class B EVM devices**

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

#### 3.2 Canada

##### 3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

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This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

#### **Concernant les EVMs avec appareils radio:**

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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