

Steve Corrigan

HPL-D Interface

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## 1 Introduction

This user's guide details the evaluation module (EVM) operation of the ISO721 and ISO721M digital isolators. The same EVM board is used for each device. Configuration requirements are presented as well as user optional I/O loads. This document is intended to aid designers with isolator parameter performance evaluation within a particular system.

## 2 Overview

The ISO721 and ISO721M digital isolators have a logic input and output buffer separated by a silicon oxide ( $\text{SiO}_2$ ) insulation barrier. Used with isolated power supplies, these devices prevent noise currents on a data bus or other circuits from entering the local ground and interfering with or damaging sensitive circuitry.

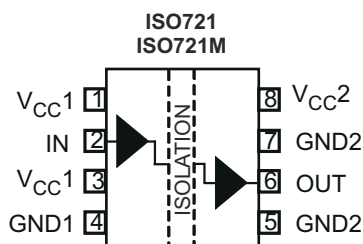
A binary input signal is conditioned, translated to a balanced signal, and then differentiated by the  $\text{SiO}_2$  isolation barrier. Across the isolation barrier, a differential comparator receives the logic transition information, then sets or resets a flip-flop and the output circuit accordingly. A periodic update pulse is sent across the barrier to ensure the proper dc level of the output. If this dc-refresh pulse is not received for more than 4  $\mu\text{s}$ , the input is assumed to be unpowered or not functional, and the fail-safe circuit drives the output to a logic-high state.

### CAUTION

Note that although these devices provide galvanic isolation of up to 4000 V, this EVM cannot be used for isolation voltage testing. It is designed for the examination of device operating parameters only and will be damaged if high voltage (> 5.5 V) is applied anywhere in the circuit.

### 3 Functional Configuration of the ISO721 and ISO721M

The EVM is configured for the pinout displayed in [Figure 3-1](#). The additional I/Os on the EVM are provided for future development.



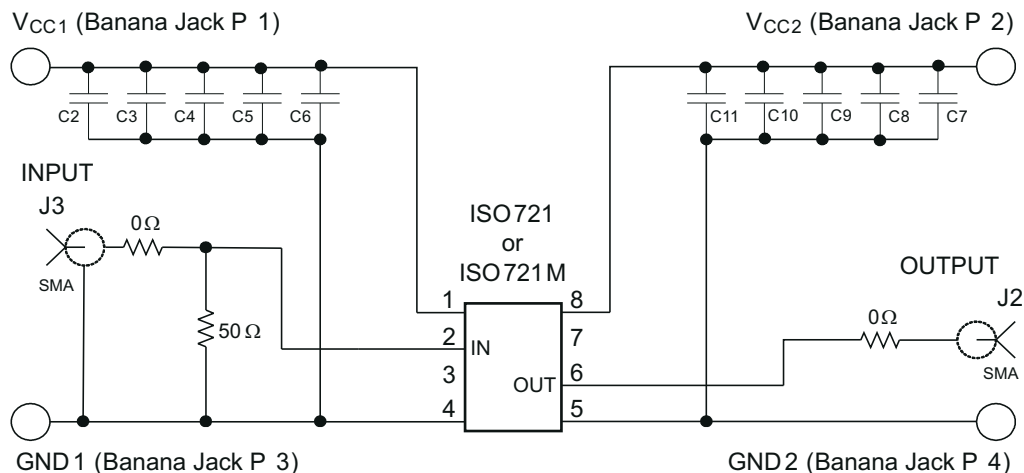
**Figure 3-1. The ISO721 and ISO721M Pinout**

The ISO721 has TTL input thresholds and a input noise filter that prevents transient pulses of up to 2 ns in duration from being passed to the output of the device.

The ISO721M has a CMOS  $V_{CC}/2$  input threshold and does not have the noise filter and the additional propagation delay. These features of the ISO721M also provide for a 0-Mbps to 150-Mbps signaling rate rather than the ISO721's 0-Mbps to 100-Mbps signaling rate.

## 4 EVM Signal Paths of the ISO721 and ISO721M Isolators

This multifunctional EVM is designed with signal paths shown in [Figure 4-1](#) for the analysis of the ISO721 and ISO721M, as well as future isolator configurations.



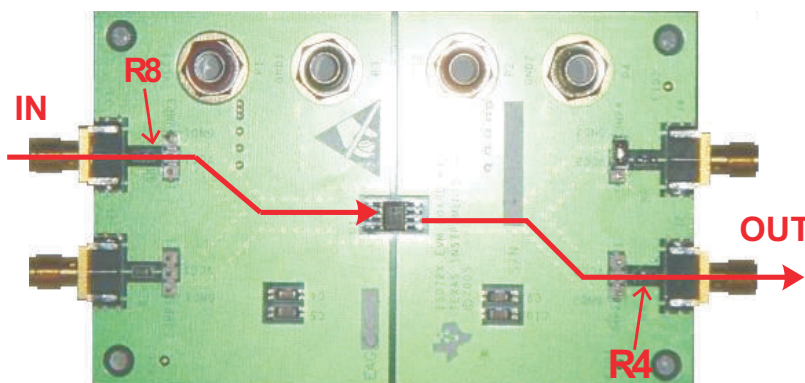
**Figure 4-1. The ISO721 and ISO721M EVM Schematic**

**Table 4-1. EVM Connections**

Connection	Label	Description
J1		SMA connector (unused)
J2		SMA connector to the output pin 6
J3		SMA connector to the input pin 2
J4		SMA connector (unused)
P1	V <sub>CC1</sub>	Input power supply banana jack
P2	V <sub>CC2</sub>	Output power supply banana jack
P3	GND1	Input power ground connection banana jack
P4	GND2	Output power ground connection banana jack
JMP1		3-pin jumper (unused)
JMP2		3-pin jumper (unused)
JMP3		3-pin jumper – V <sub>CC1</sub> , input, GND1
JMP4		3-pin jumper (unused)

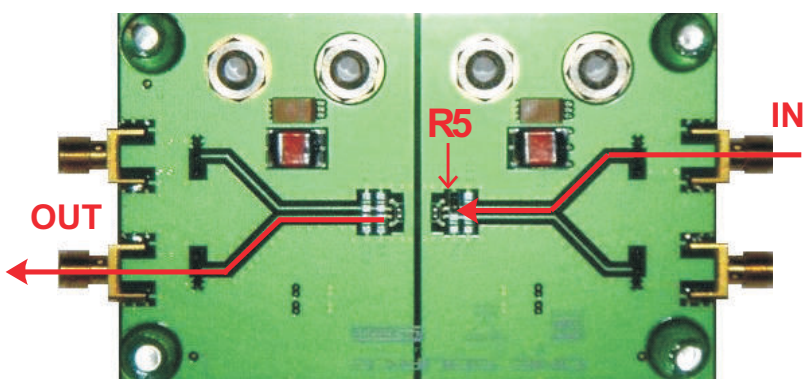
## 5 The EVM Configuration

The ISO721EVM configuration has an SMA connector J3 set up as the input to pin 2, the IN pin of the ISO721 in [Figure 3-1](#) and [Figure 4-1](#). A 0- $\Omega$  input series resistor, R8, is located next to the J3 input connector, and a 50- $\Omega$  R5 from the input to ground is located on the bottom of the board.



**Figure 5-1. ISO721 and ISO721M EVM, Top**

The output channel configuration of the ISO721EVM has the OUT pin (pin 6) of [Figure 3-1](#) and [Figure 4-1](#) connected to SMA connector J2 through a 0- $\Omega$  series resistor R4.



**Figure 5-2. ISO721 and ISO721M EVM, Bottom**

The pads for R3, C12, and C13 are available on the bottom of the EVM for varied loading conditions if desired by a user.

## 6 EVM Setup and Operation

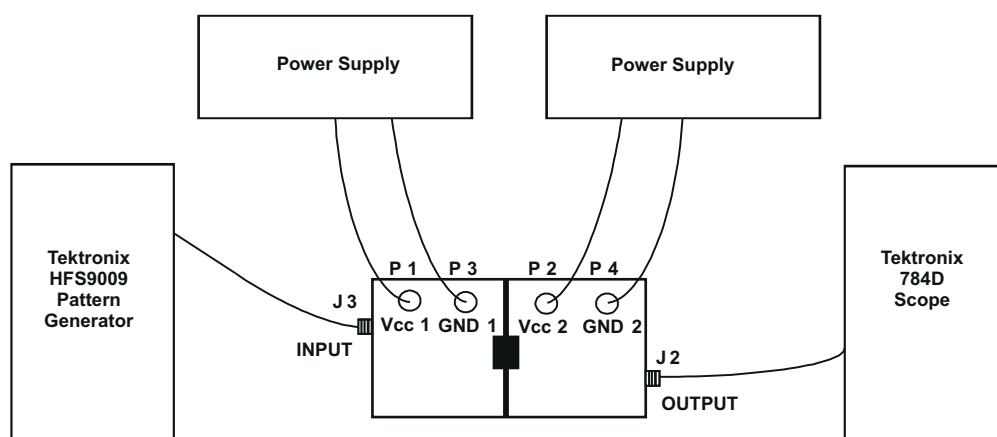
This section includes the setup and operation of the EVM for parameter performance evaluation. Typical waveforms are included.

### 6.1 Overview

The basic setup in [Figure 6-1](#) has the two power supplies required to evaluate isolator performance with 3.3-V on one side and 5-V on the other. If both sides are to be evaluated at the same supply voltage, only one power supply is required and can be used to power both sides of the EVM.

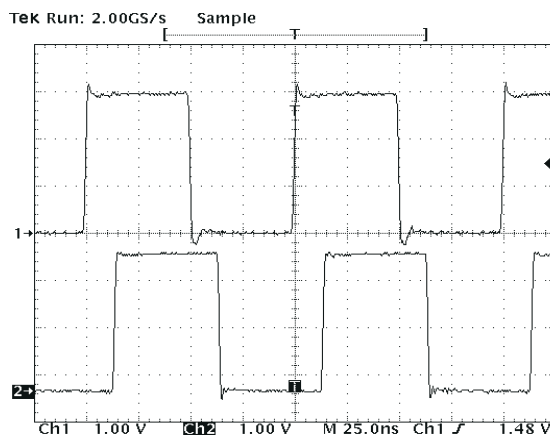
#### CAUTION

Note that this EVM is for operating parameter performance evaluation only and not designed for isolation voltage testing. Any voltage applied above the 5.5-V maximum recommended operating voltage of the ISO721 will damage the EVM.



**Figure 6-1. Basic EVM Operation**

The input to the EVM is a 20-MHz pulse displayed on channel 1 in [Figure 6-2](#). The output of the EVM is channel 2.



**Figure 6-2. Typical Input and Output Waveforms**

## 7 Revision History

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

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Changes from Revision * (January 2006) to Revision A (September 2022)	Page
• Replaced Capacitor with SiO <sub>2</sub> .....	<a href="#">2</a>

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Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

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

*NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- *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.*

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

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(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.

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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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Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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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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