

# ISO721EVM

## Contents

1	Introduction .....	1
2	EVM Setup and Operation.....	3

## List of Figures

1	The ISO721 and ISO721M Pinout.....	2
2	The ISO721 and ISO721M EVM Schematic .....	2
3	ISO721 and ISO721M EVM, Top .....	3
4	ISO721 and ISO721M EVM, Bottom .....	3
5	Basic EVM Operation .....	4
6	Typical Input and Output Waveforms .....	4

## List of Tables

1	EVM Connections.....	2
---	----------------------	---

## 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.

### 1.1 Overview

The ISO721 and ISO721M digital isolators have a logic input and output buffer separated by a silicon oxide (SiO<sub>2</sub>) 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.

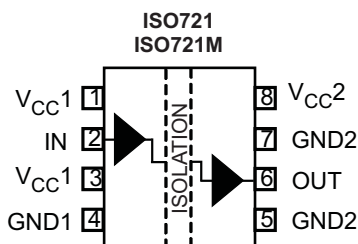
A binary input signal is conditioned, translated to a balanced signal, and then differentiated by the capacitive isolation barrier. Across the isolation barrier, a differential comparator receives the logic transition information, then sets or resets a flip-flop and the output circuit accordingly. A 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 μs, 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.

## 1.2 Functional Configuration of the ISO721 and ISO721M

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



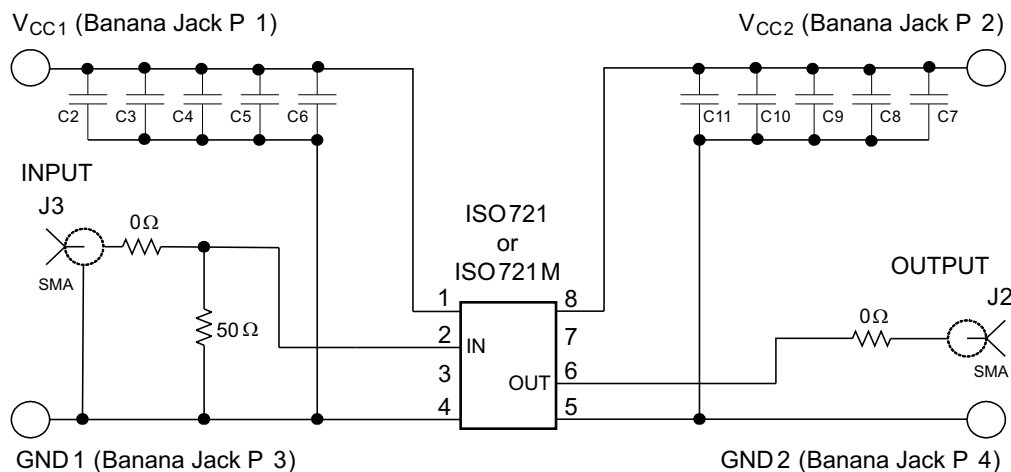
**Figure 1. The ISO721 and ISO721M Pinout**

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.

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

This multifunctional EVM is designed with signal paths shown in [Figure 2](#) for the analysis of the ISO721 and ISO721M, as well as future isolator configurations.



**Figure 2. The ISO721 and ISO721M EVM Schematic**

**Table 1. EVM Connections**

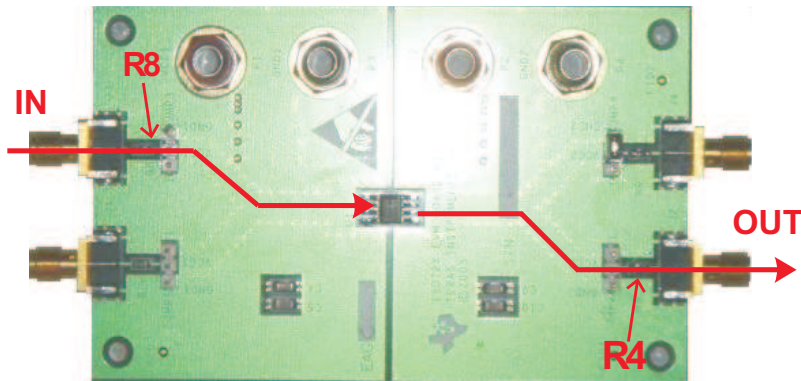
Connection	Label	Description
J1		SMA connector (unused)
J2		SMA connector to the output pin 6
J3		SMA connector to the input pin 2
J4		SMA connector (unused)
P1	$V_{CC1}$	Input power supply banana jack
P2	$V_{CC2}$	Output power supply banana jack
P3	GND1	Input power ground connection banana jack
P4	GND2	Output power ground connection banana jack

**Table 1. EVM Connections (continued)**

Connection	Label	Description
JMP1		3-pin jumper (unused)
JMP2		3-pin jumper (unused)
JMP3		3-pin jumper – $V_{CC1}$ , input, GND1
JMP4		3-pin jumper (unused)

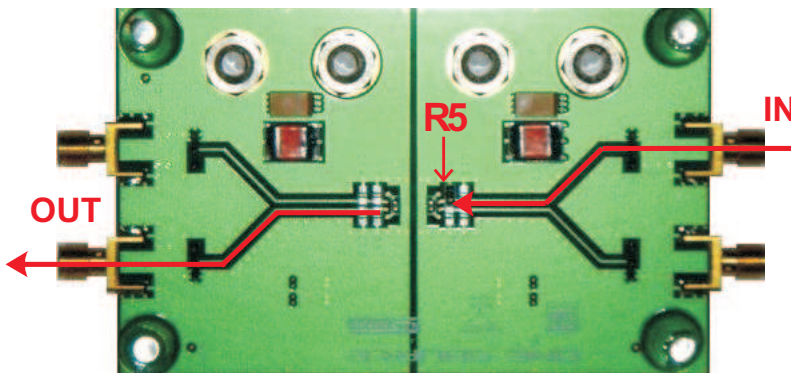
### 1.4 The EVM Configuration

The ISO721EVM configuration has an SMA connector J3 set up as the input to pin 2, the IN pin of the ISO721 in Figure 1 and Figure 2. 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 3. ISO721 and ISO721M EVM, Top**

The output channel configuration of the ISO721EVM has the OUT pin (pin 6) of Figure 1 and Figure 2 connected to SMA connector J2 through a 0- $\Omega$  series resistor R4.



**Figure 4. 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.

## 2 EVM Setup and Operation

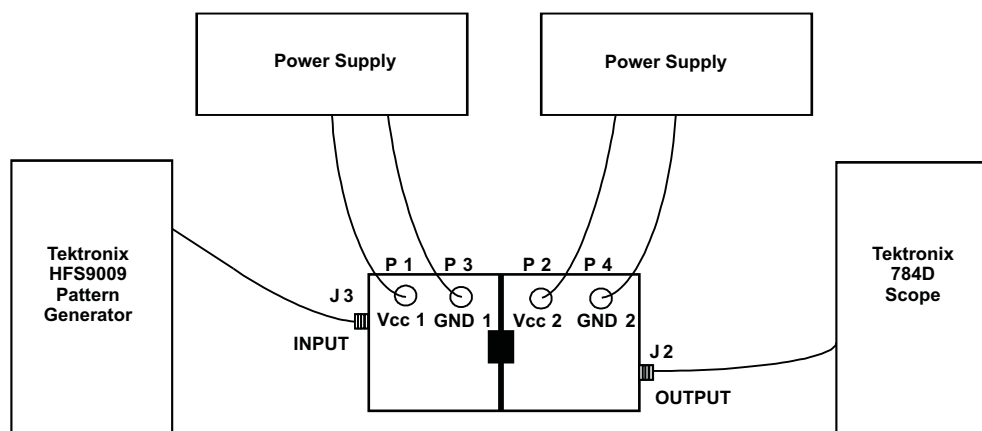
This section includes the setup and operation of the EVM for parameter performance evaluation. Typical waveforms are included.

## 2.1 Overview

The basic setup in [Figure 5](#) 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.

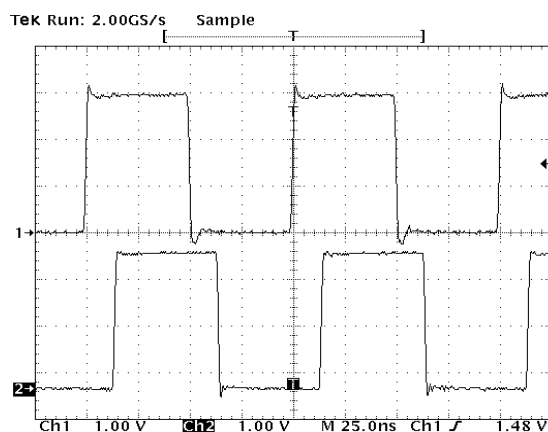
**CAUTION**

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 5. Basic EVM Operation**

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



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

## EVALUATION BOARD/KIT IMPORTANT NOTICE

Texas Instruments (TI) provides the enclosed product(s) under the following conditions:

This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by TI to be a finished end-product fit for general consumer use. Persons handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore may not meet the technical requirements of these directives or other related directives.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

**EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.**

TI currently deals with a variety of customers for products, and therefore our arrangement with the user **is not exclusive.**

TI assumes **no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.**

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For additional information on TI's environmental and/or safety programs, please contact the TI application engineer or visit [www.ti.com/esh](http://www.ti.com/esh).

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used.

### FCC Warning

This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by TI to be a finished end-product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2007, Texas Instruments Incorporated

### EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 0 V to 5.5 V and the output voltage range of 0 V to 6 V.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85°C. The EVM is designed to operate properly with certain components above 85°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2007, Texas Instruments Incorporated

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

<b>Products</b>		<b>Applications</b>	
Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>	Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>	Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>	Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Low Power Wireless	<a href="http://www.ti.com/lpw">www.ti.com/lpw</a>	Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
		Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2007, Texas Instruments Incorporated