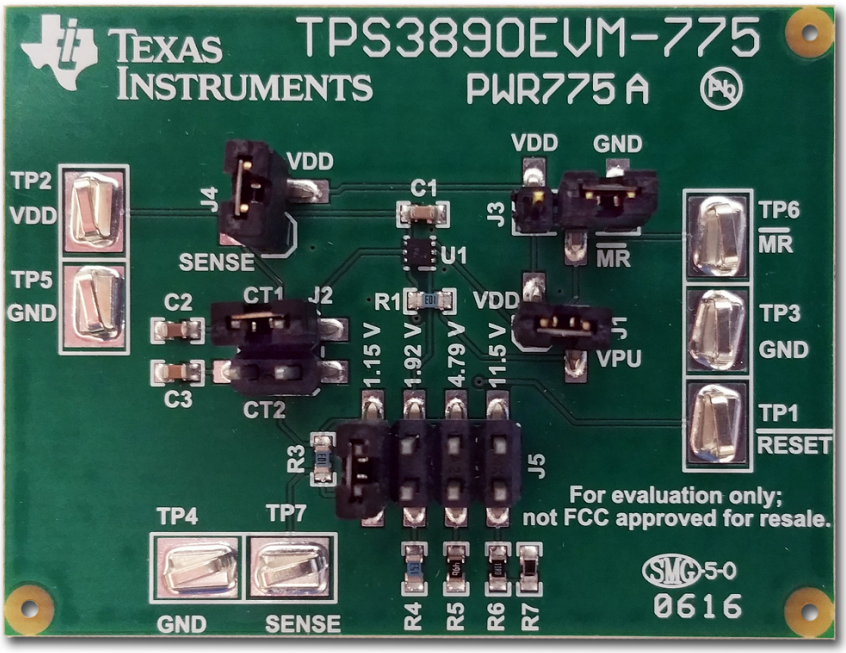
TPS3890EVM-775 Evaluation Module



This user's guide describes the operational use of the TPS3890EVM-775 evaluation module (EVM) as a reference design for engineering demonstration and evaluation of the TPS3890, low quiescent current, 1% accurate supervisor with programmable-delay. Included in this user's guide are setup instructions, a schematic diagram, printed circuit board (PCB) layout drawings, and a bill of materials for the evaluation module.

Throughout this document, the terms *EVM*, *demonstration kit*, *evaluation board*, and *evaluation module* are synonyms with the *TPS3890EVM-775* evaluation module.

Contents

List of Figures

List of Tables

1 Introduction

The Texas Instruments' TPS3890EVM-775 helps design engineers evaluate the operation and performance of the TPS3890 family of supervisors for possible use in their own circuit application. This particular EVM configuration contains the TPS389001 in a SOT (1.6 mm × 1.2 mm) package. This document describes the configuration and set up of the TPS3890EVM-775 EVM board.

2 Hardware

This section describes the jumpers and connectors on the EVM as well as how to properly connect, setup, and use the TPS3890EVM-775.

2.1 Input and Output Connector and Jumper Descriptions

2.1.1 TP1: $\overline{\text{RESET}}$

This connector is the $\overline{\text{RESET}}$ output. Connect this output to a multimeter, oscilloscope, or external circuit to verify that $\overline{\text{RESET}}$ goes low when the monitored voltage goes below the threshold.

2.1.2 TP2: VDD

This connector is for the input power supply. The operating range of this supervisor is 1.5 V to 5.5 V.

2.1.3 TP3 to TP5: GND

These connectors are GND and are electrically connected to each other.

2.1.4 TP6: $\overline{\text{MR}}$

This connector is for the manual reset input. Pulling this pin low causes the device to signal a reset.

2.1.5 TP7: SENSE

This connector is the voltage being monitored.

2.1.6 J1: VPU

The TPS3890EVM-775 is designed for $\overline{\text{RESET}}$ to pull up to either VDD or an external voltage source. Table 1 shows the connections for choosing between the two pullup options. If the shorting jumper is removed, an external voltage can be placed on pin 2, labeled VPU in Figure 1.

Table 1. Connector JP1 Selections

Short Pins	Pullup Voltage (VPU)
1 and 2	VDD
OPEN	External voltage on pin 2 (VPU)

2.1.7 J2: CT

The TPS3890EVM-775 is prepopulated with three timings to evaluate the capacitor-adjustable delay. Table 2 shows the connections for choosing between the three timings.

Table 2. Connector JP2 Selections

Short Pins	Capacitor	Delay
1 and 2 (CT1)	330 pF (C2)	479 µs
3 and 4 (CT2)	0.047 µF (C3)	63 ms
OPEN	Open	40 µs

2.1.8 J3: $\overline{MR}$

For convenience, the TPS3890EVM-775 is designed to allow $\overline{MR}$ to be tied to VDD or GND. Table 3 shows the connection options. If the shorting jumper is removed, drive $\overline{MR}$ externally via TP6.

Table 3. Connector JP3 Selections

Short Pins	$\overline{MR}$ Voltage
1 and 2	VDD
2 and 3	GND
OPEN	Driven through TP6 connection

2.1.9 J4: SENSE

The TPS3890EVM-775 is designed to monitor VDD or an external sense voltage on TP7. Table 4 shows the connections for choosing between the two monitoring options.

Table 4. Connector JP4 Selections

Short Pins	Voltage Monitored
1 and 2	VDD
OPEN	TP7

2.1.10 J5: Resistor Divider

For convenience, the TPS3890EVM-775 is designed with four prepopulated sense resister dividers. Table 5 shows the connections for choosing between the dividers.

Table 5. Connector JP5 Selections

Short Pins	Resisters (Ω)		Nominal Threshold Voltage
	R_{Top}	R_{Bottom}	
1 and 2	Short	OPEN	1.15 V
3 and 4	10.0k (R3)	15.0k (R4)	1.92 V
5 and 6	10.0k (R3)	3.16k (R5)	4.79 V
7 and 8	10.0k (R3)	1.10k (R7) + 11.0 (R6)	11.5 V

3 Board Layout

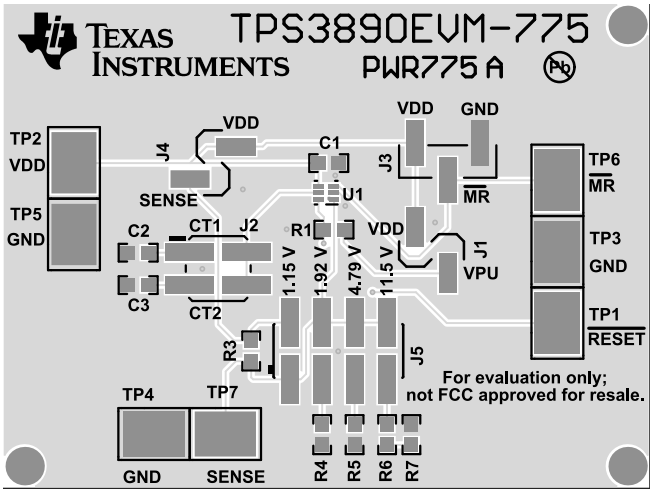


Figure 1. Top Overlay

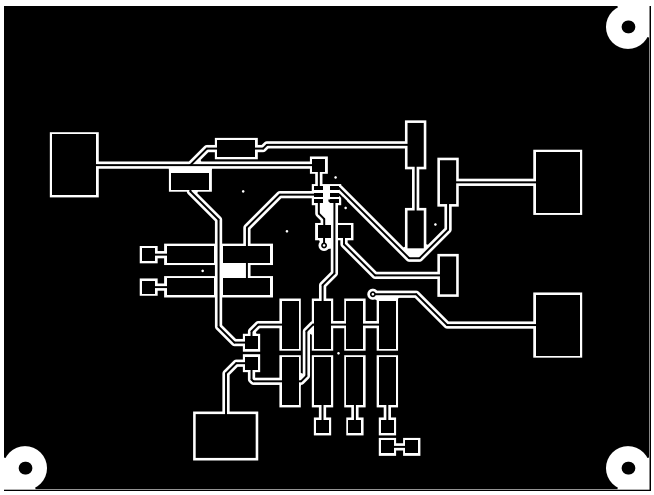


Figure 2. Top Layer

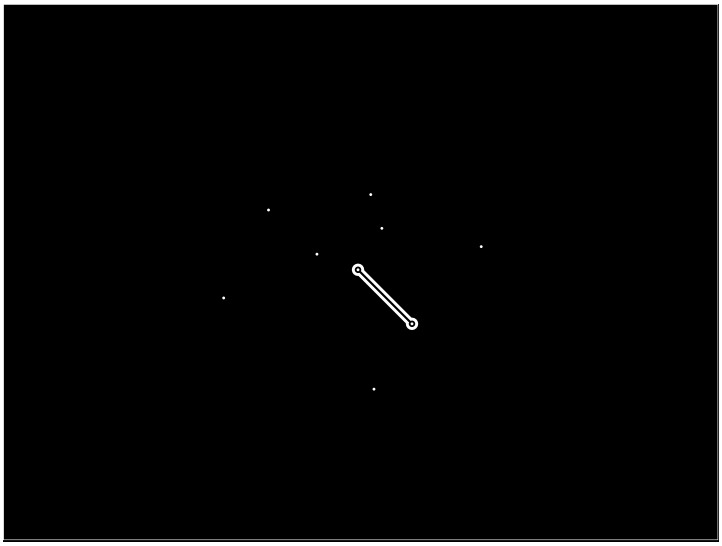


Figure 3. Bottom Layer

4 Schematic

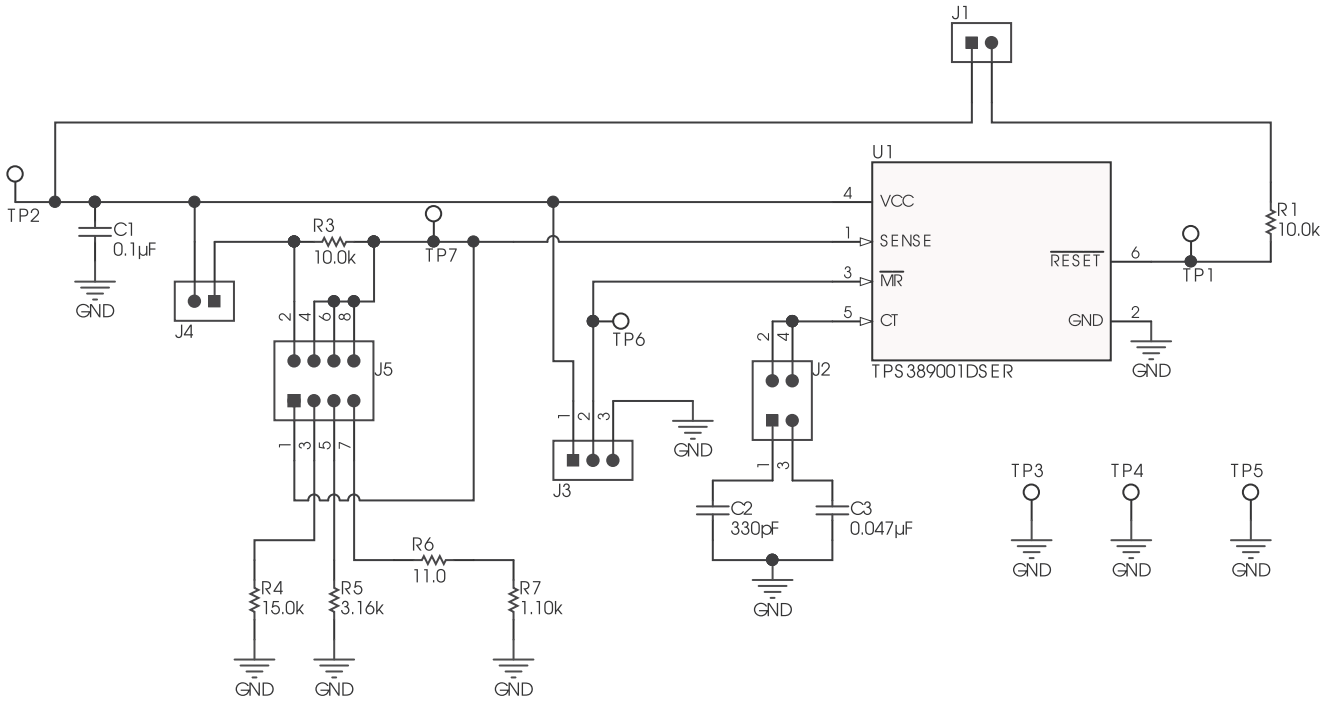


Figure 4. TPS3890EVM-775 Schematic

5 Bill of Materials

Table 6. TPS3890EVM-775 Bill of Materials

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer	Alternate PartNumber	Alternate Manufacturer
!PCB1	1	—	Printed Circuit Board	—	PWR775	Any	—	—
C1	1	0.1uF	CAP, CERM, 0.1 µF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	GCM188R71C104KA37J	MuRata	—	—
C2	1	330pF	CAP, CERM, 330 pF, 50 V, +/- 10%, X7R, 0603	0603	GRM188R71H331KA01D	MuRata	—	—
C3	1	0.047uF	CAP, CERM, 0.047 µF, 25 V, +/- 10%, X7R, 0603	0603	GRM188R71E473KA01D	MuRata	—	—
J1, J4	2	—	Header, 2.54 mm, 2x1, Gold, R/A, SMT	Header, 2.54 mm, 2x1, R/A, SMT	87898-0204	Molex	—	—
J2	1	—	Header, 100mil, 2x2, Tin, SMT	2x2 100mil Tin Header	15-91-2040	Molex	—	—
J3	1	—	Header, 100mil, 3x1, Gold, SMT	Samtec_TSM-103-01-X-SV	TSM-103-01-L-SV	Samtec	—	—
J5	1	—	Header, 2.54 mm, 4x2, Tin, SMT	Header, 2.54mm, 4x2, SMT	0015912080	Molex	—	—
R1, R3	2	10.0k	RES, 10.0 k, 1%, 0.1 W, 0603	0603	RCG060310K0FKEA	Vishay Draloric	—	—
R4	1	15.0k	RES, 15.0 k, 1%, 0.1 W, 0603	0603	CRCW060315K0FKEA	Vishay-Dale	—	—
R5	1	3.16k	RES, 3.16 k, 1%, 0.1 W, 0603	0603	CRCW06033K16FKEA	Vishay-Dale	—	—
R6	1	11.0	RES, 11.0, 1%, 0.1 W, 0603	0603	CRCW060311R0FKEA	Vishay-Dale	—	—
R7	1	1.10k	RES, 1.10 k, 1%, 0.1 W, 0603	0603	CRCW06031K10FKEA	Vishay-Dale	—	—
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5	5	1x2	Shunt, 100mil, Gold plated, Black	Shunt	969102-0000-DA	3M	SNT-100-BK-G	Samtec
TP1-TP7	7	SMT	Test Point, Compact, SMT	Testpoint_Keystone_Compact	5016	Keystone	—	—
U1	1	—	Low Quiescent Current, 1% Accurate Supervisor with Programmable-Delay, DSE0006A	DSE0006A	TPS389001DSER	Texas Instruments	TPS389001DSET	Texas Instruments
FID1-FID3	0	—	Fiducial mark. There is nothing to buy or mount.	Fiducial	N/A	N/A	—	—

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      CAUTION

      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.

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

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      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.

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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*

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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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Concernant les EVMs avec antennes détachables

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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