AXC2T-SMALLPKGEVM Evaluation Module

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1 Introduction

The AXC devices are a new family of direction controlled level translators from Texas Instruments. AXC devices have dual-supply pins enabling configurable voltage translation between 0.65 V and 3.6 V and any intermediate voltage ranges. Refer to the competitive advantages of the AXC Family in the application report *Power sequencing for the AXC family of devices* (SCEA058). Watch *Introduction to the AXC family of direction controlled translation device*.

The AXC2T-SMALLPKGEVM can be used to evaluate SN74AXC2T45 translator device in the DTM package. Additionally, this EVM supports the SN74AVC2T245 device in the RSW package.

1.1 Features

The AXC family of direction controlled translation devices are dual-supply with configurable voltage translation with an operating range from 0.65 V to 3.6 V. The A port is designed to track V_{CCA}. V_{CCA} accepts any supply voltage from 0.65 V to 3.6 V. The B port is designed to track V_{CCB}. V_{CCB} accepts any supply voltage from 0.65 V to 3.60 V.

The SN74AXC2T45 device is fully specified for partial-power-down applications using I_{OFF}. The I_{OFF} circuitry disables the outputs, thus preventing damaging current backflow through the device when the device is powered down. The V_{CC} isolation feature ensures that if either V_{CC} input is at ground, both A and B data I/O ports are in the high-impedance state.

The eight channel SN74AXC8T245 device has two direction control pins, each controlling 4 data I/Os enabling independent and simultaneous up and down translation. Refer to *AXC-SMALLPKG1EVM* for evaluating the RJW package.

The four channel SN74AXC4T774 device has individual direction control pins for each of it's IO(A and B) ports to allow configurable up and down translation. Refer to AXC4T774EVM for testing PW and RSV package.

The AXC-SMALLPKG1EVM can be used to evaluate the DEA and DTQ packages of the SN74AXC1T45. Refer to the low voltage translation for standard interfaces in the application report *Low voltage translation for SPI, UART, RGMII, and JTAG interfaces*(SCEA065).

The functional table of the SN74AXC2T45 is listed in Table 1. The functional table of the SN74AVC2T245 is listed in Table 2.

Table 1. SN74AXC2T45 Functional Table

DIR	Signal Direction
L	B data to A bus
H	A data to B bus

Table 2. SN74AVC2T245 Functional Table (Each 1-bit section)

$\overline{OE}$	DIRx	Signal Direction
H	X	Hi-Z
L	L	B data to A bus
L	H	A data to B bus

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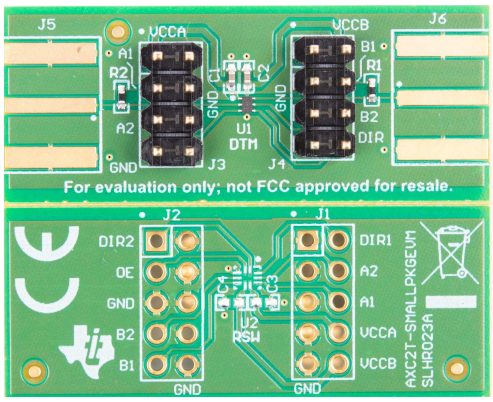


Figure 1. AXC2T-SMALLPKGEVM with DTM and RSW packages

1.2 Hardware Description

1.2.1 Headers

The EVM has standard 100-mil headers with the side closer to the device connected to ground. The side farther away from the device is mapped to the device pinout for easier connection as seen in Figure 1. The silkscreen indicates the pin name.

1.2.2 Bypass Capacitors

C1 and C3 are the bypass capacitors for V_{CCA} while C2 and C4 are the bypass capacitors for V_{CCB} with a value of 0.1 µF. C1, C2 are populated while C3, C4 are unpopulated.

1.2.3 DIR and OE Control Inputs

The direction pins and output enable pins are the control inputs of the devices and should never be left floating. The CMOS inputs must be held at a known state, either V_{CC} or ground, to ensure proper device operation. Refer to *Implications of Slow or Floating CMOS Inputs* (SCBA004).

1.2.4 Optional SMB Connectors

The optional edge-mounted SMB connector pair supports high-speed operation on A1 and B1 data I/O pins, while the corresponding header pins R1 and R2 have zero-ohm resistors populated.

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2 Board Layout

Figure 2 illustrates the AXC2T-SMALLPKGEVM layout.

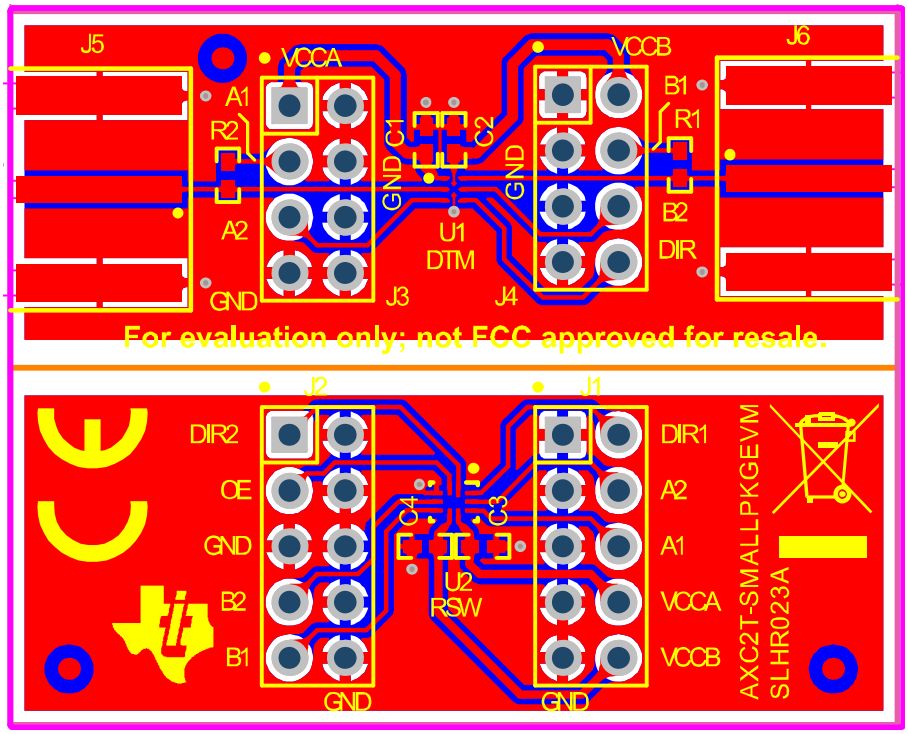


Figure 2. AXC2T-SMALLPKGEVM Layout

3 Schematic and Bill of Materials

3.1 Schematic

Figure 3 illustrates the AXC2T-SMALLPKGEVM schematic. The shaded portion of the schematic is not populated on the physical board.

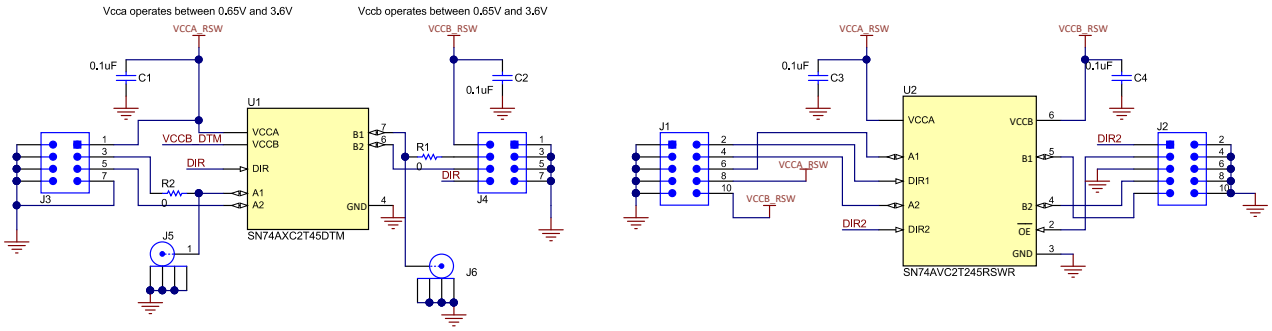


Figure 3. AXC2T-SMALLPKGEVM Schematic DTM and RSW Package

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3.2 Bill of Materials

Table 3 lists the AXC2T-SMALLPKGEVM bill of materials.

Table 3. AXC2T-SMALLPKGEVM Bill of Materials

Designator	Quantity	Description	Package Reference	Part Number	Manufacturer
C1, C2	2	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	0402YC104KAT2A	AVX
J3, J4	2	Header, 100mil, 4x2, Gold, TH	4x2 Header	TSW-104-07-G-D	Samtec
R1, R2	2	RES, 0, 5%, 0.063 W, 0402	0402	MCR01MZPJ000	Rohm
U1	1	2-Bit Bus Transceiver with Configurable Level-Shifting	DTM0008A	SN74AXC2T45DTM	TI
C3, C4	0	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	0402YC104KAT2A	AVX
J1, J2	0	Header, 100mil, 5x2, Gold, TH	5x2 Header	TSW-105-07-G-D	Samtec
J5, J6	0	Connector, SMB Jack, End launch, SMT	SMB End launch Jack, SMT	131-3701-801	Cinch Connectivity
U2	0	Dual-Bit, 2-DIR pin Dual-Supply Bus Transceiver w/ Configurable Voltage Translation	RSW0010A	SN74AVC2T245RSW	TI

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