User's Guide
TCAN1463-Q1 Evaluation Module With SIC Network

TEXAS INSTRUMENTS

ABSTRACT

This user guide details the operation of the TCAN1463-Q1 *Controller Area Network* (CAN) with *Flexible Datarate* (FD) in a signal improved capable (SIC) network transceiver evaluation module (EVM) for the SOIC package. The TCAN1463-Q1 EVM for the SOIC package supports the TCAN1043HG-Q1, TCAN1043G-Q1, TCAN1043H-Q1, TCAN1043A-Q1, and the TCAN1043-Q1 by simply replacing the installed TCAN1463-Q1 transceiver with another variant. This user guide explains the EVM configurations for basic CAN FD and CAN evaluation with and without a SIC network, various loads, and termination settings.

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1 Introduction

Texas Instruments offers a broad portfolio of high-speed (HS) CAN, CAN FD, and CAN SIC transcievers compatible with the ISO11898-2 CAN standards. These include 5-V V_{CC} only, 3.3-V V_{CC} only, 5-V V_{CC} with I/O level shifting, and galvanic-isolated CAN transceivers. These CAN transceiver families include product mixes with varying features such as low-power standby modes with and without wake up, silent modes, sleep modes, loop back, and diagnostic modes.

The TI TCAN1463-Q1 EVM helps designers evaluate the operation and performance of the TCAN1463-Q1, TCAN1043A-Q1, and TCAN1043-Q1 CAN transceivers in normal and SIC networks in accordance with CIA 601-4. The ability to perform system-level evaluation using the V_{IO}, EN, INH, nSTB, V_{SUP}, WAKE, and nFAULT pins can be realized on the EVM. It also provides bus termination, bus filtering, and protection concepts. Use the TCAN Evaluation Module to evaluate the TI 8-pin CAN and CAN FD transceiver families.

1.1 TCAN1463-Q1 Evaluation Module With SIC Network

The TCAN1463EVM has simple connections to all necessary pins of the CAN transceiver device, and jumpers where necessary to provide flexibility for device pin and CAN bus configuration. There are test points (loops) for all main points where probing is necessary for evaluation such as GND, V_{CC}, TXD, RXD, CANH, CANL, EN, nFAULT, and WAKE. The EVM supports many options for CAN bus configuration. It is pre-configured with two 120-Ω resistors connected on the bus via jumpers: a single resistor is used with the EVM as a terminated line end (CAN is defined for 120-Ω impedance twisted pair cable) or both resistors in parallel for electrical measurements representing the 60-Ω load the transceiver detects in a properly-terminated network (that is, 120-Ω termination resistors at both ends of the cable). If the application requires *split* termination, TVS diodes for protection, or a Common Mode (CM) Choke, the EVM has footprints available for this via customer installation of the desired components.

This EVM also has the ability to connect a SIC network, as defined in CIA 601-4, to the CAN bus lines via JMP6 and JMP7. Connecting the SIC network to CANH and CANL will simulate a noisy CAN bus by adding more reflections and ringing to the signals. This can be used to test the reliability of the transceiver in a very noisy environment.

Figure 1-1 shows the EVM board image.
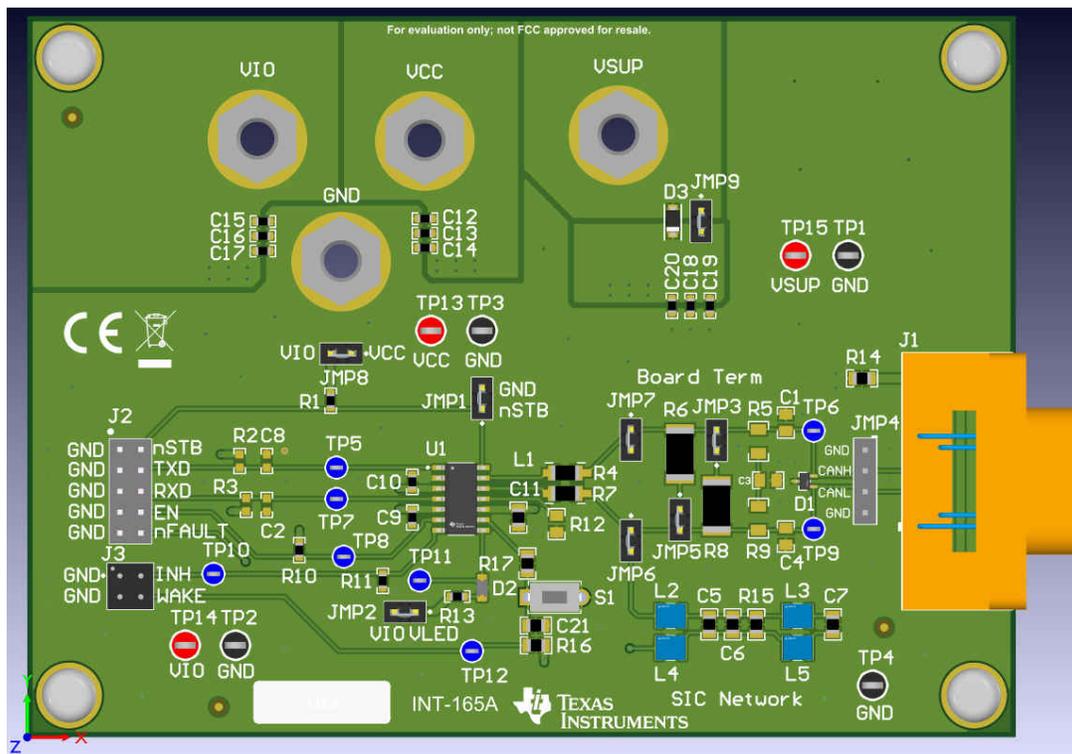
Figure 1-1. TCAN1463-Q1 Evaluation Module (EVM) With SIC Network

1.2 Applications

The TCAN1463-Q1 is designed to support CAN applications where ultra-low-power and signal improved capability (SIC) requirements exist. The applications include, but are not limited to: (≤ 1 Mbps), CAN FD applications up to 8 Mbps:

- Classic CAN:
    - Supports CAN with datarates up to 1 Mbps
- CAN FD:
    - Supports CAN FD timing requirements at 5Mbps
    - Supports CAN FD timing requirements at 8 Mbps

    (with few nodes)
- 12-V and 24-V applications
- Automotive
- Transportation
- Industrial
- Telecom

2 Test Setup and Results

2.1 Overview and Basic Operation Settings

2.1.1 Jumper Description

Table 2-1 shows a description of the jumper selections on the EVM with a short description of the function of each pin.

Table 2-1. Jumper Definitions

Connection	Type	Pin(s)	Description
J1	9- pin DB9 connector	CANH, CANL, V_{SUP}, GND	Provides an optional way to connect CANH, CANL, V_{SUP}, and GND all through a standard DB9 CAN pinout rather than through a regular header
J2	10-pin jumper	nSTB	Mode control input, Standby input, integrated pull down
		TXD	CAN transmit data input (LOW for dominant and HIGH for recessive bus states), integrated pull up
		RXD	CAN receive data output (LOW for dominant and HIGH for recessive bus states), tri-state
		EN	Mode control input, Enable Input, integrated pull down
		nFAULT	Fault output, inverted logic
		GND	Ground connection
J3	4-pin jumper	INH	Inhibit output, controls system voltage regulators and supplies
		WAKE	Wake input terminal, high voltage input
		GND	Ground connection
JMP1	2-pin jumper	nSTB, GND	Provides ability to short nSTB to GND
JMP2	2-pin jumper	V_{IO}, V_{LED}	Supply connections for V_{IO} and V_{LED}. Provides ability to short V_{IO} and V_{LED} together
JMP3	2-pin jumper	CANH, CANL	Connect 120-Ω CAN termination to the bus. Used separately for a single termination if EVM is at end of the CAN bus and termination is not in the cable. Used in combination with JMP5 to get to second CAN termination to represent the combined 60-Ω load for CAN transceiver parametric measurement.
JMP4	4-pin jumper	CANH, CANL, GND	CAN bus connection (CANH, CANL) and GND
JMP5	2-pin jumper	CANH, CANL	Connect 120-Ω CAN termination to the bus. Used in combination with JMP3 to get to second CAN termination to represent the combined 60-Ω load for CAN transceiver parametric measurement.
JMP6, JMP7	2-pin jumpers	CANH, CANL	Used to connected the CANH and CANL lines to the network. Must be used together.
JMP8	2-pin jumper	V_{IO}, V_{CC}	Supply connections to V_{IO} and V_{CC}. Provides ability to short V_{IO} and V_{CC} together
JMP9	2-pin jumper	V_{SUP}	Provides ability to bypass the revserse polarity protection diode (D3)
TP1, TP2, TP3, TP4	Test point (loop)	GND	Ground connection
TP5		TXD	CAN transmit data input
TP6		CANH	High-level CAN bus I/O line
TP7		RXD	CAN receive data output
TP8		EN	Mode control input, Enable Input
TP9		CANL	Low-level CAN bus I/O line
TP10		INH	Inhibit output, controls system voltage regulators and supplies
TP11		nFAULT	Fault output, inverted logic
TP12		WAKE	Wake input terminal, high-voltage input
TP13		V_{CC}	5-V supply voltage
TP14		V_{IO}	I/O supply voltage
TP15		V_{SUP}	Reverse blocked battery supply input

2.1.2 Power Supply Inputs V$_{SUP}$, V$_{CC}$, and V$_{IO}$

The TCAN1463-Q1 is powered through the V$_{SUP}$, V$_{CC}$, and V$_{IO}$ supply pins via the EVM. Each supply pin must be connected to the appropriate supply voltage. V$_{SUP}$ can be connected to an automotive battery voltage directly with a reverse blocking diode and supports voltages from 4.5 V to 45 V. Banana jack P3 is used to connect this voltage to the EVM, use TP15 to monitor this voltage. V$_{CC}$ is the supply voltage and supports voltages from 4.5 V to 5.5 V. Banana jack P1 is used to connect this voltage to the EVM, monitor this voltage with TP13. V$_{IO}$ is the I/O supply voltage and supports voltages from 1.7 V to 5.5 V. Banana jack P2 is used to connect this voltage to the EVM, monitor this voltage with TP14.

2.1.3 TXD Input

The TXD input of the transceiver, transmit data, is routed to J2 and TP5. The signal path to the J2 header has an optional pullup, R2, to V$_{IO}$, and and optional capacitor for filtering, C8.

2.1.4 RXD Output

The RXD output of the transceiver, receive data, is routed to J2 and TP7. The signal path to the J2 header has an optional pullup, R3, to V$_{IO}$, and a capacitor for filtering, C3.

2.1.5 nSTB and EN Mode Control

The device has four main operating modes: normal mode, standby mode, silent mode and sleep mode, and one transitional mode called go-to-sleep mode. Operating mode selection is made via the nSTB and EN input terminals in conjunction with supply conditions and wake events. Table 2-2 lists the operational modes of the device and the associated pin configurations. Figure 2-1 shows a state diagram of the various device modes with the associated pin configurations. Use *TCAN1463-Q1 Low-Power Signal Improvement CAN FD Transceiver with INH and WAKE* as an additional reference to the EVM.

Table 2-2. Operational Modes

| V$_{CC}$ and V$_{IO}$	V$_{SUP}$	EN	nSTB	WAKERQ Flag	Mode	Driver	Receiver	RXD	Bus Bias	INH
Good	Good	H	H	X	Normal	Enabled	Enabled	Mirror Bus State	V$_{CC}$/2	On
Good	Good	L	H	X	Silent	Disabled (Off)	Enabled	Mirror Bus State	V$_{CC}$/2	On
Good	Good	H	L	Cleared	Go to Sleep	Disabled (Off)	Low Power Bus Monitor (On)	High or High Z (No V$_{IO}$)	Weak pull to GND	On
				Cleared	Sleep	Disabled (Off)	Low Power Bus Monitor (On)	High or High Z (No V$_{IO}$)	Weak pull to GND	Off
				Set	Standby	Disabled (Off)	Low Power Bus Monitor (On)	High or High Z (No V$_{IO}$)	Weak pull to GND	On
Good	Good	L	L	X	Standby	Disabled (Off)	Low Power Bus Monitor (On)	High or High Z (No V$_{IO}$)	Weak pull to GND	On
Bad	Good	X	X	X	Sleep	Disabled (Off)	Low Power Bus Monitor (On)	High or High Z (No V$_{IO}$)	Weak pull to GND	Off (High Z)
X	Bad	X	X	X	Protected	Disabled (Off)	Disabled (Off)	High Z	High Z	Off (High Z)
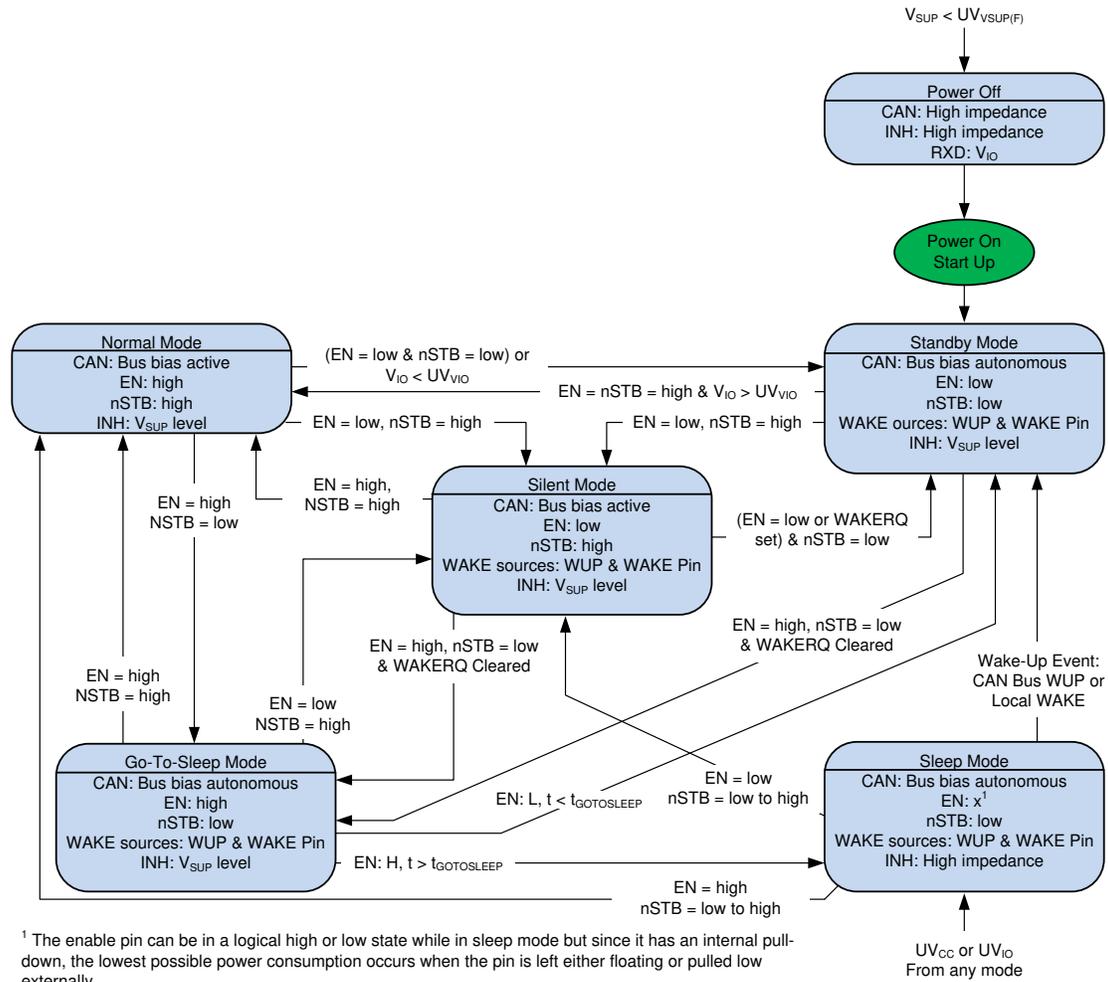
Figure 2-1. TCAN1463-Q1 State Diagram

The EN signal is available via J2 position 8 and TP8.

The nSTB pin is available via J2 position 2 and JMP1. JMP1 and J2 provide a local GND connection next to the nSTB pin to enter standby mode. nSTB incorporates a 4.7-kΩ pullup resistor, R1.

2.1.6 Inhibit (INH) High Voltage Output

The inhibit output terminal is used to control system power management devices allowing for extremely low system current consumption in sleep mode. Use this terminal to enable and disable local power supplies. The pin has two states: driven high, and high impedance (High Z).

When high (on) the terminal will show V_{SUP} minus a diode voltage drop. In the high impedance state the output will be left floating. The INH pin will be high for normal, silent, go to sleep, and standby modes. It will be low when in sleep mode. INH is available via J3 position 2 and TP10.

2.1.7 CANH and CANL Bus Pins

The CANH and CANL pins are available via J1, JMP4, TP6, and TP9. Ground connections are provided next to the CAN lines on JMP4 allowing for easy measurements.

2.1.7.1 SIC Network Configuration

The SIC network can be enabled by connecting shunts to JMP6 and JMP7. This will connect the network of inductors, capacitors, and resistors to the CANH and CANL lines and create a much noisier CAN bus. Note that both JMP6 and JMP7 need to be shunted for this to work.

2.1.8 WAKE Input

Use the WAKE terminal, a high-voltage input terminal, for local wake up (LWU) requests via a voltage transition. The terminal triggers a local wake up (LWU) event on either a low-to-high, or a high-to-low transition since it has a bi-directional input threshold (falling or rising edge). WAKE is available via J3 position 4 and TP12. The LWU event can also be triggered by pressing the S1 switch.

2.1.9 nFAULT Output

The nFAULT terminal is used to signal multiple fault condition and is available via J2 position 10 and TP11. Table 2-3 shows the device status indicator flags implemented to allow for the system to determine the status and diagnose the device and system. In addition to faults, the nFAULT terminal also signals wake up requests and *cold* power-up sequence on the V_{SUP} battery supply terminal so the system can do any diagnostics or cold booting sequence necessary. The faults are multiplexed (ORed) to the nFAULT output. When nFAULT is driven low, the D2 LED will illuminate on the board.

Table 2-3. Internal and External Indicator Flags (nFAULT)

Event	Flag Name	Cause	Indicators	Flag Cleared	Comment
Power up	PWRON	Power up on VSUP and any return of VSUP after it has been below UVVSUP	nFAULT = L upon entering silent mode from standby, go-to-sleep, or sleep mode	After transition to normal mode	
Wake-up request	WAKERQ	Wake-up event on CAN bus, state transition on WAKE pin, or initial power up	nFAULT = RXD = L after wake up in standby mode, go-to-sleep mode, and sleep mode	After transition to normal mode, or either a UVV_{CC} or UVV_{IO} event	Wake-up request may only be set from standby, go-to-sleep, or sleep mode. Resets timers for UVV_{CC} or UVV_{IO}
Wake-up source recognition	WAKESR	Wake-up event on CAN bus, state transition on WAKE pin, initial power up	Available upon entering normal mode , nFAULT = L indicates wake from WAKE terminal, nFAULT = H indicates wake from CAN bus	After four recessive to dominant edges on TXD in normal mode, leaving normal mode, or either a UVV_{CC} or UVV_{IO} event	A LWU source flag is set on initial power up
Undervoltage	UVV_{CC}	Undervoltage V_{CC}	Not externally indicated	V_{CC} returns, or Wake-up request occurs	
	UVV_{IO}	Undervoltage V_{IO}	Not externally indicated	V_{IO} returns, or Wake-up request occurs	
	UVV_{SUP}	Undervoltage V_{SUP}	Not externally indicated	V_{SUP} returns	V_{SUP} undervoltage event triggers the PWRON and WAKERQ flags upon return of V_{SUP}
CAN bus failures	CBF	CANH or CANL shorted to GND, V_{CC}, V_{SUP}	nFAULT = L in normal mode only	If fault is not present for four consecutive dominant to recessive transitions or upon leaving normal mode	Failure must persist for four consecutive dominant to recessive transitions
Local faults	TXDCLP (TCAN1043A-Q1 only)	TXD low when CAN active mode is entered	nFAULT = L upon entering silent mode from normal mode	RXD = L and TXD = H, or upon transitioning into normal, standby, go-to-sleep, or sleep modes with TXD = H	CAN driver remains disabled until the TXDCLP is cleared. CAN receiver remains active during the TXDCLP fault.
	TXDDTO	TXD dominant time out, dominant (low) signal for t ≥ t_{TXD_DTO}			CAN driver remains disabled until the TXDDTO is cleared
	TXDRXD	TXD and RXD pins are shorted together for t ≥ t_{TXD_DTO}			CAN driver remains disabled until the TXDRXD is cleared
	CANDOM	CAN bus dominant fault, when dominant bus signal received for t ≥ t_{BUS_DOM}		RXD = H, or upon transitioning into normal, standby, go-to-sleep, or sleep modes	Driver remains enabled
	TSD	Thermal shutdown, junction temperature ≥ T_{TSD}		T_J drops below T_{TSD} and either RXD = L and TXD = H, or upon transitioning into normal, standby, go-to-sleep, or sleep modes	CAN driver remains disabled until the TSD is cleared

2.2 Using CAN Bus Load, Terminations, and Protection Features

The CAN EVM is populated with two 120-Ω power resistors selectable via jumpers between CANH and CANL. When using one resistor, the EVM is used as a terminated end of a bus. For electrical measurements to represent the total loading of the bus, use both 120-Ω resistors in parallel to give the standard 60-Ω load for parametric measurement. The EVM also has footprints for split termination, if needed for the application. Table 2-4 summarizes how to use these termination options. If using split termination, match the resistors. Calculate the CM filter frequency using: f_C = 1 / (2πRC). Normally, the split capacitance is in the range of 4.7 nF to 100 nF. Note, this is the CM filter frequency, not a differential filter that impacts the differential CAN signal directly.

Table 2-4. Bus Termination Configuration

Termination	120-Ω Resistors		Split Termination Footprints		
Jumper	JMP3	JMP5	R5	R9	C3
No termination	Open	Open	Not available	Not available	Not available
120-Ω standard termination	Shorted	Open			
60-Ω load	Shorted	Shorted			
Split termination	Open	Open	60 Ω	60 Ω	4.7 nF

The EVM also has footprints for various protection schemes to enhance robustness for extreme system-level ESD and EMC requirements. Table 2-5 summarizes these options.

Table 2-5. Protection and Filtering Configuration

Configuration	Footprint Reference	Use Case	Population and Description
Series resistors or CM choke	R4/R7 or L1 (common footprint)	Direct CAN transceiver to bus connection	R4 and R7 populated with 0 Ω (default population)
		Series-resistance protection, CAN transceiver to bus connection	R4 and R7 populated with MELF resistor as necessary for harsh EMC environment
		CM choke (bus filter)	L1 populated with CM choke to filter noise as necessary for harsh EMC environment
Bus filtering capacitors transient protection	C1/C4	Bus filter	Filter noise as necessary for harsh EMC environment. Use filter capacitors in combination with L1 CM choke
Transient protection	D1	Transient and ESD protection	To add extra protection for system level transients and 30 kV ESD events, ESD2CAN24-Q1 is populated in the D1 socket.

2.3 Using Customer-Installable I/O Options for Current Limiting, Pull up and Pull down, Noise Filtering

The TCAN1463-Q1 EVM has footprints on the PCB for installing various filtering and protection options to adapt the EVM to match CAN network topology requirements, if the EVM is being used as a CAN node.

Each digital input or output pin has footprints allowing for pull-up or pull-down resistors (depending on pin used) and capacitors to GND which allows for EMI/EMC filtering. Table 2-6 lists these features for each of the digital input and output pins of the EVM. Replace or populate the RC components as necessary for the application.

Table 2-6. RC Filter and Protection List

Device Pin			Jumper/Switch		Pull up and Pull down	C to GND	Description
No.	Description	Type	Pull up	Pull down			
1	TXD	Input	Not available	Not available	R2 pull up	C8	
4	RXD	Output	Not available	Not available	R3 pull up	C2	
6	EN	Input	Not available	Not available	R10 pull up	Not available	
7	INH	High voltage output	Not available	Not available	R11 pull down	Not available	
9	WAKE	Input	Not available	S1	R16, R17 pull up	C21	Momentarily press S1 to trigger local wake up
14	nSTB	Input	Not available	JMP1	R1 pull up	Not available	

3 EVM Setup and Basic Usage

3.1 Equipment

The following equipment may be used to evaluate the performance of the TCAN1463-Q1 device.

- Power supply capable of supplying 5 V for V_{CC} and 1.8 V to 5 V for V_{IO}
- Power supply capable of supplying 4.5 V to 40 V for V_{SUP}
- If the CAN bus interface and IO voltage are to be observed using an oscilloscope, use high-impedance probes (1 MΩ or greater) or an oscilloscope with an internal high-impedance option. This prevents the CAN driver and IO buffers from becoming overloaded during normal operating conditions.

3.2 TCAN1463-Q1 EVM Setup

Configure the TCAN1463-Q1 EVM for normal operation by installing shunts on the EVM as described in Table 3-1.

Table 3-1. Basic Operation Jumper Settings

Jumper	Shunt
JMP2	Installed - shorts V_{IO} and V_{LED} together. Use JMP2 position 2 to drive V_{LED} independently from V_{IO}
JMP3	Installed – implements 120-Ω resistor between CANH and CANL
JMP5	Installed – implements 120-Ω resistor between CANH and CANL
JMP8	Installed – shorts V_{CC} and V_{IO} together Use P2 to drive V_{IO} independently from V_{CC}

Connect the power supplies to the EVM using the banana connecter P1, P2, P3, and P4. If banana cables are unavailable, use test points TP1, TP2, TP3, TP13, TP14, and TP15 instead.

- Set P1 or TP13 to 5 V at 100 mA
- Set P2 or TP14 to 3.3 V or 5 V at 100 mA for the IO buffer voltage
- Set P3 or TP15 to 12.5 V at 100 mA
- Set P4 equal to GND

For more detailed information, see the schematic reference for power in Figure 4-1.

Connect the EVM to the CAN bus for network evaluation. TXD and RXD can be jumpered to the CAN controller via J2 position 4 and position 6, respectively. If evaluating the TCAN1463-Q1 without a CAN network, connect a function generator to J2 position 4 with the desired data rate. The generator should be set to provide a 0 V to 5 V TTL square wave into the high impedance input TXD. Connect an oscilloscope with high-impedance probes or high-impedance input to the CAN bus line CANH and CANL. Use a third channel on the oscilloscope to monitor RXD.

4 Schematic and Bill of Materials

4.1 TCAN1463-Q1 EVM Schematic

Figure 4-1 and illustrate the EVM schematics.

Figure 4-1. TCAN1463–Q1 EVM Schematic

4.2 TCAN1463-Q1 Bill Of Materials

Table 4-1 shows the component list for the TCAN1463-Q1 EVM.

Table 4-1. TCAN1463-Q1 EVM BOM

Designator	Quantity	Value	Description	Part Number	Manufacturer
C5, C6, C7	3	220pF	CAP, CERM, 220 pF, 100 V, ± 5%, C0G/NP0, 0805	C0805C221J1GACTU	Kemet
C9, C10, C14, C17	4	0.1uF	CAP, CERM, 0.1 uF, 16 V, ± 10%, X7R, AEC-Q200 Grade 1, 0603	CGJ3E2X7R1C104K080AA	TDK
C11, C21	2	0.1uF	CAP, CERM, 0.1 uF, 50 V, ± 5%, X7R, 0805	C0805C104J5RACTU	Kemet
C12, C15	2	10uF	CAP, CERM, 10 uF, 10 V, ± 20%, X5R, 0603	C1608X5R1A106M080AC	TDK
C13, C16	2	1uF	CAP, CERM, 1 uF, 16 V, ± 10%, X7R, 0603	C1608X7R1C105K080AC	TDK
C18	1	10uF	CAP, CERM, 10 uF, 35 V, ± 20%, X5R, 0603	GRM188R6YA106MA73D	Murata
C19	1	1uF	CAP, CERM, 1 uF, 50 V, ± 10%, X7R, 0603	UMK107AB7105KA-T	Taiyo Yuden
C20	1	0.1uF	CAP, CERM, 0.1 uF, 100 V, ± 10%, X7S, AEC-Q200 Grade 1, 0603	CGA3E3X7S2A104K080AB	TDK
D1	1		24-V, 2-Channel ESD Protection Diode for In-Vehicle Networks, SC70-3	ESD2CAN24DCK	Texas Instruments
D2	1	Red	LED, Red, SMD	LS R976-NR-1	OSRAM
J1	1		D-Sub-9, 11Pos, Male, TH	09 65 162 6810	Harting
J2	1		Header, 100mil, 5x2, Tin, TH	PEC05DAAN	Sullins Connector Solutions
J3	1		Header, 100mil, 2x2, Tin, TH	PEC02DAAN	Sullins Connector Solutions
JMP1, JMP2, JMP3, JMP5, JMP6, JMP7, JMP8, JMP9	8		Header, 100mil, 2x1, Gold, TH	TSW-102-07-G-S	Samtec
JMP4	1		Header, 100mil, 4x1, Tin, TH	PEC04SAAN	Sullins Connector Solutions
L2, L3, L4, L5	4	3uH	Ind Chip Wirewound 3uH 5% 7.9MHz 20Q-Factor Ceramic 300mA 1210 T/R	AISC-1210-3R0J-T	Abracon
P1, P2, P3, P4	4		Standard Banana Jack, Uninsulated, 15A	108-0740-001	Cinch Connectivity
R1, R10	2	4.7k	RES, 4.7 k, 5%, 0.1 W, 0603	CRCW06034K70JNEA	Vishay-Dale

Table 4-1. TCAN1463-Q1 EVM BOM (continued)

Designator	Quantity	Value	Description	Part Number	Manufacturer
R4, R7	2	0	RES, 0, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	CRCW12060000Z0EA	Vishay-Dale
R6, R8	2	120	RES, 120, 1%, 1 W, AEC-Q200 Grade 0, 2512	CRCW2512120RFKEG	Vishay-Dale
R11	1	62.0k	RES, 62.0 k, 1%, 0.1 W, 0603	RC0603FR-0762KL	Yageo
R13	1	1.50k	RES, 1.50 k, 1%, 0.1 W, 0603	RC0603FR-071K5L	Yageo
R14	1	1.00Meg	RES, 1.00 M, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	ERJ-6ENF1004V	Panasonic
R15	1	60.4	RES, 60.4, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	CRCW080560R4FKEA	Vishay-Dale
R16	1	20.0k	RES, 20.0 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	ERJ-6ENF2002V	Panasonic
R17	1	33.2k	RES, 33.2 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	CRCW080533K2FKEA	Vishay-Dale
S1	1		Switch, Tactile, SPST-NO, 0.05A, 12V, TH	PTS635SL50LFS	C&K Components
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5, SH-J6, SH-J7, SH-J8	8		Shunt, 2.54mm, Gold, Black	60900213421	Wurth Elektronik
TP1, TP2, TP3, TP4	4		Test Point, Compact, Black, TH	5006	Keystone
TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12	8		Test Point, Miniature, Blue, TH	5117	Keystone
TP13, TP14, TP15	3		Test Point, Compact, Red, TH	5005	Keystone
U1	1		Low-Power Signal Improvement CAN FD Transceiver with INH and WAKE	TCAN1463DQ1	Texas Instruments
C1, C4	0	20pF	CAP, CERM, 20 pF, 100 V, ± 5%, C0G/NP0, 0805	08051A200JAT2A	AVX
C2, C8	0	0.1uF	CAP, CERM, 0.1 uF, 16 V, ± 10%, X7R, AEC-Q200 Grade 1, 0603	CGJ3E2X7R1C104K080AA	TDK

Table 4-1. TCAN1463-Q1 EVM BOM (continued)

Designator	Quantity	Value	Description	Part Number	Manufacturer
C3	0	4700pF	CAP, CERM, 4700 pF, 100 V, ± 10%, X7R, 0805	GRM219R72A472KA01D	MuRata
L1	0	100uH	Inductor, Ferrite, 100 uH, 0.15 A, 2 ohm, SMD	ACT45B-101-2P-TL003	TDK
R2, R3	0	4.7k	RES, 4.7 k, 5%, 0.1 W, 0603	CRCW06034K70JNEA	Vishay-Dale
R5, R9	0	60.4	RES, 60.4, 1%, 0.25 W, 1206	RC1206FR-0760R4L	Yageo America
R12	0	102k	RES, 102 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	CRCW0805102KFKEA	Vishay-Dale

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

Changes from Revision * (October 2021) to Revision A (August 2022)   **Page**

- Updated the *TCAN1463-Q1 EVM Schematic* 0
- Updated the *TCAN1463-Q1 Bill Of Materials* - Deleted component D3.. 0

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