

TC1-DESIQ-SBB User Guide

User's Guide



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TC1-DESIQ-SBB User Guide

1 Board Overview

Thank you for your interest in TI's TC1-DESIQ-SBB. These boards are not included with the GSPS ADC Reference Board hardware kit, but are separately available in order to evaluate DESIQ Mode performance. The TC1-DESIQ-SBB uses the TC1-1-13MA+ from Mini-Circuits, which is designed for wide-band functionality and low cost, see [Figure 1](#).

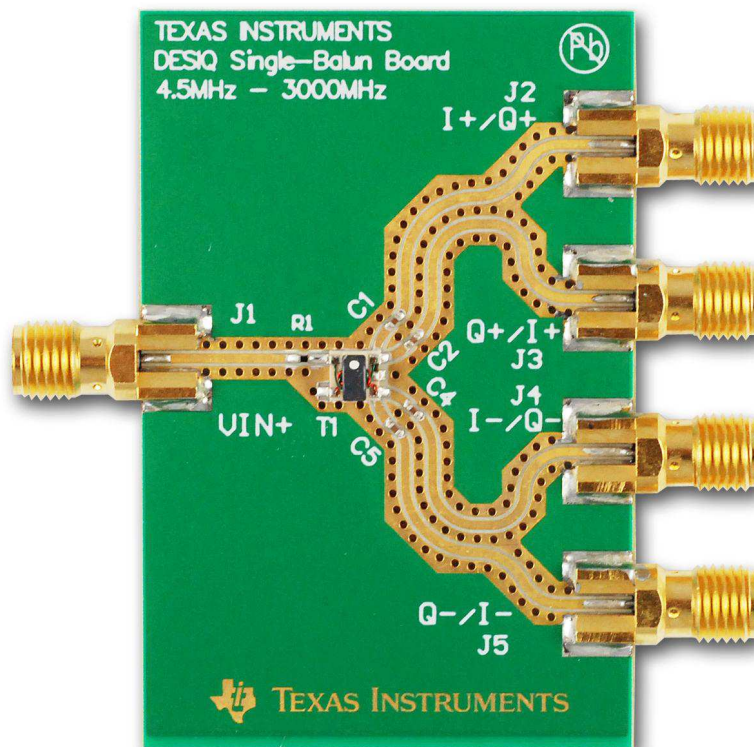


Figure 1. TC1-DESIQ-SBB Board

- Board: TC1-DESIQ-SBB
- Balun: TC1-1-13MA+
- Balun Manufacturer: Mini-Circuits
- Frequency range: {4.5MHz, 3GHz}
- Impedance ratio: 1:1
- Features: wire-wound construction, wide-band functionality, good return loss
- Datasheet: <http://www.minicircuits.com/pdfs/TC1-1-13MA+.pdf>

2 Board Schematics

Since the composite input impedance of the GPS ADCs in DESIQ Mode are 50Ω , and the impedance of most signal generators are 50Ω , the 1:1 impedance ratio of this balun is ideal for the application, see [Figure 2](#). The balun board includes capacitors for AC-coupling, so DC blocks to the ADC are not necessary.

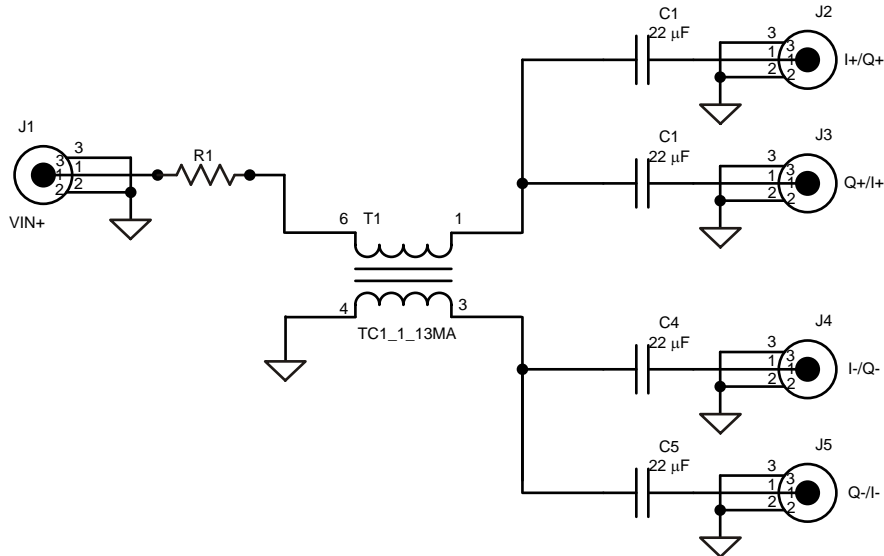


Figure 2. TC1-DESIQ-SBB Schematic

3 Connections in Setup

The connection between the TC1-DESIQ-SBB and the ADC1xDxxxx(RF) Reference Board should be made as shown in [Figure 3](#). These connections can be made with the 6" SMA to SMA cables which are included in the Reference Board hardware kit. Note that the connections are not directly across; care must be taken to make the correct connections.

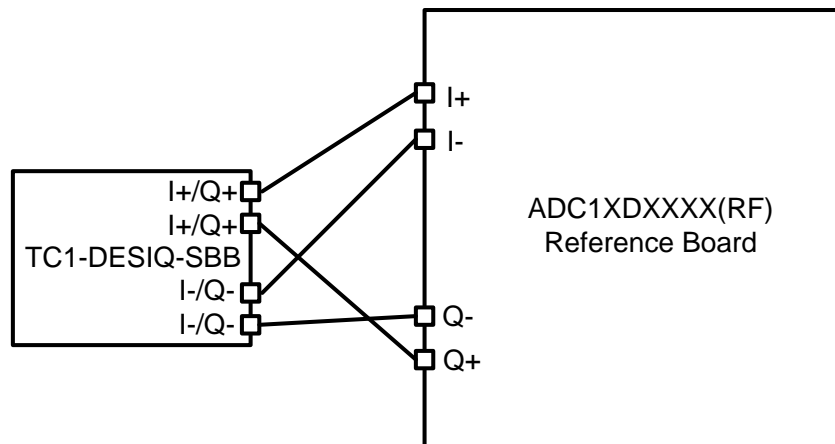


Figure 3. Connection Diagram to GPS ADC Reference Board

4 Limitations and Debug Tips

Please note that this board cannot be used to drive the DESCLKIQ Mode. This is because the DESCLKIQ Mode requires I- and Q-channel inputs to be balanced more precisely than can be achieved by two separate boards attached by cables. Using this board to drive the DESCLKIQ Mode is functionally possible, but there will be a large interleaving spur, which cannot be minimized to achieve reasonable SFDR performance.

Debug tips:

- Use (4) cables of the same length to make the connection between the TC1-DESIQ-SBB and the GPS ADC Reference Board. Different cable lengths will result in a phase difference which will degrade performance.
- All the interleaved modes (DES Mode) have an interleaving spur located at $F_s/2 - F_{in}$ which is due to timing skew and gain mismatch. This spur may be manually adjusted, i.e. reduced, using the DES Timing Adjust feature and the I/Q-channel FSR Adjust feature. The DES Timing Adjust feature will achieve the greater reduction in spur magnitude. These features are accessible via the WaveVision5 GUI.
- If the magnitude is very low as compared to DESI, DESQ or the Non-DES Mode, the most likely cause is that connections between the balun board and the ADC reference board are incorrect.

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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.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

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

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (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.

Concerning EVMs including detachable antennas

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.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

Concernant les EVMs avec appareils radio

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.

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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This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

1. Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
3. Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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