



High Performance Narrow-Band Transceiver IC

Silicon Anomaly Sheet

ADF7021

This anomaly sheet deals with all known bugs, anomalies, and workarounds for the ADF7021 narrow-band transceiver. This relates to Silicon Revision 4, which has a corresponding silicon revision readback code of 0x2104. See the ADF7021 data sheet for details on how to perform a silicon revision readback.

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SYNC WORD DETECT (SWD) BUG IN 4FSK MODE

It is not possible to access the sync word detect signal on the SWD pin (Pin 33) in 4FSK mode. This is because the test DAC output is automatically muxed to the SWD pin in 4FSK mode.

Workaround

The sync word detect function can be performed in a microcontroller by monitoring the incoming receive data (on the TxRxDATA pin) and checking against the wanted sync byte or start-of-frame delimiter.

The sync word detect feature is not affected in either 2FSK or 3FSK modes.

Rev. 0

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One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.
Tel: 781.329.4700 www.analog.com
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USING IF FILTER FINE CALIBRATION FOR CRYSTAL VALUES ABOVE 16.7 MHZ

The ADF7021 has selectable IF filter bandwidth settings of 25 kHz, 18.75 kHz, and 12.5 kHz, which act to perform channel selection and reject out-of-band signals. The IF filter is implemented in the analog domain and is a fifth-order Butterworth polyphase design centered at the IF of 100 kHz. To compensate for manufacturing tolerances, the IF filter should be calibrated after power-up to ensure that the bandwidth and center frequency are correct. Coarse calibration and fine calibration schemes are provided to offer a choice between fast calibration with the coarse calibration and high filter centering accuracy with fine calibration.

The ADF7021 data sheet recommend placing the lower and upper fine calibration tones at 65.8 kHz and 131.5 kHz, respectively, by using the formulas described in the Register 6—IF Fine Cal Setup Register Comments section. However, this is not possible for a crystal or TCXO value above 16.7 MHz because of the resolution provided in the IF Fine Cal Setup Register.

Workarounds

Users should first check to see if a fine calibration is required for their setup. This can be done by referring to the IF Filter Calibration section in the ADF7021 data sheet. If users only need to perform a coarse calibration, the choice of XTAL/TCXO is not an issue because the coarse calibration works over the specified range of XTAL/TCXO values.

If a fine filter calibration is required, one of the following workarounds should be used:

- Use an XTAL or a TCXO value below 16.7 MHz.
- For applications requiring an XTAL or a TCXO value above 16.7 MHz and less than 21.33 MHz, perform the sequence listed in Table 1. This programming sequence should be inserted in the receiver power-up sequence after the Register 3 write, which replaces the normal fine IF filter calibration register writes to Register 6 and Register 5. Refer to the ADF7021 data sheet for the standard receiver power-up sequence.
- There is no fine IF filter calibration workaround in place for XTAL/TCXO values > 21.33 MHz. In this case, users are recommended to perform a coarse IF filter calibration only.

Table 1. Register Programming Sequence for IF Filter Fine Calibration Workaround

Sequence Number	Register Number	Register Write	Description
1	15	0xC000 000F	Override the IF filter gain and bandwidth setting for the IF filter calibration routine.
2	4		Set the IF filter bandwidth to 18.75 kHz. Keep all other Register 4 settings as recommended in the data sheet.
3	9	0x0004 0009	Set the IF filter gain to low and AGC to manual mode.
4	6		Set the IF_FINE_CAL bit. Set the IF_CAL_DWELL_TIME bits as recommended in the ADF7021 data sheet. Place the lower and upper tones at 84 kHz and 114.7 kHz, respectively, using the formulas for the fine cal filter tones in the data sheet.
5	5		Set the IF_CAL_COARSE bit. This performs a coarse calibration immediately followed by a fine calibration. Wait until the filter calibration (coarse plus fine) is complete. This typically takes 5.2 ms. Alternatively, users can monitor the FILTER_CAL_COMPLETE signal to ascertain when the filter calibration routine is complete. This signal is programmed to appear on MUXOUT using Register 0.
6	9	0x0002 31E9	Set the AGC to automatic gain control. This should be done only after the IF filter calibration routine is complete.
7	15	0x0000 000F	Reset the test mode register.

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