ADIS16201 ANOMALIES

This anomaly list describes the known bugs, anomalies, and workarounds for the ADIS16201.

Analog Devices, Inc., is committed, through future silicon revisions, to continuously improve silicon functionality. Analog Devices tries to ensure that these future silicon revisions remain compatible with your present software/systems by implementing the recommended workarounds outlined here.

ADIS16201 FUNCTIONALITY ISSUES

Silicon Revision Identifier	Kernel Revision Identifier	Chip Marking	Silicon Status	Anomaly Sheet	No. of Reported Anomalies
N/A	N/A	Date code = xx1333 xx = unrelated to date	Release	Rev. A	6

MANUAL FLASH MEMORY UPDATE FAILURES [er001]

Background	The ADIS16201 uses a dual memory structure to maintain its operational configuration. The RAM register structure controls the operation of the device and the Flash/EE memory contents determine what is loaded into the RAM at start-up and during reset recovery events. The Flash/EE memory is updated by using a control bit in the COMMAND register of this part.
Issue	Flash/EE memory update was failing at a rate of approximately 5%.
Workaround	Date Code 0718 and older can exhibit this behavior. If it is encountered, use the STATUS register to check for a failed Flash/EE memory update; if the error flag indicates a failure, try it again.
Related Issues	None.

SCALE CALIBRATION REGISTER MATH ERROR [er002]

Background	The ADIS16201 provides scale correction registers to accommodate calibration adjustments after system-level installation. These registers are XACCL_SCALE, YACCL_SCALE, XINCL_SCALE, and YINCL_SCALE.
Issue	The lower byte of the scale adjustment registers was not computing correctly. Small adjustments result in large output errors.
Workaround	Date Code 0750 and older can exhibit this behavior. Firmware Revision 1.5 fixed this issue. Verify this by reading the contents of 0x52 (lower byte) which is 0x15, if the fix is in place. If it is equal to 0x14 or lower, this issue exists on the part. If scale adjustment is not used, the device operates without error.
Related Issues	None.

STATUS REGISTER NOT CLEARING WHEN READ [er003]

Background	The STATUS register contains various diagnostic error flags, which clear when read.
Issue	The STATUS register clears when Address 0x3D is read, but not when Address 0x3C is read.
Workaround	Date Code 0750 and older can exhibit this behavior. Firmware Revision 1.5 fixed this issue. Verify this by reading the contents of 0x52 (lower byte) which is 0x15, if the fix is in place. If it is equal to 0x14 or lower, this issue exists on the part. If this issue is encountered, switch the read address to 0x3D to clear the flags.
Related Issues	None.

AUTONULL FUNCTION RESULTS FAILS UNDER NEGATIVE ACCELERATION [er004]

Background	The autonull function simply measures the output of each acceleration and inclinometer register and then loads an equal but opposite value into the user-configurable offset null registers. This restores the outputs to zero.
Issue	When a negative acceleration acts upon the device during the auto null, it can return a positive output, rather than zero.
Workaround	Date Code 0750 and older can exhibit this behavior. Firmware Revision 1.5 fixed this issue. Verify this by reading the contents of 0x52 (lower byte) which is 0x15, if the fix is in place. If it is equal to 0x14 or lower, this issue exists on the part. If this issue is encountered, manual calibration adjustment is a better option.
Related Issues	None.

ALM_SMPL1/ALM_SMPL2 WRITES CAUSE DEVICE FAILURE [er005]

Background	The ALM_SMPL1 and ALM_SMPL2 registers provide critical timing configuration data for rate-of-change alarm settings limited to one byte. The upper bytes of this register are documented as not used.
Issue	Writing to the upper byte of these registers causes a device failure.
Workaround	Date Code 0750 and older can exhibit this behavior. Firmware Revision 1.5 fixed this issue. Verify this by reading the contents of 0x52 (lower byte) which is 0x15, if the fix is in place. If it is equal to 0x14 or lower, this issue exists on the part. Do not attempt to write to the upper bytes of these registers, which are located at Address 0x25 and Address 0x27.
Related Issues	None.

START-UP BEHAVIOR [er006]

Background	The ADIS16201 uses a number of internal functions (accelerometer, ADC, DAC, I/O, clock, voltage reference) to produce the accelerometer/inclination outputs with respect to gravity. Once the power supply to the ADIS16201 reaches 2.35 V, the ADIS16201 begins its power-on sequence to initialize and start each of these functions. The ADIS16201 uses an internal processor core and firmware to facilitate this power-on sequence.
Issue	On a small percentage of units that have Date Code 1333 (or lower), the start-up process occasionally exhibits behaviors that preclude correct initialization of the internal ADC. The observable symptoms include (but not limited to) the following: • SUPPLY_OUT register will return a value ~120 mV lower than the supply voltage to the part. • TEMP_OUT register will return a value ~20°C greater than expected. • XACCL_OUT, YACCL_OUT will return a value ~120 mG lower than expected. • XINCL_OUT, YINCL_OUT will return a value 6° to 7° off from the expected value. Investigation of this phenomenon has found that the anomalous start-up behavior only occurs on a very small percentage of ADIS16201 units. On units that show this phenomenon, there appears to be a very small window of temperature that may cause the problem to occur. For example, some devices that show this power-on issue occur when the ADIS16201 temperature is within a 1° to 2°C window between the −40°C to +105°C operating temperature.
Workaround	For those with unused material (not solder-attached to a PCB), use units that have Date Code 1333 (or higher). These units have a firmware Revision 1.6, which modifies the power-on initialization sequence in a manner that helps to prevent the microcontroller for initializing incorrectly during initial power-on. Note that the firmware revision resides in an undocumented register location, at Address 0x52 and uses and 8-bit, 2-digit binary-coded decimal (BCD) format. Reading Address 0x52 returns a 16-bit number, which represents Address 0x52 and Address 0x53. Mask off the upper 8-bits to eliminate contents from Address 0x53 and use the remaining 8-bits to determine the firmware revision of the ADIS16201. The lower nibble represents the ones digit. For example, 0x15 would represent firmware Revision 1.5, which indicates that the unit does not employ the updated power-on sequence. If the location contains the hexadecimal number of 0x16, then the unit uses firmware Revision 1.6, which employs the updated power-on sequence. For those who are observing this issue in existing systems, develop a detection routine that leverages one or more of the six register-specific symptoms, depending on the specific application. Systems that start-up in the same orientation can leverage historical information on the xINCL_OUT and xACCL_OUT and check to see if the values are within ±5°, because this behavior causes an angle error of 6° to 7°. When that is not practical, checking for negative changes in SUPPLY_OUT, which exceed 100 mV in magnitude offer another opportunity for detecting this condition. When this condition is detected, cycle the power to the device and check for the same conditions after the start-up process completes. While one power cycle is typically sufficient, some cases may require additional power cycles.
Related Issues	None.

FUNCTIONALITY ISSUES

Table 1. ADIS16201 Functionality Issues

Reference Number	Description	Status
er001	Flash/EE memory update failures	Fixed
er002	Scale calibration register math error	Fixed
er003	STATUS register not clearing when read	Fixed
er004	Autonull function results fail under negative acceleration	Fixed
er005	ALM_SMPL1/ALMSMPL2 write causes device failure	Fixed
er006	Start-up behavior	Fixed

NOTES

www.analog.com