

Using Allegro ASEK37601 Daughterboard with ACS37503 Samples Programmer GUI

Introduction

This quick guide documents the use of the ASEK37601 daughterboard (TED-0003717) and ASEK-20 (Part #850540-004) with the Allegro ACS37503 samples programmer. The ASEK37601 daughterboard layout and 3D view are shown in Figure 1 and Figure 2, respectively. The ASEK37601 daughterboard schematic is provided in the Schematic section.

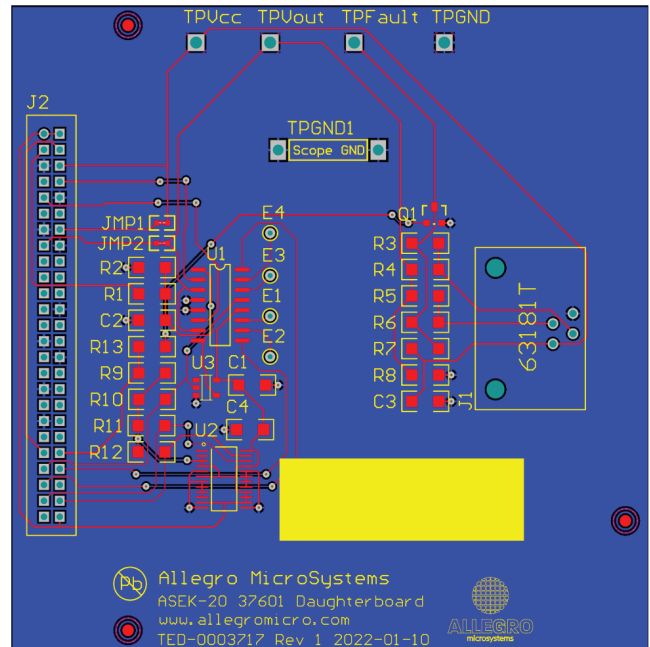


Figure 1: ASEK37601 Top and Bottom Layers

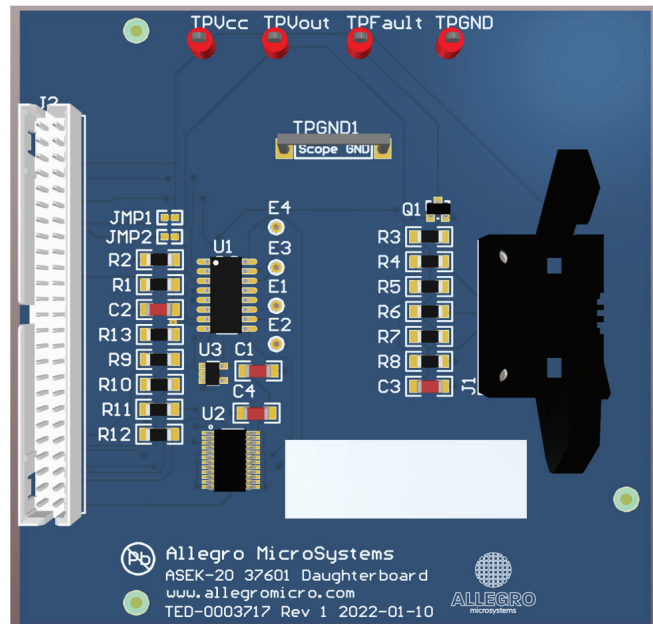


Figure 2: ASEK37601 3D View

Downloading the Programmer GUI

1. Register for software on the Allegro Software Portal: <https://registration.allegromicro.com/login>.
2. Ensure that the ASEK-20 that is used has the most recent firmware downloaded. Refer to the ASEK-20 firmware webpage (<https://registration.allegromicro.com/parts/ASEK-20#/parts/ASEK-20>) and the ASEK-20 quick guide in the “Support Files” on the ASEK-20 firmware webpage.
3. After registration and login on the Allegro Software Portal, the dashboard page is shown. Click “Find a Part”.
4. In the “Select by Part Number” search bar (shown in Figure 3), search for “ACS37503”.

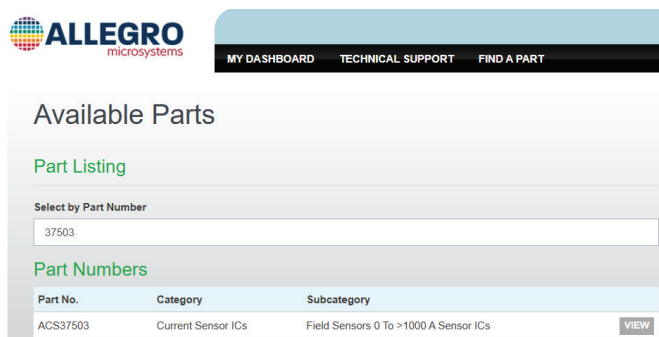


Figure 3: Part Number Search in Allegro Software Portal

5. To save the programming application installer MSI file, click “Download”.

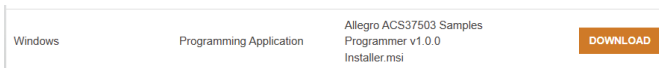


Figure 4: Save Programming Application Installer MSI File

6. To execute the downloaded installer file, double-click on the file.

7. In the Allegro ACS37503 Samples Programmer Setup window that appears, click “Next”.



Figure 5: Allegro ACS37503 Samples Programmer Setup Window

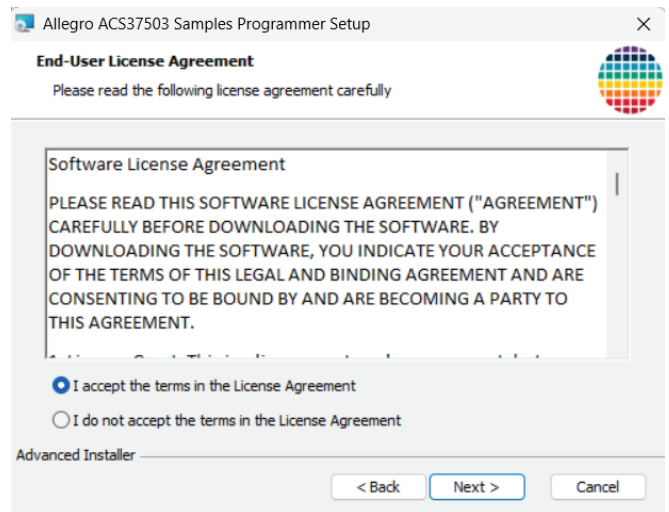


Figure 6: End-User License Agreement Window

8. Follow the steps to choose the desired installation location on the user PC to install the programmer.

Connecting ASEK-20 to PC and ASEK37601 Daughterboard

1. Use the provided cable to interconnect the PC and the USB port on the ASEK-20 chassis.
2. Connect the ribbon cable to the J2 connector on the left side of the ASEK37601 daughterboard.
3. Connect the other end of the ribbon cable to the DEVICE CONNECTION port on the ASEK-20 chassis, as shown in Figure 7.

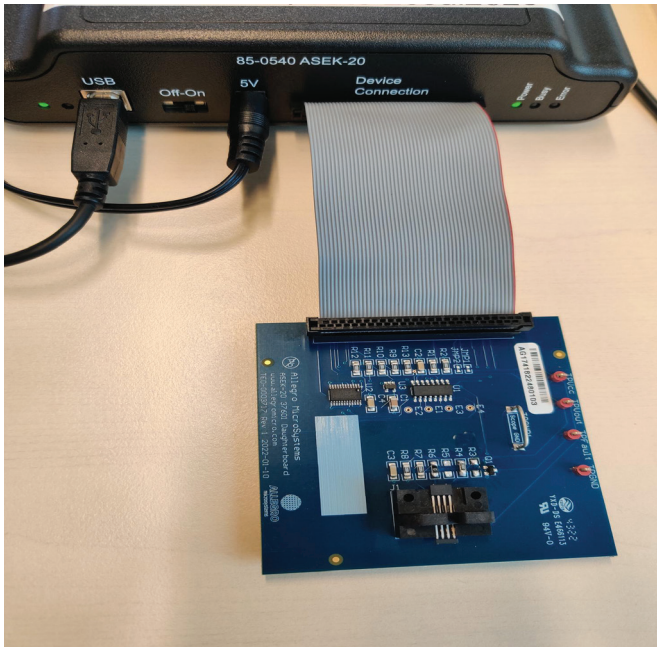


Figure 7: Connection Between ASEK-20 and ASEK37601

4. Connect the 5 V DC power supply.
5. Toggle the OFF-ON switch to the ON position to power-up the ASEK-20.

Inserting ACS37503 Into Socket

Insert the ACS37503 into the daughterboard as follows:

1. Place the ACS37503 into the J1 socket, with pin 1 oriented as indicated in Figure 7.
2. Ensure that the ejector pin mark is face-down in the socket.
3. On the left and right side of the socket, use the clamps to secure the placement of the part.

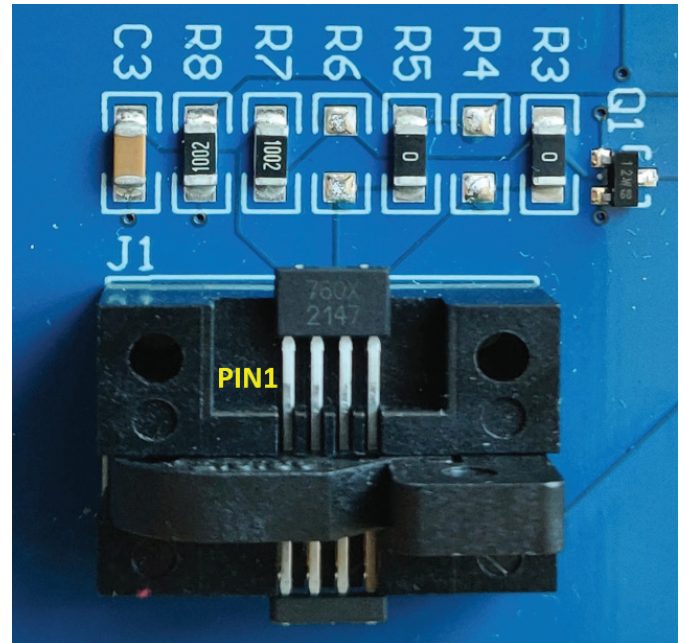


Figure 8: ACS37503 in KT Socket

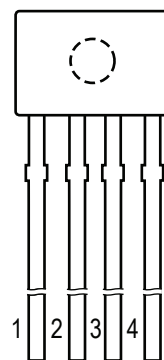


Figure 9: Pinout Diagram (Ejector Pin Mark On Opposite Side)

ACS37503 Terminal List Table

Number	Name	Function
1	VCC	Input power supply; also used for programming
2	VOUT	Output signal, also used for programming
3	FAULT/ PROG_EN	Overcurrent fault and overtemperature fault; low-voltage programming enable pin
4	GND	Ground

Using Programmer GUI

When the programmer is opened, a window appears, as shown in Figure 10. To configure the ASEK-20 communication port, open the menu using one of the following methods:

- Navigate to: Setup → Communication Setup; or
- At the bottom right of the graphical user interface (GUI), double-click the COM indicator.

The dialog box in Figure 11 appears. If the COM port is not known:

1. Unplug the USB cable to the ASEK-20.
2. In the “Communication Setup” dialog window, click “Refresh”.
3. Click on the “COM Port” pulldown menu.
4. Note which ports are listed in the menu.
5. Plug the USB cable into the ASEK-20.
6. Click “Refresh”.

7. Click the “COM Port” popup menu again.
8. Note the COM port not previously listed in the menu; this is the port connected to the ASEK-20.
9. Select this COM port for use.

Once the correct COM port is selected and the ASEK-20 is connected to the PC, next to “Communication”, verify the status of the ASEK-20.

If the status is “Active”, the ASEK-20 is powered and responding. If the status is “Inactive”, the ASEK-20 is not responding or is not powered on. If this is the case, click “Refresh” and ensure the ASEK-20 chassis is plugged into the PC and the chassis is in the powered-on state.

Click “OK” to exit the dialog box.

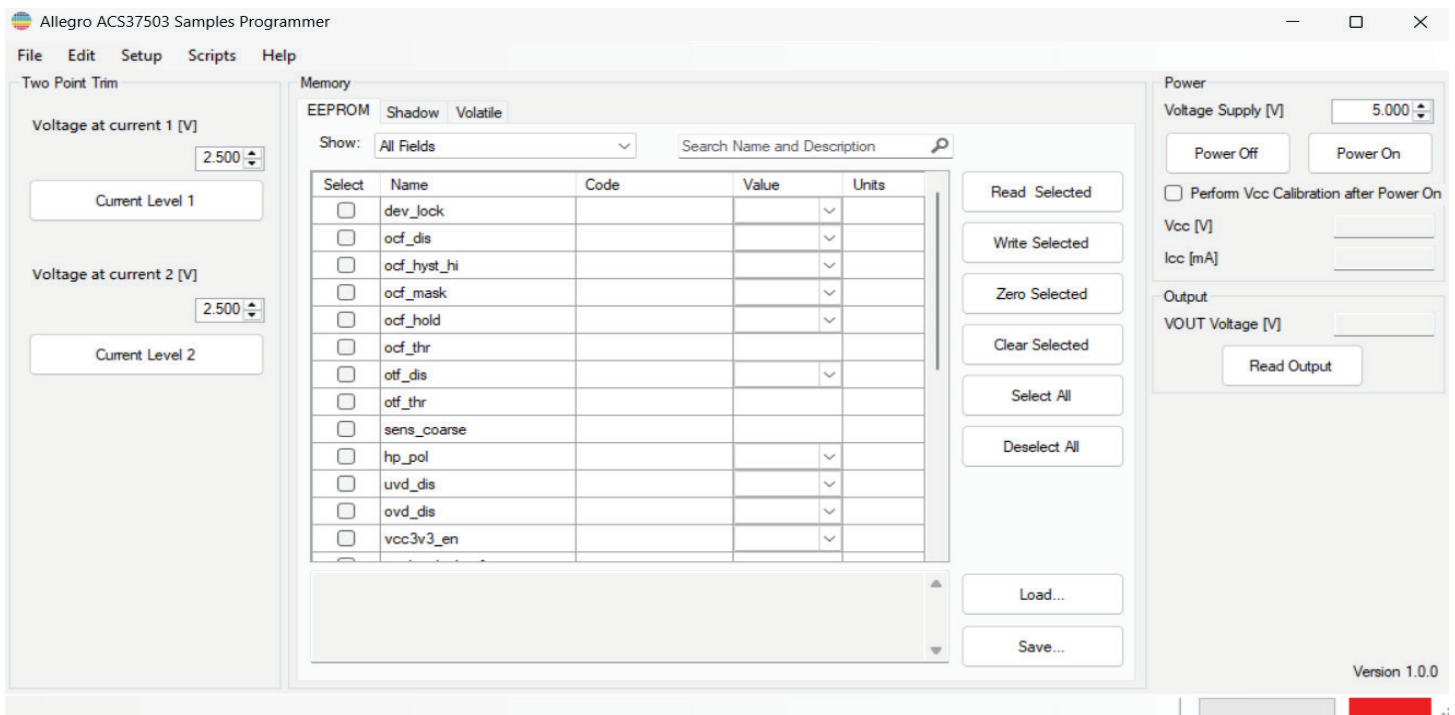


Figure 10: ACS37503 Programmer Application

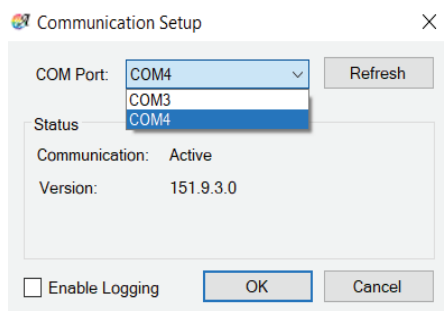


Figure 11: Communication Setup Dialog Box

Status Bar

The green-colored or red-colored rectangle on the right side of the status bar (shown in Figure 12) indicates the status of the communication with the ASEK. If the status bar is red, the communication is not active. If the status bar is green, the application is communicating with the ASEK. To open the Communication Setup Dialog window, click on the rectangle.

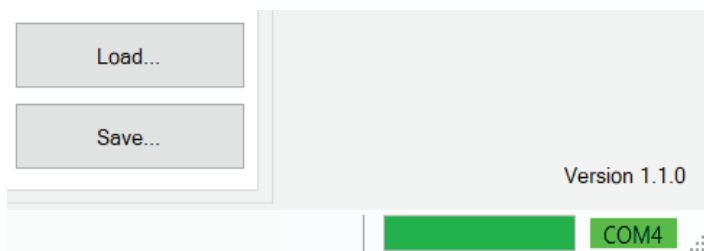


Figure 12: Status Bar On Bottom Right of GUI

Part Turn-On and Turn-Off

To power on the part using the ASEK-20, on the right-hand side of the programmer GUI, click “Power On”, as shown in Figure 13.

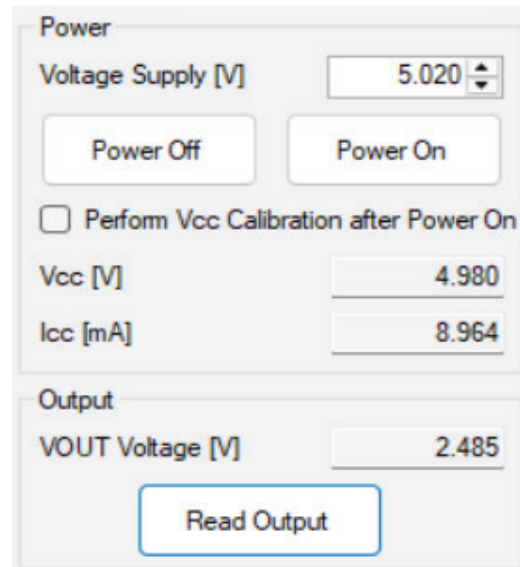


Figure 13: Power On/Off and Read Output

Once the part is in the powered-on state, the V_{CC} and I_{CC} fields populate with the measured values. Verify that the desired voltage is shown and that device consumption is 8 mA (typical; maximum of 10 mA).

To read the output of the ACS37503, click “Read Output” (shown in Figure 13). Verify that the output voltage is a reasonable value. If testing a bidirectional part with 5 V typical V_{CC} (0.5 V with zero external field applied for a unidirectional device) the output voltage should be approximately 2.5 V with zero external field applied.

To turn the part off, click “Power Off”.

Read and Write to Part

Before reading and writing to the part, the part must be connected and powered on using the programmer GUI.

It is recommended that the user save the memory to a tabular file before experimenting with programming so the user can return the device to its original factory programmed state if necessary. See the Save and Load Memory Files section.

To read a field (see Figure 14):

1. In the Select column, select the checkbox to the left of the desired register name.
2. Click “Read Selected”.

Select	Name	Code	Value	Units
<input checked="" type="checkbox"/>	dev_lock	0	false	
<input checked="" type="checkbox"/>	ocf_dis	0	false	
<input checked="" type="checkbox"/>	ocf_hyst_hi	0	false	
<input checked="" type="checkbox"/>	ocf_mask	0	false	
<input checked="" type="checkbox"/>	ocf_hold	0	false	
<input checked="" type="checkbox"/>	ocf_thr	10	10	
<input checked="" type="checkbox"/>	otf_dis	0	false	
<input checked="" type="checkbox"/>	otf_thr	7	7	
<input checked="" type="checkbox"/>	sens_coarse	0		0
<input checked="" type="checkbox"/>	hp_pol	0	false	
<input checked="" type="checkbox"/>	uvd_dis	0	false	
<input checked="" type="checkbox"/>	ovd_dis	0	false	
<input checked="" type="checkbox"/>	vcc3v3_en	0	false	

Read Selected

Write Selected

Zero Selected

Clear Selected

Select All

Deselect All

Figure 14: “Read Selected” and “Write Selected” Buttons

To write to a field (see Figure 14):

1. In the Select column, select the checkbox of the desired field.
2. In the Code column, change the value to the desired value and press the ENTER key.
3. Click “Write Selected”.

To verify that a field was written to the device:

1. Click “Clear Selected”. This causes the values in the “Code” and “Value” cells to disappear.
2. Click “Read Selected”. This causes the values that were written to appear in the “Code” and “Value” cells.
3. Verify that the values are correct.

The programmer menu provides the following options:

- **Read Selected:** Reads the value of the selected field.
- **Write Selected:** Writes the entered value to the part.
- **Zero Selected:** This option zeroes the selected field, but does not write zero to the device unless “Write Selected” is clicked.
- **Clear Selected:** This option hides and clears the value of the selected field, but does not change the value.
- **Select All:** Selects all fields.
- **Deselect All:** Deselects any and all selected fields.

NOTE: To display a bit description, click on the bit name (see Figure 15). To display an address and bit position, hover the cursor over the bit name (see Figure 16).

<input checked="" type="checkbox"/>	otf_thr	7	7
<input checked="" type="checkbox"/>	sens_coarse	0	0
<input checked="" type="checkbox"/>	hp_pol	0	false
<input checked="" type="checkbox"/>	uvd_dis	0	false
<input checked="" type="checkbox"/>	ovd_dis	0	false
<input checked="" type="checkbox"/>	vcc3v3_en	0	false

OTF threshold setting

Figure 15: For Field Definition, Click Desired Field

<input checked="" type="checkbox"/>	qvo_fine	248	-8
<input checked="" type="checkbox"/>	sens_fine	1421	-627
<input checked="" type="checkbox"/>	vout_test	sens_fine	0
<input checked="" type="checkbox"/>	fault_test	(Address: 0x7, bits 18:8)	0

Figure 16: For Field Address, Hovering Over Field

Access to Register Diagram

To access the register diagram, follow the navigation:

- “Help” → Select “ACS37503 Register Diagram”.

This action opens a dialog window as shown in Figure 17. For detailed descriptions of all individual bits, see the Customer Memory Map section of the ACS37503 datasheet.

Address	Bit Number																																																																							
	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06																																														
0x06	ecc_6						spare_regs						bw_lquni_e						unlocked						analog_lock						vcc3v						ovd_dvdd						dhp_p						sens_coarse						otf_thr						otf_d						ocf_thr					
0x07	ecc_7						fault_test_seq						lerfault_test_s						vout_test_s						sens_fine																																															

Figure 17: ACS37503 Register Diagram

Manchester Programming Protocol

Follow the navigation “Setup” → “Device Setup...”. The dialog menu in Figure 18 appears. In this menu, the user can change various characteristics of the Manchester programming protocol used by the ASEK-20. To restore the default values for these settings, click “Restore Defaults” (see Figure 18). For more information about the device-specific Manchester parameters, see the ACS37503 device datasheet, Programming Parameters section.

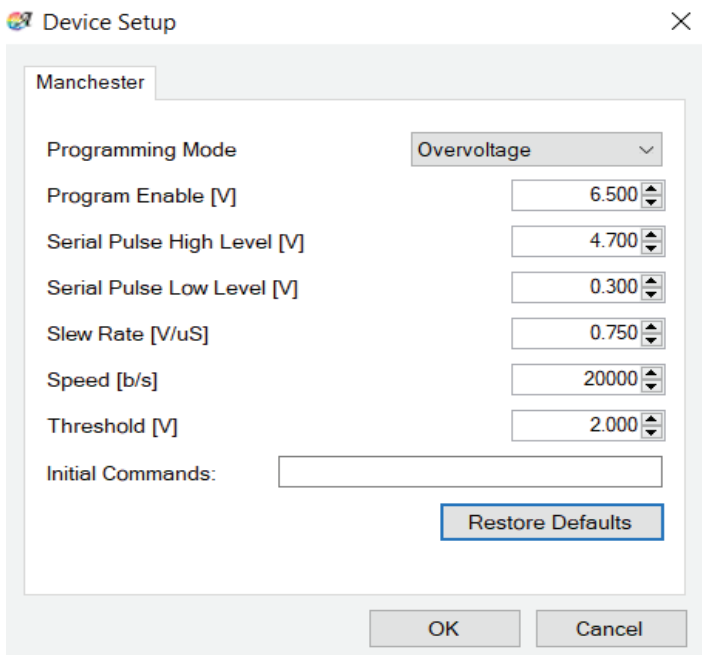


Figure 18: Device Setup Menu, Default Values

The Manchester options are:

- **Program Enable [V]:** Used to set the voltage for the program enable operation.
- **Serial Pulse High Level [V]:** Used to set the voltage for the high level of the Manchester signal.
- **Serial Pulse Low Level [V]:** Used to set the voltage for the low level of the Manchester signal.
- **Slew Rate [V/μs]:** Used to set the speed at which the Manchester signal transitions from one voltage to another.
- **Speed [kb/s]:** Used to set the bit rate for communication with the ASEK.
- **Threshold [V]:** Used to set the threshold to determine the difference between a 1 and a 0 when performing a register read.
- **Initial Commands:** Used for commands that must be sent to the ASEK-20 when it is being initialized.

Save and Load Memory Files

Before performance of any programming experimentation, a memory save is recommended to allow the user to return the device to its original factory-programmed state, if necessary.

To save the memory as a tabular data file or text file, click “Save...” in the bottom right of the GUI, as shown in Figure 19. To open a file explorer where the user can save the memory information as a CSV file or TXT file, click “Save...”. The user can also save the memory by clicking “File” → “Save Memory...”.

To load a previously saved file that contains memory data, click “Load...”. The User can also load a memory file by following the navigation “File” → “Load Memory...”.

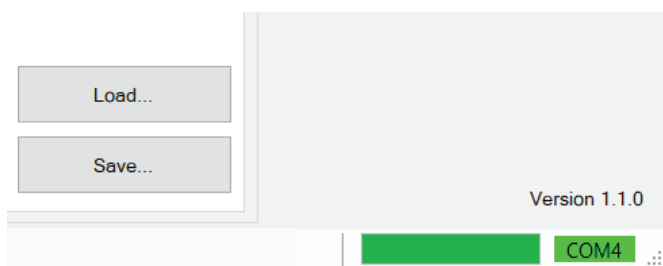


Figure 19: Load and Save Memory to File

Two-Point Programming

The goal of two-point programming is to calculate and set device sensitivity using two known points. Two values of the magnetic field and two values of the desired voltage output are needed to proceed.

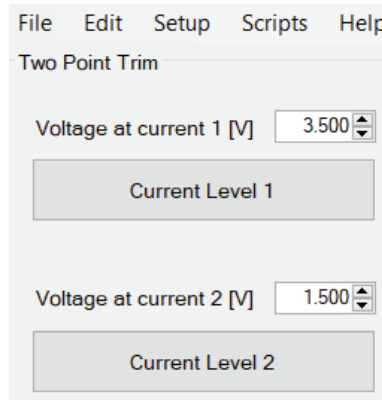


Figure 20: Two-Point Programming Menu

Prepare a test bench with the ACS37503 evaluation setup, a ferro-magnetic core, and current-carrying conductor as follows:

1. Enter a value for “Voltage at current 1 [V]”.
2. Apply the first calibration field (corresponding to the voltage at current 1), and click “Current Level 1”.
3. Enter a value for “Voltage at current 2 [V]”.
4. Apply the second calibration field (corresponding to voltage at current 2), and click “Current Level 2”.

Tips and Tricks for Two-Point Programming

- The coarse gain value (SENSE_COARSE) and the field polarity orientation (H_POL) bits should not be changed by the customer. If these bits are changed, device performance as reported in the datasheet is not guaranteed.
- The two-point algorithm adjusts the SENS_FINE value, which must result in sensitivity within the sensitivity programmable range (Table 1) for the given part number. The value of QVO_FINE is adjusted to minimize the error of the voltage at current 2.
- If the calculated SENS_FINE or QVO_FINE value is out of the expected range, the GUI displays an error message.

Table 1: Sensitivity Programming Range

Part Number	Factory Programmed Sensitivity (mV/G)	Sensitivity Programmable Range (mV/G)
ACS37503LKTATN-001B5-C	1	0.5 to 1.1
ACS37503LKTATN-002B5-C	2	1.1 to 2.42

Schematic

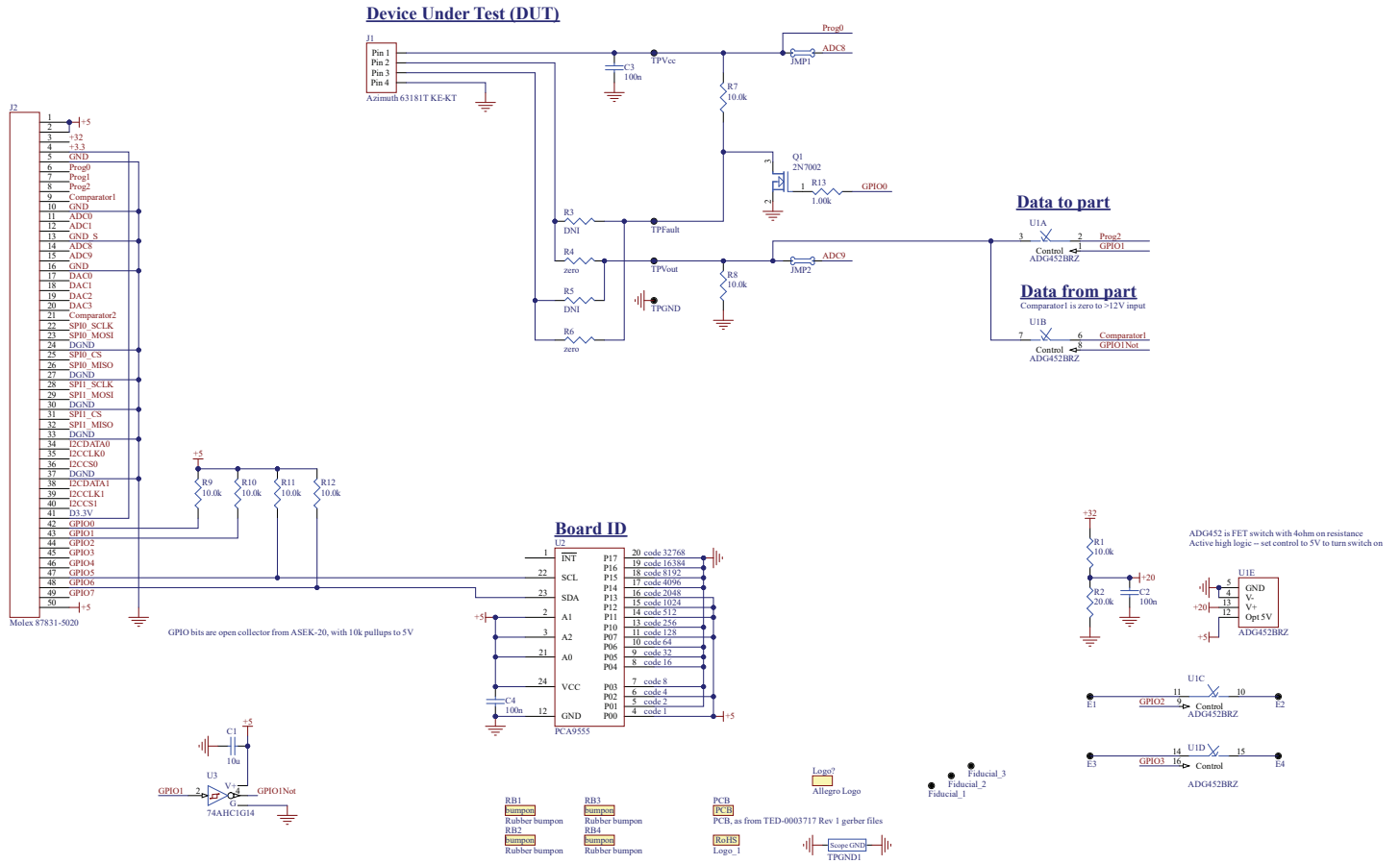


Figure 21: ASEK37601 Daughterboard Schematic

Revision History

Number	Date	Description
–	December 18, 2025	Initial release

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