User Manual

Using Allegro ASEK37601 Daughterboard with ACS37601 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 ACS37601 Samples Programmer. ASEK37601 daughterboard layout and 3D view can be seen in Figure 1 and 2. See the Appendix section for the ASEK37601 Daughterboard Schematic.

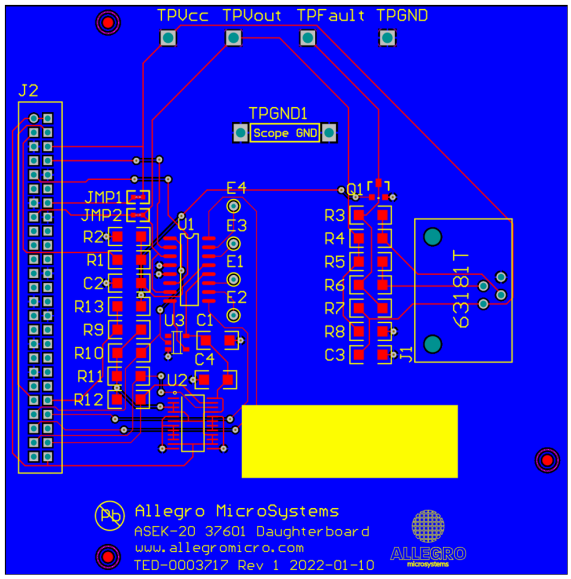


Figure 1: ASEK37601 Top and Bottom Layers

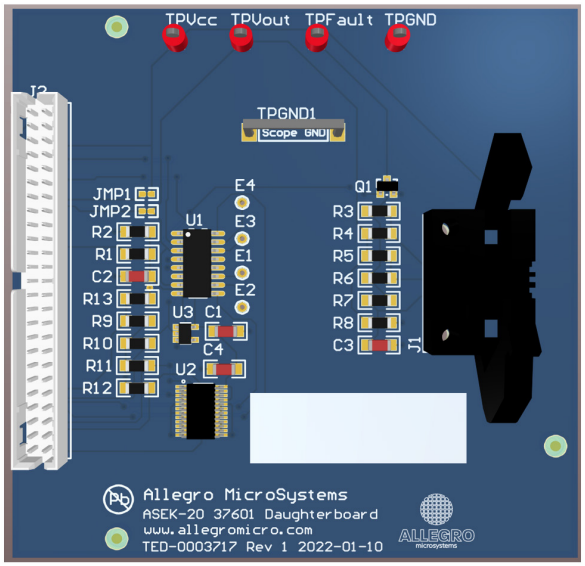


Figure 2: ASEK37601 3D view

Downloading the Programmer GUI

1. Register for software on the Allegro Software Portal: https://registration.allegromicro.com/login.
2. Ensure that the ASEK-20 being 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 under "Support Files" on the ASEK-20 firmware webpage.
3. After registering and logging in to the software portal, the dashboard page will be shown. Choose the "Find a Part" button.
4. Search for "ACS37601" in the "Select by Part Number" search bar shown in Figure 3.

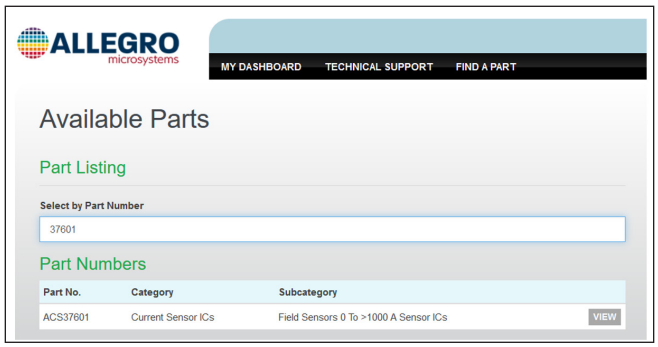


Figure 3

5. Click "View" next to the ACS37601 search result.
6. Click "Download" to save the Programming Application ZIP file.

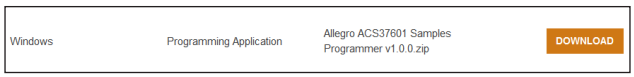


Figure 4

7. Extract downloaded ZIP file to a known location.
8. Go to the extracted folder and launch "Allegro ACS37601 Samples Programmer.exe" application file.

Connecting ASEK-20 to PC and ASEK37601 Daughterboard

1. Interconnect PC and USB port on the ASEK-20 chassis with provided cable.
2. Connect ribbon cable to the J2 connector on the left-hand 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 5.

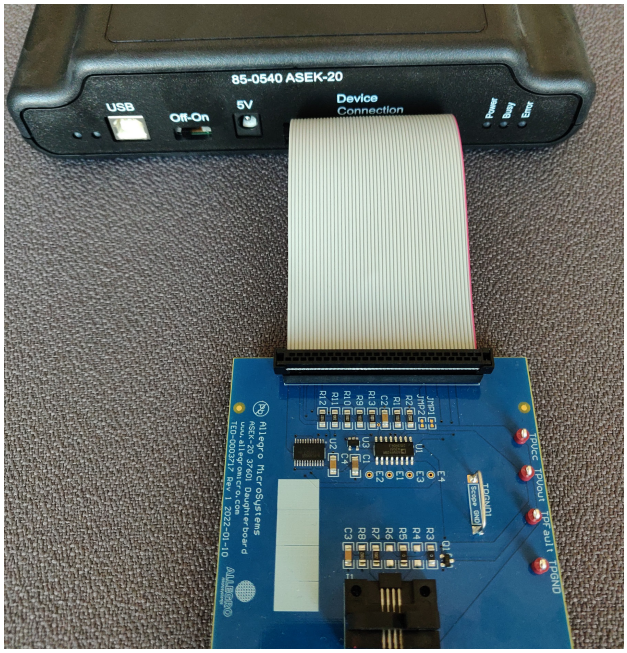


Figure 5: Connection between ASEK-20 and ASEK37601

4. Connect the 5 V DC Power Supply.
5. Power-up ASEK-20: Move “Off-On” switch to ON position.

Inserting ACS37601 into the Socket

To insert ACS37601 into the daughterboard, do the following:

1. Place the ACS37601 into the J1 socket with pin1 as indicated on Figure 6.
2. Ensure that the ejector pin mark is on the side facing down into the socket.
3. Secure the part in place using the clamps on the left and right side of the socket.

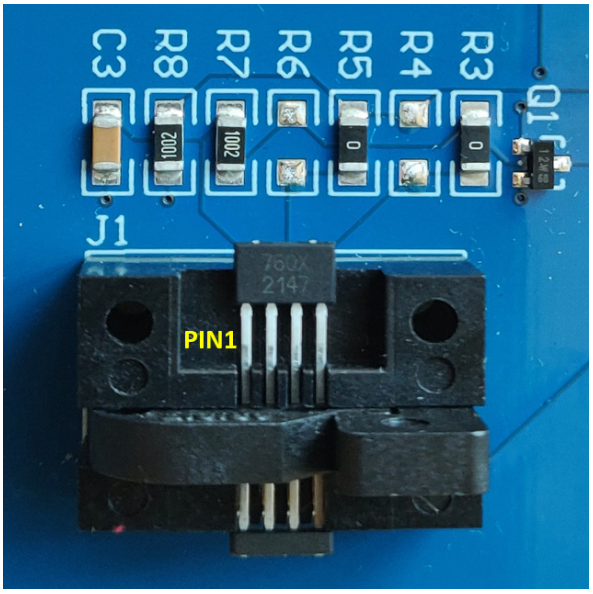
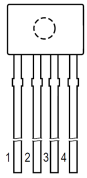


Figure 6: ACS37601 in KT socket



Terminal List Table

Number	Name	Function
1	VCC	Device power supply terminal
2	VOUT	Analog output signal, also used for programming
3	FAULT	Overcurrent fault and overtemperature fault
4	GND	Device ground terminal

Figure 7: Pinout Diagram (Ejector pin mark on opposite side)

Using Programmer GUI

Opening the programmer will result in a window identical to Figure 8 below.

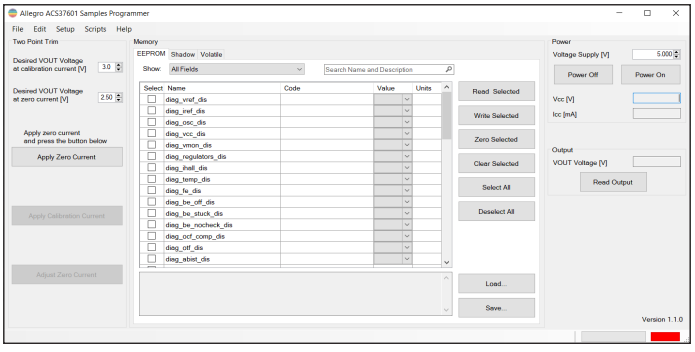


Figure 8: ACS37601 Programmer Application

To configure ASEK-20 Communication Port, go to menu “Setup → Communication Setup” (or double click the ‘COM’ indicator at bottom-right corner).

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

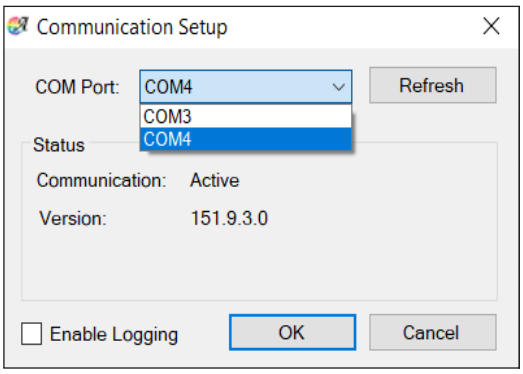


Figure 9: Communication Setup dialog box

The dialog box in Figure 9 will appear. If the COM port is unknown, do the following:

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

Once the correct COM port is selected and the ASEK-20 is connected to the PC, verify next to “Communication” 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 powered on. If this is the case, click “Refresh” and ensure the ASEK-20 chassis is plugged into the PC and the chassis is powered on.

Click “OK” to exit the dialog box.

Status Bar

The green or red colored rectangle on the right side of the status bar shown highlighted in red in Figure 10 indicates the status of the communication with the ASEK. If the status bar is red, the communication is not active and if green, the application is communicating with the ASEK. Clicking on the rectangle will open the Communication setup dialog window.

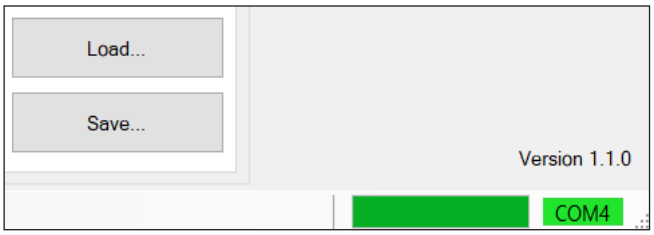


Figure 10: Status bar on the bottom right-hand side of GUI

Turning the Part ON and OFF

To power on the part using the ASEK-20, click “Power On” on the right-hand side of the programmer GUI as show in Figure 11.

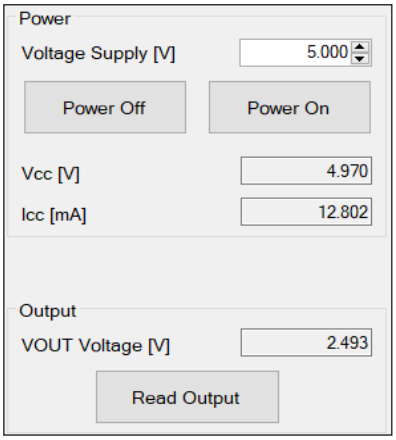


Figure 11: “Power On/Off” and “Read Output”

Once the part is powered on, values for “V_{CC}” and “I_{CC}” will populate with the measured values. Verify that the voltage is what is desired and that the device is consuming typically 13 mA (maximum of 19 mA).

To read the output of the ACS37601, click “Read Output” button in Figure 11. Verify the Output Voltage is a reasonable number, around 2.5 V with zero external field applied if testing a bidirectional part with 5 V typical V_{CC} (0.5 V with zero external field applied for a unidirectional device).

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

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

Read and Writing to the Part

Note 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 Saving and Loading Memory Files section below.

To read a field, select the desired field by checking the box under “Select” to the left of the register name and click the “Read Selected” button from Figure 12.

To write to a field, select the desired field by checking the box under “Select” to the left of the name. Change the value under “Code” to the desired value and press Enter. Click “Write Selected” button from Figure 12.

To verify that field was written to the device, do the following: click “Clear Selected” causing the values in the “Code” and “Value” cells to disappear. Then click “Read Selected”. The values that were written will reappear in the “Code” and “Value” cells verifying the user correctly wrote to the part.

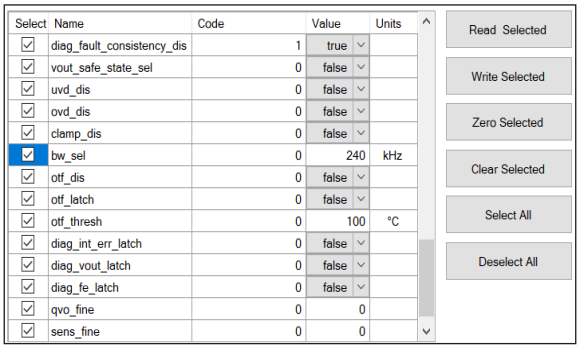


Figure 12: “Read Selected” and “Write Selected” buttons

Below, each option on the programmer menu has been briefly defined:

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

Note that clicking on a bit name will show bit description (see Figure 12). Hovering the cursor over a bit name will tell the user address and bit position (see Figure 14).

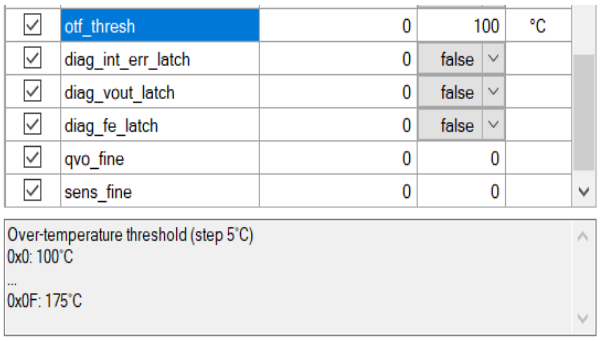


Figure 13: Field definition by clicking desired field

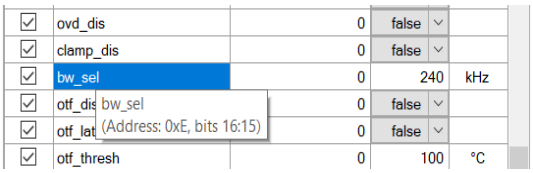


Figure 14: Hovering over a field shows the address

Accessing the Register Diagram

To access the register diagram, go to menu “Help” →Select “ACS37601 Register Diagram”. This will open a dialog window identical to the window in Figure 15 below. See ACS37601 Datasheet section: “Customer Register Table” for detailed description of all individual bits.

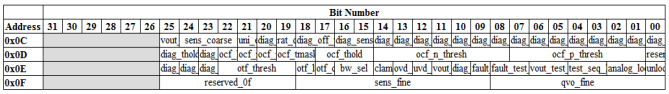


Figure 15: ACS37601 Register Diagram

Manchester Programming Protocol

Under “Setup” → “Device Setup…”, the dialog menu in Figure 16 below will appear. In this menu, user can change various characteristics of the Manchester programming protocol used by the ASEK-20. To restore these settings to their default settings, click “Restore Defaults” button as shown in Figure 16. For more information about the device specific Manchester parameters, see the ACS37601 device datasheet, Device Programming section.

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

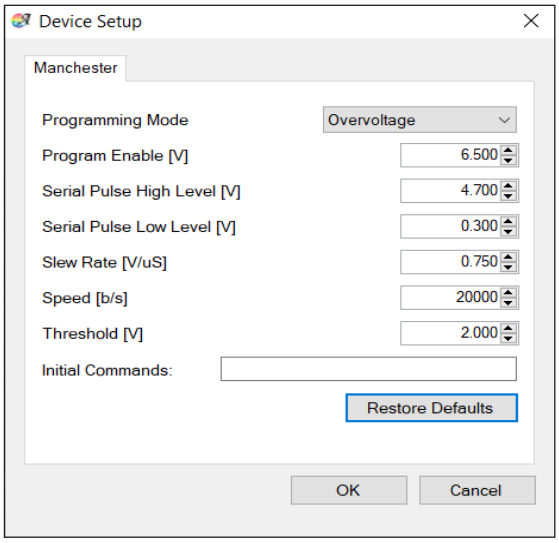


Figure 16: "Device Setup" menu defaults

Below, each Manchester option has been briefly defined:

- **Program Enable [V]**: Used to set the voltage for the Program Enable.
- **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 will take to get 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 for determining the difference between a 1 and a 0 when performing register read.
- **Initial Commands**: Used for commands that must be sent to the ASEK-20 when it is being initialized.

Saving and Loading Memory Files

To save the memory as a tabular data file or text file, click "Save…" in the bottom right side of the GUI as shown in Figure 17. Clicking "Save…" will open a file explorer where the user can save the memory information as a CSV file or TXT file. Saving the memory is recommended before experimenting with programming so the user can return the device to its original factory-programmed state if necessary. The user can also save the memory by clicking "File" → "Save Memory…".

To load a previously saved file containing memory information, click "Load…" button. User can also load a memory file by going to menu "File" → "Load Memory…".

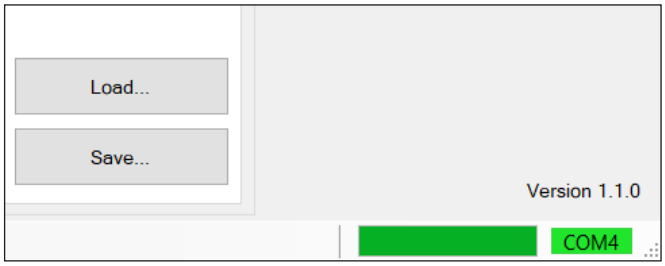


Figure 17: "Load" and "Save" the memory to a file

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

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 desired voltage output are needed to proceed.

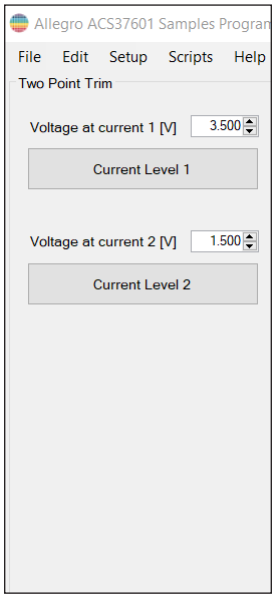


Figure 18: Two-Point Programming Section

Prepare a test bench with the ACS37601 evaluation setup, a ferromagnetic core, and current-carrying conductor.

Step 1) Enter a "Voltage at current 1 [V]".

Step 2) Apply the first calibration field (corresponding to voltage at current 1) and press "Current Level 1" button.

Step 3) Enter a "Voltage at current 2 [V]".

Step 4) Apply the second calibration field (corresponding to voltage at current 2) and press "Current Level 2" button.

TIPS AND TRICKS FOR TWO-POINT PROGRAMMING

The coarse gain value "*sense_coarse*" or field polarity orientation "*vout_pol*" bits should not be changed by customer, otherwise device performance from datasheet is not guaranteed.

Two-Point algorithm is adjusting "*sens_fine*" value which have to result in sensitivity within Sensitivity Programmable Range (Table 1) for given Part Number. Value of "*qvo_fine*" is adjusted to minimize error of Voltage at current 2.

If calculated "*sens_fine*" or "*qvo_fine*" value is out of the expected range, GUI will show error message.

Table 1: Sensitivity Programming Range

Part Number	Factory Programmed Sensitivity (mV/G)	Magnetic Field Range (G) at Factory Sensitivity Trim	Sensitivity Programmable Range (mV/G)	Magnetic Field Range (G) at Min. Sensitivity Trim	Magnetic Field Range (G) at Max. Sensitivity Trim
ACS37601LKTATN-0P5B5-C	0.5	±4000	0.5 to 0.86	±4000	±2326
ACS37601LKTATN-001B5-C	1	±2000	0.83 to 1.44	±2410	±1389
ACS37601LKTATN-002B5-C	2	±1000	1.24 to 2.16	±1613	±926
ACS37601LKTATN-001B3-C	1	±1332	0.82 to 1.43	±1624	±931

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

Appendix

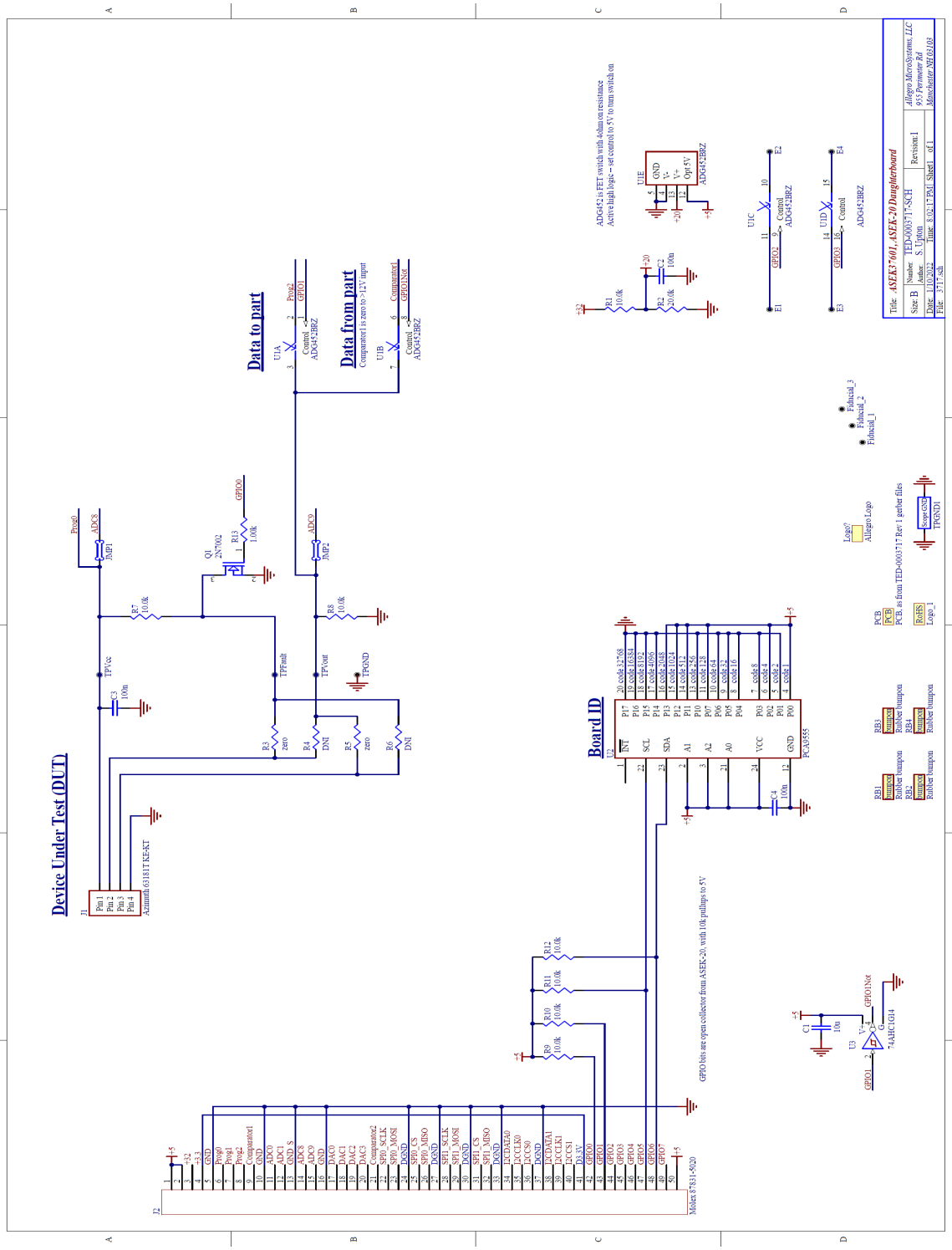


Figure 19: ASEK37601 Daughterboard Schematic

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

Revision History

Number	Date	Description
–	May 31, 2022	Initial release
1	March 21, 2023	Updated Two-Point Programming section (page 6)

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com