User Manual

Using Allegro ASEK-20 and ASEK71240 Daughterboard with ACS71240 Samples Programmer

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Introduction

This quick guide documents the use of the ACS71240 daughterboard (TED-0002385) and the ASEK-20 (Part #85-0540-004) with the Allegro ACS71240 samples programmer. The ASEK-20 chassis can be seen in Figure 1, and the top and bottom layers of the ASEK-20 ACS1240 daughterboard can be seen in Figure 2. See the Appendix section for the ASEK71240 Daughterboard Schematic.

Figure 1: ASEK-20 Chassis

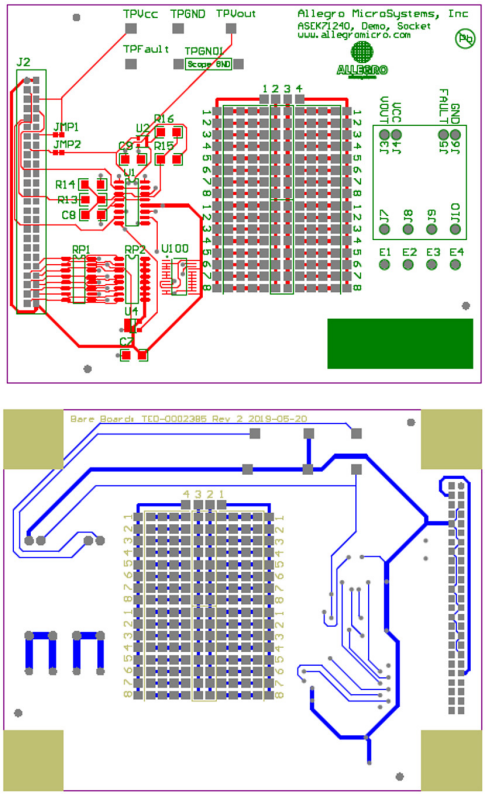

Figure 2: Top and Bottom Layers for ASEK-20 ACS71240 Daughterboard

Downloading the Programmer

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) 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 highlighted in Figure 3.

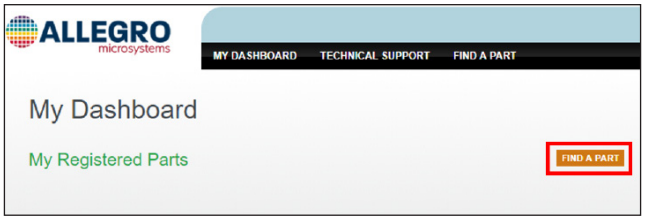

Figure 3: "Find a Part" button allowing the user to register specific devices

4. Click "Find a Part" to go to the "Available Parts & Software" page.
5. Search for "ACS71240" in the "Select by Part Number" search bar shown in Figure 4.

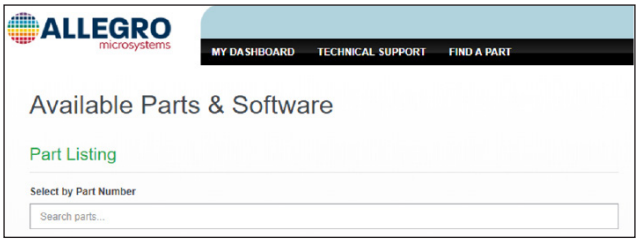

Figure 4: "Select by Part Number" on the Available Parts & Software page

6. Click "View" next to the ACS71240 search result as shown highlighted in Figure 5.

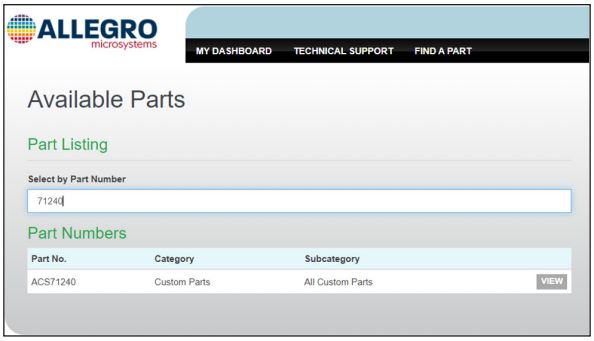

Figure 5: "View" next to "ACS71240" search result

7. Click "Download" next to the first result to open the Programming Application ZIP file as highlighted in red in Figure 6.

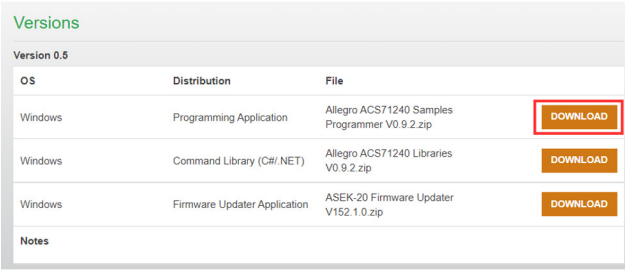

Figure 6: "Download" to open the Programming Application

8. Open and extract the downloaded ZIP file and save to a known location.
9. Open the extracted ZIP file and open the folder "Allegro ACS71240 Samples Programmer V#".
10. Open the "Allegro ACS71240 Samples Programmer" application file (EXE file extension) to open the samples programmer.

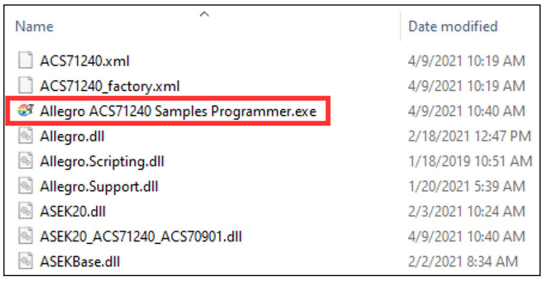

Figure 7: Application file

Connecting ASEK-20 to PC and ASEK71240 Daughterboard

1. Connect one end of the USB communications cable to the USB port of a personal computer.
2. Connect the other end of the USB communications cable to the "USB" port on the ASEK-20 chassis.
3. Connect a ribbon cable to the "J2" connector on the left-hand side of the ACS71240 daughterboard.
4. Connect the other end of the ribbon cable to the "Device Connection" port on the ASEK-20 chassis as shown in Figure 8.

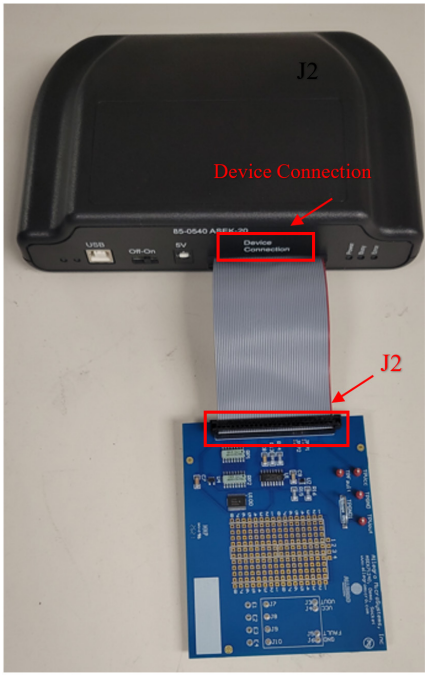

Figure 8: Connection between ASEK-20 and ASEK71240 Daughterboard

5. Connect the DC Power Supply/Cable to the 5 V port on the ASEK-20 chassis.
6. Plug in the DC Power Supply to a 110/220 AC 60/50 Hz outlet with the appropriate power adapter.

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Using the Programmer

Connecting to the ASEK-20

Opening the programmer will result in a window identical to Figure 9 below.

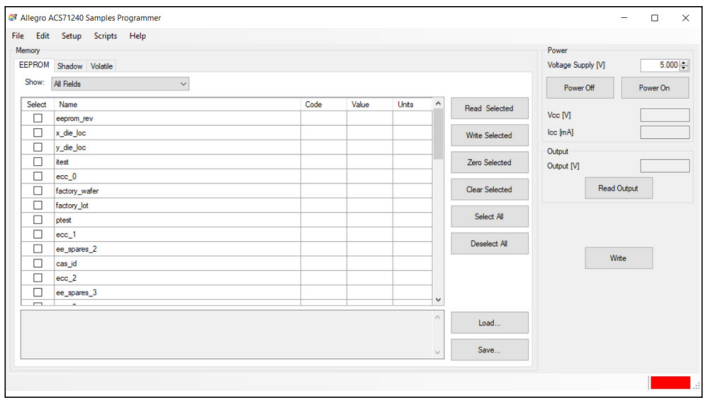

Figure 9: ACS71240 Programmer Application

To connect the ASEK-20, click “Setup” → “Communication Setup”. The dialog box in Figure 10 will appear. Click the correct COM# in the pulldown menu next to COM Port. 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 as highlighted in blue in Figure 10.
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.

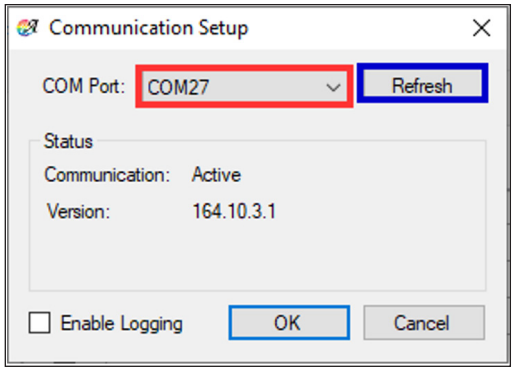

Figure 10: Communication Setup dialog box

Status Bar

The green or red colored rectangle on the right side of the status bar shown highlighted in red in Figure 11 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. The COM port that is currently set is overlaid on the colored rectangle. Clicking on the rectangle will open the Communication setup dialog window.

Figure 11: 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 as show in red in Figure 12.

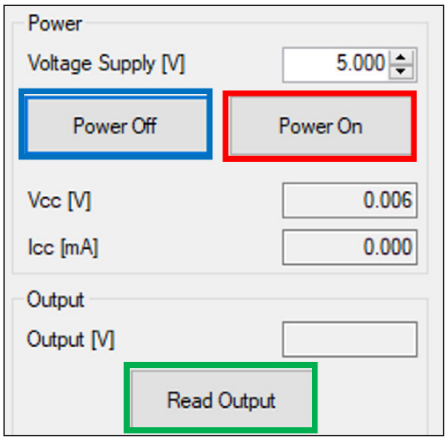

Figure 12: “Power On”, “Power Off”, and “Read Output”

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Once the part is powered on, values for "V_{CC} [V]" and "I_{CC} [mA]" will populate with the measured values. Verify that the voltage is what is desired and that the device is consuming approximately 10 mA (maximum of 12 mA).

To read the output of the ACS71240, select "Read Output" highlighted green in Figure 12. Verify the Output [V] is a reasonable number, around 2.5 volts with zero external field applied if testing a bidirectional part with 5 volts typical V_{CC} (0.5 volts with zero external field applied for a unidirectional device).

To turn the part off, select "Power Off" to the left of "Power On", highlighted in blue in Figure 14 above. Clicking "Power Off" will cause ICC to fall to ≈ 0 mA.

Reading from 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 highlighted in red in Figure 15.

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 highlighted in blue in Figure 15.

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.

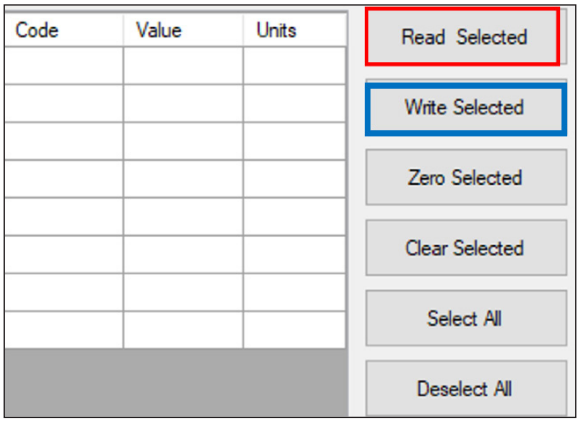

Figure 13: "Read Selected" and "Write Selected" buttons

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 the name of a selected field will define the field to the user. Hovering over a field with the PC cursor will tell the user the address of that field (see Figure 13).

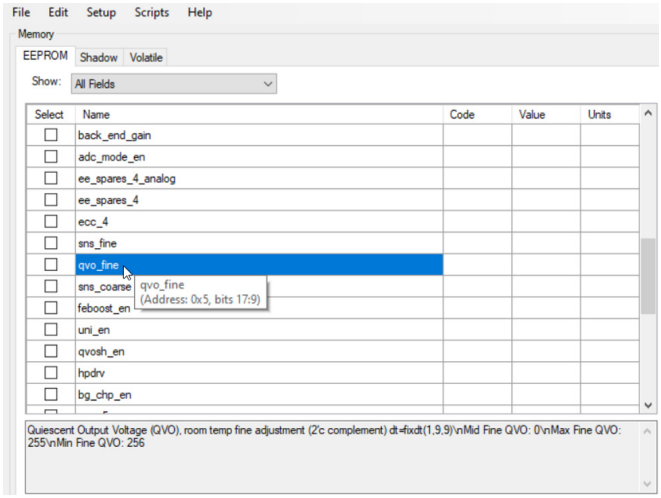

Figure 14: Hovering over a field shows the address

Accessing the Register Diagram

To access the register diagram, hover over "Help" on the menu bar. Select "ACS71240 Register Diagram". This will open a dialog window identical to the window in Figure 18 below. See the appendix section below for a larger register diagram.

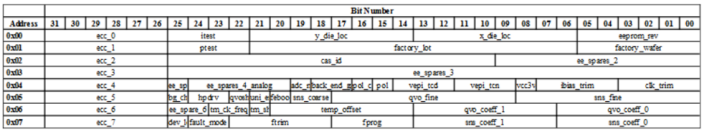

Figure 15: ACS71240 Register Diagram

Manchester Programming Protocol

Under "Setup" → "Device Setup…", the dialog menu in Figure 16 below will appear. In this menu, the 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" as highlighted in red in Figure 16.

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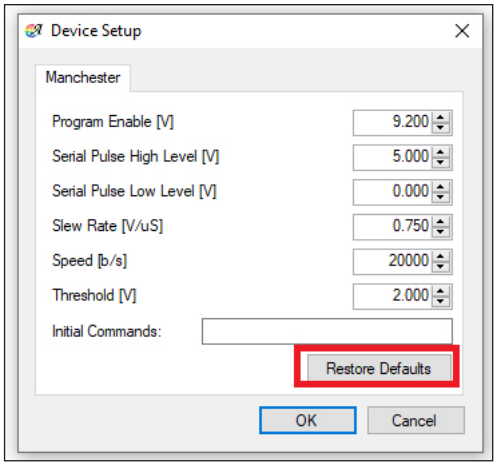

Figure 16: "Device Setup" menu defaults

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.

The ACS71240 uses a bidirectional communication on VOUT. When the voltage on the VCC pin is increased beyond the programming threshold, the device will enter programming mode (see Figure 17). Note the ACS71240 does not initiate communication; it responds to commands from the external controller. If the command is a write, there is no acknowledging from the ACS71240. If the command is a read, the ACS71240 responds by transmitting the requested data. To initialize any communication, V_{CC} should be increased to a level above V_{prgL} (6.5 V) without exceeding V_{prgH} (9.2 V). At this time, VOUT is disabled and acts as an input.

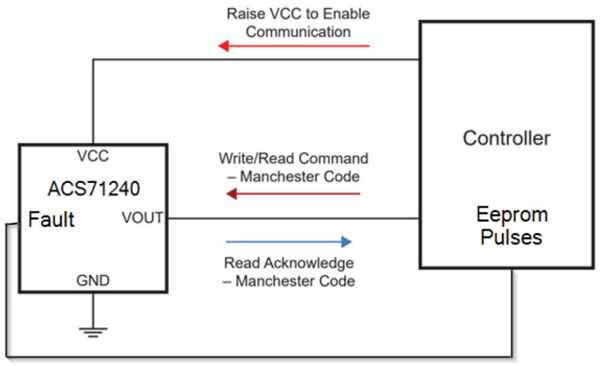

Figure 17: ACS71240 Programming Diagram

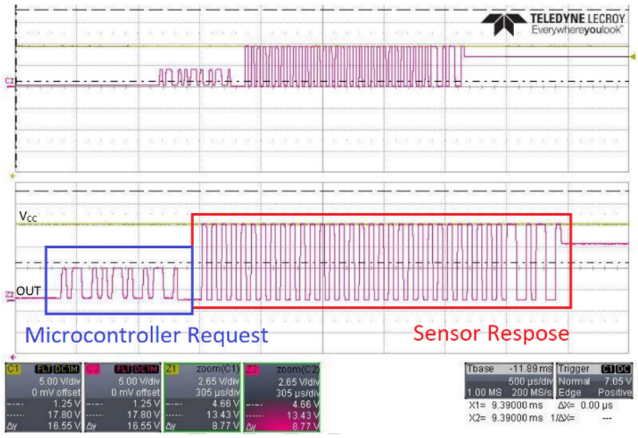

Figure 18: Oscilloscope capture showing the Manchester programming protocol on the output of the part

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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 highlighted in red in Figure 19. 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…" as highlighted in green in Figure 19 below. Clicking "Load…" will open a file explorer where the user can navigate to a previously saved CSV or TXT file. The user can also load a memory file by clicking "File" → "Load Memory".

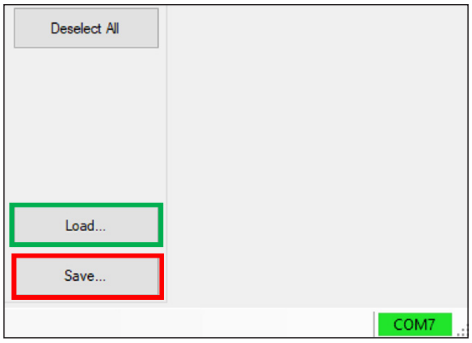

Figure 19: "Load" and "Save" the memory to a tabular file

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Appendix

	Bit Number																															
Address	**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**	**05**	**04**	**03**	**02**	**01**	**00**
0x00	ecc_0						itest				y_die_loc								x_die_loc								eeprom_rev					
0x01	ecc_1						ptest				factory_lot																factory_wafer					
0x02	ecc_2						cas_id																ee_spares_2									
0x03	ecc_3						ee_spares_3																									
0x04	ecc_4						ee_sp	ee_spares_4_analog					adc_m	back_end_g	pol_c	pol	vepi_tcd			vepi_tcn			vcc3v	ibias_trim			clk_trim					
0x05	ecc_5						bg_ch	hpdrv		qvosh	uni_e	feboo	sns_coarse	qvo_fine									sns_fine									
0x06	ecc_6						ee_spare_6	tm_ck_freq		tm_sh	temp_offset						qvo_coeff_1						qvo_coeff_0									
0x07	ecc_7						dev_l	fault_mode		ftrim				fprog			sns_coeff_1						sns_coeff_0									

Figure 20: ACS71240 Register Diagram

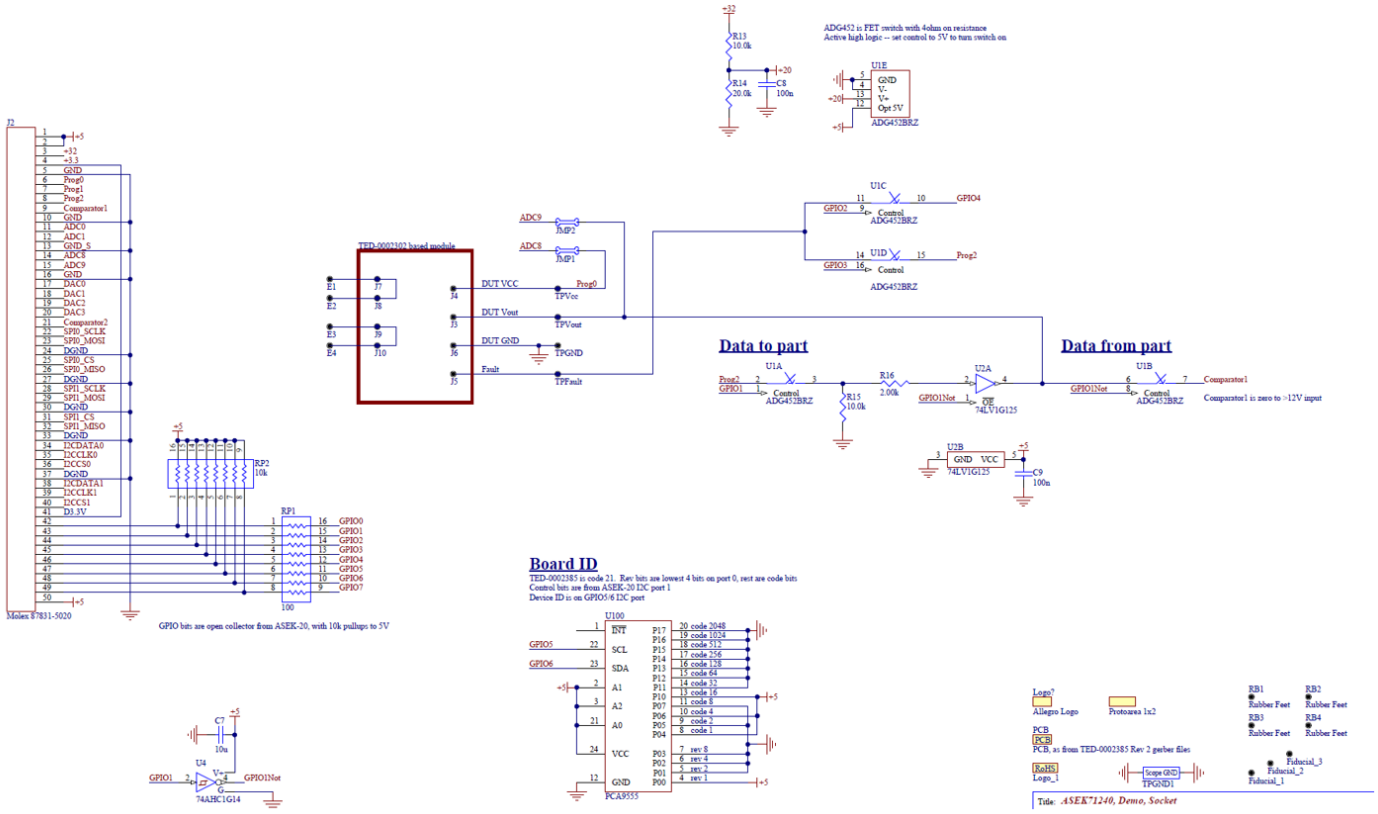

Figure 21: ASEK71240 Daughterboard Schematic

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Revision History

Number	Date	Description
–	August 16, 2021	Initial release

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