IQS572EV02 Arduino Shield Module Datasheet

Trackpad Arduino Shield PCB using IQS572

1 Overview

The IQS572-B000 is a trackpad solution including on-chip gesture recognition, flexible device setup and leading sensitivity management and adjustment. The IQS572EV02 uses an 8x8 diamond sensor pattern to detect user proximity and touch, identify finger position co-ordinates, and generate gesture outputs based on the finger interaction. With effective on-chip sensor co-ordinate filtering, and advanced processing algorithms, the IQS572 provides reliable and stable operational outputs.

The sensor reports these outputs via standard I^2C protocol to the master (in this case the Arduino), and is also fully configurable and programmable via this interface.

The IQS572-B000 is a standard IQS5xx-B000 product, and thus the complete IQS5xx-B000 product datasheet can be referenced for all IQS572-B000 trackpad information:

- http://www.azoteq.com/images/stories/pdf/iqs5xx-b000_trackpad_datasheet.pdf

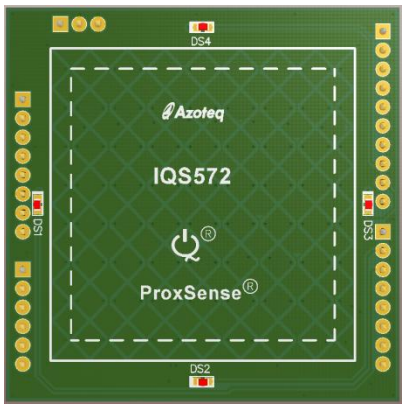


Figure 1.1 IQS572EV02 Shield Board

2 Device Configuration

The IQS572EV02 is programmed with the standard B000 trackpad firmware, with the setup parameters pre-configured for this PCB. Some of the important parameter configurations are shown in the table below.

Since this is just an example configuration, all normal IQS572-B000 setup flexibility exists, and the configuration can be modified as required by the user.

Table 2.1 IQS572EV02 Parameter / Setup Summary

Settings parameter	Value	Settings parameter	Value
Total Rx	8	Total Tx	8
Rx mapping	{2, 1, 3, 5, 4, 8, 6, 7, ...}	Tx mapping	{0, 1, 2, 3, 4, 5, 6, 7, ...}
ALP channel	Enabled	-	-
ALP Rxs	0x00 0xFF	ALP Txs	0x00 0x55
Prox theshold (TP)	23	Prox threshold (ALP)	8
Touch threshold – set	28	Touch threshold – clear	22
ATI Target (TP)	800	ATI Target (ALP)	500

ATI C (TP)	2	ATI C (ALP)	18
Active Mode report rate	13	Idle Touch report rate	50
Idle Mode report rate	75	LP1 report rate	60
LP2 report rate	120	-	-
Active Mode timeout	5	Idle Touch timeout	60
Idle Mode timeout	45	LP1 timeout	30
Total multi-touches	5	X & Y resolution	1024

To obtain the full device configuration, simply connect the trackpad module to a CT210 (or DS100), and run it with the IQS5xx-B000 PC GUI software. At start up all GUI parameters are updated to match the on-chip values, and can therefore easily be read in the GUI.

3 Connecting to PC

Although the module is designed to be used as a plug-in shield PCB for the Arduino Uno, it can also be connected to the Azoteq PC software for evaluation, visualisation, configuration and programming.

3.1 Hardware connections

To connect the IQS572EV02 to the PC, the following needs to be linked between the CT210/DS100 and the module.

Table 3.1 Hardware connections to CT210/DS100

Function	CT210 Pin	IQS572EV02 (AZP691A01) Pin
GND	Pin 1	P1 Pin 6 or 7 or P4 Pin 4
VDDHI	Pin 3	P1 Pin 4
SDA	Pin 7	P4 Pin 2
SCL	Pin 9	P4 Pin 1
RDY	Pin 10	P3 Pin 6

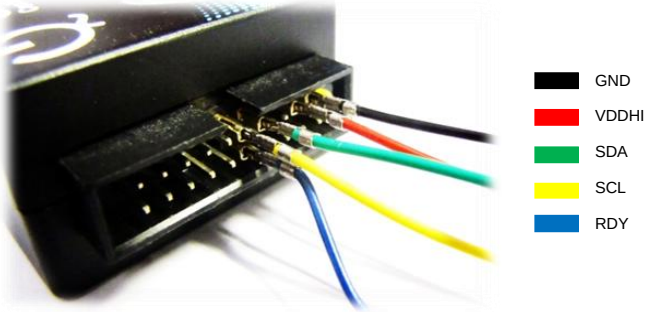


Figure 3.1 CT210 I²C connections

3.2 Evaluation in GUI

The features of the IQS572-B000 product can be evaluated and visualised using the following PC GUI software:

- http://www.azoteq.com/images/stories/software/azoteq_iqs5xxb000_setup.zip

This allows the designer to see the full power and information available from the IQS572 trackpad product. For more information on the GUI itself, including the device setup procedure, please see the following application note:

- http://www.azoteq.com/images/stories/pdf/AZD087%20-%20IQS5xx-B000%20Setup%20and%20User%20Guide.pdf

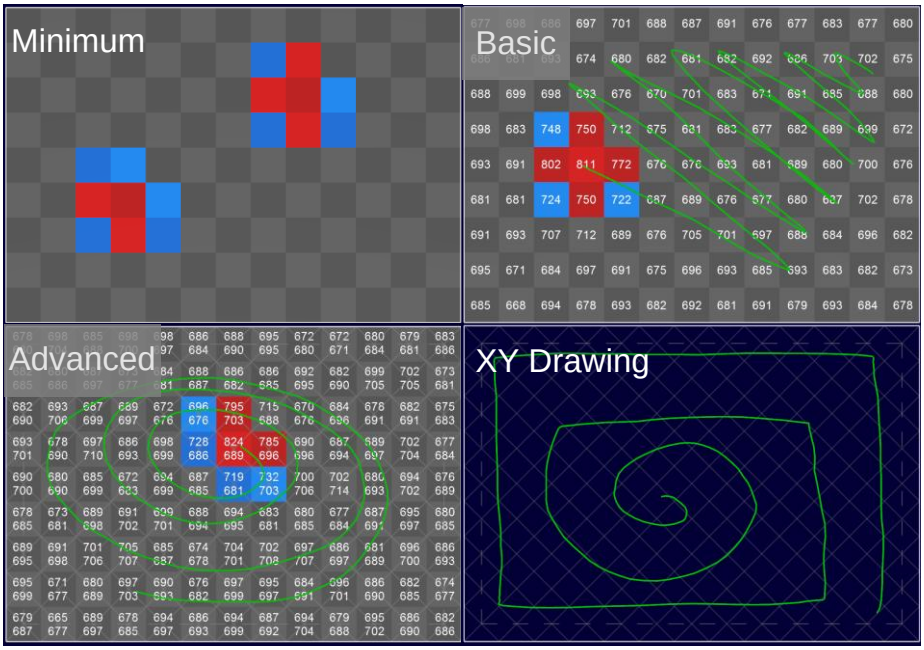


Figure 3.2 2D preset display examples

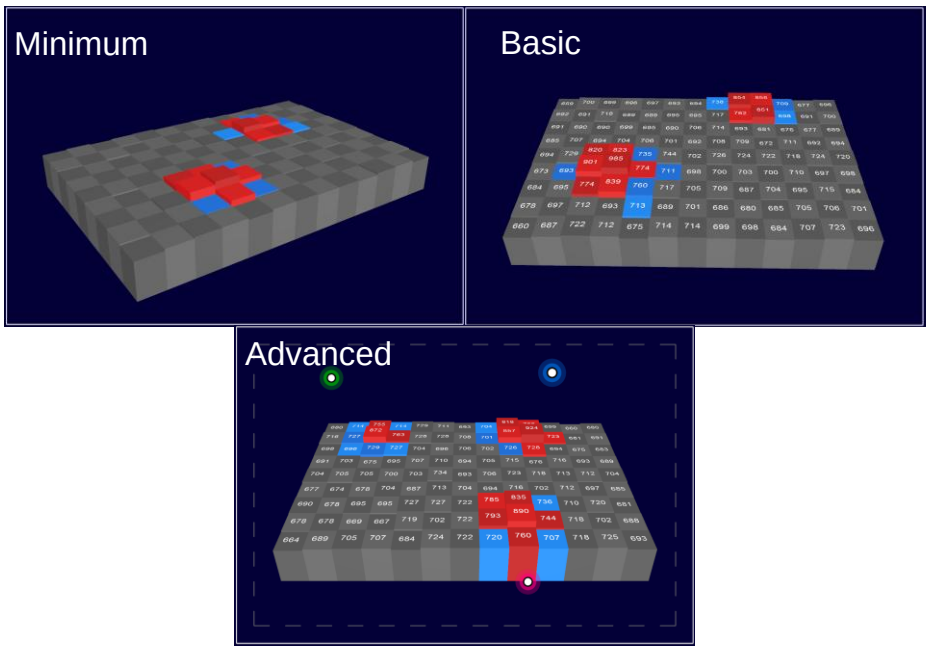


Figure 3.3 3D preset display examples

3.3 Programming

The IQS5xx-B000 GUI enables a user to modify the configuration of a trackpad and to subsequently program the device with a new hex file containing the new settings.

This is explained further in the AZD087 application note.

4 Connecting to Arduino

The main purpose of the module is to be used together with an Arduino Uno mainboard, providing a trackpad input shield module for the popular development environment.

4.1 Hardware connections

Simply plug the module into the aligning sockets on the Arduino mainboard.

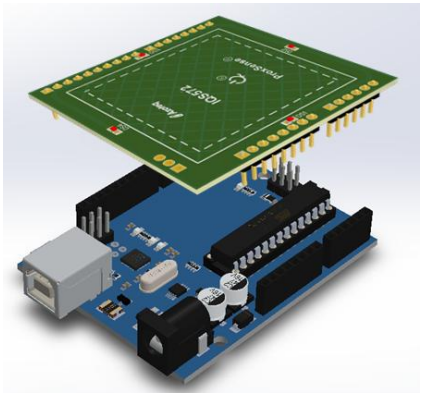


Figure 4.1 Shield + Arduino Uno

4.2 Arduino source code

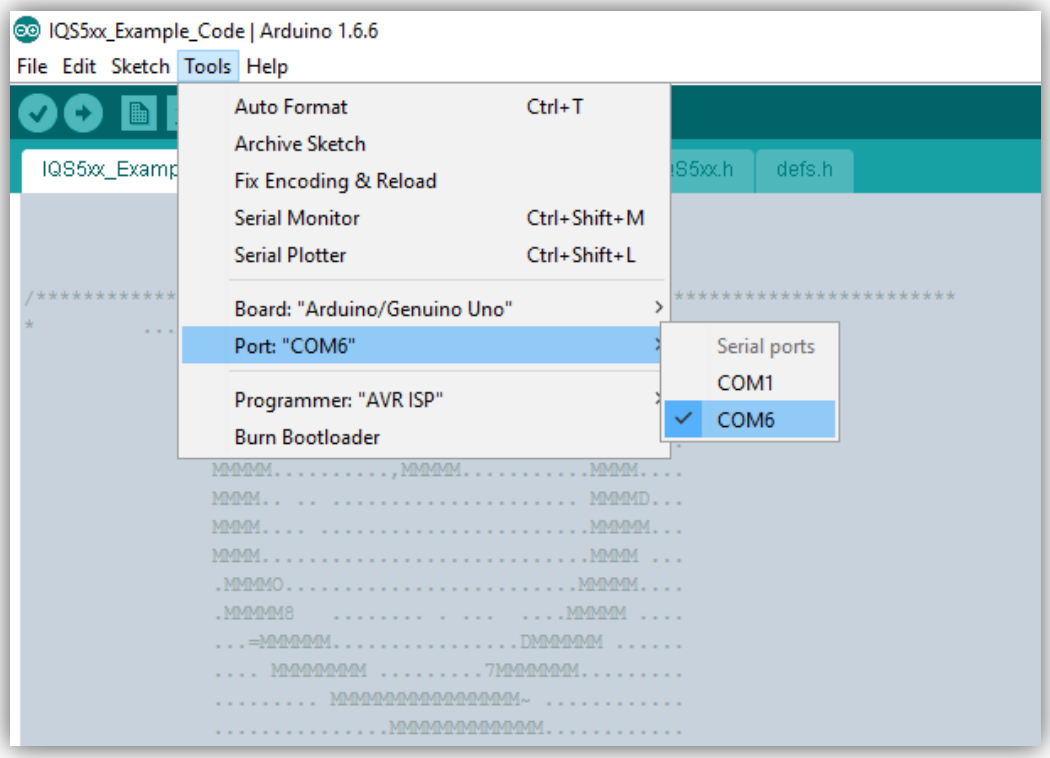
An example project is provided to allow for fast integration into the Arduino environment. The example source code communicates with the IQS572EV02 module, handles the I^2C interaction with the device, and then displays relevant output data on the serial monitor.

The source code for the IQS572EV02 module can be obtained here:

http://www.azoteq.com/images/stories/software/iqs572ev02_arduino_shield_v1.0.zip

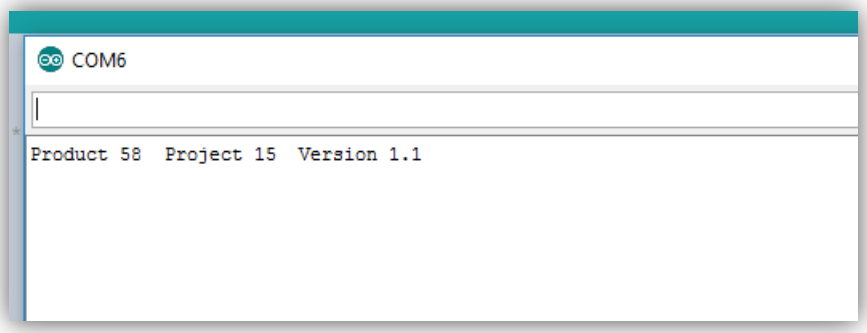
4.3 User guide

The project must be compiled ( ), and the serial COM port must be configured.

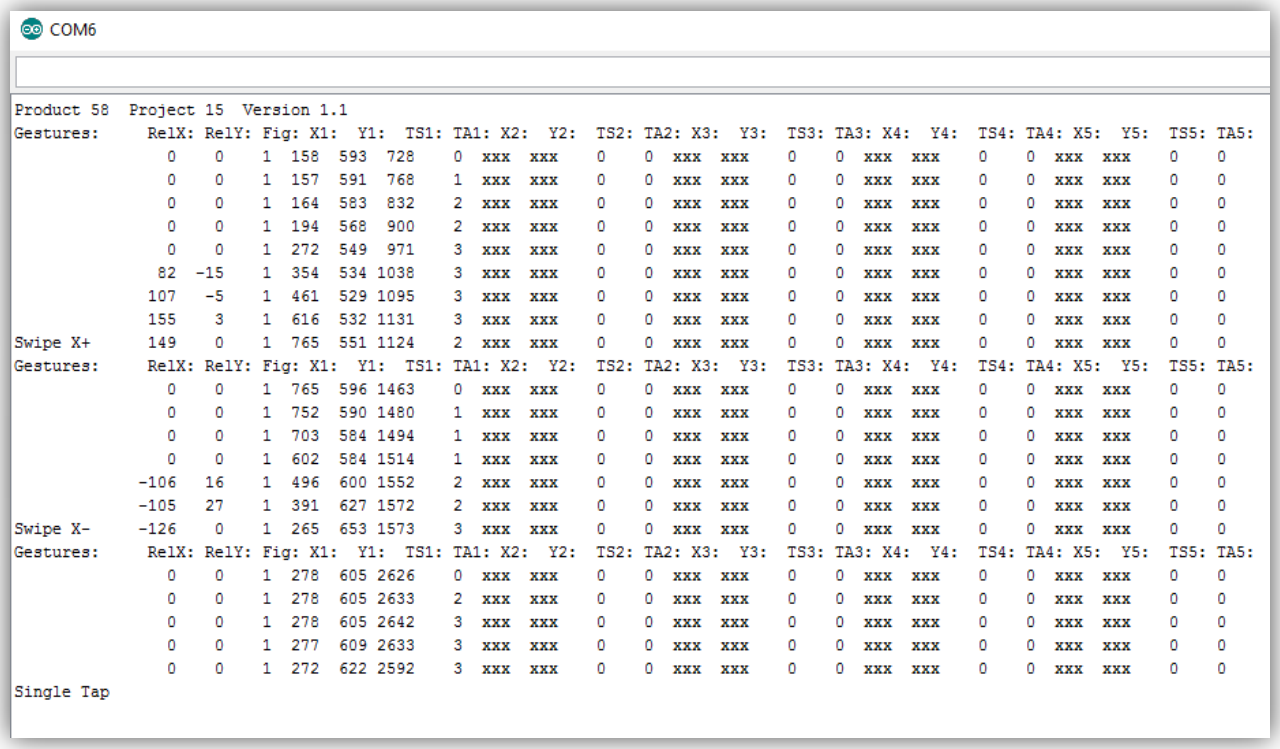


After this the program must be uploaded ( ), and once this is successful, the serial monitor can be opened (Tools->Serial Monitor) to view the data from the IQS572.

With a successful setup, shortly after opening the serial monitor window, you will see the version number details displayed as follows:



Now when interacting with the trackpad you will see finger position data and gesture outputs displayed on the window, here is an example of such data:



5 Electrical characteristics

For all general electrical characteristics, please refer to the IQS5xx-B000 datasheet.

5.1 Current consumption

With the parameters configured for the specific module, some expected current consumption values can be provided. Please note these are bench measured values, and can vary depending on numerous factors. For example in Active mode (during a user touch), the current varies according to the size of the touch due to change in the amount of processing required. The following are simply to provide an estimate of what can be expected.

Table 5.1 Total Current Consumption

User Interaction	Mode	I²C bytes read	Report Rate	Current	Unit
1 standard 8mm finger	Active Mode	16 bytes	13ms	1.86	mA
2 standard 8mm fingers	Active Mode	16 bytes	13ms	2.26	mA
None	Idle Mode	None	75ms	227	uA
None	LP1	None	60ms	58	uA
None	LP2	None	120ms	30	uA
None	Suspend	None	n/a	<1	uA

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