



ProxSense[®] IQS213 GUI User Guide

IQ Switch[®] - ProxSense[®] Series - SwipeSwitch™

Table of Contents

1	INTRODUCTION1
2	SETUP1
3	GUI OPERATION2

1 Introduction

This user guide describes the basic operation of the **IQS213** Graphical User Interface (GUI) software from Azoteq. The GUI provides a platform for rapid prototyping by enabling application and development engineers to visualise the real time data stream from the **IQS213** Proximity, Touch and Swipe Sensor.

2 Setup

The **IQS213** GUI Software can be downloaded from the "Software and Tools" section on the Azoteq website: <u>www.azoteq.com</u>

2.1 General Setup

- ♥ Ensure that the IQS213 has the I²C debug bit programmed, to enable data streaming. The programming of OTP (One Time Programmable) options can be accomplished with the Azoteq USBProg.exe software and CT210 (or later) USB dongle.
- Connect the GND, VDDHI, RDY, SDA and SCL lines on an IQS213 IC or prototype pcb to the Azoteq CT210 (Configuration Tool) or DS100 (DataStreamer) USB dongle.
- U Note: Pull-Up resistors (typ. 10k Ω) may be required on I²C communication lines.
- ♀ Run the **IQS213** Software GUI.





2.2 IQS213 EVKIT (EV03)

- Connect the **IQS213** EV03 EVKIT to a computer using a suitable USB cable (with the ON/OFF switch in the OFF position, which disconnects the battery power).
- 也 Run the **IQS213** Software GUI.
- ♥ The IQS213 EV03 kit does not require the use of an Azoteq USB dongle to interface with the IQS213 GUI, since the EV03 kit has been designed to be USB compatible.







3 GUI Operation

- ♥ The IQS213 GUI display is illustrated in Figure 3.1. The "Hints and Tips" Pop-up window in the centre of the screen contains important information relevant to the GUI software and IC, please take the time to read though all of the information. The scroll buttons can be used to flip through the hints and tips and are marked in Figure 3.1
- ♥ After closing the Hints & Tips window in the centre of the screen, data streaming can be started by clicking on the "Start" button, also indicated in Figure 3.1



Figure 3.1 IQS213 GUI Startup Screen

- ♥ After clicking the "Start" Button, the "Electrode Configuration" pop-up window will appear, as shown in Figure 3.2. Please select the appropriate electrode configuration that match the electrode design connected to your IQS213 device. The four available options are for 2-or 3-Channel, Self- or Projected capacitive electrode configurations.
- ♥ Upon selecting the desired electrode configuration, the GUI will automatically setup the device and start to stream the IQS213 data.



IQ Switch[®] ProxSense[®] Series





Figure 3.2 IQS213 Electrode Configuration Selection Pop-up window

 ♥ After data streaming has commenced, the display will appear as illustrated in Figure 3.3. The channel data is indicated by bar graphs in the centre of the GUI:



Figure 3.3 IQS213 Data streaming started



- ♥ Please note that the GUI automatically disables the "Event-Mode" streaming option by setting the IQS213 device to provide continuous data streaming. This provides a fluent and continuous stream of data for prototyping and visualisation. Event-Mode I²C (Event-driven / interrupt driven) communication is the default interface on all IQS213 devices. Therefore, with the IQS213 IC configured in Event Mode, communication will only occur when the IC registers an event, such as proximity, touch and swipe detection events. Please see the IQS213 datasheet for further information regarding Event Mode operation.
- ♥ When a user performs a swipe action, a swipe event is registered, and the swipe indicator will light up. The indicator will be toggled once another swipe event is detected.
- ♥ Channel 0 (CH0) is used as a proximity (PROX) only channel. This channel is realized by charging all active channel electrodes simultaneously to deliver a distributed proximity channel. During Low Power (LP) modes, only CH0 is active upon detection of a PROX event on CH0, the IC will zoom to Normal Power (NP) for fast touch / swipe detection.
- ♥ The proximity and touch detection levels (thresholds), as well as the overall sensitivity can be adjusted individually for each channel, in the "Compensation / Multiplier / Thresholds" section of the GUI, as illustrated in Figure 3.4.



Figure 3.4 IQS213 GUI Settings

♥ The threshold settings will adjust the proximity and touch detection levels, whereas the Multiplier and Compensation settings will adjust the counts, and thus the overall sensitivity of the device. By default the ATI algorithm will adjust these values to the optimum settings to reach a target count of approximately 640 counts for the proximity channel, and 320 for the touch channels. ATI can be turned off and the settings selected manually. The ATI





settings can be found in the ATI section of the software GUI, as illustrated in the upper right corner of Figure 3.4.

- ♥ After the appropriate adjustments have been made to the IC, the settings can be saved to a file for future use, by making use of the Save/Load function as displayed in the left hand side of Figure 3.4. This enables settings to be loaded from the file, instead of re-adjusting all settings from scratch.
- ♥ Proximity, Touch and Swipe detection events are indicated in the GUI, by the channel light underneath the corresponding bar graph, as well as the Swipe Indicator light. A blue light indicates proximity detection, a red light indicates touch detection and the Swipe indicator swipe detection, as illustrated in Figure 3.5.



Figure 3.5 **Proximity, Touch and Swipe indications**

- ♥ The user can also select the desired IQS213 IC type from the "IC Type" tab in the GUI, as shown in Figure 3.6. This will configure the IQS213 IC to operate as either a SwipeSwitch™ or normal touch and proximity detection device. Please refer to the IQS213 datasheet for IC type configurations.
- ⁽¹⁾ Hint: For first-time users of IQS213 SwipeSwitch[™] related devices, it is recommended to select the "zz1 x2x zz3" IC type option, if using a 3-channel swipe electrode configuration (see Figure 3.6). Selecting this IC type, together with the "Zero State" = On function, will provide the most flexible swipe detection capability.



IQ Switch[®] ProxSense[®] Series



Azoteq IQS213			
File Options Help			
USB Dongle & Messages Azoteq - CT220 Compatible device(s) detected Device did not enter debug mode Device not ready (Timeout) ¥ Streaming	1400 1300 1200 1100 1000 900		V ATI ATI ATI Partial CS-Size Off Off 29.9 pF Orget ATI Off 59.8 pF Arget ATI CH-1.3 Read H0 CH-2 X 8 Send Redo ATI V Comms
Setup Start Scope Pause S	Swipe		Event Mask V Prox V Touch V Side V ATI N tric N tric V C Cont V C Cont V C Cont V C Cont V C Cont V C C C C C C C C C C C C C C C C C C C
Setup USB Dongle Voltage Select: IPC Speed: 3.3 V Fest Read device settings after start-up Polsplay Options Enable Minimum Mode Baseline View Save / Load Settings	IC Type 3CH Normal Mode ● 1zz 12z z2z 3CH Normal Mode ● 1zz z2z zz3 1zz 1xz x2x zx3 zz3 ● 1zz 12z z2z z23 zz3 1zz x2x zz3 ● 2CH Normal Mode	3 5 swipe	LTA Filter Hak Time 2.5 Seconds 0 On 0 Seconds Off Reseed Swipe Settings States/Timers TC Type IC Type
Load settings on start up Settings Re	Conne. LTA: Delta: Compensation / Multiplier / T Compensation: Sens: Comp: 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	hrresholds	● 1zz 12z 22 ③ CH Normal Mode ● 1zz 22z z23 ○ 1zz 1xz x2x x3 zz3 ○ 1zz 12z z2z 223 zz3 ○ 1zz 1xz x2x zz3 ○ 2CH Normal Mode ○ ♥ Other Noise Detect Auto Off ○ Off ○ off ○ Touch ○ Off ○ Off ○ off ○ Touch ○ Off ○ Off ○ off ○ Touch ○ Off ○ Touch ○ Off ○ Touch ○ Off ○ Other ○ Off

Figure 3.6 IQS213 IC Type Selection

⁽U) To visualise detailed changes in data with respect to time (discrete samples), the "Scope View" can be enabled by clicking on the "Scope" button, as illustrated in Figure 3.7.

cope View Enable		Channel Data	ATI
	1400		All
Azoteq - CT220	1300		ATI ATI Partial CS-Size Projected I Off Image: Off Image: Off 29.9 pF 1.25 uA Image: On Image: On Image: Size Image: Off 2.5 uA
GUI updated with device settings		/	5 uA
Device streaming started		/	X Count Rede ATI
× Streaming			
V Succinity 1350-			CHO All
Satup St 1250-			IC Version
1200-			Get Versio
Scope Pa 1150-			
1100-			Long Term Averages (LTA)
			CH0 All
USR Decede 950-			CH1
Voltage Select: 12C Speed 900-			CH2
3.3 V Test 850			
Read device activities of the 750-	-		
Read device settings after 730- 700-			Scope
Display Options 650		1	1400 😴 Set Y Max
Enable Minimum Mode 600-			
baseline view 550-			G G G
Save / Load Settings 500-			10 Set Y Inc End Zero
Load settings on start up 400-			600 Set X Range On
Settings file 350-			Set CH3
Apply Settings Save Save Save Save Save Save Save Save			Resat scope view
250- 200			Rescale Scope View
Log Streaming Data 200-			Show Coordinates
Start Log Log All Day 100-			X Coordinates Bar Graph
50-			Y Coordinates
0+ 7559	5 75695 75795 758	95 75995 76095 76195	32 🕃
			Send
			Base Value
	Touch Thresholds: 4	4 🕤 4 🕤 Read	Prox 0 100 The second secon
	Prov		Contra Minute and
	Thresholds: 2	Read	Scope view setting

Figure 3.7 IQS213 GUI - Scope View

Copyright © Azoteq (Pty) Ltd 2012. All Rights Reserved. IQS213 GUI User Manual Revision 1.2





- ♥ Each channel's visibility and colour can be adjusted along with the scale of the scope view, in the scope view settings section, on the right hand side of the scope view window.
- ♥ To return to the Bar graph view, simply close out of the scope view window. This can be done by clicking on the X in the upper right hand corner of the window, or by clicking the "Bar Graph" button in the lower right hand corner of scope view settings section of the scope view window.

For I²C-related data streaming information, please refer to the IQS213 datasheet for device memory register descriptions and application note: "*AZD066: IQS213 Communication Interface Guideline*", available at: <u>www.azoteq.com</u>.

For further enquiries regarding the **IQS213**, please contact your local distributor or submit enquiries to Azoteq at: <u>ProxSenseSupport@azoteq.com</u>

The following patents relate to the device or usage of the device: US 6,249,089 B1, US 6,621,225 B2, US 6,650,066 B2, US 6,952,084 B2, US 6,984,900 B1, US 7,084,526 B2, US 7,084,531 B2, US 7,119,459 B2, US 7,265,494 B2, US 7,291,940 B2, US 7,329,970 B2, US 7,336,037 B2, US 7,443,101 B2, US 7,466,040 B2, US 7,498,749 B2, US 7,528,508 B2, US 7,755,219 B2, US 7,772,781, US 7,781,980 B2, US 7,915,765 B2, EP 1 120 018 B1, EP 1 206 168 B1, EP 1 308 913 B1, EP 1 530 178 B1, ZL 99 8 14357.X, AUS 761094

IQ Switch®, ProxSense®, LightSense™, AirButton® and the 🦞 logo are trademarks of Azoteq.

The information in this Datasheet is believed to be accurate at the time of publication. Azoteq assumes no liability arising from the use of the information or the product. The applications mentioned herein are used solely for the purpose of illustration and Azoteq makes no warranty or representation that such applications will be suitable without further modification, nor recommends the use of its products for application that may present a risk to human life due to malfunction or otherwise. Azoteq products are not authorized for use as critical components in life support devices or systems. No licenses to patents are granted, implicitly or otherwise, under any intellectual property rights. Azoteq reserves the right to alter its products without prior notification. For the most up-to-date information, please refer to <u>www.azoteq.com</u>.

WWW.AZOTEQ.COM

ProxSenseSupport@azoteq.com