Application Note: AZD007
IQ Switch® - ProxSense™ Series
USBProg.exe Overview (WinXP)

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1 Introduction:

The ProxSense™ Proximity and Touch detection ICs contain **OTP (One Time Programmable)** options which can be set by the designer. These OTP options aid the designer in configuring the ICs for custom designs**. USBProg.exe** and the **CTxxx (Configuration Tool xxx**) can be used to easily configure these OTP options.

Please refer to **Application Note: AZD005** for installation guide and firmware update of USBProg.exe and Configuration Tools (CTxxx).

2 Single Channel ProxSense™ IC Programming Configuration:

(IQS123, IQS124, IQS125, IQS126, IQS127)

Steps to initialise the Module:

1. Connect CT120/CT200 to computer via USB cable.
2. Connect IQS1xx Configuration Header of Module to CTxxx (see Table 1 and Figure 1)
    - In-Circuit or
    - Place IQS1xx IC in Programming socket
        - **Both cases require VDD/V_{REG} capacitor to GND = 1uF populated.**

The pins required to program the OTP options on the IQS12x series of ICs should be connected to the programmer (CTxxx) as in Table 1:

Table 1: Hardware interface description: IQS1xx – Programmer

IQS1xx Pin Name						CT120 / CT200 pin #: 20-pin Box Header
IQS123, IQS124, IQS125	IQS126	IQS127D	IQS127S	IQS127C (CapPO)		
VSS					↔	1
						2
VDDHI					↔	3
VDD					↔	4
CS		POUT	SHLD	POUT	↔	5
CX					↔	6
					↔	7
						8
					↔	9
OUT	POUT				↔	10

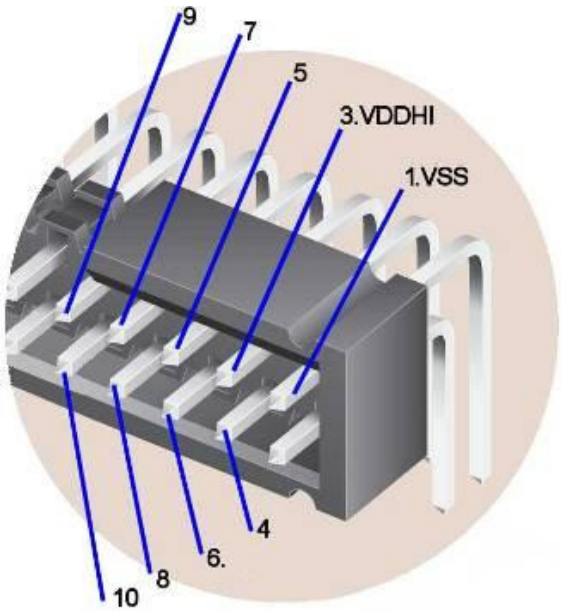


Figure 1: 20 pin Box Header on CT120/CT200

3. Open USBProg vX.XX.exe (v6.2.0 or later).
4. Select relevant device on first menu (the IQS1xx IC should be connected via USB using the CTxxx Configuration Tool (in circuit / programming socket) when selecting a device).
5. Click on “Read Chip”. This should read the current settings on the IC, and display it in the right-hand column. (If the IC is in default mode, this should all be in a black font)
6. Refer to the relevant IC’s datasheet to change each OTP function’s options using the dropdown boxes.

7. Click on “Program Chip” after the correct selection has been made. (**Note:** Each Function can only be programmed once, as it is One Time Programmable (OTP))

8. Please Note: After programming, Click “Read Chip”. The “OPTION” and “READ” columns should now match for successful “Program Chip” result.

Example of USBProg.exe (IQS127S):

Step 3: Open USBProg
&
Step 4: Select IQS127

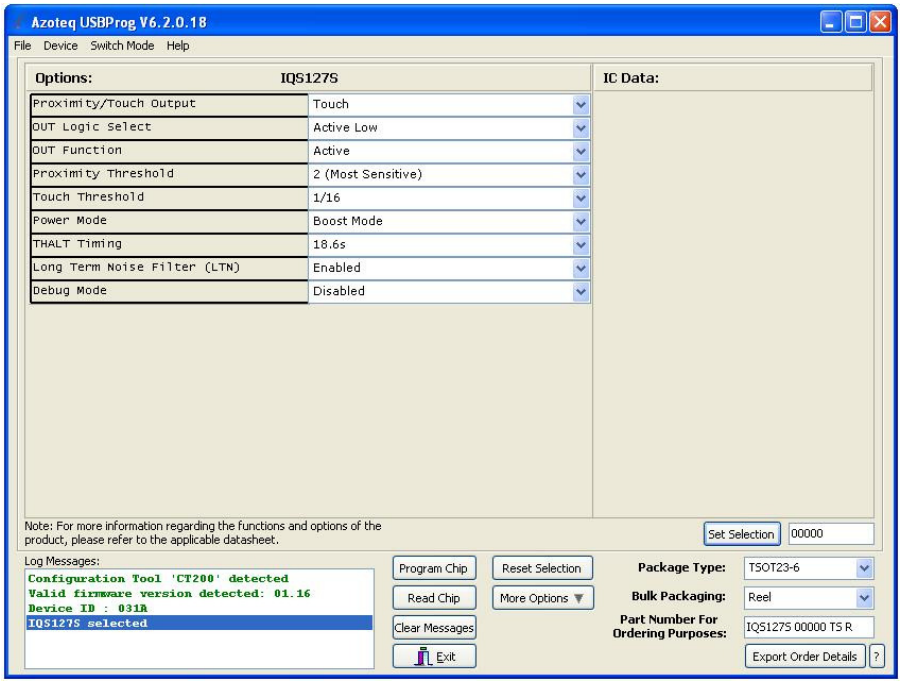
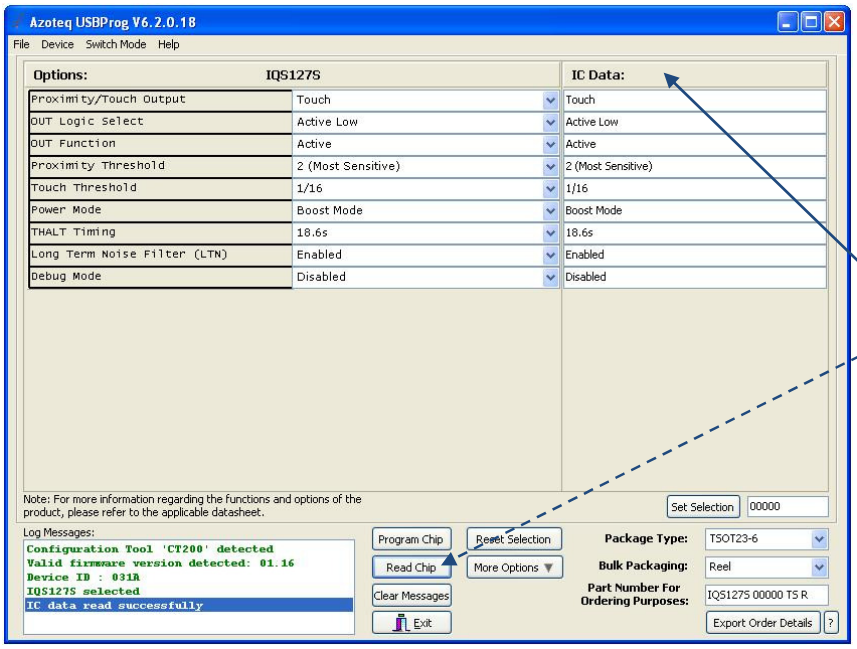


Figure 2: USBProg.exe – IQS127S

The latest version of USBProg.exe can be downloaded from www.azoteq.com

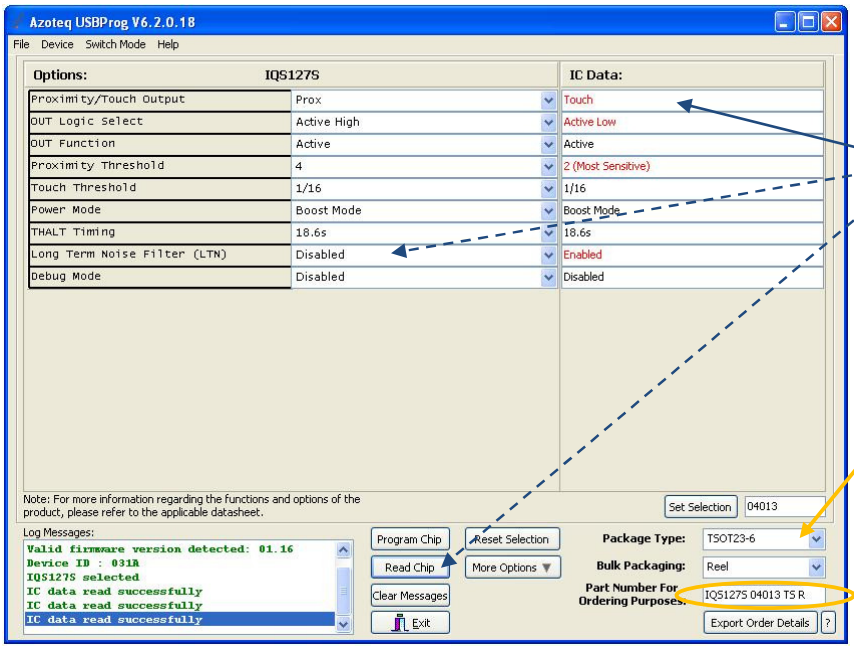
Step 5: Read Chip



Click on "**Read Chip**". Default IC settings will be displayed when IC is still in the un-configured state.

Figure 3: USBProg.exe – IQS127S IC Data

Step 6: IC Options



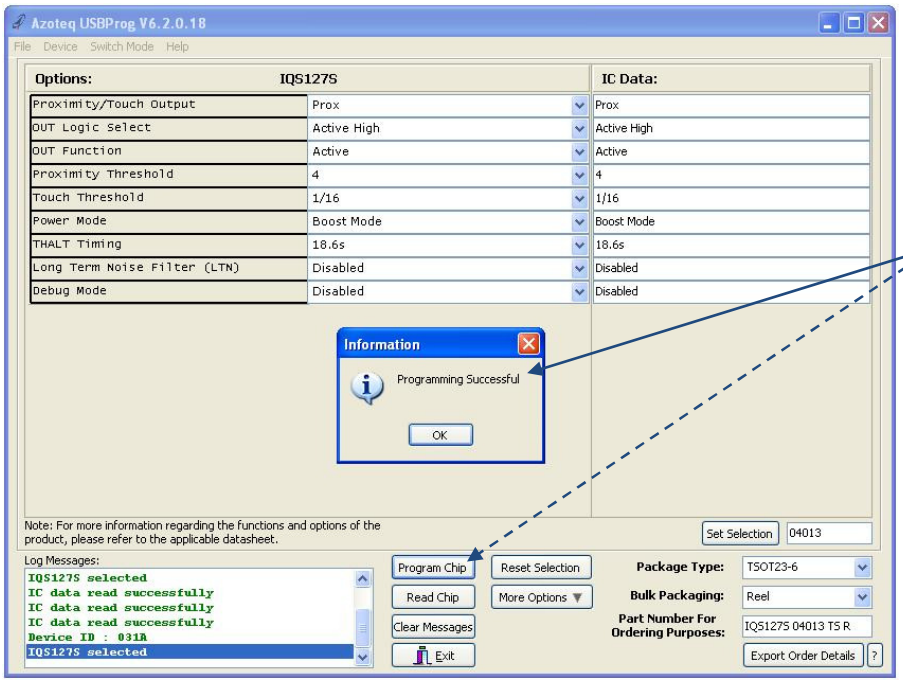
Changing an option and clicking "Read Chip" will indicate changed settings in red.

Note: Part Ordering Information can also be changed by the user.

Note: This ***Part Number*** is supplied to Azoteq for preconfigured orders. (MOQ applies)

Figure 4: USBProg.exe – IQS127S Changed IC data

Step 7: Program Chip



Click **"Program Chip".**

If the "IC Data" and "Option" column match, Programming will be successful.

Figure 5: USBProg.exe – IQS127S Programmed IC

Note: Each option on the IC can only be configured once, as it is **OTP (One Time Programmable).**

3 Multi-Channel ProxSense™ IC Programming Configuration:

(IQS132, IQS 133, IQS221, IQS240)

Steps to initialise the Module:

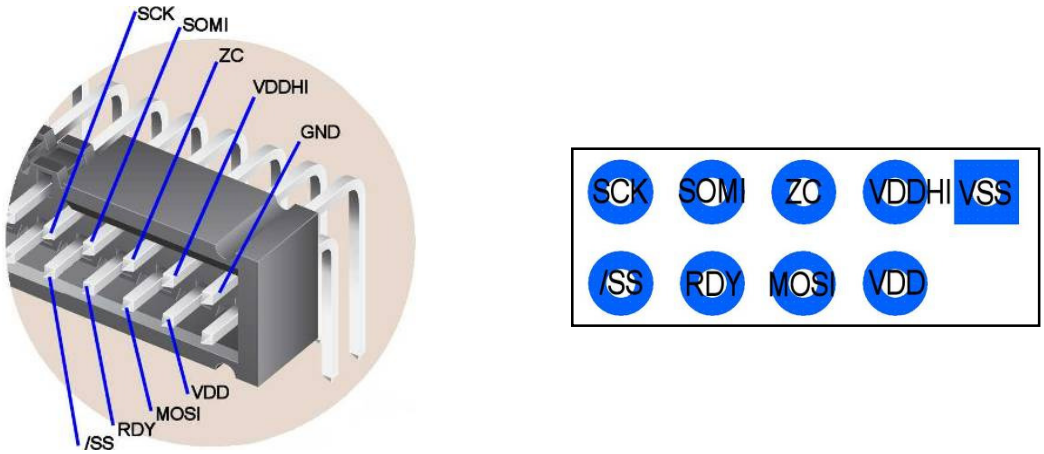
1. Connect CT120/CT200 to computer via USB cable (IQS13x compatible with CT200 only).
2. Connect IQSxxx Configuration Header of Module to CTxxx (see Table 2 and Figure 6)
   - In-Circuit or
   - Place IQSxxx IC in Programming socket
     - **Both cases require VDD capacitor = 1uF to GND populated.**
     - **Both cases require ICTRL resistor = 43kΩ to GND populated.**

The pins required to program the OTP options on the multi-channel IQSxxx series of ICs should be connected to the programmer (CTxxx) as in Table 2:

Table 2: Hardware interface description: IQSxxx – Programmer

IQS13x Pin Name	IQS2xx Pin Name		**CT120/CT200** pin #: 20 pin Box Header**
VSS		↔	1
		↔	2
VDDHI		↔	3
	VDD	↔	4
	ZC	↔	5
	MOSI	↔	6
TO0	SOMI	↔	7
	RDY	↔	8
TO1	SCK	↔	9
	/SS	↔	10

**This header correspond 1:1 with the standard headers used on most Azoteq PCBs.



(a) (b)

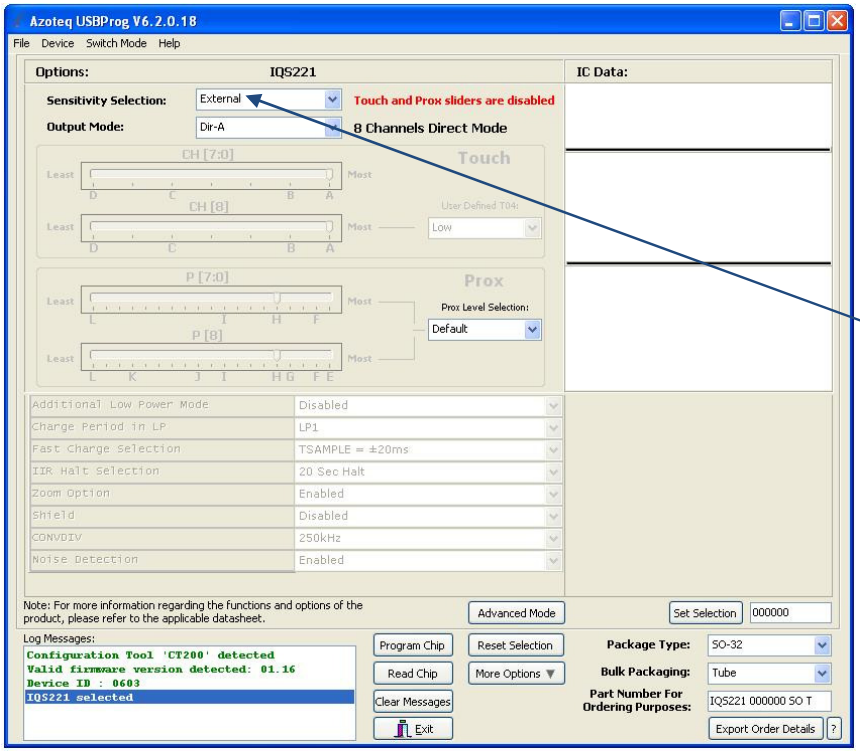
Figure 6: (a) 20 pin Box Header on CT120/CT200. (b) 10-Way Double Row HDR on Azoteq PCBs.

3. Open USBProg vX.XX.exe (v6.2.0 or later).
4. Select relevant device on first menu (the IQSxxx IC should be connected via USB using the CTxxx Configuration Tool (in circuit / programming socket) when selecting a device).
5. Click on “Read Chip”. This should read the current settings on the IC, and display it in the right-hand column. (If the IC is in default mode, this should all be in a black font)
6. Refer to the relevant IC’s datasheet to change each OTP function’s options using the dropdown boxes.
7. Click on “Program Chip” after the correct selection has been made. (**Note:** Each Function can only be programmed once, as it is One Time Programmable (OTP))
8. Please Note: After programming, Click “Read Chip”. The OPTION and READ columns should now match for successful “Program Chip” result.

The latest version of USBProg.exe can be downloaded from www.azoteq.com

Example of USBProg (IQS221):

Step 3: Open USBProg
&
Step 4: Select IQS221

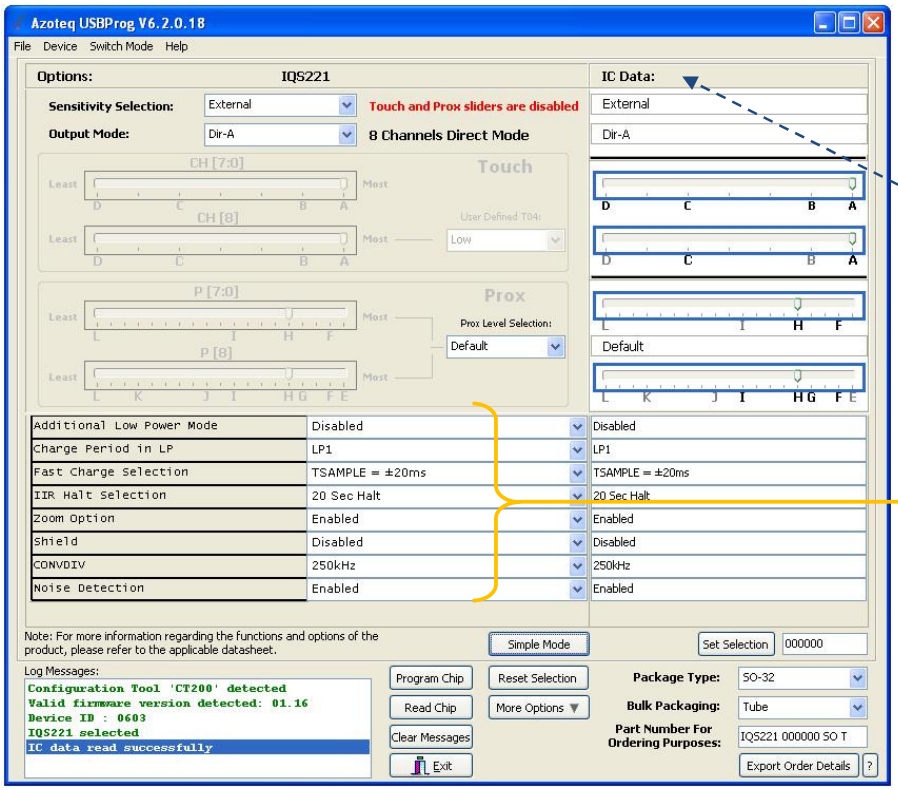


Note: The IQS221 has an enhanced opening page on the USBProg. This page includes choosing the Sensitivity and Output Mode of the IQS221.

This enables the designer to choose whether the IC Sensitivity Settings is selected internally (programmed) or externally (with resistors options). If used internally, the page will expand enabling the designer to use the greyed-out sliders to choose Sensitivity settings.

Figure 7: USBProg.exe – IQS221

Step 5: Read Chip & Advanced Mode



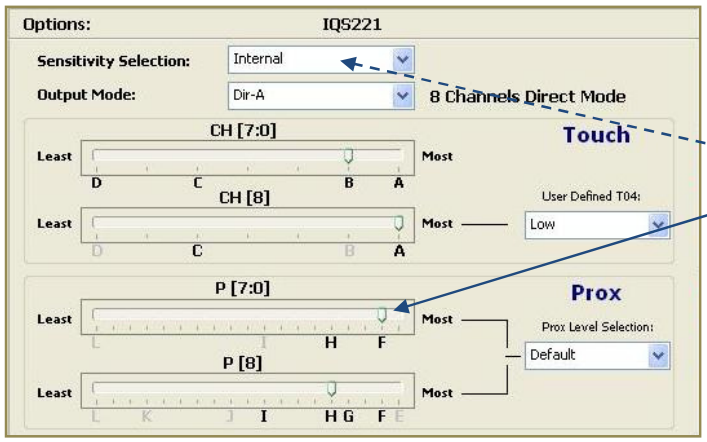
Click on "**Read Chip**".

Default IC settings will be displayed when IC is still in the un-configured state.

Advanced Mode: Clicking on "Advanced Mode" enables the designer to change additional options on the IC. These options are for more advanced designs

Figure 8: USBProg.exe – IQS221 Advanced settings

Step 6: IC Options

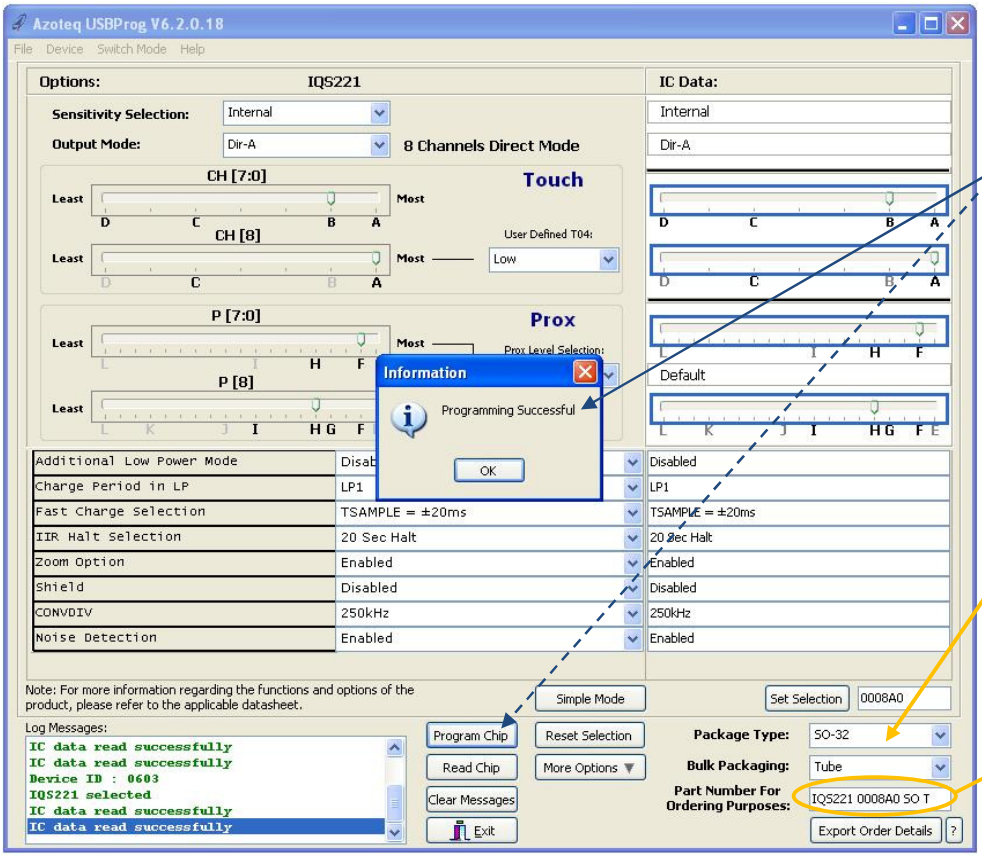


Selecting the **Internal Sensitivity Setting** will allow programming of the IQSxxx IC's sensitivity OTP options.

Refer to the IQSxxx IC's datasheet for OTP options and settings.

Figure 9: USBProg.exe – IQS221 OTP settings

Step 7: Program Chip



Click **"Program Chip".**

If the "IC Data" and "Option" column match, Programming will be successful.

Note: Part Ordering Information can also be changed by the user.

Note: This ***Part Number*** is supplied to Azoteq for preconfigured orders. (MOQ applies)

Figure 10: USBProg.exe – IQS221 Programmed IC

Note: Each option on the IC can only be configured once, as it is **OTP (One Time Programmable).**