PYREDS Rev. 1.11

ezPyro[™] Evaluation Tool Software User Manual



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Please note: the information contained in this document is subject to change without further notification.

1 Introduction

This document covers the operation of the ezPyro[™] Evaluation Tool software and should be used in conjunction with the ezPyro[™] Sensor Reference Manual.

The software can be used to test up to four single-pixel sensors or one 2x2 array sensor. It enables you to optimise the sensor for a specific environment, observe signals in real time, and to experiment with register settings, optimising:

- Gain
- Filtering (HPF, LPF, Transconductance)
- Sample rate
- clk/sync for device synchronisation
- Interrupt enable / disable
- Wake Up (WUP)

Register settings can be saved to, and loaded from, a text file. Please refer to page 21 for details.

Please note: this software is generic and can be used with any of the digital evaluation kits and development boards in this range. However, the evaluation kits also have type specific software which allows for a more in-depth analysis of the element that each kit has been developed for.

2 Getting Started

2.1 Installing ezPyro[™] Evaluation Tool

To install the ezPyro[™] Evaluation Tool from the ezPyro[™] Software folder on the supplied USB stick, open the ezPyro[™] Evaluation Tool folder and run the setup application. The software is compatible with Windows 7, 8, & 10.

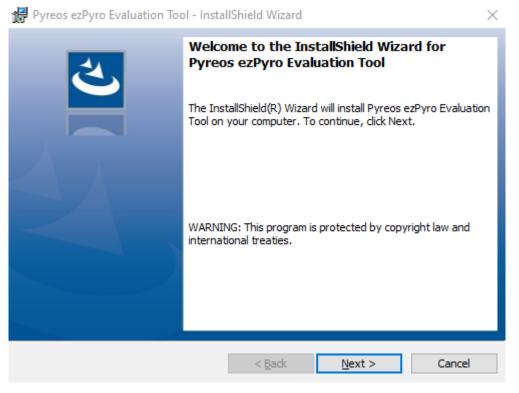


Figure 1: Evaluation Tool Install Shield Wizard

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2.2 Launching the Software

1. Open the ezPyro[™] Evaluation Tool from the **Start** menu of the connected computer. By default, the software launches in the 4-sensor single-pixel view. If a device has been connected before launching the software, go to step 4.

Pyreos ezPyro Evaluation Tool				- 🗆 X
File Device View About				
ezPyro Master Asic Status	Sensor 1 CCP Register Channel 2	Sensor 2 CCP Register Channel 2	Sensor 3 CCP Register Channel 2	Sensor 4 - CCP Register Channel 2
Streaming	AFE register	AFE register	AFE register	AFE register
Normal Power Sleep Mode	Sample Rate	Sample Rate	Sample Rate	Sample Rate
Data Rate (Hz) :	WUP register UHT Thr	WUP register	WUP register	WUP register
Sample Rate (ms) : Asic Version : Programming Mode	LHT Thr	ULT Thr	ULT Thr	ULT Thr
Single Device All Devices Save/Load Settings	WT Thr	WT Thr	WT Thr	WT Thr
Save Save Default Load	Apply Scope - Sensor 1 Channel 2	Apply Scope - Sensor 2 Channel 2	Apply Scope - Sensor 3 Channel 2	Apply Scope - Sensor 4 Channel 2
	18000	18000	18000	18000
	•	•		↓
Pyreos hardware found on COM3	-18000 0 < > 400	-18000 0 < > 400	0 < > 400	0 < > 400

Figure 2: Multiple Single-Pixel Sensor View (Default) without a connected device

- 2. Connect the device to the PC.
- 3. The name of the device appears in the *Device* menu. Click on the device to complete the connection.

Pyreos ezPyro Evaluation Tool						
File	Device	View	About			
-ezPy	CO	M3 : Py	rreos Generic ezPyro firmware v1.04			
	Re	scan Port	ts			
	Conne	cted	Channel 2			

Figure 3: Connect to device

4. If no device appears in the list, or the device is plugged in after the software is opened, select **Rescan Ports** from the *Device* menu.

Pyreos ezPyro Evaluation Tool						
File	Device	View	About			
-ezPy	s					

Figure 4: Connected to device



5. A warning message "*Master device has no channels enabled*" is displayed. This implies no data will be streaming as the **clk** and **sync** outputs of the master will be inactive when no data is being recorded. No data will be streamed until the channels have been enabled on the master (by default, Sensor 1 is the master, but this can be changed in the AFE register settings).

Note: This m	essage is not	displayed	if the sensors h	nave been used	previously or I	if a de	fault con	figuration	file exists.
--------------	---------------	-----------	------------------	----------------	-----------------	---------	-----------	------------	--------------

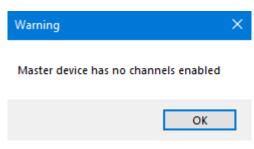


Figure 5: Device Connected - no channels active

6. Click on the **OK** button.

Note: There can only be one master device for surface mounted devices. If there is more than one master, then the slaves receive multiple clock and sync signals, and this causes interference in the slave output resulting in a noisy signal.



3 4-Sensor Single-Pixel View

With four sensors connected to the backplane board the following window is displayed.

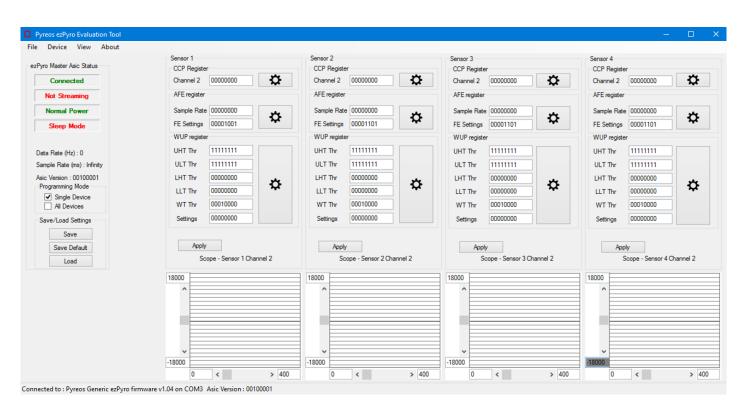


Figure 6: ezPyro[™] Evaluation Tool window before sensors have been enabled

1. Input values as required into the CCP register(s) for the sensor.

Note: These textboxes represent the bits of the registers. The input must be zeroes and ones (binary characters) and will be interpreted as a byte regardless of how many characters have been input. For example, 111 is interpreted as 00000111. Entries are treated as the least significant bits of the whole byte.

When changing registers directly please refer to the sensor reference manual; this explains the meaning of each bit in the registers.

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Sensor 1 CCP Register		
Channel 2	0000001	\C
AFE register		
Sample Rate	0000000	<u>بد</u>
FE Settings	00001001	¥
WUP register		
UHT Thr	1111111	
ULT Thr	1111111	
LHT Thr	0000000	يعر
LLT Thr	0000000	¥
WT Thr	00010000	
Settings	0000000	
Apply	ppe - Sensor 1 Cha	nnel 2

Figure 7: Changing CCP Register settings directly

Note: Any change to a register setting is not implemented until the Apply button has been clicked. If a new setting has not been applied it is shaded grey, as shown in Figure 7.

2. Click on the **Apply** button for the sensor. Check that a signal is displayed.

rro Master Asic Status	Sensor 1 CCP Register	Sensor 2 CCP Register	Sensor 3 CCP Register	Sensor 4 CCP Reg	
Connected		Channel 2	Channel 2	Channel 2	
Streaming	AFE register	AFE register	AFE register	AFE regis	ster
Normal Power	Sample Rate 00000000	Sample Rate	Sample Rate	Sample R	
Sleep Mode	PE Settings 00001001	FE Setungs	FE Setungs	T L Setting	igs
	WUP register	WUP register	-WUP register	- WUP reg	
ta Rate (Hz) : 989	UHT Thr 11111111 ULT Thr 11111111	UHT Thr	UHT Thr	UHT Thr	
mple Rate (ms) : 1.01 c Version : 00100001	111T The 0000000	ULT Thr	ULT Thr	ULT Thr	
ogramming Mode	LLT Thr 00000000			LLT Thr	
Single Device All Devices	WT Thr 00010000	WT Thr	WT Thr	WT Thr	
ave/Load Settings	Settings 00000000	Settings	Settings	Settings	
Save					
Save Default	Apply	Apply	Apply	1	Apply
Load	Scope - Sensor 1 Channel 2	Scope - Sensor 2 C	Channel 2 Scope - S	Gensor 3 Channel 2	Scope - Sensor 4 Channel
	18000	18000	18000	18000	
	^	^	^	^	
	~ <u> </u>	×		v	

Figure 8: Changing CCP Register settings directly - No Saturation



3.1 Sensor Configuration Settings

For more detailed information about the CCP, AFE or WUP settings, click on the cogs adjacent to the register settings. Changes are not implemented until the **Apply** button has been clicked. If a modified text field has not been applied, the box is shaded grey.

Note: Please refer to the ezPyroTM Sensor Reference Manual for information about these registers and their settings.

hannel 2 00000001	•	Sensor Evaluation	on Tool CCP Registe	r Control- Sensor 1		
FE register						
ample Rate 00000000		г	Status	Feedback Cap.	High Pass Filter	Feedback Trans.
E Settings 00001001	*					
VUP register		Channel 1 :				
HT Thr 11111111						
JLT Thr 11111111		Channel 2 :	Enabled - (1) 🗸	50 fF - (000) ~	′ 1 Hz - (00) ∨	1.20 TOhm - (00) >
HT Thr 00000000		, T				
LT Thr 00000000	\$	Channel 3 :				
/T Thr 00010000		Channel 4 ·				
ettings 0000000						
		Channel 4 :				

Figure 9: CCP Cog Single-Pixel Sensor view Sensor 1

CCP Register	00000001		
	~	Sample Rate	1 🜩 mSec
AFE register	1 - 1		
Sample Rate	0000000	Interrupt Output	Enabled - (1) V
FE Settings	00001001		
WUP register		Sync Mode	Master - (0) V
UHT Thr	1111111	Clk Output	Enabled - (1) V
ULT Thr	11111111		
LHT Thr	0000000	Low Pass Filter	180 Hz 🗸 🗸
LLT Thr	0000000	High Pass Filter	Disabled - (0) \sim
WT Thr	00010000	Low Power Mode	Disabled - (0) V
Settings	0000000		
		Apply	Cancel

Figure 10: AFE Cog Single-Pixel Sensor view Sensor 1

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CCP Register					
Channel 2 00000001	Sensor Evalua	ation Tool WUP Register Control- Sensor	1		
AFE register	Upper Hig	h Wake Threshold 255		10000	
Sample Rate 00000000	Upper Los	w Wake Threshold 255 ÷	Active Pixel Channel 0 - (000) V	18000	
FE Settings 00001001	Lower Hig	gh Wake Threshold 0 ≑	Dark Pixel Channel 0 - (000) V		
WUP register	Lower Low	w Wake Threshold 0	Sleep Mode Type One Channel (Active V		
UHT Thr 1111111	Wake	Up Time Threshold 16 🜩			
ULT Thr 1111111					
LUT The 0000000	: J	Apply	Go To Sleep		
		Cancel	Wake Up		
LLT Inr 0000000					
WT Thr 00010000		Apply A	And Close		
Settings 00000000				~	
				-18000	

Figure 11: WUP Cog Single-Pixel Sensor view Sensor 1

3.2 Saturation

Sometimes when the device is first started it will saturate for a time before it settles. This can take up to 10 seconds to stop. Typical saturation events are shown in Figure 12. If the sensors are uncovered, and the gain and transconductance setting are set to maximum, signal saturation due to air flow is likely.

	Sensor 1	Sensor 2	Sensor 3	Sensor 4	
Pyro Master Asic Status	CCP Register	CCP Register	CCP Register	CCP Register	
Connected	Channel 2 00000001	Channel 2 00000001	Channel 2 00000001	Channel 2 00000001	
Streaming	AFE register	AFE register	AFE register	AFE register	
Normal Power	Sample Rate 00000000	Sample Rate 00000000	Sample Rate 00000000		
Sleep Mode	FE Settings 00001001	FE Settings 00001101	FE Settings 00001101		
	WUP register	WUP register	WUP register There has	as been a saturation event on one of the sensors during the csv file recording	
lata Rate (Hz) : 1012	UHT Thr 11111111	UHT Thr 11111111	UHT Thr 11111111		
Sample Rate (ms) : 0.99	ULT Thr 11111111	ULT Thr 1111111	ULT The 11111111	Suppress future warnings?	
Asic Version : 00100001	LHT Thr 00000000	LHT Thy 00000000	LHT Thr 00000000		
Programming Mode Single Device	LLT Thr 00000000	LLT Thr 00000000	LLT Thr 00000000		
All Devices	WT Thr 00010000	WT Thr 00010000	WT Thr 00010000	Stop Capture OK	
Save/Load Settings	Settings 00000000	Settings 00000000	Settings 00000000		
Save					
Save Default	Apply	Apply	Apply	Apply	
Load	Scope - Sensor 1 Channel 2	Scope - Sensor 2 Channel 2	Scope - Sensor 3 Channel 2	Scope - Sensor 4 Channel 2	
	18000	18000	18000	18000	
	^	^	^	^	

Figure 12: Changing CCP Registers directly – Saturation and Warning message for CSV capture

If saturation occurs during a csv file writing operation (see insert above), a warning dialog is displayed. Click on the **Stop Capture** button to cancel the recording of data. The dialog also offers the option to suppress the saturation warning message in future.

When a saturation event occurs 'Saturation Occurred', is added to the file name and the saturated values are changed to 65535 in the appropriate data column. This ensures that the event is easy to identify when viewing files. It also allows any analysis to be easily accomplished without having to do any pre-processing of the data.

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3.3 Multiple Sensor Single-Pixel Views

The ezPyro[™] Evaluation Tool detects sensors when the device is connected to the PC and adjusts the display accordingly.

Note: Sensors must be connected in numerical order. For example, if you want to use two sensors ensure they are placed in positions 1 and 2.

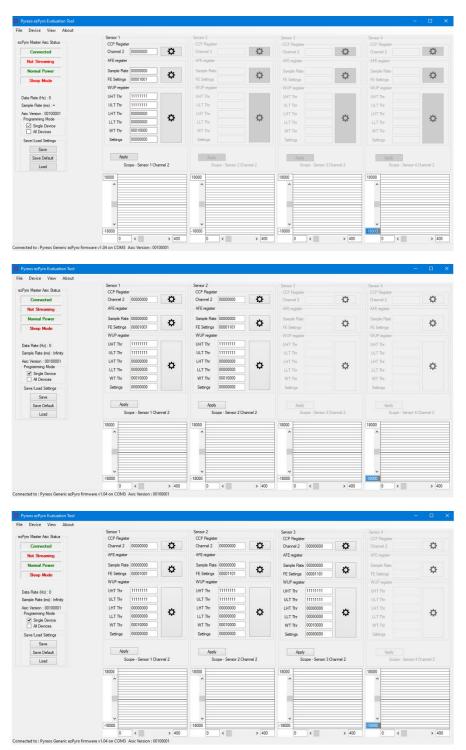


Figure 13: 1 (top), 2 (middle) and 3 (bottom) sensor single-pixel views

3.4 Programming Modes

By default, **Single Device** programming mode is selected. In this mode the settings for all sensors can be set independently. To apply the same register settings on all the devices, select the **All Devices** check box. In this mode, if the settings for any of the sensors are changed then the setting for all other sensors are also changed.

For example, clicking **Apply** for sensor 2, after making changes to sensor 2, will apply the changes to all the sensors. Clicking **Apply** for any of the other sensors will update all the sensors to the settings of that sensor, not the changed settings of sensor 2.

This does not apply to the master/slave bit, as only one sensor can be the master. Single device mode must be used to change the master to a different device.

Pyreos ezPyro Evaluation T	ool	D Py	reos ezPyr	o Evaluat	ion Tool
File Device View Abo	out	File	Device	View	About
ezPyro Master Asic Status		ezPy	ro Master A	sic Status	
Connected			Connec	ted	
Not Streaming			Not Strea	aming	
Normal Power			Normal P	ower	
Sleep Mode			Sleep N	lode	
Data Rate (Hz) : 0		Da	ta Rate (Hz	2):0	
Sample Rate (ms) : ∞		Sa	mple Rate ((ms) : ∞	
Asic Version : 00100001			ic Version :		I I
Programming Mode			rogramming	Mode	
Single Device				Device	
All Devices			All Dev	vices	
Save/Load Settings		S	ave/Load S	Settings	
Save			Sav	/e	
Save Default			Save D)efault	
Load			Loa	be	

Figure 14: Single Devices and All Devices programming modes

If one of the configuration cogs is clicked while **All Devices** mode is active, **Single Device** programming mode is set automatically. Apply changes to the configuration form (see page 8) as required. To apply these changes to all sensors, select **All Devices** and then click the **Apply** button for the sensor.

3.5 Saving and Loading Settings

Click on the **Save** button to save the current settings for all sensors. To restore settings saved previously, click on the **Load** button, and then browse to the required file.

4 Single 2x2 pixel view

When the software starts, it displays a set of registers for each connected device (up to four). With a 2x2 array sensor (a single device incorporating 4 pixels) connected, the Sensor Evaluation Tool initially displays only one set of registers, the same as when one single pixel device is connected.

To display registers for each channel in the array, select Single 2x2 Array Sensor View from the View menu.

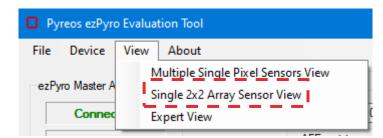


Figure 15: Single 2x2 Array Sensor View

In *Multiple Single-Pixel Sensors View*, the pixel is always attached to channel 2. In *Single 2x2 Array Sensor View*, *however*, the text above each scope states which channel is being displayed.

File Device View About	
Sensor 1 Sensor 1 CCP Register Connected AFE register Channel 1 0000000 CCP Register Normal Power Sample Rate (M2): 0 Sample Rate (H2): 0 ULT Thr ULT Thr ULT Thr Itilitititititititititititititititititit	Sensor 1 CCP Register Channel 4 00000000
Al Channels WT Thr 00010000 Save/Load Settings Settings 00000000 Save Apply Apply Load Scope - Sensor 1 Channel 1 Scope - Sensor 1 Channel 2	Scope - Sensor 1 Channel 4
0 < > 400 0 < > 400 0 < > 400	0 < > 400

Figure 16: Single 2x2 Array Sensor View in Single Channel programming mode

In this view, the available programming modes are **Single Channel** or **All Channels**. With **Single Channel** selected, the register boxes for channels 2, 3 and 4 are active allowing each channel's settings to be changed independently of the others.

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With **All Channels** selected, the register boxes for channels 2, 3 and 4 are greyed and disabled with the settings from Channel 1 applying to all channels. Click on the **Apply** button to confirm any changes to the register settings.

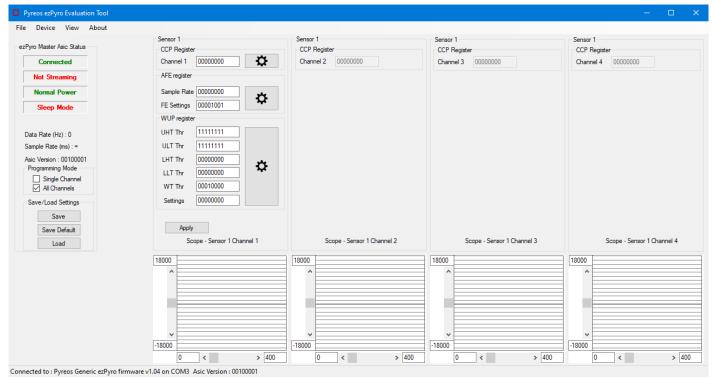


Figure 17: Single 2x2 Sensor View - All Channels programming mode

4.1 Register Control Settings

Click on the 'cog' adjacent to the CCP Register settings to display the Register Control dialog box. If **All Channels** mode was enabled, **Single Channel** programming mode is disabled, and the registers can now be programmed independently. In Single Channel programming mode, only Channel 2 settings are displayed, and these apply to all four sensors.

	Status	Feedback Cap.	High Pass Filter	Feedback Trans.
Channel 1 :	Enabled - (1) V	50 fF - (000)	✓ 1 Hz - (00) ✓	1.20 TOhm - (00) V
Channel 2 :	Enabled - (1) v	50 fF - (000)	✓ 1 Hz - (00) ✓	1.20 TOhm - (00) 🗸
Channel 3 :	Enabled - (1) v	50 fF - (000)	✓ 1 Hz - (00) ✓	1.20 TOhm - (00) 🗸
Channel 4 :	Enabled - (1) v	50 fF - (000)	✓ 1 Hz - (00) ✓	1.20 TOhm - (00) 🗸

Figure 18: Single 2x2 Sensor View - CCP Register Control dialog box

5 Expert View

For a more detailed view of the sensor and additional options select **Expert View** from the *View* menu.

Pyreos ezPyro Evaluation Tool							
File	Device	View	About				
ezPy	ro Master A		Aultiple Single Pixel Sensors View				
	Connec	E	xpert View				



Device View Abo	out			
Vito Master Asic Status Connected Streaming Normal Power Sleep Mode	ezPyro Asic Registers Channel Control Register Channel 1 00000001 Channel 2 00000001 Channel 3 00000001 Channel 4 00000001	Sleep Mode Register UHT Thr 11111111 ULT Thr 11111111 LHT Thr 00000000 WT Thr 00000000	ezPyro Asic Commands Go To Sleep Wake Up	Scope Settings ezPyro Devices Chart Control
ata Rate (Hz) : 1020 mmple Rate (ms) : 0.98 wic Version : 00100001 rogramming Mode	Apply Refresh Analogue FE Register Sample Rate 0000000 FE Settings 00001001 Apply Refresh	Settings 00000000 Apply Refresh		Scope View Mode
	-18000	> 400 0 <	> 400	-18000 0 < > 400 0 < > 400

Use **Expert View** to put the device into Sleep Mode, edit the scopes and assign device channels to them, and to control an emitter, if one is connected. The emitter controls are always displayed even if no emitter board is connected (there is no feedback from the board for the software to ascertain if a connection is present).

There are two tabs: *Scope Settings* and *ezPyro[™] Devices*.

5.1 Sleep Mode

Use the ezPyro[™] Evaluation Tool to put a device into Sleep Mode. However, the software does not allow the device to subsequently be forced to wake up. It is therefore important that the Sleep Mode WUP registers are manually set to values that allow a wake-up condition to be met before the device is put into Sleep Mode. Please refer to the sensor reference manual for details.

To put a device into Sleep Mode, click on the **Go To Sleep** button.

5.2 Wake Up Settings

For valid wake up settings, the UHT and ULT cannot be set to the same value, the LHT and LLT cannot be set to the same value, and the thresholds cannot be set to the maximum and minimum values. The WUT threshold must be set to at least the minimum number of samples.

	255						W	т	
Jpper High Wake Threshold	-	÷			18000		\rightarrow		
Upper Low Wake Threshold	180	-	Active Pixel Channel	Channel 2 - (010) 🗸	^				- UH
lower High Wake Threshold	80	\$	Dark Pixel Channel	Channel 0 - (000) 🗸					
Lower Low Wake Threshold	0	-					1	\wedge	
			Sleep ModeType	One Channel (Active 🗸			1	1	UL:
Wake Up Time Threshold	16	-					1		
							1		
	Apply		Go To	Sleep					
	0.1	_					1		
	Cancel		Wake	e Up			\backslash		LH
							~		
		Ap	ply And Close						
					×				← LLT
					-18000	0 <			> 400

Figure 21: Valid LHT, LLT, UHT and ULT settings

If these conditions are not met, the following warning message is displayed.

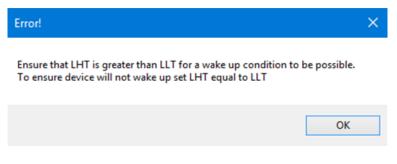


Figure 22: Wake up settings warning message



5.3 Scope Settings

Use the *Chart Control* settings to configure the X and Y scales and grid spacing on the four scopes. Select the channels to be displayed by the four scopes using the *Scope 1, Scope 2, Scope 3,* and *Scope 4* dropdown boxes.

Chart Control 18000 ↓ (-32766 to 32767) Maximum Value 18000 ↓ (-32767 to 32766) Time Range 400 ↓ (50 to 5000) Grid Spacing 1500 ↓ (apply Scaling) Scope View Mode ● ● ● Scope View Mode ● ● ● Scope 1 Device U1 - Channel 2 ▼ Scope 2 Scope 3 Device U1 - Channel 2 ▼ Scope 4 Device U1 - Channel 3 Device U2 - Channel 4 Device U2 - Channel 4 Device U2 - Channel 1 Device U2 - Channel 1 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 1	e Settings ezPyr	ro Devices		
Minimum Value 18000 ⊕ (-32767 to 32766) Time Range 400 ⊕ (50 to 5000) Grid Spacing 1500 ⊕ (50 to 5000) Grid Spacing 1500 ⊕ (50 to 5000) Scope View Mode ● ● Scope 1 Device U1 - Channel 2 ▼ Device U1 - Channel 3 Device U1 - Channel 4 Device U1 - Channel 4 Device U1 - Channel 4 Device U2 - Channel 4 Device U2 - Channel 4 Device U2 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4	Chart Control			
Time Range 400	Maximum Value	18000 🜲	(-32766 to 32767)	
Grid Spacing 1500 Apply Scaling Scope View Mode 	Minimum Value	-18000 🜲	(-32767 to 32766)	
Grid Spacing 1500 Apply Scaling Scope View Mode 	Time Range	400 🜲	(50 to 5000)	
Normal (show scrollbars) Full (hide scrollbars) Scope 1 Device U1 - Channel 2 V Device U1 - Channel 1 Device U1 - Channel 2 Device U1 - Channel 3 Device U1 - Channel 4 Device U1 - Channel 4 Device U2 - Channel 4 Device U3 - Channel 4 Device U4 - Channel 4 Device U4 - Channel 1	Grid Spacing			Apply Scaling
Normal (show scrollbars) Full (hide scrollbars) Scope 1 Device U1 - Channel 2 V Device U1 - Channel 1 Device U1 - Channel 2 Device U1 - Channel 3 Device U1 - Channel 4 Device U1 - Channel 4 Device U2 - Channel 4 Device U3 - Channel 4 Device U4 - Channel 4 Device U4 - Channel 1				
Scope 1 Device U1 - Otternel 2 ▼ Scope 2 Device U1 - Otternel 1 Device U1 - Otternel 2 Device U1 - Otternel 2 Device U1 - Otternel 2 Device U1 - Otternel 3 Device U2 - Otternel 1 Device U2 - Otternel 1 Device U2 - Otternel 3 Device U2 - Otternel 3 Device U3 - Otternel 3 Device U3 - Otternel 1 Device U3 - Otternel 3 Device U3 - Otternel 3 Device U3 - Otternel 4 Device U3 - Otternel 3 Device U3 - Otternel 4 Device U3 - Otternel 4 Device U3 - Otternel 4	Scope View Mod	le		
Scope 1 Device U1 - Otternel 2 ▼ Scope 2 Device U1 - Otternel 1 Device U1 - Otternel 2 Device U1 - Otternel 2 Device U1 - Otternel 2 Device U1 - Otternel 3 Device U2 - Otternel 1 Device U2 - Otternel 1 Device U2 - Otternel 3 Device U2 - Otternel 3 Device U3 - Otternel 3 Device U3 - Otternel 1 Device U3 - Otternel 3 Device U3 - Otternel 3 Device U3 - Otternel 4 Device U3 - Otternel 3 Device U3 - Otternel 4 Device U3 - Otternel 4 Device U3 - Otternel 4	Normal	(show scrollbars) O Full (bide scrr	llbars)
Scope 2 Device UI - Channel 1 Device UI - Channel 2 Scope 3 Device UI - Channel 3 Device UI - Channel 4 Device UI - Channel 4 Device UI - Channel 1 Device UI - Channel 4 Device UI - Channel 3 Device UI - Channel 4 Device UI - Channel 4 Device UI - Channel 4 Device UI - Channel 4 Device UI - Channel 4 Device UI - Channel 1 Device UI - Channel 4 Device UI - Channel 1 Device UI - Channel 1 Device UI - Channel 1 Device UI - Channel 1 Device UI - Channel 1 Device UI - Channel 1	0.10110		, 0.101 (100 0010	(Locito)
Scope 2 Device U1 - Ohannel 2 Device U1 - Ohannel 3 Device U1 - Ohannel 4 Device U2 - Ohannel 4 Device U2 - Ohannel 4 Device U2 - Ohannel 2 Device U2 - Ohannel 4 Device U3 - Ohannel 4 Device U3 - Ohannel 4 Device U3 - Ohannel 2 Device U3 - Ohannel 3 Device U3 - Ohannel 3 Device U3 - Ohannel 4 Device U3 - Ohannel 4 Device U3 - Ohannel 4 Device U3 - Ohannel 1 Device U3 - Oh				
Scope 3 Device U1 - Channel 4 Device U2 - Channel 1 Device U2 - Channel 2 Device U2 - Channel 3 Device U2 - Channel 4 Oevice U2 - Channel 4 Device U3 - Channel 1 Device U3 - Channel 1 Device U3 - Channel 3 Device U3 - Channel 3 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 1		Scope 1	Device U1 - Channel	2 🗸
Scope 4 Device U2 - Channel 2 Device U2 - Channel 3 Device U2 - Channel 4 Device U3 - Channel 1 Device U3 - Channel 1 Device U3 - Channel 3 Device U3 - Channel 3 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4 Device U3 - Channel 4			Device U1 - Channel	1
Device U2 - Channel 4 Device U3 - Channel 1 Device U3 - Channel 2 Device U3 - Channel 3 Device U3 - Channel 4 Device U4 - Channel 1		Scope 2	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel	1 2 3 4
Device U3 - Channel 1 Device U3 - Channel 2 Device U3 - Channel 3 Device U3 - Channel 3 Device U3 - Channel 4 Device U4 - Channel 1		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel	1 2 3 4 1 2
Device U3 - Channel 3 Device U3 - Channel 4 Device U4 - Channel 1		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel	2 3 4 1 2 3
Device U3 - Channel 4 Device U4 - Channel 1		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel	2 3 4 1 2 2 3 4
Device U4 - Channel 1		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U3 - Channel Device U3 - Channel	2 3 4 1 2 2 3 3 4 1 2 2 2
		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U3 - Channel Device U3 - Channel Device U3 - Channel	2 3 4 1 2 3 4 4 1 2 3 3 4 4 2 2 3
		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U3 - Channel Device U3 - Channel Device U3 - Channel Device U3 - Channel	
Device U4 - Channel 3		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U3 - Channel	2 3 4 1 2 3 4 1 2 3 4 4 1 2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4
Device U4 - Channel 4 Unassigned Scope		Scope 2 Scope 3	Device U1 - Channel Device U1 - Channel Device U1 - Channel Device U2 - Channel Device U2 - Channel Device U2 - Channel Device U3 - Channel Device U4 - Channel Device U4 - Channel	

Figure 23: Scope Settings showing the dropdown device list for Scope 1

5.4 Sensor Devices

This tab shows the Emitter Control settings. The graphic on the right-hand side shows which of the devices is currently active and editable on the tab. The active registers are shown in green. Click on another device (for example, U4) to update the tab with that device's register settings.

Scope Settings ezPyro Devices	Scope Settings ezPyro Devices
Emitter Control	Emitter Control
ezPyro Devices	ezPyro Devices
ON/OFF Emitter = Off	ON/OFF Emitter = Off
Frequency = 10.0000 Hz Apply U1 U2	Frequency = 10.0000 Hz Apply U1 U2
1 Emitter Period = 100 ms Apply	1 Emitter Period = 100 ms Apply
Duty Cycle Controls	Duty Cycle Controls
On time = 50 ms Apply	On time = 50 ms Apply
Off time = 50 ms Apply U3 U4	Off time = 50 ms Apply U3 U4
Off time = 50 ms Apply	
Duty cycle Percentage On Board Number Connected = 64	Duty cycle Percentage On Board Number Connected = 64
50.0000 % Apply	50.0000 % Apply

Figure 24: ezPyro[™] Devices tab in Single Device programming mode with U1 (left) and U4 (right) settings selected

By selecting the **All Devices** programming mode, all the sensor graphics are coloured green and the text boxes display the last individually selected device.



ON/OFF Emitter = Off	ezPyro Devices
Frequency = 10.0000 Hz Apply 1 Emitter Period = 100 ms Apply	U1 U2
Duty Cycle Controls On time = 50 ms Apply Off time = 50 ms Apply	U3 U4
1802 50.0000 7% Apply	ard Number Connected = 64

Figure 25: ezPyro[™] Devices tab – All Devices programming mode

5.5 Register Control in Expert View

	Status	Feedback Cap.	High Pass Filter	Feedback Trans.
Channel 1 :	Disabled - (0) 🗸	50 fF - (000) 🗸	1 Hz - (00) 👻	1.20 TOhm - (00) ¥
Channel 2 :	Enabled - (1) v	50 fF - (000) 🗸	1 Hz - (00) 👻	1.20 TOhm - (00) V
Channel 3 :	Disabled - (0) 🗸	50 fF - (000) 🗸	1 Hz - (00) 🖌	1.20 TOhm - (00) V
Channel 4 :	Disabled - (0) 🗸	50 fF - (000) 🗸	1 Hz → (00) 🖌	1.20 TOhm - (00) V

Figure 26: CCP Register- Detailed View

In Expert View, the Register Control dialog boxes (displayed by clicking on the 'cog' buttons) display descriptions of the registers in the same way, except for the CCP Register. This is because the single-pixel sensor view is designed for sensors with a single-pixel. Therefore, most of the CCP registers are not required. However, in Expert View no assumption is made about pixel numbers and the additional registers are displayed.



6 Saving Data to CSV file

To save data, select **Save to CSV** from the *File* menu.



Figure 27: Save to CSV

The Capture Data to CSV File dialog box is displayed.

Capture Data to CSV File	
Save As :	p
 Capture data Indefinitely Number of sample to capture 200 Capture time 2000 ms Suppress Saturation Warning Box 	Ok Cancel

Figure 28: Save to CSV clicked

Enter the full address path to which the file should be written or browse to the required folder. By default, files are saved to the *Pyreos* folder if it exists or *Documents* if it does not. The *Pyreos* folder is created automatically in the Documents folder the first time the user saves a configuration file.

Choose options for the way data is to be captured. The options are to:

- **Capture data indefinitely**: save data until **Stop CSV Capture** is selected from the *File* menu.
- **Number of Samples to capture**: save a specific number of samples according to the sampling rate set in CSV File Options.
- Capture time xxxx ms: record data for a set time interval (in milliseconds).

6.1 Data Sampling Rates

1. Choose **CSV File Options** from the *File* menu to set the timing interval for data sampling.

CSV File Writer Options			×
Use Timing Options	e period betwe	en data re	ecords
0 Time duration per record	d (Seconds)		
Apply			.:

Figure 29: CSV Options Clicked

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2. Select the Use Timing Options checkbox.

CSV File Writer Options	—		×
Use Timing Options Timing Options 0 0 0 Time Hours Minutes Seconds 0 Time duration per record	period betwe (Seconds)	en data re	ecords
Apply			

Figure 30: Enabling CSV Options

- 3. Input values for:
 - Time period between data records: the delay between consecutive data samples
 - Time duration per record (Seconds): the time of each record.

WARNING: The duration of each record cannot be greater than or equal to the delay between consecutive records.

CSV File Writer Options — 🗆	×	Time between records
Use Timing Options		
Timing Options		
0 30 V Time period between data reco Hours Minutes Seconds	rds	Duration of record
60 Time duration per record (Seconds)		
Apply		

Figure 31: Applying data sampling times

4. Click on the **Apply** button.

Invalid timing options result in a warning message being displayed. If this occurs, correct the settings, and reapply.

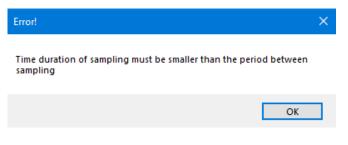


Figure 32: CSV Options error message

7 Saving and Loading Configuration Files

There are two options for saving the current settings in configuration files:

- Save: create and save the configuration in a text file in any location (Documents\Pyreos if unspecified).
- Save Default: as above, but also create or overwrite the default configuration file applied whenever the software initially connects to a device. This file has the name "default.txt' and is located in the Documents\Pyreos\ezPyro Evaluation Tool folder.

7.1 Saving Settings

To save the current set of register settings for future use:

1. Click on the **Save** button.

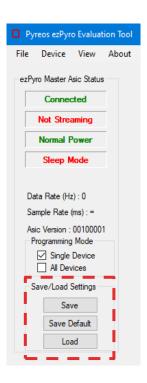


Figure 33: Save and Load buttons

2. A Save As dialog box is displayed. By default, files are saved in a folder called Pyreos in the Documents folder.

Save As		×
← → ~ ↑ G ≪ Users → User → Documents →	Pyreos > ezPyro Evaluation Tool	✓ Ŏ P Search ezPyro Evaluation Tool
Organise 🔻 New folder		iii • ()
This PC Name Desktop Cocuments	Date modified Type No items match your searc	Size ch.
Downloads Music Pictures		
Videos Ti31205500A (Ci) DVD RW Drive (C		
NODE_F303K8 (E gms (\\192.168.1 Company (\)192		
File name: Save as type: ".txt		
∧ Hide Folders		Save Cancel

Figure 34: Saving Settings

- 3. Enter a suitable file name for the settings. The settings file is saved as a text file (TXT extension).
- 4. Click on the **Save** button.

7.2 Saving the Default Configuration

Click on the **Save Default** button to update the default configuration used by the software. You are given the option to save the configuration under another filename as described in the previous section. When confirmed, a second version of the configuration is saved as "default.txt' in the *Documents\Pyreos\ezPyro Evaluation Tool* folder. If the file already exists, it is overwritten. The default configuration file is applied to a device whenever the software first connects to it.

7.3 Loading Settings

To apply a previously saved set of registry settings:

1. Click on the **Load** button

2. An *Open* dialog box is displayed.

	- Sensor 1-			Sensor 2		Sensor 3				Sensor 4		
Master Asic Status	Open Open			Jensor 2		Sensor 3						
Connected								0.0			00000000	\C
Streaming	← → × ↑	ers > User	Documents > Pyr	eos > ezPyro	Evaluation lool	Ŷ	- C	D Sear	rch ezPyro E	valuation Tool		
Normal Power	Organise 🔻 New folde	er								· 🔳 🕐		\$
Sleep Mode	 OneDrive 	Name	^		Date modified	Туре	Size					~
	💭 This PC	Config	gSettings.txt		29/06/2020 20:29	Text Document		2 KB			r	
a Rate (Hz) : 988	3D Objects											
ple Rate (ms) : 1.01	Desktop											
Version : 00100001 gramming Mode	🗄 Documents											- ‡
Single Channel	🖶 Downloads											
All Devices	Music											
ve/Load Settings	Pictures											
Save	Videos											
Save Default	TI31205500A (C:)										y cope - Sensor 4 (Channel 2
Load	NODE_F303K8 (E gms (\\192.168.1											
	Company (\\192											
	NODE F303K8 (E:) ¥											
	File na	ame: Config	Settings.txt				~	*.txt		\sim		
								Оре	n	Cancel		
	¥			× –		×					8	
	-18000			-18000		-18000				-18000		

Figure 35: Load Settings - Select File

- 3. Select the required settings file.
- 4. Click on the **Open** button. The register settings are applied to the currently active device(s).

Note: Configuration files are specific for the number of devices used: for example, a configuration file for 2 sensors will not work for 1, 3 or 4 sensors.

8 About

Click on **About** in the menu bar to display file and version information about the ezPyro Evaluation Tool software.



Figure 36: About Dialogue Box

9 Troubleshooting

9.1 No Kit Detected on the COM Ports

If no kit is detected on the COM port -

- Try rescanning the ports using the Rescan Ports options in the Devices dropdown menu.
- Try disconnecting the USB cable from the device and the PC and then reconnecting everything.
- Try disconnecting the USB cable from the device and the PC, close the Pyreos software. Reconnect the USB cable to the device and the PC and reopen the Pyreos software.

9.2 Signal Saturation

9.2.1 Continuous Saturation

If the signal remains saturated use the CCP and AFE register cogs to alter the gain, high pass filter, low pass filter, sample rate, and feedback trans. to the required levels so that the system gives clear, stable readings

9.2.2 Sporadic Saturation

If the readings are stable but suddenly saturate and then stabilise again, ensure that the environment around the kit is stable. Limit changes in temperature caused by air flow; drafts, air conditioning, etc. and sunlight.

9.3 I/O Exception

	×
System.IO.IOException: The I/O operation has been aborted because of either a thread exit or an application request.	
at System.IO.Ports.InternalResources.WinIOError(Int32 errorCode, String str) at System.IO.Ports.InternalResources.WinIOError() at System.IO.Ports.SerialStream.get_BytesToRead() at System.IO.Ports.SerialPort.get_BytesToRead() at Pyreos.PYDK_Asic_Arran_v01.processFrame() at Pyreos.Detector.runThread()	
ОК	

Figure 37: I/O Exception



If this warning appears check that the USB cable is undamaged and that it is connected properly.

A timeout warning also appears and the kit needs to be reconnected in the usual manner.

×	
Timeout since last status packet received	
ОК	

Figure 38: Timeout warning

If the problem persists replace the USB cable, ensuring that it can handle the transfer of both power and data.

9.4 Known 'Save To CSV' Bug

There is known bug when saving data from the ezPyro Evaluation Tool software.

The browse function allows the user to create a file in a specified folder.

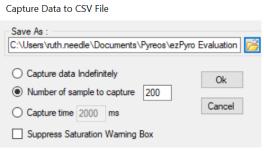


Figure 39: Browsed path to save csv file

However when ok is clicked the following exception appears.

rror: System.IO.DirectoryNotFoundException: Could not find a part of he path 'C:\Users\ruth.needle\Documents\Pyreos\ezPyro Evaluation
ool\'. at System.IOError.WinIOError(Int32 errorCode, String
naybeFullPath) at System.IO.FileStream.Init(String path, FileMode mode, FileAccess
ccess, Int32 rights, Boolean useRights, FileShare share, Int32
ufferSize, FileOptions options, SECURITY_ATTRIBUTES secAttrs, String sgPath, Boolean bFromProxy, Boolean useLongPath, Boolean
heckHost) at System.IO.FileStreamctor(String path, FileMode mode, FileAccess
ccess, FileShare share, Int32 bufferSize, FileOptions options, String
isgPath, Boolean bFromProxy, Boolean useLongPath, Boolean
heckHost)
at System.IO.StreamWriter.CreateFile(String path, Boolean append,
oolean checkHost)
at System.IO.StreamWriterctor(String path, Boolean append,
ncoding encoding, Int32 bufferSize, Boolean checkHost)
at System.IO.StreamWriterctor(String path, Boolean append)
at Pyreos.CSVFileWriterctor(String fileName) at Pyreos.CSVFileWriterctor(String fileName, String coloumTitles)
at Pyreos.csvriewiter.ccolstring inevalie, string coodin ites) at Pyreos.ezPyro_Evaluation_Tool.saveToCSV(Int32 noSamples)
,
ОК

Figure 40: Directory Not Found Exception

At present the work around is to enter the file name directly in to the dialogue box. To save as a CSV file add .csv at the end of the file name, if this is omitted then the file is saved as a FILE and has to be converted to .csv later.

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Capture Data to CSV File	
Save As : name_of_file.csv	õ
 Capture data Indefinitely Number of sample to capture 200 Capture time 2000 ms Suppress Saturation Warning Box 	Ok Cancel

Figure 41: Direct save to csv file naming

This saves the file to the Pyreos\ezPyro Evaluation Tool folder that is automatically created in the Documents folder of the connected PC as part of the 'Save to CSV' process.

10 Further Information and Support

The Pyreos website has a list resources available to help our customers

https://pyreos.com/resource-centre

If you encounter any difficulties with the kit, please contact Pyreos Support

E-mail: support@pyreos.com

11 List of Abbreviations

AFE	Analog Front End
ССР	Channel Control Packet
CSV	Comma Separated Values
HPF	High Pass Filter
LHT	Lower High Threshold
LLT	Lower Low Threshold
LPF	Low Pass Filter
WT	Wake-up Time Threshold
WUP	Wake-Up Packet
UHT	Upper High Threshold
ULT	Upper Low Threshold