

1300 Henley Court Pullman, WA 99163 509.334.6306 www.digilentinc.com

PmodJSTK2[™] Reference Manual

Revised July 19, 2016 This manual applies to the PmodJSTK2 rev. C

Overview

The Digilent PmodJSTK2 (Revision C) is a versatile user input device that can be easily incorporated into a wide variety of projects. With a two-axis joystick on a center button, a trigger button, and a programmable RGB LED capable of 24-bit color.



The PmodJSTK2.

Features include:

- Factory Calibrated Two Axis Resistive Joystick
- Center Joystick Button
- Trigger Style Push Button
- 24-bit RGB LED
- 6-pin Pmod connector with SPI interface
- Library and example code available in resource center

1 Functional Descriptions

The PmodJSTK2 utilizes two potentiometers oriented orthogonally to one another and are manipulated by moving the joystick in the X and Y directions. As the joystick moves, the voltage output at the sweep pin of each potentiometer changes and is measured by the 10-bit ADC present on the embedded PIC16F1618 microcontroller. The raw measured data is stored at a rate of 100 Hz as a 16-bit right-justified variable in RAM with the upper 6 bits masked with zeros.

Additionally, each successive measurement also produces two 8-bit values representative of the joysticks physical location with respect to each axis. Note that if inversion of either of the 8-bit position axis are set, the values will not change until the data has been re-collected by the PIC16 at the 100 Hz rate.

DOC#: 502-330



2 Specifications

Parameter	Min	Typical ¹	Max	Units
Recommended Operating Voltage	3.1	3.3	3.5	V
Maximum Supply Voltage	-	-	5.5	V
Power Supply Current ²	-	4.85	-	mA
Power Supply Current ³	-	17.6	-	mA
Parameter		Value		Units
Maximum Joystick Angle		25		Degrees
Communication Protocol		SPI		

Note¹: Data in the Typical Column uses V_{cc} at 3.3V unless otherwise noted Note²: Normal operation with the RGB LED Off and no buttons pressed Note³: Normal operation with the RGB LED set to white and both buttons pressed

3 Interfacing with the Pmod

The PmodJSTK2 communicates with the host board via the SPI protocol. With the PmodJSTK2, there are two types of data packet protocols: the standard data packet of 5 bytes and an extended data packet with 6 or 7 bytes in total. With the standard 5 byte protocol, users may use the old code from the PmodJSTK without any syntax errors. The 5 byte packet structure is provided in the image below:

		Byte 1		E	Byte 2	Byte	3		Byte 4		Byte 5		
MOSI	(COMMAND/)	PARAM	11 / DUMMY	PARAM2 / [YMMUC	PA	RAM3 / DUMI	MY	PARAM4 / DUMMY		
MISO	sr	mpX (Low Byt	e)	smpX	(High Byte)	smpY (Low	v Byte)	sn	npY (High Byt	e)	fsE	3uttons	
		Bit 7		Bit 6	Bit 5	Bit 4	Bit 3		Bit 2	В	Bit 1	Bit 0	
fsButto	ons	EXTPKT		0	0	0	0		0	TRIC	GGER	JOYSTICK	
		EXTPKT: Ex 1 = additiona 0 = standard	ten dat I dat resp	led Packe ta corresp conse pae	et Status Bit conding to the cket, no additi	command by onal data folk	te is avai ows this b	lable oyte	and may be	retriev	ved after	this byte	
		TRIGGER: 1 1 = trigger bu 0 = trigger bu	rigg utton utton	er Button is currer is not be	Status Bit tly pressed ing pressed								

JOYSTICK: Joystick Center Button Status Bit

1 = joystick center button is currently pressed

0 = joystick center button is not being pressed

As noted in the standard data packet structure, users may either send a zero and a series of 4 dummy bytes to receive the standard 5 bytes of data or they may send a single command byte with up to 4 parameters in the four following bytes to set the internal values such as the joystick calibration or on-board RGB LED.

The extended data protocol allows for additional data to be obtained from the device during a communication session after the standard 5 bytes of information such as normalized 8-bit positional data for each axis. Users may also obtain the current calibration values and the status of the module through this method.



	Byte 1		Byte 2	Byte 3		Byte 4	Ву	te 5	Byte 6
MOSI	cmdGetStatu	is D	UMMY	DUMMY		DUMMY	DU	MMY	DUMMY
MISO	smpX (Low By	rte) smpX	(High Byte)	smpY (Low Byte)	smp	Y (High Byte) fsBi	uttons	fsStatus
	Bit 7	Bit 6	Bit 5	Bit 4	B	Bit 3	Bit 2	Bit 1	Bit 0
s Statu s	CALIBRATING	LASTCAL	LASTFW	S LASTFRS		-	-	INVX	INVY
Initial Value	0	0	0	1		0	0	0	0
Bit 7	CALIBRATING 1 = calibration	3: Calibration procedure is	Status Bit ⁽¹⁾ currently exec	uting	Bit 4	LASTFR: 1 = last fl	S: Flash Rea ash read wa	id Success Bit s successful	(4)
Bit 6	0 = calibration LASTCAL: Ca 1 = last calibra 0 = last calibra	is not taking libration Succ tion procedur tion procedur	olace ess Bit ⁽²⁾ e was success e failed	ful	Bit 3 Bit 2 Bit 1	0 = last fl Unimpler Unimpler INVX: Joy	ash read fail mented: Rea mented: Rea ystick X-Axis	ed ad as '0' ad as '0' Position Inver	sion Enable Bit
Bit 5	LASTFWS: Fla 1 = last flash w 0 = last flash w	ash Write Suc rrite was succ rrite failed	cess Bit ⁽³⁾ essful		Bit 0	0 = joystic 0 = joystic INVY: Joy 1 = joystic 0 = joystic	ck x-axis pos ck x-axis pos ystick Y-Axis ck y-axis pos ck y-axis pos	ition inversion Position Inver ition inversion ition inversion	is enabled is disabled sion Enable Bit is enabled is disabled

1: This bit is set immediately after receiving a Calibrate command. It will remain set until the calibration procedure completes.

3: This bit is set or cleared immediately after a flash write attempt is performed. It will always be cleared at initial power on.

 This bit is set or cleared immediately after a calibration procedure completes.

4: This bit is set or cleared immediately after a flash read attempt is performed. This bit will be set at initial power on, provided that the calibration constants were successfully read from the high endurance flash.

3.1 SPI Timing Requirements

The embedded PIC16F1618 requires certain SPI timing requirements in order for successful communication to occur. When the Chip Select line is brought low, users must wait at least 15 μ S before sending the first byte of data. An interbyte delay of at least 10 μ S is required when transferring multiple bytes. When the Chip Select line is brought high after the last byte has been transferred, at least 25 μ S is required before users may bring the Chip Select line low again to initiate another communication session.

3.2 Calibrating the Module

The PmodJSTK2 has a set of factory loaded calibration values that are used to calculate the 8-bit position values for each axis. Users may enter calibration mode to recalculate all of those values by rotating the joystick around so the embedded PIC16 can record all of the maximum and minimum samples for the two axes. The on-board blue LED will be flashing to indicate that the calibration sequence is taking place. When the embedded microcontroller detects that the joystick has not changed for an entire second, allowing the microcontroller to presume that the most recent set of measurements correspond to the joystick's center position, the blue LED will stop flashing and the green LED will flash twice to indicate that the calibration procedure was successful. However, if 10 seconds pass without the PIC16 detecting the center position, the blue LED will stop flashing and the red LED will flash twice indication procedure was not successful.

Once the Chip Select pin goes high after the calibration command has been processed, the PmodJSTK2 will not accept any new commands during the calibration procedure. Users may still poll the status register to determine the current status of the device during this time.

3.3 Using the High-endurance Flash

The PmodJSTK2 has a set of factory loaded calibration values that are used to calculate the 8-bit position values for each axis. Users may enter calibration mode to recalculate all of those values by rotating the joystick around so the embedded PIC16 can record all of the maximum and minimum samples for the two axes. The on-board blue LED will be flashing to indicate that the calibration sequence is taking place. When the embedded microcontroller detects that the joystick has not changed for an entire second, allowing the microcontroller to presume that the most recent set of measurements correspond to the joystick's center position, the blue LED will stop flashing and the green LED will flash twice to indicate that the calibration procedure was successful. However, if 10 seconds pass without the PIC16 detecting the center position, the blue LED will stop flashing and the red LED will flash twice indication procedure was not successful.

Once the Chip Select pin goes high after the calibration command has been processed, the PmodJSTK2 will not accept any new commands during the calibration procedure. Users may still poll the status register to determine the current status of the device during this time.

3.4 Command Summary

3.4.1 Get Commands

		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdGetPosition	(0xC0)	1	1	0	0	0	0	0	0
Parameters									
None									

Get the 8-bit position variables corresponding to the location of the Joystick's X and Y axis. The X position is transferred to the master following the byte containing the button state. The Y position is transferred to the master immediately following the X position.

		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
cmdGetStatus	(0xF0)	1	1	1	1	0	0	0	0	
Parameters										

None

Get a copy of the device's status register. The 8-bit status register is transferred to the master following the byte containing the button state.

		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdGetFirmwareVer	(0xF1)	1	1	1	1	0	0	0	1
Parameters									

None

Get a copy of the device's firmware version. The low byte of the firmware version is transferred to the master following the byte containing the button state. The high byte is transferred to the master immediately following the low byte.

		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdGetCalXMin	(0xE0)	1	1	1	0	0	0	0	0
Parameters									
None									
Cot a convoftho smo	VMin colibrativ	on constant	Tho low b	uto of the c	olibration o	onctant ic t	rans for rod	to the meet	or

Get a copy of the smpXMin calibration constant. The low byte of the calibration constant is transferred to the master following the byte containing the button state. The high byte is transferred to the master immediately following the low byte.

		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdGetCalXMax	(0xE1)	1	1	1	0	0	0	0	1
_	-							-	

Parameters

None

Get a copy of the smpXMax calibration constant. The low byte of the calibration constant is transferred to the master following the byte containing the button state. The high byte is transferred to the master immediately following the low byte.

3.4.2 Set Commands

	_	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetLed	(0x80)	1	0	0	0	0	0	IGNORED	LEDST
Parameters	_	LEDST: G	reen LED (DN/OFF Sta	ate				
None		1 = turn LE 0 = turn LE	D on D off						
		IGNORED	the state	of this bit h	as ignored				
Turn the Green LED on o	r off. The R	ed and Gre	en LEDs a	re both set	to the off s	tate.			
	r	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetLedRGB	(0x84)	1	0	0	0	0	1	0	0
Parameters PARAM1 – Red LED PARAM2 – Green LI PARAM3 – Blue LED PARAM4 – ignored Set the duty cycles for the) duty cycle ED duty cycl) duty cycle Red, Gree	e cle e en and Blue	e I FDs						
		n, and bra	S LLDJ.						
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetInversion	(0x88)	1	0	0	0	1	0	INVX	INVY
Parameters		1 = enable	stick X-Axis iovstick x-	Position Ir	version En	able Bit			
None		0 = disable	joystick x-	axis positio	n inversion				
Enable inversion of the 8-	bit position	1 = enable 0 = disable value corre	stick Y-Axis joystick y- joystick y- esponding t	axis position in axis positio axis positio to the X and	n inversion En n inversion n inversion d/or Y axis (able Bit of the Joyst	ick.		
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetCalXMin	(0xA8)	1	0	1	0	1	0	0	0
Parameters PARAM1 – smpXM PARAM2 – smpXM PARAM3 – ignored PARAM4 – ignored Set the smpXMin calibrat If the specified value fails	in (Low By in (High By tion constants to meet th	te) ⁄te) nt. Please r iis requirem	note that the ent then sr	e value spe npXMin wil	cified for sr I not be upc	np XM in mu lated.	st be less t	han smpXC	enterMin.
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetCalXMax	(0xA9)	1	0	1	0	1	0	0	1
Parameters				1			1		
PARAM1 – smpXM PARAM2 – smpXM PARAM3 – ignored PARAM4 – ignored Set the smpXMax calibra smpXCenterMax. If the s	ax (Low By ax (High B ation consta pecified va	yte) yte) ant. Please lue fails to r	note that th meet this re	ie value spe equirem ent	ecified for s then smpXI	mpXMax m Max will no	ust be grea t be update	ater than :d.	
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetCalYMin	(0xAA)	1	0	1	0	1	0	1	0
Parameters PARAM1 – smpYM PARAM2 – smpYM PARAM3 – ignored PARAM4 – ignored	in (Low By in (High By	te) ⁄te)							

Set the smpYMin calibration constant. Please note that the value specified for smpYMin must be less than smpYCenterMin. If the specified value fails to meet this requirement then smpYMin will not be updated.



$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$										
Emission UKAB j 0 1 0 1 0 1 0 1 0 1 1 1 Parameters PARAM1 - smpYMax (Low Byte) PARAM3 - ignored PARAM4 - ignored PARAM4 - ignored Set the smyYMax calibration constant. Please note that the value specified for smpYMax must be greater than smpYCenterMax. If the specified value fails to meet this requirement then smpYMax will not be updated. Bit 1 Bit 0 1 0 1 0 0 PARAM3 Set the smyYMax calibration constant. Please note that the value specified for smpYMax will not be updated. Bit 1 Bit 0 0 PARAM4 - ignored Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 <td< td=""><td></td><th>(0A.D)</th><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></td<>		(0A.D)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PARAM1 - smpYMax (Low Byte) PARAM1 - smpYMax (High Byte) PARAM3 - ignored Set the smpYMax calibration constant. Please note that the value specified for smpYMax must be greater than smpYCenterMax. If the specified value fails to meet this requirement then smpYMax will not be updated. cmdSetCalXCenMin (0xAC) 1 0 1 1 0 0 Parameters PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored	cmd SetCal Y Max	(UXAB)	1	U	1	0	1	U	1	1
Image: CondSetCalXCenMin (DxAC) Image: Display="block">Image: Display="block">Image: Display="block">Image: Display="block">Image: Display="block" Image: Display="block">Display="block" Image: Display="block">Display="block" Image: Display="block">Display="block" Image: Display="block">Display="block" Image: Display="block" I	PARAM1 – sm pYM PARAM2 – sm pYM PARAM3 – ignored PARAM4 – ignored Set the smpYMax calibra smpYCenterMax. If the s	lax (Low By lax (High By l ation consta specified val	te) /te) nt. Please i ue fails to r	note that the	e value spe quirem ent f	ecified for si then smpYI	mpYMax m Max will no	ust be grea t be update	ater than d.	
cmdSetCalXCenMin (0xAC) 1 0 1 0 1 0 0 Parameters PARAM1 - smpXCenterMin (Low Byte) PARAM2 - smpXCenterMin (High Byte) PARAM3 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored PARAM4 - ignored Set the smpXCenterMin calibration constant. Please note that the value specified for smpXCenterMin must be greater than smpXMin and less than smpXCenterMax. If the specified value fails to meet these requirements then smpXCenterMin will not be updated. cmdSetCalXCenMax (0xAD) 1 0 1 0 1 0 1 Parameters PARAM1 - smpXCenterMax (Low Byte) PARAM2 - smpXCenterMax (Byte) PARAM3 - ignored 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 1<			Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Parameters	cmdSetCalXCenMin	(0xAC)	1	0	1	0	1	1	0	0
PARAM1 - smpXCenterMin (Low Byte) PARAM2 - smpxCenterMin (High Byte) PARAM4 - ignored PARAM4 - ignored Set the smpXCenterMin calibration constant. Please note that the value specified for smpXCenterMin must be greater than smpXCenterMax. If the specified value fails to meet these requirements then smpXCenterMin will not be updated. cmdSetCalXCenMax (0xAD) 1 0 1 0 1 Parameters PARAM1 - smpXCenterMax (Low Byte) PARAM2 - smpXCenterMax (Ligh Byte) PARAM3 - ignored PARAM4 - signored PARAM4 - signored PARAM4 - ignored PARAM4 - ignored Set the smpXCenterMax calibration constant. Please note that the value specified for smpXCenterMax must be greater than smpXCenterMax calibration constant. Please note that the value specified for smpXCenterMax must be greater than smpXCenterMax calibration constant. Please note that the value specified for smpXCenterMax will not be updated. cmdSetCalYCenMin (0xAE) 1 0 1 1 0 Parameters PARAM1 - smpYCenterMin (Low Byte) 1 0 1 1 0 Parameters PARAM1 - smpYCenterMin (Low Byte) 1 0 1 1 0 PARAM2 - smpYCenterMin (UxAE) 1 0 1 1 1 0 </td <td>Parameters</td> <th>-</th> <td></td> <td></td> <td>I</td> <td>I</td> <td>1</td> <td>1</td> <td>1</td> <td></td>	Parameters	-			I	I	1	1	1	
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Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 Parameters PARAM3 – ignored PARAM4 – ignored Set the smpXCenterMax calibration constant. Please note that the value specified for smpXCenterMax must be greater than smpXCenterMin and less than smpXMax. If the specified value fails to meet these requirements then smpXCenterMax will not be updated. Emit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 CmdSetCalYCenMin (0xAE) PARAM1 – smpYCenterMin (Low Byte) PARAM1 – smpYCenterMin (Low Byte) PARAM4 – ignored	cmdSetCalXCenMax	(0xAD)	1	0	1	0	1	1	0	1
Bit 7Bit 6Bit 5Bit 4Bit 3Bit 2Bit 1Bit 0cmdSetCalYCenMin(0xAE)10101110ParametersPARAM1 - smpYCenterMin (Low Byte)PARAM2 - smpYCenterMin (High Byte)PARAM3 - ignoredPARAM4 - ignoredSet the smpYCenterMin calibration constant. Please note that the value specified for smpYCenterMin must be greater thansmpYM in and less than smpYCenterMax. If the specified value fails to meet these requirements then smpYCenterMin will not be updated.Bit 7Bit 6Bit 5Bit 4Bit 3Bit 2Bit 1Bit 0cmdSetCalYCenMax(0xAF)101011111	Parameters PARAM1 – sm pXC PARAM2 – sm pXC PARAM3 – ignored PARAM4 – ignored Set the smpXCenterMax smpXCenterMin and less not be updated.	enterMax (I enterMax (I calibration s than smpX	Low Byte) High Byte) constant. F (Max. If the	Please note specified v	that the va alue fails to	lue specifie o meet thes	d for smpX e requirem	CenterMax ents then s	must be gi mpXCente	eater than Max will
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cmdSetCalYCenMin (0xAE) 1 0 1 0 1 1 1 0 Parameters PARAM1 – smpYCenterMin (Low Byte) PARAM2 – smpYCenterMin (High Byte) PARAM3 – ignored PARAM4 – ignored Set the smpYCenterMin calibration constant. Please note that the value specified for smpYCenterMin must be greater than smpYM in and less than smpYCenterMax. If the specified value fails to meet these requirements then smpYCenterMin will not be updated. Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 cmdSetCalYCenMax (0xAF) 1 0 1 0 1 1 1 1			Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Parameters PARAM1 - smpYCenterMin (Low Byte) PARAM2 - smpYCenterMin (High Byte) PARAM3 - ignored PARAM4 - ignored Set the smpYCenterMin calibration constant. Please note that the value specified for smpYCenterMin must be greater than smpYM in and less than smpYCenterMax. If the specified value fails to meet these requirements then smpYCenterMin will not be updated. Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 cmdSetCalYCenMax (0xAF) 1 0 1 1 1 1	cmdSetCalYCenMin	(0xAE)	1	0	1	0	1	1	1	0
Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 cmdSetCalYCenMax (0xAF) 1 0 1 0 1 1 1 1	Parameters PARAM1 – smpYC PARAM2 – smpYC PARAM3 – ignore PARAM4 – ignore Set the smpYCenterMin smpYM in and less than not be updated.	CenterMin (L CenterMin (F d calibration smpYCente	ow Byte) High Byte) constant. P rMax. If the	lease note ∋ specified \	that the val value fails to	ue specified o meet thes	d for smpY(e requirem	CenterMin n ents then s	nust be grea mpYCenter	ater than Min will
cmdSetCalYCenMax (0xAF) 1 0 1 0 1 1 1 1			Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	cmdSetCalYCenMax	(0xAF)	1	0	1	0	1	1	1	1

Parameters

PARAM1 – smpYCenterMax (Low Byte) PARAM2 – smpYCenterMax (High Byte) PARAM3 – ignored PARAM4 – ignored

Set the smpYCenterMax calibration constant. Please note that the value specified for smpYCenterMax must be greater than smpYCenterMin and less than smpYMax. If the specified value fails to meet these requirements then smpYCenterMax will not be updated.



		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetCalXMinMax	(0xB0)	1	0	1	1	0	0	0	0
Parameters									

Parameters

PARAM1 - smpXMin (Low Byte) PARAM2 - smpXMin (High Byte) PARAM3 - smpXMax (Low Byte) PARAM4 - smpXMax (High Byte)

Set the smpXMin and smpXMax calibration constants. Please note that the value specified for smpXMin must be less than smpXCenterMin and the value specified for smpXMax must be greater than smpXCenterMax. If either of the specified values fail to meet the above requirements then smpXMin and smpXM ax will not be updated.

		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetCalYMinMax	(0xB1)	1	0	1	1	0	0	0	1

Parameters

PARAM1 - smpYMin (Low Byte) PARAM2 - smpYMin (High Byte) PARAM3 - smpYMax (Low Byte)

PARAM4 - smpYMax (High Byte)

Set the smpYMin and smpYMax calibration constants. Please note that the value specified for smpYMin must be less than smpYCenterMin and the value specified for smpYMax must be greater than smpYCenterMax. If either of the specified values fail to meet the above requirements then smpYMin and smpYMax will not be updated.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdSetCalXCenMinMax (0xB2)	1	0	1	1	0	0	1	0

Parameters

PARAM1 - smpXCenterMin (Low Byte)

PARAM2 - smpXCenterMin (High Byte)

PARAM3 - smpXCenterMax (Low Byte)

PARAM4 - smpXCenterMax (High Byte)

Set the smpXCenterMin and smpXCenterMax calibration constants. Please note that the value specified for smpXCenterMin must be greater than smpXMin and the value specified for smpXCenterMax must be less than smpXMax. Additionally, the value specified for smpXCenterMin must be less than the value specified for smpXCenterMax. If any of the specified values fail to meet the above requirements then smpXCenterMin and smpXCenterMax will not be updated.

3.4.3 Other Commands

	_	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdCalibrate	(0xA4)	1	0	1	0	0	1	0	0
Parameters									
None									
Enter Joystick calibration mode.									
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdWriteFlash	(0xB8)	1	0	1	1	1	0	0	0
Parameters									
None									
Write the calibration constants from RAM to High Endurance Flash.									
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
cmdRldFromFlash	(0xBC)	1	0	1	1	1	1	0	0
Parameters									
None									

Read the calibration constants from High Endurance Flash and load them into RAM.

4 Pinout Description Table

A pinout table of the PmodJSTK2 is provided below.

Pin	Signal	Description
1	CS	Chip Select
2	MOSI	Master-Out-Slave-In
3	MISO	Master-In-Slave-Out
4	SCK	Serial Clock
5	GND	Power Supply Ground
6	VCC	Power Supply (3.3V/5V)

Although users are welcome to create their own interface code for the PmodJSTK2 if they so desire, preconstructed libraries that provide functions for initializing the module, reading in values, and adjusting calibration values exist. They are available on the PmodJSTK2 <u>example code page</u>.

Any external power applied to the PmodJSTK2 must be within 2.95V and 5.5V; however, it is recommended that Pmod is operated at 3.3V.

5 Physical Dimensions

The pins on the pin header are spaced 100 mil apart. The PCB is 1.875 inches long on the sides parallel to the pins on the pin header, 0.9375-inch-long on the sides perpendicular to the pin header, and 1.75 inches tall. With the 3-D printed housing the module is 1.875 inches long on the sides parallel to the pins on the pin header, 1.125 inches long on the sides perpendicular to the pin header, and 1.75 inches tall.