

ROHM Sensor Shieldの使い方

May 27, 2016 Sensor Application G

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センサーボードラインナップ



No.	Sensor	Type Name
1	Accelerometer	KX022-1020
2	Pressure sensor	BM1383GLV
3	Magnetic sensor	BM1422GMV
4	ALS/PS sensor	RPR-0521RS
5	Color sensor	BH1745NUC
6	Hall sensor	BD7411G
7	Temperature sensor	BD1020HFV
8	UV sensor	ML8511A

ROHM Sensor Shield



- Arduino Unoとセンサを接続するための基板
- Size: 88mm x 63mm
- I2C接続センサ 5つ, Analog接続センサ2つ
 , GPIO接続センサ1つ接続可能

電圧切り替え

- 5V-3.0/1.8V レベルシフタ搭載
 - GPIO : FAIRCHILD FXMA108
 - I2C : NXP PCA9306
- I2Cプルアップレジスタ実装済み



各センサ基板の機能

- I/F端子、電源/GND端子をスルーホールで出す
- 基板の大きさは20mm x 20mm
- 基板裏にROHMロゴ
- 基板の色は黒色
- I2Cデバイスでアドレス選択端子があるものはパターンカットとはんだで切り替えられるようにする
 - KX022-1020, BM1422GMV, BH1745NUC
- ・ 基板の端にM3サイズの穴







ADDR

VDD

デフォルト



1. ArduinoとSensorShieldの接続

AAAAAAAAA BIIIIIIIIIIIIIIIIIII

.....

USB コネクタ

2. SensorShieldに接続する基板選択

• 例としてBM1383GLVをI2C_1に接続

....

3. SensorShieldの電圧設定

• 1.8V



4. PCとArduinoをUSBケーブルで接続

- 5. Arduino用のプログラムをArduino IDEをインストールしたlibrariesへコピー
 - 動作確認環境 Arduino 1.6.7以降
 - Arduino IDEはhttp://www.arduino.cc/からダウンロードしたものをご使用ください。
- 6. Arduino IDEの起動



- 7. プログラムの選択
 - File->Examples->BM1383GLV-> example->BM1383GLV



ROHM

 ToolsのBoard部分 を"Arduino/Genuino Uno", Port部分 を"COMxx(Arduino/Genuino Uno)"に変更。COM Portの番号は 環境によって異なります。



ROHII



9. Uploadボタンでプログラムの書き込み



10.プログラムが正常にUploadできたか確認。赤枠部分のメッセージが"Done uploading"になっていることを確認。

💿 BM1383GLV	Arduino 1.6.7		x
Eile Edit Sketch	Iools Help		
OO DE	10	E	
BM1383GLV		5	2
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File Edit Sketch To	ools Help		1			
OO DE	Auto Format	Ctrl+T	1			
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BM1383GLV	Fix Encoding & Reload					
/************	Serial Monitor	Ctrl+Shift+M				
EM1383GLV. ino	Serial Plotter	Ctrl+Shift+L	I			
Copyright (c) 20	Board: "Arduino/Genuino I	Uno"	ľ			
Permission is he	Port: "COM16 (Arduino/Genuino Uno)"					
of this software	Programmer: "AVRISP mkII"					
to use, copy, so	Burn Bootloader					
The above copyright all copies or subst THE SOFTHWRE IS PRI IMPLIED, INCLUDING FITNESS FOR A PART	L notice and this permission tantial portions of the Softw DVIDED "AS IS", WITHOUT WARFA BUT NOT LIMITED TO THE WARFA LOULAR PURPOSE AND NONINFRING	notice shall be included in mre. WITY OF ANY KIND, EXPRESS OR WITIES OF MERCHANTABILITY. EMENT, IN NO EVENT SHALL THE .				
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C	m	,				
		Arduins/Genuino Uno on COM16				

11.Tools->Serial Monitorを選択



00 BM1383GLV Arduino 1.6.7	- • ×	COM16 (Arduino/Genuino Uno)	
File Edit Sketch Tools Help			Send
	2	DM1303GL ID Register Value = 0x31	* .
BM1383GLV		EM1383CLV (PRESS) = 1013.13 [hPa]	
/	*****	BW1883GLV (PRESS) = 1013.18 [hPa]	
EM138SELV.ino		DW1000GLV (PRESS) = 1010.17 [hPa]	16
Copyright (c) 2016 ROHM Co.,Ltd.		EW1003GLV (PRESS) = 1013.20 [NPA]	
Permission is hereby granted, free of charge, to any person of	obtaining a copy		
of this software and associated documentation files (the "So in the Software without restriction, including without limit;	(teare"), to dee ation the rights	DM10036LY (PRESS) + 1013.13 [PPA]	
to use, copy, modify, merge, publish, distribute, sublicense.	. and/or sell	BW1383CLY (PRESS) = 1013.18 [hPo]	
copies of the Software, and to permit persons to whom the Sof furnished to do so, subject to the following conditions:	itware is	8M1883GLY (PRESS) = 1013.18 [hPa]	
The above coveright police and this permission relice shall I	he included in	BW18830LV (PRESS) = 1013.17 [hPa]	
all copies or substantial portions of the Software.		PW1989/3 V (PPP99) = 1019 18 D-P+1	
THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIN	ND, EXPRESS OR		
IMPLIED. INCLUDING BUT NOT LIMITED TO THE WARANTIES OF MERCI ETTHESS FOR A PARTICULAR PREPARE AND MUNICEDINGSMENT. IN NO.	HANTABILITY.	BW1383GLV (PRESS) = 1013.13 [hPa]	
*	internet inter	DW1003GLV (PRESS) = 1019.21 [hPa]	
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		EW1888GLY (PRESS) = 1018.18 [hPa]	
Sketch uses 6.972 bytes (21%) of program storage space. Maximu Global variables use 437 bytes (21%) of dynamic memory. leaving	m is 32,256 bytes. g 1,511 bytes for	EW1182/1 V (EEESS) = 1012 10 [HD-1	
		Veresover (recov) - rerot to [re]	
Antuinomenu	ine Use on COM16	Autoscroll	No line ending + 9500 baud
			Reserved and a second s

12.Serial Monitor上にログが表示されることを確認

Arduino基板の使い方(KX022) I2C I/F



[Program] File->Examples-> KX022->example-> KX022

[動作] 500msごとにKX022のX,Y,Z 軸それぞれのデータを取得し 表示

00 k0/022 Arduno 1.6.7		COM16 (Arduino/Genuno Ur	19) 🗕 🗖 🗶
File Edit Sketch Tools Help			Send
	P	COI22_WHO_AMI Register Value = 1	hx14
10022	2	EXE22 (X) = 0.18 [g] EXE22 (Y) = 0.06 [g]	
/**************************************		KX022 (Z) = 0.55 (g)	1
10022+ ine		60022 (X) = 0.18 [e]	
Copyright (c) 2010 ROHM Co.,Ltd.	1	KX022 (Y) = 0.06 [g] KX022 (Z) = 0.99 [g]	
Permission is hereby granted, free of charge, to of this collected accounted documentation (i)	any person obtaining a cost	KX822 (X) = 0.17 [e]	
in the Software without restriction, including wi	thout limitation the rights	KX022 (Y) = 0.06 [g]	
to use, copy, modify, merge, publish, distribute,	sublicense, and/or sell.	CA122 (2) * 0.33 [6]	
furnished to do so, subject to the following cond	litionst	KX0222 (X) = 0.18 [g]	
and the second se		KX022 (Y) = 0.06 [g]	
The above convright notice and this permission no all contast or substantial continue of the Software	tice shall be included in	NAME2 (2) - 9,35 (2)	
err copres of passentrer pertiene of the anteen		KX822 (X) = 0.18 [c]	
THE SOFTWARE IS PROVIDED "AS LS", WITHOUT WARRANT	Y OF ANY KIND, EXPRESS ON	KX022 (Y) = 0.06 [g]	
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRAW	TEL OF MERCHANTABILITY,	KX022 (Z) = 0.89 [g]	
FITNESS FOR A PARTICULAR POPOLE AND NORINFRENZA	DIT, DENO ENDET SMUL DE	KNE22 (X) = 0.18 [g]	
A.6.		KX022 (Y) = 0.06 [g]	
Done uploading.		KX022 (Z) = 0.99 [g]	
		KO022 (X) = 0.18 [c]	
Sketch uses 7.252 bytes (221) of program storage sa	mace. Maximum is 32,256 bytes.	KX022 (Y) = 0.06 [g]	
Global variables use 532 bytes (252) of dynamic me	ery, leaving 1,516 bytes for	KX022 (Z) = 0.99 [c]	
()			
	Adulte/Service Une on COM16	Autoscroll	No line ending + 9600 baud

Arduino基板の使い方(BD7411) GPIO I/F



[Program] File->Examples-> BD7411G->example-> BD7411

[動作] 500msごとにBD7411の出 力をチェックし、出力がLow の場合にメッセージを出力

※注意事項
 BD7411のプログラム
 を書き込む際は、
 BD7411のボードを外してから行ってください。

00 BD7411 Arduno 1.6.7	COM16 (Arduino/Genuino Uno)	
File Edit Sketch Tools Help		Send
	BC7411G Sample	
607411		
//		
607411. inc	007411G Wagnet field Detct!	
Comyright (c) 2010 ROHM Co.,Ltd.	807411G Wagnet field Detct!	
Permission is hereby granted, free of charge, to any person obtaining a copy		
of this software and associated documentation files (the "Software"), to de- in the Software without restriction, including without limitation the rights to use, conv. and fy, serge, publish, distribute, sublicence, and/or seti	007411G Magnet field Detct!	
coples of the Software, and to permit persons to show the Software is furmished to do so, subject to the following conditions:	807411G Wagnet field Detct!	8
The above convright notice and this permission notice shall be included in all copies or substantial portions of the Software.	007411G Megnet field Detct: 007411G Megnet field Detct: 807411G Megnet field Detct:	
THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARWARTY OF ANY KIND, EXPRESS OR DEFLIED, INCLUDING BUT NOT LIMITED TO THE WARWARTED OF MERCHANTABULITY.	507411G Wagnet field Detct!	
FITNESS FOR A PARTICULAR PUPPOSE AND NUMINFRINGEMENT. IN NO EVENT SHALL THE	storellig megnet field betct:	
A		
Done uploading.		
Sketch uses 2,802 bytes (7%) of program storage space. Maximum is 82,258 bytes. Global variables use 246 bytes (12%) of dynamic memory, leaving 1,802 bytes for		
x	P A terroral	· Insenting - 0800 band
Arduina/Densins Upo an COM15	L Dougster	a me evere · java pare



[Program] File->Examples-> BD1020HFV->example-> BD1020

[動作] 500msごとにBD1020の出力 を温度に変換してメッセージ出 力

Co BD1020 Arduno 1.6.7		COM16 (Arduno/	Genuino Uno)		×
File Edit Sketch Tools Help				6	Send
	P	BD1020HFV Sample			
		ED1020HFV Temp=28.95	[degrees Celsius], ADC=268		1
BD1020	R .	BD1020HFV Temp=28.85	(deprees Celsius). ADC=268		
/**************************************	×	ED1020HFV Temp=20.95	[deprees Celsius]. ADC=268		
801121, inc		BD1020HFV Temp=28,85	[deprees Celsius], ADC=268		- 10
		001020HFV Temp=28.95	[degrees Celsius], ADC=268		1
Department (r) 2010 KOM Co., Ltd.		BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		11
Contraction and the second second second second		001020HFV Temp=20.95	[deprees Celsius], ADC=268		
Permission is berefy granted, free of charge, to	any person obtaining a copy	BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
of this software and associated documentation fi	les (the "Software"), to de-	601020HFV Temp=28.36	[degrees Celsius], ADC=263		
in the Software without restriction. Including w	ithout limitation the rights	BD1020HFV Temp=28,85	[deprees Celsius], ADC=288		
to use, copy, modify, merce, publish, distribute.	sublicence, and/or sell	001020HFV Temp=20.95	[degrees Celsius], ADC=268		
copies of the Doftmare, and to permit persons to	shoe the Software is	BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
furnished to do so, subject to the following con-	ditionst	ED1020HFV Temp=28.95	[degrees Celsius], ADC=268		
		BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
The above convright notice and this peralection re	stice shall be included in	001020HFV Temp=28.95	[degrees Celsius], ADC=268		
all copies or substantial portions of the Softwar	re.	BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
		ED1020HFY Tesp=20.95	[degrees Celsius], ADC=268		
THE SOFTWARE IS PROVIDED "AS 15", WITHOUT BARRAN	TY OF MAY KIND, EXPRESS OR	BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
IMPLIED. INCLUDING BUT NOT LIMITED TO THE WARRAW	TIES OF MERCHANTABILITY.	001020HFV Temp=20.95	[deprees Celsius], ADC=268		
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINCED	HENT, IN NO EVENT SHALL THE	BD1020HFV Temp=28,85	[deprees Celsius], ADC=268		
WE W		001020HFV Temp=28.95	[deprees Celsius], ADC=268		
		BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
Done uploading/		001020HFV Temp=20.95	[degrees Celsius], ADC=268		
Description of the second s		BD1020HFV Temp=28.85	[deprees Celsius], ADC=268		
a state that a state of the state		001020HFV Temp=20.95	[deprees Celsius], ADC=268		
oxetch upes 4,326 bytes (13%) of progrem storage s	pece. Maximum is 32,256 bytes.	BD1020HFV Temp=28.85	[deprees Celsius]. ADC=268		
Global variables use 285 bytes (121) of dynamic me	eory, leaving 1,782 bytes for	001020HFV Temp=20.85	[deprees Celsius], ADC=268		
		BD1020HFV Temp=28.38	[deprees Celsius], ADC=269		-
K		IT & second	Ma Day and	1 Cares	hand
	Arduino/Genuino Uno en COM10	- Autoscroll	No line endine	• 100	baud

サンプルプログラムでの各センサの接続場所



No.	Sensor	Type Name	
1	Accelerometer	KX022	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
2	Pressure sensor	BM1383GLV	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
3	Magnetic sensor	BM1422GMV	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
4	ALS/PS sensor	RPR-0521RS	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
5	Color sensor	BH1745NUC	I2C_1,I2C_2,I2C_3,I2C_4,I2C_5
6	Hall sensor	BD7411G	GPIO
7	Temperature sensor	BD1020HFV	ANALOG_2
8	UV sensor	ML8511A	ANALOG_1

各センサ基板の動作電圧



No	Sensor	Type Name		Recommended Operating Voltage [V]			Selectable Power [V]		
110.				Min.	Тур.	Max	1.8	3	5
4	Accelerator	KY000 4000	Vdd	1.71	2.5	3.6	\frown	\bigcirc	
1	Accelerometer	KXUZZ-10ZU	Vio	1.7	-	Vdd	0	0	
2	Pressure sensor	BM1383GLV	VDD	1.7	-	3.6	\bigcirc	\bigcirc	
2	Magnatia aanaar	BM1422GMV	AVDD	1.7	-	2.0	0		
3 M	Magnetic sensor		DVDD	1.7	-	2.0			
4	4 41.0/20		VCC	2.5	3.0	3.6		\sim	
4 ALS/PS sensor	RPR-0521R5	VLEDA	2.8	3.0	5.5		0		
5	Color sensor	BH1745NUC	Vcc	2.3	2.5	3.6		0	
6	Hall sensor	BD7411G	VDD	4.5	5.0	5.5			\bigcirc
7	Temperature sensor	BD1020HFV	VDD	2.4	3.0	5.5		0	0
8	UV sensor	ML8511A	VDD	2.7	3.3	3.6		0	

I2C Device Address List



No.	Sensor	Type Name	Device Address(7bit)
1	Accelerometer	KX022-1020	0x1E/0x1F
2	Pressure sensor	BM1383GLV	0x5D
3	Magnetic sensor	BM1422GMV	0x0E/0x0F
4	ALS/PS sensor	RPR-0521RS	0x38
5	Color sensor	BH1745NUC	0x38/0x39

青字はデフォルトのデバイスアドレス

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