

The World Leader in High Performance Signal Processing Solutions



ADIS16228 Evaluation Tutorials

Detailed steps for executing a Manual FFT function, using one sample rate setting.

January 2, 2014



Launch software & Set Device = ADIS16228

ver Managemen

Analog Devices Vibration Evaluation Program 1.1.9	
Devices Register Access Network Alarms Data Capture Tools	Demo About
ADIS16227	
ADIS16228 Axis Selection	
ADIS16000 Start X axis -	🔄 Enable Data Log 🛛 0
(g)	omain × axis
0.005	
0	
X = 2883 Y = 0.0095 (H	z) 10240
0.01 Frequency D	omain Y axis
0.005	
X = 2997 X = 0.0089 (H	2) 10240
(a) Frequency Dom	ain∠axis
0.005	
0	
X = 3227 Y = 0.0085 (H	2) 10240
Paadu	
левиу	



2

Select mode & Launch Register Access Window

Analog Devices Vibration B	Evaluation Program 1.1.	9	
Devices Register Access	Network Alarms	Data Capture Tools Demo About	
	•		
Mode Selection	Axis Sele	ction 📃 🔲 Enable Data Lo	og 0
0.01 (g)		Frequency Domain $ imes$ axis	
0.005			
0			
X = 3112	Y = 0.0097	(Hz)	10240
0.01		Frequency Domain Y axis	
(9)			
0.005			
0 LX = 330	Y = 0.0021	(Hz)	10240
0.01		Frequency Domain Z axis	
(g)			
0.005			
0			
X = 287	Y = 0.002	[Hz]	10240
Ready			.:

NOTES:

 Setting Mode Selection to Manual FFT is the equivalent of setting REC_CTRL1[1:0] = 00



Click on REC_CTRL1

Select a Category	Contro	ol/Statu	IS 🔹			S	elect R	GLOB_CMD	•	
Register	Page	Addr	Contents	-	Single Register Write	Value	Mask	Function	Write	Ţ
FFT_AVG1	0	0C	0000			0001	FFFF	Auto-Null	Write	
FFT_AVG2	0	0E	0000	≡		0002	FFFF	Power-Down (wake with /CS	Write	
BUF_PNTR	0	10	0000		Value 1F00	0004	FFFF	Self-Test	Write	
REC_PNTR	0	12	0000		New Hey Value	0008	FFFF	Factory Reset	Write	
REC_CTRL1		1A	1F00			0010	FFFF	Clear Status	Write	ן
REC_CTRL2	0	1C	00FF		Write	0020	FFFF	Flash Test	Write	ן
REC_PRD	0	1E	0005			0040	FFFF	Flash Update	Write	ן
ALM_F_LOW	0	20	0000		Read Selected Register	0080	FFFF	Software Reset	Write	ן
ALM_F_HIGH	0	22	0000			0100	FFFF	Clear Records	Write	ן
ALM_X_MAG1	0	24	0000		Update Registers in Category	0200	FFFF	Clear spectral alarm bands	Write	ן
ALM_Y_MAG1	0	26	0000			0400	FFFF	Reset buffer pointer	Write	j
ALM_Z_MAG1	0	28	0000		Save Reg Settings to File	0800	FFFF	Record start/stop	Write	Ĵ
ALM_X_MAG2	0	2A	0000		Load Bog Cottings from File	1000	FFFF	Save spectral alarm band	Write	Ĵ

ver Management

NOTES:

•

Clicking on a register name causes an automatic read of its contents, which displays in the data box that is located next to "Current Hex Value"



Click on the white box, located next to "New Hex Value"

Select a Category	Contr	ol/Statu	us ▼			Se	elect R	egister GLOB_CMD	•
Register	Page	Addr	Contents	*	Single Register Write	Value	Mask	Function	Write
FFT_AVG1	0	0C	0000		Selected Register REC CTRL1	0001	FFFF	Auto-Null	Write
FFT_AVG2	0	0E	0000	E		0002	FFFF	Power-Down (wake with /CS	Write
BUF_PNTR	0	10	0000		Value 1F00	0004	FFFF	Self-Test	Write
REC_PNTR	0	12	0000		New Hey Value	0008	FFFF	Factory Reset	Write
REC_CTRL1	0	1A	1F00			0010	FFFF	Clear Status	Write
REC_CTRL2	0	1C	00FF		Write	0020	FFFF	Flash Test	Write
REC_PRD	0	1E	0005			0040	FFFF	Flash Update	Write
ALM_F_LOW	0	20	0000		Read Selected Register	0080	FFFF	Software Reset	Write
ALM_F_HIGH	0	22	0000			0100	FFFF	Clear Records	Write
ALM_X_MAG1	0	24	0000		Update Registers in Category	0200	FFFF	Clear spectral alarm bands	Write
ALM_Y_MAG1	0	26	0000			0400	FFFF	Reset buffer pointer	Write
ALM_Z_MAG1	0	28	0000		Save Reg Settings to File	0800	FFFF	Record start/stop	Write
ALM_X_MAG2	0	2A	0000	Ţ	Load Beg Settings from File	1000	FFFF	Save spectral alarm band	Write

NOTES:

•

- In this example, the starting setting (**REC_CTRL1 = 0x1F00**) enables all four sample rates: SR0, SR1, SR2, and SR3.
- Change the value in the second nibble (REC_CTRL1[11:8]) from "F" to a "1" to disable SR1, SR2 and SR3, while leaving SR0
 - enabled. New register value:
- REC_CTRL1 = 0x1100



Enter "1100" into the white box, located next to "New Hex Value"

Select a Category	Contro	ol/Statu	∎ sr			S	elect R	egister GLOB_CMD	•
Register	Page	Addr	Contents	*	Single Register Write	Value	Mask	Function	Write
FFT_AVG1	0	0C	0000		Selected Register BEC. CTBI 1	0001	FFFF	Auto-Null	Write
FFT_AVG2	0	0E	0000	=		0002	FFFF	Power-Down (wake with /CS	Write
BUF_PNTR	0	10	0000		Value 1F00	0004	FFFF	Self-Test	Write
REC_PNTR	0	12	0000		New Hey Value 1100	0008	FFFF	Factory Reset	Write
REC_CTRL1	0	1A	1F00			0010	FFFF	Clear Status	Write
REC_CTRL2	0	1C	00FF		Write	0020	FFFF	Flash Test	Write
REC_PRD	0	1E	0005			0040	FFFF	Flash Update	Write
ALM_F_LOW	0	20	0000		Read Selected Register	0080	FFFF	Software Reset	Write
ALM_F_HIGH	0	22	0000			0100	FFFF	Clear Records	Write
ALM_X_MAG1	0	24	0000		Update Registers in Category	0200	FFFF	Clear spectral alarm bands	Write
ALM_Y_MAG1	0	26	0000			0400	FFFF	Reset buffer pointer	Write
ALM_Z_MAG1	0	28	0000		Save Reg Settings to File	0800	FFFF	Record start/stop	Write
ALM_X_MAG2	0	2A	0000	Ŧ	Load Reg Settings from File	1000	FFFF	Save spectral alarm band	Write

- Since the Register Access window writes register values, 2 bytes at a time, enter the hexadecimal code for the entire register.
- In this case, In this example, "1100" keeps all of the previous settings, except for the sample rate changes.



Click on the "Write" button

Select a Category	Contro	ol/Statu	is 🔹			S	elect R	egister GLOB_CMD	•
Register	Page	Addr	Contents	*	Single Register Write	Value	Mask	Function	Write
FFT_AVG1	0	0C	0000		Selected Register REC CTRL1	0001	FFFF	Auto-Null	Write
FFT_AVG2	0	0E	0000	Ε		0002	FFFF	Power-Down (wake with /CS	Write
BUF_PNTR	0	10	0000		Value 1F00	0004	FFFF	Self-Test	Write
REC_PNTR	0	12	0000		New Hey Value 1100	0008	FFFF	Factory Reset	Write
REC_CTRL1		1A	1F00			0010	FFFF	Clear Status	Write
REC_CTRL2	0	1C	00FF		Write	0020	FFFF	Flash Test	Write
REC_PRD	0	1E	0005			0040	FFFF	Flash Update	Write
ALM_F_LOW	0	20	0000		Read Selected Register	0080	FFFF	Software Reset	Write
ALM_F_HIGH	0	22	0000			0100	FFFF	Clear Records	Write
ALM_X_MAG1	0	24	0000		Update Registers in Category	0200	FFFF	Clear spectral alarm bands	Write
ALM_Y_MAG1	0	26	0000			0400	FFFF	Reset buffer pointer	Write
ALM_Z_MAG1	0	28	0000		Save Reg Settings to File	0800	FFFF	Record start/stop	Write
ALM_X_MAG2	0	2A	0000	_	Load Reg Settings from File	1000	FFFF	Save spectral alarm band	Write

NOTES:

۲

- Since the Register Access window writes register values, 2 bytes at a time, enter the hexadecimal code for the entire register.
- In this case, In this example, "1100" keeps all of the previous settings, except for the sample rate changes.



Click on AVG_CNT to observe current sample rate setting for SR0 (and others)

Select a Category	Contr	ol/Statu	IS 🔻			S	elect R	egister GLOB_CMD	-
Register	Page	Addr	Contents	*	Single Register Write	Value	Mask	Function	Write
ALM_Z_MAG1	0	28	0000			0001	FFFF	Auto-Null	Write
ALM_X_MAG2	0	2A	0000			0002	FFFF	Power-Down (wake with /CS	Write
ALM_Y_MAG2	0	2C	0000		Value 6420	0004	FFFF	Self-Test	Write
ALM_Z_MAG2	0	2E	0000		New Hey Value 1100	0008	FFFF	Factory Reset	Write
ALM_PNTR	0	30	0000			0010	FFFF	Clear Status	Write
ALM_S_MAG	0	32	0000	Ξ	Write	0020	FFFF	Flash Test	Write
ALM_CTRL	0	34	0080			0040	FFFF	Flash Update	Write
DIO_CTRL	0	36	OF		Read Selected Register	0080	FFFF	Software Reset	Write
GPIO_CTRL	0	38	020			0100	FFFF	Clear Records	Write
AVG_CNT	0	3A	6420		Update Registers in Category	0200	FFFF	Clear spectral alarm bands	Write
DIAG_STAT	0	3C	0080			0400	FFFF	Reset buffer pointer	Write
GLOB_CMD	0	ЗE	×***		Save Reg Settings to File	0800	FFFF	Record start/stop	Write
ALM_X_STAT	0	40	0000	_	Load Reg Settings from File	1000	FFFF	Save spectral alarm band	Write

- The present setting (6420) for AVG_CNT establishes the following sample rates: SR0 = 20480 SPS SR1 = 5160 SPS SR2 = 1280 SPS
 - SR3 = 320 SPS
- For the purpose of this tutorial, this does not need to change.



Select "GLOB_CMD" in the drop-down menu located next to "Select Register"

elect a Category	Contro	il/Statu	15 🔻			S	elect R	egister	GLOB_CMD	-
Register	Page	Addr	Contents	*	Single Register Write	Value	Mask	Function	REC_CTRL1	
LM_Z_MAG1	0	28	0000			0001	FFFF	Auto-Null	REC_CTRL2	-
LM_X_MAG2	0	2A	0000			0002	FFFF	Power-Down	ALM_CTRL DIO_CTRL	-
LM_Y_MAG2	0	2C	0000		Value 6420	0004	FFFF	Self-Test	GPIŌ_CTRL	
ALM_Z_MAG2	0	2E	0000		New Hey Value 1100	0008	FFFF	Factory Rese	ŧt	Write
ALM_PNTR	0	30	0000			0010	FFFF	Clear Status		Write
ALM_S_MAG	0	32	0000	Ξ	Write	0020	FFFF	Flash Test		Write
ALM_CTRL	0	34	0080			0040	FFFF	Flash Update	•	Write
DIO_CTRL	0	36	0F		Read Selected Register	0080	FFFF	Software Res	set	Write
GPIO_CTRL	0	38	0200			0100	FFFF	Clear Record	s	Write
AVG_CNT	0	3A	6420		Update Registers in Category	0200	FFFF	Clear spectra	l alarm bands	Write
DIAG_STAT	0	3C	0080			0400	FFFF	Reset buffer	pointer	Write
GLOB_CMD	0	ЗE	×***		Save Reg Settings to File	0800	FFFF	Record start/	'stop	Write
ALM_X_STAT	0	40	0000	_	Load Beg Settings from File	1000	FFFF	Save spectra	il alarm band	Write

- This function provides simpler access to commonly-used global and configuration commands.
- Selecting the GLOB_CMD register provides single-click access to all of the global commands in the ADIS16228.



Click on "Write" next to the "Flash Update," then exit the Register Access window

Select a Category	Contro	ol/Statu	IS 🔻			Se	elect R	egister GLOB_CMD	-
Register	Page	Addr	Contents	*	Single Register Write	Value	Mask	Function	Write
ALM_Z_MAG1	0	28	0000			0001	FFFF	Auto-Null	Write
ALM_X_MAG2	0	2A	0000			0002	FFFF	Power-Down (wake with /CS	Write
ALM_Y_MAG2	0	2C	0000		Value 6420	0004	FFFF	Self-Test	Write
ALM_Z_MAG2	0	2E	0000		New Hey Value 1100	0008	FFFF	Factory Reset	Write
ALM_PNTR	0	30	0000		New lie 1100	0010	FFFF	Clear Status	Write
ALM_S_MAG	0	32	0000	Ξ	Write	0020	FFFF	Flash Test	Write
ALM_CTRL	0	34	0080			0040	FFFF	Flash Update	Write
DIO_CTRL	0	36	OF		Read Selected Register	0080	FFFF	Software Reset	Write
GPIO_CTRL	0	38	0200			0100	FFFF	Clear Records	Write
AVG_CNT	0	3A	6420		Update Registers in Category	0200	FFFF	Clear spectral alarm bands	Write
DIAG_STAT	0	3C	0080			0400	FFFF	Reset buffer pointer	Write
GLOB_CMD	0	ЗE	×***		Save Reg Settings to File	0800	FFFF	Record start/stop	Write
ALM_X_STAT	0	40	0000		Lord Pog Cottings from File	1000	FFFF	Save spectral alarm band	Write

- The **Flash Update**, associated with **GLOB_CMD[6]**, copies user-configuration values to the flash memory location for each register.
- This causes the device to load the new contents when resetting or powering up again.
- Clicking on the Write button next to Flash
 Update is equivalent to setting GLOB_CMD=40
 in the Single Register
 Write function



Click on "Start" to initial a data capture, FFT analysis and display of data



NOTES:

Click on **Start** does the following:

- Set **GLOB_CMD**[11] = 1
- Monitor Busy Signal to track progress.
- Once DIO2 indicates that the data capture and analysis are complete, collect data from buffers (x_BUF registers)
- Display data



Sometimes, the vertical scale settings will not suffice





Right click on the waveform to reveal scale setting window



NOTES:

•

Click on the arrows to scroll between range and grid spacing settings.



Experiment with the settings



NOTES:

 Note that each axis has independent controls





Thank you!

- We sincerely hope that this was helpful.
- Click on "Back" in your web browser to return to the Wiki Guide.
- Good luck in your project!

