

Application Report SLUA474–July 2008

# Information to Provide When Reporting Issues With TI Gauges

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#### ABSTRACT

This document describes the steps recommended to help us assist you in troubleshooting problems with TI Impedance Track gauges more quickly. The procedures described in this document require the use of TI bqEVSW. Providing us with this information initially can help speed up the process of finding a solution to your problem.

## 1 Introduction

The items that help the most in troubleshooting problems are listed below:

- · Log file containing the issue being reported
- GG (Gas Gauge) files, which contain an image of the data flash
- SENC file, which is an encrypted version of the data and instruction flash file

The remainder of this document will describe the steps involved in obtaining this information. TI bqEVSW, corresponding to the particular part you are using, will be required to obtain this information. The software can be downloaded from <a href="http://power.ti.com">http://power.ti.com</a>.

## 2 How to Log and Extract GG Files Using TI bqEVSW

If the problem is reproducible, follow the instructions below to capture the failure in progress. This information can greatly help in troubleshooting the problem. If the problem is not easily reproducible, but the problem currently exists in a pack, skip to the *Extracting SENC file from Gas Gauge* section.

- 1. Create a directory for saving the log file and GG (data flash image) files.
- 2. Open EVSW and go to the SBS screen.

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Name	Value	Unit	Log	Scan	Name	Value	Unit	Log	Scan	
Manufacturer Access	0000	hex	V	V	Run time To Empty	65535	min	V	V	
Remaining Cap. Alarm	300	mAh	V	V	Average Time to Empty	65535	min	V	V	
Remaining Time Alarm	10	min	V	V	Average Time to Full	65535	min	V	V	
Battery Mode	6081	hex		V	Charging Current	4000	mA	2	1	
At Rate	0	mA		V	Charging Voltage	16800	mV	V		
At Rate Time To Full	65535	min	V	V	Battery Status	0000	hex	•	•	
At Rate Time To Empty	65535	min	~		Cycle Count	0		V		
At Rate OK	1			V	Cell Voltage 4	4038	mV	V	V	
Temperature	22.45	°C			Cell Voltage 3	3987	mV	V		
Voltage	16001	m٧	V		Cell Voltage 2	3992	mV	V	V	
Current	0	mA			Cell Voltage 1	3983	mV			
Average Current	0	mA	V	V	FET Status	0006	hex	2	V	
Max Error	100	%			Safety Status	0000	hex			
Relative State of Charge	84	%	V	V	PFStatus	0000	hex	•	V	
Absolute State of Charge	76	%			Operation Status	8043	hex		V	
Remaining Capacity	3321	mAh	V		Charging Status	0200	hex	V		
Full charge Capacity	3957	mAh	M.	V	Allerer.					
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3. From the *Options* pull-down menu, select *Set Log All*. This will put checkmarks in all of the boxes in the *Log* column in the data area of the SBS Screen. All SBS data on this screen will be logged to a file.



4. From the *Options* pull down menu, select *Set Logging Interval*. A *Logging Interval* window will pop up. Enter 4000 in the text box and click *OK*. This will set the data logging interval to happen every 4 seconds. This will give us enough resolution to see everything happening without filling up the log file too quickly.

bqEVSW - Logging Interval	
Logging Interval in milliseconds. (Specify Minimum interval - Actual interval may be greater)	OK Cancel
4000	

5. Click the *Start Logging* button at the top of the data section. A window will pop up asking for a file name and location. Name the file with a useful description and save the file in the directory created in step 1. After saving, logging will start and continue until the *Stop Logging* button is clicked.





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6. Go to Data Flash screen.

TEXAS INSTRUMEN	тs	R E	AL WORLD S	ISNAI	P R I	) C E S	SING"
Read All Write All	Write A	All, <u>P</u> reserve					
Calibration	)		and a second second				
Configuration	Y	Power	Gas Gauging	Ύ Β	a Table	Y	PF Status
1st Level Safety	2nd Le	vel Safety	Charge Control	SBS Co	nfiguration	Y	System Data
Name	Value	Unit	Name	Value	Unit	-	
Voltage	-	-	AFE OC Dsg		hex		
COV Threshold		mV	AFE OC Dsg Time		hex		
COV Recovery		mV	AFE SC Cha Cfg		hex		
CUV Threshold		mV	AFE SC Dsg Cfg		hex		
CUV Recovery		mV	Temperature	-	-		
Current	1 -	241	Over Temp Chg		°C		
OC (1st Tier) Chg		mA	OT Cha Recovery		°C		
OC (1st Tier) Dsg		mA	Over Temp Dsg		°C		
Current Recovery Time		Sec	OT Dsg Recovery		°C		

7. From the *Options* pull-down menu, select 'Set AutoExport Interval...'. This will open a text box. Enter 180 in the text box and click 'OK'. This will change the save interval for the data flash images. Every 3 minutes, a new GG file will be saved to a directory to be specified in the next step. This allows us to track changes made to the data flash over the course of the logging session. Since data flash does not update as often as SBS parameters do, 3 minute intervals will work.

bqEVSW - AutoExport Interval	
AutoExport Interval in seconds	OK Cancel
180	



8. From the *Options* pull-down menu, select *Set AutoExport Filename...*. A window will pop up asking for a file name and location. Keep the default name and save the file in the directory created in step 1. The EVSW will append a number to the end of the filename and this number will increment by 1 for every GG file logged.

AutoExport Dat	a Flash to file:	with prefix		? 🔀
Save jn; Recent Desktop My Documents	EVSW	•	- 🗈 💣 🎟	
	File <u>n</u> ame:	DataFlashExport.gg	•	<u>S</u> ave
My Network Places	Save as <u>type</u> :	Gas gauge data flash files(*.gg)	•	Cancel

9. From the Options pull-down menu, select AutoExport.... This will start the process of logging GG files to the directory specified. Every 3 minutes, a new data flash capture will be saved. A checkmark to the left of AutoExport... indicates that logging is in progress. To disable logging, click on AutoExport... while the check mark is visible.

Set Set	AutoExport Interval AutoExport Filename	MENTS		RE	XE WORLD S	1 G N A 1	e Rona
🖌 🗸 Aub	oExport	e All	Write A	All, <u>P</u> reserve			
🖌 🖌 Veri	fy Writes				4		
	Configurat	on	Y	Power	Gas Gauging	)́В	a Table
	1st Level Sal	ety (	2nd Le	vel Safety	Charge Control	SBS Cor	nfiguration
8.5	Name		Value	Unit	Name	Value	Unit
	Voltage			1.24	AFE OC Dsg		hex
	COV Threshold			mV	AFE OC Dsg Time		hex
	COV Recovery			mV	AFE SC Chg Cfg		hex
ata 🛛	CUV Threshold			mV	AFE SC Dsg Cfg		hex
	CUV Recovery			mV	Temperature	-	
asn	Current		14 A	-	Over Temp Chg		°C
	OC (1st Tier) Chg			mA	OT Chg Recovery		°C
	OC (1st Tier) Dsg			mA	Over Temp Dsg		°C
	Current Recovery 1	ime		Sec	OT Dsa Recovery		20

10. After logging is complete, zip up the directory containing the log and GG files.



## 3 Extracting SENC File From Gas Gauge

Extracting the SENC file should be done after the logging is complete. This will provide us with further information about the problem that may assist with solving the problem.

1. In EVSW go to the Pro screen.

			Land Marke
1 Siles	TEXAS INSTRUMENTS REAL WORLD S	IGNAL PROCESSIN	G. <sup>TH</sup>
1	This screen is only for advanced users. Some commands may cause permanent damage to the ha All Values are in Hexadecimal without the 0x prefix. Target Address 17 Send SMB Command	ardware. Please use caution.	
	SMB Command 109		
CD C	Read SMB Word		
383	SMB Command ODBeadResult (hex) None.		
	Write SMB Word		
Data	SMB Command 00 Word (hex) 0F00 Write		
Flash	Read SMB Block		
	SMB Command 78 Result (hex) None.		
Pro	Result (ASCII)		
	Write SMB Block		
alibrate	SMB Command 78 Block Data 0102 0304 05 06 Write		
	Hexadecimal to Decimal converter and vice versa		
EASY	Hexadecimal value 00 = Signed Decimal value 00		
(EASY	Srec programming		
	C:\Documents and Settings\a0866575\Desktop\bq20z70		
0% 🗖			
0%			

- 2. If the device is in full access mode, skip to step 3. If the gauge is sealed, it will need to be unsealed, and then put in full access mode.
  - a. In the 'Write SMB Word' area set the SMB Command box to 00
  - b. Then, in the *Word (hex)* box, type the first unseal key and click the *Write* button. Then type the second unseal key and click the 'Write' button. This will put the device in unseal mode
  - c. Finally, also in the *Word (hex)* box, type the first full access key and click the *Write* button. Then type the second full access key again and click the *Write* button. This will put the device in full access mode and allow the device to enter ROM mode
- 3. Send a command to put the device in ROM mode
  - a. In the Write SMB Word area set the 'SMB Command' box to 00.
  - b. Then, in the *Word (hex)* box, type 0F00 and click the *Write* button. This will send the device to ROM mode. In this mode, the device can be programmed with a new instruction flash set.



4. The final step will be to extract the SENC file from the device. From the *Flash Memory* pull-down menu, select *Read to File* (This may say *Export SREC to file* or something similar, depending on the bqEVSW version).

🗄 Texas Instru	iments by Gas Gauge Evaluation Software - by20z70 v1.10 - [Pro (Advanced) Scre
Eile Options	Flash Memory Window Help
	Read to File REAL WORLD SIGN
1	This screen is only for advanced users. Some commands may cause permanent damage to the hardware. All Values are in Hexadecimal without the 0x prefix. Target Address 17 Send SMB Command
	SMB Command Send
5B5	Read SMB Word       SMB Command       OD <u>Bead</u> Result (hex)       None.
Data Eleck	Write SMB Word SMB Command 00 Word (hex) 0F00
Flash	Read SMB Block       SMB Command 78       Bead       Result (hex)       None.
Pro	Result (ASCII)

5. A window will pop up asking for a file name and location. Name the file with a useful description and save the file in the directory created in step 1. After clicking *Save*, a progress bar will be shown while the SENC is being extracted.

Save sRecord as	i						? 🔀
Save in:	C EVSW			•	🗢 🖻 (	* 📰 •	
📁 Recent							
Desktop							
b My Documents							
a0866575 on LTA0866575							
<b></b>	File <u>n</u> ame:	-			1	J [	<u>S</u> ave
My Network Places	Save as <u>type</u> :	Encrypted	Srec files(*.senc)			-	Cancel
5							/

7



Reading Flash Memory	X
Reading Instruction and Data Flash	
Cancel	

- 6. In the Send SMB Command area set the SMB Command box to 00 and click the 'Send' button. This will restart the firmware
- 7. Send the SENC file, along with the log and GG files, to TI for analysis.

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Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Telephony	www.ti.com/telephony
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

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