CONTINUOUS RECORDING SETUP

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The following is written in the context of the Geode, but it applies also to the StrataVisor NZXP and the ES-3000. It is assumed that the user is familiar with setting up their GPS (if available) and serial input parameters, including the use of a third-party tool like Hyperterminal to troubleshoot.

The Geode can be configured to acquire continuous, or gapless, data. The data will not be stored in a single file but in numerous, time-contiguous or time-overlapping SEG files (depending on acquisition parameters). Since the Geode does not begin transferring data until the entire record has been acquired, continuous recording requires that the time needed to transfer a file be shorter than its record length *in time*. I.e., if a record is 4 seconds long, it must require less than 4 seconds to transfer the file to the PC.

The transfer time can be estimated by dividing the typical throughput of the system (450 Kb/sec) by the file size.

The key parameters for continuous recording are Sample Interval, Record Length, Delay, Trigger Holdoff, Stack Options, and Auto Save. Generally, the sample interval is the most important, and all other parameters are subservient and derived from it.

To set up the continuous recording parameters, launch SCS.

• Make sure the system is disarmed. Press the "1" key to toggle between armed and disarmed. When disarmed, the status bar will be colored red:

• Select Acquisition >> Sumple Interval/Record Lengin.								
Seismodule Controller 11.1.63	Seismodule Controller 11.1.63.0 Beta - Multiple Geode 05 - [Trigger Window]							
1 Survey 2 Geom 3 Observer	4 Acquisition 5 File 6 Display 7 0	4 Acquisition 5 File 6 Display 7 DoSurvey 8 Window 0 Print . System						
	1 Sample Interval/Record Length	SI 0.25ms, RL 0.128s, Delay 0s						
	2 Acquisition Filters	FILTER OUT V						
	3 Correlation	OFF						
	4 Stack Options	REPLACE ONLY						
	5 Specify Channels							
	6 Preamp Gains	ALL LOW GAIN						
	7 Stack Polarity POSITIVE							
	8 Trigger Options	Holdoff 0.2s, AUTO ARM, Sensitivity 50, STANDARD TRIGGER						

• Select Acquisition >> Sample Interval/Record Length.

• Set your desired sample interval and record length. The file size in Kb will be displayed. We recommend that you use the longest record length possible, as longer record lengths and fewer

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records are more efficient than the converse. Next, set the delay to be a **negative** number **equal to the record length**. If the record length is 16 seconds, set a delay of -16.

A	cquisition Timing	Parameters	×
	Sample Interval		
	O 20.833 us	Max Length = 16.384 Sec Current File Size = 5.86 MB	
	O 31.250 us		
	O 62.500 us	Record Length 16 Sec	
	O 0.125 ms		
	0.250 ms		
	O 0.500 ms	Delay .16 Sec	
	O 1.000 ms		
	O 2.000 ms		
	O 4.000 ms		
	O 8.000 ms		
	🔿 16.000 ms	OK Cancel	

- Divide the file size by 450 Kb/sec (pay attention to units) to calculate the transfer time. Is it shorter than the record length? If so, continue. If not, adjust your parameters (in the example above, the transfer time would be roughly 5860/450 or about 13 seconds. This means that, theoretically, the time between triggers should be no less than 13 seconds, or gaps in the data will occur. In this example, our record length of 16 seconds is longer than the transfer time, so gapless recording is ensured.
- Select *Acquisition* and make sure all filters are out.

Seismodule Controller 11.1.63.0 Beta - Multiple Geode OS - [Trigger Window]										
🔝 1 Survey	2 Geom	3 Observer	4 Acquisition	5 File	6 Display	7 DoSurvey	8 Window	0 Print	. System	
			1 Sample Ir	nterval/R	lecord Len	gth SI 0.25m	s, RL 16s, D	elay -16s	;	
			2 Acquisitio	n Filters		FILTER C	UT, FILTER	OUT		N
			3 Correlatio	n		OFF				43
			4 Stack Op	tions		REPLACE	ONLY			
			5 Specify C	hannels						
			6 Preamp G	ains		ALL LOW	GAIN			
			7 Stack Pol	arity		POSITIVE	E			
			8 Trigger O	ptions		Holdoff 0	.2s, AUTO /	ARM, Sen	sitivity 50, ST	ANDARD TRIGGER

• Select *Acquisition* and make sure correlation is disabled.

Seismodule Controller 11.1.63.0 Beta - Multiple Geode 05 - [Trigger Window]										
1 Survey	2 Geom	3 Observer	4 Acquisition	5 File 6 Display	7 DoSurvey	8 Window	0 Print .	System		
			1 Sample Ir	nterval/Record Len	gth SI 0.25m	ns, RL 16s, De	lay -16s			
			2 Acquisitio	n Filters	FILTER (OUT, FILTER O	TUC			
			3 Correlation	n	OFF				N	
			4 Stack Op	tions	REPLACE	E ONLY			ЧČ	
			5 Specify C	hannels						
			6 Preamp 6	ains	ALL LOW	/ GAIN				
			7 Stack Pol	arity	POSITIV	E				
			8 Trigger C	ptions	Holdoff	0.2s, AUTO AF	RM, Sensit	ivity 50, STAN	DARD TRIGGER	
										_

• Select *Acquisition* and set the stacking mode to "replace only".

Seismodule Controller 11.1.63.0 Beta - Multiple Geode 05 - [Trigger Window]											
🔝 1 Survey	2 Geom	3 Observer	4 Acquisition	5 File 6 Displa	y 7 DoS	Survey	8 Window	0 Print	. System		
			1 Sample In	terval/Record Le	ength SI	I 0.25ms	s, RL 16s, D	elay -16s			
			2 Acquisition	n Filters	FI	ILTER O	UT, FILTER	OUT			
			3 Correlatio	3 Correlation OFF							
			4 Stack Opt	4 Stack Options REPLACE ONLY							
			5 Specify Cl	nannels							-NE
			6 Preamp G	ains	A	LL LOW	GAIN				
			7 Stack Pola	rity	P	OSITIVE					
			8 Trigger Op	otions	H	oldoff 0.	2s, AUTO A	ARM, Sen	sitivity 50, S	TANDARD	TRIGGER

If you are **NOT** using an external triggering device (typically a GPS):

• Select *Acquisition >> Trigger Options*. Set a trigger holdoff of 90% of the record length. Set the arm mode to "auto". Choose Auto-trigger and set the limit to zero.

📓 Seismodu	Seismodule Controller 11.1.63.0 Beta - Multiple Geode 05 - [Trigger Window]										
🔝 1 Survey	2 Geom	3 Observer	4 Acquisition	5 File	6 Display	7 DoSurvey	8 Window	0 Print	. System		
			1 Sample I	nterval/i	Record Len	gth SI 0.25	ms, RL 16s, D	elay -16s			
			2 Acquisitio	n Filters	,	FILTER	OUT, FILTER	.001			
			3 Correlation	n		OFF					
			4 Stack Op	4 Stack Options REPLACE ONLY							
			5 Specify C	hannels	;						
			6 Preamp 0	ains		ALL LO	N GAIN				
			7 Stack Pol	arity		POSITI	√E				
			8 Trigger C	ptions		Holdoff	0.2s, AUTO	ARM, Sen	sitivity 50, S	TANDARD TR	IGGER
											~~~~

Trigger Options	X
Trigger Holdoff 14.4 sec	
Arm Mode	
Trigger Sensitivity Low High	
Trigger Mode	
Auto-Trigger Limit  Enter 0 for no limit	:
C Advanced Self-Trigger Setup	
OK Cancel	

• Select *File* and then *Storage Parameters*. Set the beginning file number and path to save the data. For now, leave Auto Save disabled. Set the file format to either SEG-2 or SEG-D (SEG-Y is not recommended for continuous recording).

Seismodule Controller 11.1.63.0 Beta - Multiple Geode 05 - [Trigger Window]											
🔝 1 Survey	2 Geom	3 Observer	4 Acquisition	5 File	6 Display	7 DoSurvey	8 Window	0 Print	. System		
				1 S	torage Para	meters	Auto Save	OFF, Dis	k C: \Test,	1.DAT	
				2 R	ead Disk						
				ЗR	ead Next (S	iEG-Y Disk File)	(				

Storage Parameters	X
Next File Number 1 Auto Save Stack Limit 1	
Data Type	
● SEG-2 ● SEG-D ● SEG-Y	
Drive Switching Enabled Setup	
Drive C: V Path Test	-
Select a path from list or type in name to create a new f	older
OK Cancel	

• Select System >> Advanced Acquisition Options.



Check the box to enable continuous acquisition:

Advanced Options	×
Enable Continuous Acquisition (Default: disabled).	
OK Cancel	

## Test:

• Maximize the trigger window and set an appropriate time scale. Press the "1" key to arm the system and begin recording. Make sure that the shot-to-shot time is consistently equal to the trigger holdoff time.



It may not be exact, but it will be close. The main thing is that it is less than the record length; in this case, 16 seconds. What you are looking for is missed triggers, which will be signified by a doubling of the shot-to-shot time. If you see this, it represents a gap in your data and you need to adjust your parameters. You probably broke the main rule, which is that the transfer time must be smaller than the record length.

• Disarm the system, enable Auto Save, re-arm, and repeat the above. Let the system run for 5 minutes. If it doesn't miss any triggers, you should be ready to acquire continuous data. Your trigger time plot should look something like this (the red bar is the time between arming and disarming).



Note: Because we set a 14.4-second holdoff time, and because the triggers are coming continuously, the SEG files will have a time-overlap of approximately 1.6 seconds. There will be a slight amount of jitter in this – it will vary by a few samples owing to network and data writing inconsistencies from shot to shot.

If you ARE using an external triggering device:

- Connect the device trigger output to the trigger input on the Master Geode.
- Connect the data output to a serial port on the PC.
- Select *System* >> *Serial I/O* >> *Serial Input* and set up the serial input parameters to match those of your GPS.



Serial Input Parameters			×			
🔲 Serial Input Enabled	Baud Rate	Baud Rate 9600 💌				
	Byte Size 8					
COM Port	Parity Bit	Stop Bits	Apply			
C COM1 C COM5	C Even 6	1 Stop Bit	- Terminator			
C COM3 C COM7	None	0 1 1/2 Stop Bit	⊙ LF			
С СОМ4 С СОМ8	C Mark	2 Stop Bits	O CR			
SEG-D External Block Size f	SEG-D External Block Size for Input Serial String     Image: Auto   Image: Fixed Block Size:     Image: Provide Block Size:   Image: Provide Block Size:					
Serial Input Setup						
Store One String	C Concat	tenate Several Strin	ngs			
U Durant Counter for Sou	arce Depth II::	Sent by Request (P	ort ID UT)			
Time Window: +/-	Seconds from t	rigger   Fast i	GPS			
Replace PC time Stam	p with GPS time	Parse	e GPGGA only			

• Select *Acquisition* >> *Trigger Options*. Set the trigger holdoff to be ½ second less than the record length. Set the trigger mode to standard trigger.

Seismodule Controller 11.1.63.0 Beta - Multiple Geode OS - [Trigger Window]								
1 Survey 2 Geom 3 Obser	ver 4 Acquisition 5 File 6 Display 7	DoSurvey 8 Window 0 Print . System						
	1 Sample Interval/Record Length 2 Acquisition Filters 3 Correlation 4 Stack Options	SI 0.25ms, RL 16s, Delay -16s FILTER OUT, FILTER OUT OFF REPLACE ONLY						
	5 Specify Channels 6 Preamp Gains 7 Stack Polarity	ALL LOW GAIN POSITIVE						
	8 Trigger Options	Holdoff 14.4s, AUTO ARM, Sensitivity 50, AUTO-TRIGGER						
		ν£.						

Trigger Options		x
Trigger Holdoff 15.5	sec	
Arm Mode	O Manual	
Trigger Sensitivity Low Master Trigger: Line # 1	Geode or NZ # 1	1
Trigger Mode		
C Auto-Trigger	Limit 0 Enter 0 for no limit	
C Advanced Self-Trigger	Setup	
ΟΚ	Cancel	

Test

- Maximize the trigger window. Start your GPS sending serial data and PPS output. Press the "1" key to arm the system and begin recording. Make sure that the shot-to-shot time is consistently equal to the trigger holdoff time. Again, what you are looking for is missed triggers, which will be signified by a doubling of the shot-to-shot time. If you see this, it represents a gap in your data and you need to adjust your parameters.
- Disarm the system, enable Auto Save, re-arm, and repeat the above. Let the system run for 5 minutes. If it doesn't miss any triggers, you should be ready to acquire continuous data.

Note: Because we set a 15.5-second holdoff time, and because the triggers are coming once per second, the SEG files will have a time-overlap of approximately 0.5 seconds – the system will trigger on every  $16^{th}$  PPS from the GPS. There will be a slight amount of jitter in this – it may sometimes vary by  $\pm$  one sample.

In both of the above cases, it should be noted that the amount of overlap can vary from one shot to the next. It is up to the user to account for overlap. If you write concatenation software, each trace of each file should be compared to its counterpart in the next file, because overlap can vary even on a trace-by-trace basis. If it is essential to record perfect, time-contiguous records with no overlap on any traces, additional hardware is required and is available.