

APPENDIX H - SEED Format definitions

1. MSEED HEADERS

MiniSEED (MSEED, mseed) format is strictly defined by the Standard for the Exchange of Earthquake Data (SEED) Reference Manual, SEED format version 2.4, appendix A. (http://www.iris.edu/manuals/SEEDManual_V2.4.pdf)

Network code <net>: Two (2) alphanumeric characters are assigned by the DMC at start of deployment. Make sure you have a network code. If not please request one from <http://www.fdsn.org/getcode.html>.

Station name <sta>: Up to five (5) alphanumeric characters; no special characters allowed.

Channel name <chn>: MSEED channel names are defined by the sample rate, instrument (i.e. sensor) type, and channel orientation. Please refer to the seed manual V2.4 -.

Band Code:

- The first letter specifies the general sampling rate and the response band of the instrument. (The “A” code is reserved for administrative functions such as miscellaneous state of health.)

Band code	Band type	Sample rate (Hz)	Corner period (sec)
E	Extremely Short Period	≥ 80	< 10 sec
S	Short Period	≥ 10 to < 80	< 10 sec
H	High Broad Band	≥ 80	≥ 10 sec
B	Broad Band	≥ 10 to < 80	≥ 10 sec
M	Mid Period	≥ 1 to < 10	
L	Long Period	~ 1	
V	Very Long Period	~ 0.1	
U	Ultra Long Period	~ 0.01	
R	Extremely Long Period	~ 0.001	
A	Administrative		
W	Weather/Environmental		
X	Experimental		
P	Geophone- Very short period seismometer		5-10 or higher

- **The second character** specifies the family to which the sensor belongs. The third letter specifies the physical configuration of the members of a multiple axis instrument package or other parameters as specified for each instrument.

Instrument Code

H High Gain Seismometer
 L Low Gain Seismometer
 G Gravimeter
 M Mass Position Seismometer
 N* Accelerometer

* Historically some channels from accelerometers have used instrumentation codes of L and G. The use of N is the FDSN convention as defined in August 2000.

- **Third character: Orientation**

Orientation code	
Z N E	Traditional (vertical, N-S, E-W)
1 2 3	Orthogonal components
A B C	Triaxial (along the edges of a cube turned up on a corner)
U V W	Optional components

- **Location Code <loc>:** Defined by each data stream.

For PASSCAL EXPERIMENTS location codes are not required unless there is more than one sensor per station, or stations are deployed in proximity of less than 1 km. If you are already using a location code you need not remove it. We are attempting to unify the criteria of location codes for PASSCAL experiments since preferences seem to vary from experiment to experiment. If you decide to include a location code, please try to be consistent and include them not only on the headers of the mseed volumes, but also describe them in your batch file. The batch file will be used to generate the metadata, and should agree with the header of your records. Please send us an e-mail:

data_group@passcal.nmt.edu if you have any questions or comments

2. CHANNEL NAME CONVENTION GUIDE

Assignment of channel names will aid researchers, especially those unfamiliar with the general response of the instrumentation (Figure 1). It will also help those searching for specific types of data (for example short period versus broadband, or high versus low gain).

Instrument	Sample Rates (Hz)					
	>= 80	10 >= to < 80	>1 to < 10	1	0.1	0.01
STS-2	HH?	BH?	MH?	LH?	VH?	UH?
CMG-3T	HH?	BH?	MH?	LH?	VH?	UH?
CMG-ESP	HH?	BH?	MH?	LH?	VH?	UH?
TR-240	HH?	BH?	MH?	LH?	VH?	UH?
TR-120	HH?	BH?	MH?	LH?	VH?	UH?
TR-40	HH?	BH?	MH?	LH?	VH?	UH?
CMG-40T 30s	HH?	BH?	MH?	LH?	VH?	UH?
CMG-40T 1s	EH?	SH?	MH?	LH?	VH?	UH?
S-13	EH?	SH?	MH?	LH?	VH?	UH?
HS-10	EH?	SH?	MH?	LH?	VH?	UH?
L-4C	EL?	SL?	ML?	LL?	VL?	UL?
L-22	EL?	SL?	ML?	LL?	VL?	UL?
L-28	EL?	SL?	ML?	LL?	VL?	UL?
L-28LB (4.5 Hz geophone)	EL?	SL?	ML?	LL?	VL?	UL?
L-40A (40 Hz geophone)	EP?	SP?	MP?	LP?	VP?	UP?
FBA ES-T	HN?	BN?	MN?	LN?	VH?	UN?

Table 1. Recommended SEED channel names for many of the sensors available from PASSCAL

A gain of 250 V/m/s was somewhat arbitrarily chosen as the division between 'High gain' and 'Low gain' for our velocity sensors. Those 250 V/m/s and higher would use “H” as the instrument code, those less than 250 V/m/s would use “L”. This division places the STS-2, Guralps, Trilliums, S-13, and HS-10 in the high gain regime (for SEED channel naming) and the Mark Products sensors in the low-gain regime. [Note: the HS-10 is rarely shipped by PASSCAL; a search of the DMC's database shows the HS-10 (gain = 300 V/m/s @ 10 Hz) has been archived as a high gain sensor. The choice of 250 V/m/s therefore is consistent with the only instrument code used for previous submissions of HS-10 data.]

For consistency with the SEED manual, “L” is recommended as the instrument code for the 4.5 Hz geophone sensor, though in practice it is considered a geophone. The SEED manual recommends “P”, the geophone code, for sensors with a natural frequency of 5 - 10 Hz and higher.

For accelerometers, the use of the broad-band band codes "H" and "B" for the band code of the channel name are recommended. While the term "broad-band" is typical with respect to the flat portion of the response curve of velocity sensors, its use is logical for accelerometers, considering their responses are flat with respect to acceleration.

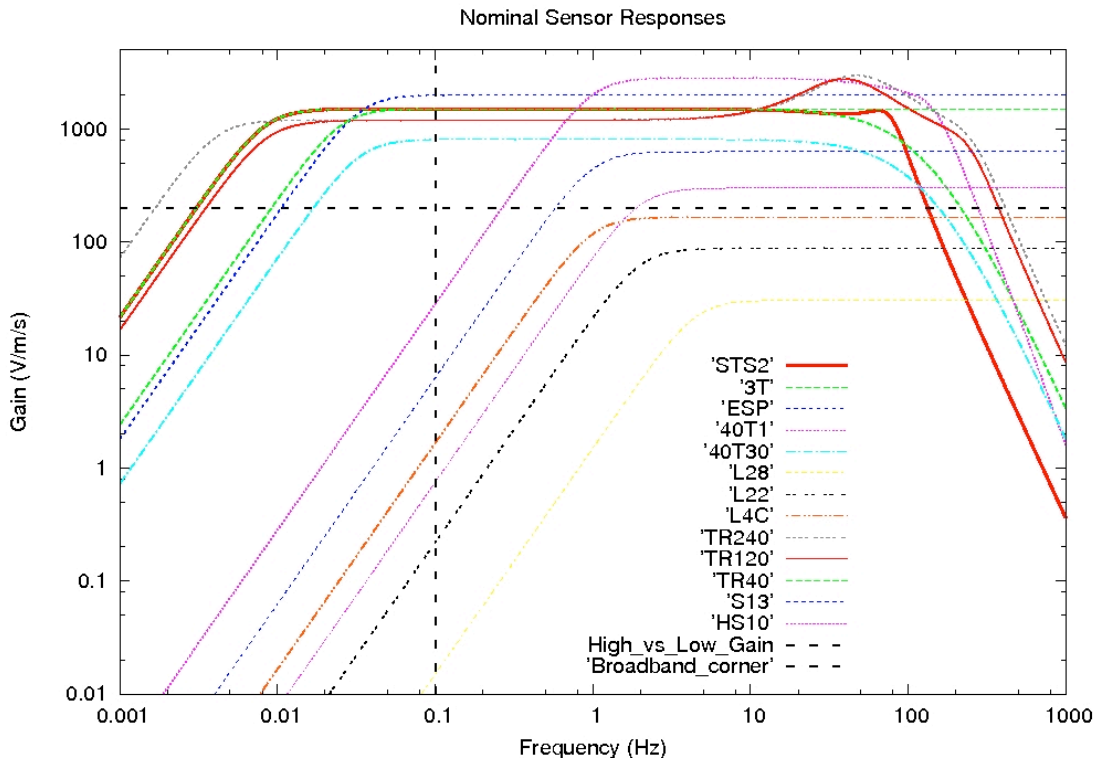


Figure 1. Nominal response for PASSCAL sensors. The black horizontal and vertical dashed lines indicate the suggested division between low and high gain instruments and the SEED manual division between broad-band and short period sensors respectively.