



DBBUILD – *ADDING NEW SENSOR AND DATALOGGERS*

ANTELOPE USERS GROUP MEETING

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DBBUILD GUI

- Graphical interface to help construct metadata database (dbmaster)
- Accesses user contributed sensor and datalogger information
- Additional sensors or dataloggers can be added

INITIAL WINDOW

- Every sensor or datalogger change gets a configuration time
- Network info stays the same
- Station information will vary
- Datalogger and sensor types can be specified and serial numbers (and additional info) are required

Master Database Construction

Database Configuration Hide Help

Configuration time Comment

Network

net network name

TA

network type network operator/origin

Station

sta latitude longitude elevation station name

Datalogger

Please select datalogger

serial number dlsta dl loc use soh State of Health Channels

s/n filename s/n pf

Sensor

? Please select sensor

1 2 3 4 5 6

serial number edepth band rsptype loc code

s/n filename s/n pf

Add Quit

DATALOGGER LIST

- Grouped by manufacturer
- Individual datalogger types
- If your particular datalogger is not listed, you will need to construct it

The screenshot shows the 'Master Database Construction' software window. The 'Configuration' tab is active, displaying a form for entering database information. The form is organized into sections: Configuration time, Network, Station, Datalogger, and Sensor. The 'Datalogger' section is expanded, showing a list of manufacturers and their respective datalogger types. The 'Sensor' section is also expanded, showing a list of sensor types. The 'Datalogger' list includes: ANF, Earth Data, Fairfield Nodal, Geological Survey of Canada, Guralp, Kinematics, Nanometrics, OBSIP, PEPPV, Paroscientific, Passcal, Quanterra, Reftek, SAIC, UWseismic, Unknown, and ZAMG. The 'Sensor' list includes: Etna, Etna-2 Acausal Filter 5Vpp Input, Etna-2 Causal Filter 5Vpp Input, Makalu Causal Filters, Makalu Non-Causal Filters, Rock Causal Filter 10Vpp Input, Rock Causal Filter 40Vpp Input, Rock Causal Filter 5Vpp Input, Rock Non-Causal Filter 10Vpp Input, Rock Non-Causal Filter 40Vpp Input, Rock Non-Causal Filter 5Vpp Input, Whitney w/Causal Filters, and Whitney w/Non-Causal Filters. The 'Datalogger' section also includes a 'Please select datalogger' button, a 'dlsta' field, a 'dl loc' field, a 'use soh' checkbox, and a 'State of Health Channels' button. The 'Sensor' section includes a 'band' field, a 'rsptype' field, a 'loc code' field, and a 's/n pf' button. A 'Quit' button is located at the bottom right of the window.

Master Database Construction

Database Configuration Hide Help

Configuration time Comment

Network

net network name

TA

network type network operator/origin

Station

sta latitude longitude elevation station name

Datalogger

Please select datalogger

ANF

Earth Data

Fairfield Nodal

Geological Survey of Canada

Guralp

Kinematics

Nanometrics

OBSIP

PEPPV

Paroscientific

Passcal

Quanterra

Reftek

SAIC

UWseismic

Unknown

ZAMG

dlsta dl loc use soh State of Health Channels

s/n pf

Sensor

Etna

Etna-2 Acausal Filter 5Vpp Input

Etna-2 Causal Filter 5Vpp Input

Makalu Causal Filters

Makalu Non-Causal Filters

Rock Causal Filter 10Vpp Input

Rock Causal Filter 40Vpp Input

Rock Causal Filter 5Vpp Input

Rock Non-Causal Filter 10Vpp Input

Rock Non-Causal Filter 40Vpp Input

Rock Non-Causal Filter 5Vpp Input

Whitney w/Causal Filters

Whitney w/Non-Causal Filters

band rsptype loc code

s/n pf

pf Clear

Quit

EXAMPLE: STS-6 SENSOR

STS-6 sensor information is not available

- Gather data sheet from manufacturer
- Confirm data sheet has all information: sensitivity, sample rates, poles and zeroes
- For missing information, contact the manufacturer

SEISMIC INSTRUMENTATION

STS-6A

360s Borehole Seismometer

New Ultra-High Performance Broadband Seismometer of the STS Family

FEATURES

- STS-1 observatory-class ultra-low-noise performance in a borehole
- Automatic levelling system compensates for up to 5 deg tilt
- More than *double* the clip level of the STS-1. Low gain for highest dynamic range
- Bandwidth extends to 50Hz - far above the STS-1 with low noise
- Thermal and magnetic shielding for ultra-low-frequency performance
- Guaranteed orthogonal 3-axis outputs



In the 1980's researchers Streckeisen, Steim and Wielandt established standards for digital very broadband (VBB) seismic recording and the Streckeisen STS-1/VBB family of products was introduced to seismological research worldwide. The principles of VBB seismometry have defined research instrumentation since then.

The Streckeisen STS family have set the world standard for broadband seismometers for over 40 years. The legendary STS-1 and STS-2 surface sensors were followed in 2010 by the STS-2.5, and in 2014, the STS-5A expanded this family with a Borehole sensor system of equal performance and reliability.

Based on Streckeisen's field proven sensor technology the new STS-6A is designed to meet the latest USGS requirements for replacing the aging seismometers in the Global Seismographic Network (GSN) – the standard instrumentation for global research. The STS-6A for the first time combines ultra-low frequency and high-dynamic-range coverage across the entire teleseismic and regional frequency bands in a single instrument. The ability to deploy such an instrument in a quiet deep borehole environment opens previously untapped research opportunities.

The sensor provides a motorized gimbal system for in situ leveling and a direct interface to the Quanterra Q330 family of recording systems for control of both the sensor and gimbal systems. It is integrated within a cylindrical 6.0" downhole package, which includes magnetic shielding for operation at high latitudes.

No intervening "host box" is required. Remote control of advanced functions is supported through a bi-directional RS-422 serial interface. The serial interface is not required for typical operation. The sensor package and cabling have been designed to tolerate continuous immersion at depths of 300 meters.

The gimbal system is powered only during sensor deployment, removal or periodic re-leveling "in situ." When not in use, the gimbal and the internal controller are automatically de-powered completely.

SPECIFICATIONS

Generator constant:	2x600 Vs/m \pm 1%
Response:	Flat to ground velocity from 2.78mHz (360s) to 50Hz \leq 20Hz: \pm 17mm/s ground velocity $>$ 20Hz: linearly derating from \pm 17mm/s to \pm 6.7mm/s ground velocity
Clip level:	
Normalized to frequency:	20..50Hz 0.42g _{pp} / 10Hz 0.21g _{pp} / 1Hz 0.021g _{pp} / 0.1Hz 0.0021g _{pp} / 0.01Hz 0.00021g _{pp}
Seismic signals output: resistance per line	max. \pm 20V differential, 220 Ω serial
Boom position output: resistance	max. \pm 10V single-ended, 1k Ω serial
Calibration input:	max. \pm 3VDC

Control inputs:	3...30VDC, 0.5mA, galvanically isolated
Communication:	RS-422, galvanically isolated
Operating temperature:	-20°C to 70°C (guaranteed), 40°C to 70°C (functional)
Humidity:	0-100% RH
Enclosure rating:	Stainless steel, exceeds IP69
Various:	RoHS and CE Compliant
Size:	Diameter 6.0" (153 mm), Length 24.0" (610 mm)
Weight:	30kg

EXAMPLE: STS-6 SENSOR

- Poles and zeroes not available – need to email manufacturer
- Generator constant = Sensitivity (convert to nm/s) in sts6.pf
- Normalization frequency = in sts6 (poles&zeroes??)
- Seismic signal output = ??

SPECIFICATIONS

Generator constant:	2x600 Vs/m $\pm 1\%$
Response:	Flat to ground velocity from 2.78mHz (360s) to 50Hz
Clip level:	$\leq 20\text{Hz}$: $\pm 17\text{mm/s}$ ground velocity >20Hz: linearly derating from $\pm 17\text{mm/s}$ to $\pm 6.7\text{mm/s}$ ground velocity
Normalized to frequency:	20..50Hz $0.42g_{nn} / 10\text{Hz}$ $0.21g_{nn} / 1\text{Hz}$ $0.021g_{pp} / 0.1\text{Hz}$ $0.0021g_{pp} / 0.01\text{Hz}$ $0.00021g_{pp}$
Seismic signals output:	max. $\pm 20\text{V}$ differential 220 Ω serial resistance per line
Boom position output:	max. $\pm 10\text{V}$ single-ended, 1k Ω serial resistance
Calibration input:	max. $\pm 3\text{VDC}$

```
originator    Jennifer Eakins, UCSD
last_modified  2018-08-28
```

```
#
#
```

```
category      Streckeisen
configuration  STS-6
```

Where did you find the data sheet?

```
info    &Literal{
```

```
Derived from https://kinemetrics.com/wp-content/uploads/2017/04/datasheet-360ser-sts6a-kinemetrics-streckeisen.pdf
```

```
}
```

```
description    Streckeisen STS-6
dfile          sts6
```

Unique description and name of response file

```
rsptype        V      # velocity instrument
band           b      # broad band
short_period_sensor  no  # Sets first character of SEED channel code
sensor_type_code H     # 2nd character in SEED channel code
```


atype	sensor
sensitivity	12e-7
iunits	nm/s
ounits	V

Sensitivity constant from data sheet

orientations		&Tbl{
Z	0	0
N	0	90
E	90	90
		}

Response (poles&zeroes) file to create

response	&datafile(responses/sts6)
----------	---------------------------

caldrive	c
active	yes
calgen	1
cal2rsp	1
calper	1


```
if any questions about values
# contact Streckeisen representative
#
# STS-6      2.78E-03 hz seismometer
# Normalized response relative to velocity
# All poles and zeroes in radians/sec
# 1          type
# 3          num of zeroes
# 7          num of poles
# 0.0        input sample interval
# 1          decim factor
# 3.60e+10   normalization factor
# 1 0        gain
```

Name and response values

```
# sensitivity 1200 v/m/sec
```

Generator Constant

```
3.60e+10
```

Normalized to 1 (evalresp)

```
7          Poles
-0.3700E-01  0.3700E-01  0.0000E+00  0.0000E+00
-0.3700E-01  -0.3700E-01  0.0000E+00  0.0000E+00
-0.9739E+01  0.0000E+00  0.0000E+00  0.0000E+00
-0.2199E+03  0.1382E+03  0.0000E+00  0.0000E+00
-0.2199E+03  -0.1382E+03  0.0000E+00  0.0000E+00
-0.2199E+03  0.6849E+03  0.0000E+00  0.0000E+00
-0.2199E+03  -0.6849E+03  0.0000E+00  0.0000E+00
3          Zeros
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0.9425E+01  0.0000E+00  0.0000E+00  0.0000E+00
```

Poles and zeroes from email request