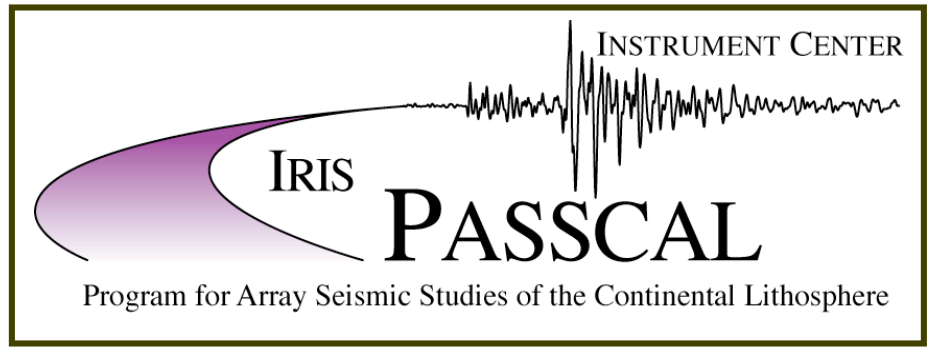


PH5 Data Processing In a Nutshell



PH5 is the recommended archiving format for controlled-source experiments. This abbreviated guide will walk you through the process. Suggested Unix command lines are highlighted turquoise. '08-021' and 'HLP' are example experiment codes - please substitute your own specific details. See the glossary on last page for definitions of terms & acronyms.

1. Initialize the ph5 file, creating an organized framework for your data:
`initialize-ph5 -k 08-021_Experiment.kef -n 08-021`
 2. Add raw data to the ph5 file. The 'trd_list' and 'rt130_list' in the command lines below are text files containing the path to each raw data file, one per line.
 - a. For Texan data:
`125a2ph5 -n 08-021 -f trd_list >& 125a2ph5.out`
 - b. For RT130 data:
`1302ph5 -n 08-021 -f rt130_list >& 1302ph5.out`
- ```
Example trd_list file
#
../raw/I1303RAW309.TRD
../raw/I1308RAW309.TRD
../raw/I1313RAW309.TRD
```
3. Create a dep (deployment) file by combining the geometry, das, and shot files:  
`tsp2dep -g -u HLP_geometry -d HLP_das -s HLP_shots >& 08-021.dep`. You can also make the dep file by hand; use the format shown in the glossary. The *LUNCH BOX* system, available from PASSCAL, can help organize meta-data and generate a .dep file automatically. See Appendix B for more information on deployment files.
  4. Build a kmz file to view the experiment geometry: `kmz-builder -d 08-021.dep`. Open the resulting \*.kmz file with Google Earth to see your experiment map. Correct any errors in the .dep file before proceeding.
  5. Load the deployment file into the ph5 file: `dep2ph5 -n 08-021 -d 08-021.dep >& dep2ph5.out`
  6. View the contents of your ph5 file with `hdfview`; browse the gui to find the \*.ph5. Use caution - careless editing may corrupt the file.
  7. Calculate the source-to-receiver offset for each station and shot: `geod2kef -n 08-021 >& 08-021-Offset_t.kef`
  8. Texan data needs timing-drift corrections; create a .kef file for this. RT130 users may skip this step.  
`time-kef-gen -n 08-021 >& 08-021-Time_t.kef`
  9. Define the sensor orientation.
    - a. Create a receiver\_t.kef text file, see example next page. Most 3-component users can use this example verbatim; edit only for non-standard orientations.
    - b. Single-component users need just one row of this table. Use whichever axis you recorded, Z, N, or E.
    - c. Later you'll add this file, and the other .kef files, to the ph5 file with `kef2ph5`, as shown in step 11.

- 10.** Describe the event windows. Using *hdfview*, locate the SOH arrays. Find a das# that recorded during all of the event windows. Run *sort-kef-gen* to build a kef file, calling the das# you found with the -s option: `sort-kef-gen -n 08-021 -s 11025 > 08-021-Sort_t.kef`

- 11.** Load the \*.kef files into the PH5 file with *kef2ph5*:

- a. Starting with the source-to-receiver offsets from step 7, use the -c option to check that the files are error-free:  
`kef2ph5 -n 08-021 -k 08-021-Offset_t.kef -c >& Offset_kef2ph5.out`  
Inspect the output file; if no errors, repeat **without** -c and output file:  
`kef2ph5 -n 08-021 -k 08-021-Offset_t.kef`
- b. Next, check the timing corrections from step 8:  
`kef2ph5 -n 08-021 -k 08-021-Time_t.kef -c >& Time_kef2ph5.out`  
Inspect the output file; if no errors, repeat **without** -c and output file:  
`kef2ph5 -n 08-021 -k 08-021-Time_t.kef`
- c. Repeat this 2-step *kef2ph5* loading process for the receiver\_t.kef and the Sort\_t.kef files (from steps 9 & 10).

```
Example "receiver_t.kef" file
Nov. 2, 2009
#
Table row 1
/Experiment_g/Receivers_g/Receiver_t
orientation/azimuth/value_f = 0.0
orientation/azimuth/units_s = degrees
orientation/dip/value_f = -90.0
orientation/dip/units_s = degrees
orientation/description_s = Z
Table row 2
/Experiment_g/Receivers_g/Receiver_t
orientation/azimuth/value_f = 0.0
orientation/azimuth/units_s = degrees
orientation/dip/value_f = 0.0
orientation/dip/units_s = degrees
orientation/description_s = N
Table row 3
/Experiment_g/Receivers_g/Receiver_t
orientation/azimuth/value_f = 90.0
orientation/azimuth/units_s = degrees
orientation/dip/value_f = 0.0
orientation/dip/units_s = degrees
orientation/description_s = E
```

- 12.** Should you find an inaccurate table in the ph5 file, follow these steps to correct it:

- a. Download the table in question to a kef file with *tabletokef*: `tabletokef -n 08-021 -C > 08-021-receiver_t.kef`  
This command would download the receiver table (shown above). To retrieve the event table, use the -V option; for array table Array\_t\_001 use option "-A 1". In the following example, we're working on the receiver table.
- b. Remove all rows unaffected by the change by deleting them from the kef file entirely - otherwise those rows will be duplicated when you reload the kef file as a table. Add the string 'Update:description\_s' to the row description *only* for those rows which need revision. Here's an example for how to change the vertical dip in the receiver\_t.kef file, leaving the other rows unchanged by deleting them from your working kef file:
- ```
# Table row 1
/Experiment_g/Receivers_g/Receiver_t:Update:description_s
orientation/azimuth/value_f = 0.0
orientation/azimuth/units_s = degrees
orientation/dip/value_f = -89.0
orientation/dip/units_s = degrees
orientation/description_s = Z
```
- c. Check the kef file syntax and formatting with *kef2ph5 -c*, as shown in step 11. If no errors are detected, load the table corrections back into the ph5 by running *kef2ph5* again, this time without the -c option. (If all goes well, you'll see no difference in the table other than the change from -90.0, as in the example in the box above, to -89.0.)

- 13.** Create the DMC request key and data description files, which will inform future users and enable access to the data:
`report-gen -n 08-021 -k -d` Some hand-editing of the resulting data_description file may be needed to correct the formatting; more text may be added if desired.

- 14.** Load the data request key and data description file you just made by using *report2ph5*. Other data reports in MSWord, pdf, postscript, or text file formats may also be loaded with *report2ph5* if desired.

- 15.** Please contact us before sending the data: data_group@passcal.nmt.edu, or call (575) 835-5070. We accept FTP, DVD, and USB/fire-wire hard drive. Hard drives will be returned after the data archiving is complete. DVDs will be recycled or disposed unless you request they be returned. **Be sure to label your drives and disks clearly** - we have many incoming shipments. Your items could be misdirected without proper identification.

Ship your controlled-source data to:

IRIS PASSCAL Instrument Center
New Mexico Tech (& name of contact person, if known)
100 East Road
Socorro, NM 87801

GLOSSARY

Italicized terms are ph5 tools available on the command line.

das – data acquisition system (Texan, RT130, etc.); otherwise known as a datalogger.

das file – a tsp file relating the das# to the station id.

dep (deployment) file – contains shot info (id#, coordinates in decimal degrees, time); and receiver info (id#, type, coordinates in decimal degrees), one entry per line. See abbreviated example below. Note that the number of semi-colons is important as they are field delimiters.

```
SHOT;9937;9937;9;N36.574444;W128.893611;0.0;2008:307:03:44:59.379;;;;;
SHOT;9940;9940;9;N36.319167;W129.356944;0.0;2008:307:03:51:59.301;;;;;
#
RECV;12187;1265;1;texan;1;;;N37.667712;E126.461056;;;;;
RECV;10765;1275;1;texan;1;;;N37.666352;E126.465401;;;;;
RECV;10996;1285;1;texan;1;;;N37.666583;E126.472629;;;;;
```

event window – the predicted length of time for a seismic wave to travel from the shot to receiver.

geometry file – a tsp file relating station id# with UTM (Universal Transverse Mercator) coordinates.

hdfview – a Java-based database viewer used to browse ph5 files.

kef2ph5 – loads a kef file in to a ph5 file, opposite of *tabletokef*.

kef file, *.kef – kitchen exchange format; text is readable by ph5 scripts.

ph5 file – PASSCAL's implementation of HDF5, a file format for large & complex datasets.

shot file – a tsp file relating shot id's & times.

tabletokef – exports a ph5 table to a kef file for easy access, editing, or revision; opposite of *kef2ph5*.

trd, TRD – Texan raw data, a file format.

tsp2dep – converts tsp to dep file format.

tsp file – Texan Streamline Processing; TSP is available from UTEP (University of Texas, El Paso).