Metadata tips:

* Texan serial numbers in the metadata must have 10,000 added to their value for the batch and par files. So, Texan 2345 should be listed as 12345 and Texan 643 would be 10643. This reflects the internal serial number for the unit, which is represented as I2345 and I0643 in the file name of the .TRD file.

* Normally Antelope each sensor needs to have a unique serial number. Since the GS-11 geophones do not have individual serial numbers, in our example we made some up. If you have a large number of stations, you can use the same value for all sensors since we modified the axis statements in the batch file with the 'Q' in place of the lead designation.

```
#comment: this is a batch file example

net PI PASSCAL network

sta PI47 37.8260 -122.4792 0.010 Station PI47
time 03/14/2015 00:00:00
datalogger rt125 11935
sensor GS11V 0 47
axis Z 0 180 - Q 32
samplerate 250sps
channel Z DHZ
add

close PI47 03/16/2015 23:59:59

sta PI48 37.8091 -122.4772 0.010 Station PI48
time 03/14/2015 00:00:00
datalogger rt125 12348
sensor GS11V 0 48
axis Z 0 180 – Q 32
samplerate 250sps
channel Z DHZ
add

close PI48 03/16/2015 23:59:59
```

RT125 (Texan) Data Processing In a Nutshell

Last revised: 14 June 2016

These abbreviated instructions show how to transform RT125 data into SEED format. **Unix commands (bold print)** and any command line arguments are highlighted in yellow.

1. Create and maintain an organized directory structure for your data. Start by creating a main directory for your project. Once the main project directory is made, create subdirectories within it for your raw data (RAW) and database (DB). For example: **mkdir** RAW (move .TRD files here), **mkdir** DB (for database files along with batch and par files).

2. In the DB directory, use a text editor to create a batch file describing every station in your network. See the template and the metadata tips at the end of this document to get started.

```
#das; refchan; refstrm; netcode; station; channel; samplerate; gain

11935;    1;    1;    PI;   PI47;   DHZ;    250;   32
12348;    1;    1;    PI;   PI48;   DHZ;    250;   32
```

3. Next you will need to create a parameter file in the DB directory that our tool, **trd2mseed**, can parse. You can either use batch2par: **batch2par** <*batchfile*> > <*parfile*> or use a text editor and the format above to create one from information in the batch file. Please note that if you use **batch2par** the 'refstrm' column might need to be hand-edited because the initial output will not be understood by rt2ms. You will also need to edit the 'gain' column because changing the placeholder value of x1 to your instrument gain (usually 32).

4. In the main project directory create a list of raw Texan (.TRD) files that includes the path to the files:
   ls RAW/* > raw-files.lst

5. Convert TRD files into miniseed:
   trd2mseed –v –f raw-files.lst –o MSEED –p DB/parfile >& trd2ms.out

   A file listing the information needed for clock corrections, passcal.pcf, will be created in the MSEED directory. **trd2mseed** applies clock corrections to the data by default, with a couple of exceptions. The first exception is a switch, --no_clock_corrections, which will prevent clock corrections from being applied; a pcf file will still be generated. The second is a switch to prevent clock corrections to instruments with excessive clock drifts. Excessive clock drifts are identified by the slope of the drift. The default is to ignore drift rates over 1% but there is also a switch that will allow you to set the maximum slope at which corrections will be applied. See **trd2mseed** –h for more options.

6. In the DB directory, build the Antelope database using the batch file you built in Step 2:
   dbbuild -b <*dbname*> <*batchfile*> >& dbbuild.out

7. View your database in the DB directory: **dbe** <*dbname*>. You might want to take a quick look at the site table for location inaccuracies and the sitechan table to check that all of your channels and on/off dates are correct. If you find errors or inaccuracies, correct the batch file and repeat Steps 6 & 7. At this point you have a descriptive framework (metadata only) - the next step is to attach the waveforms.

8. When you're reasonably certain the database is error-free you can run **miniseed2days** in the project directory to create station/channel/day volumes and link the waveforms:
   miniseed2days -d DB/<*dbname*> -u -w "day_volumes/%{sta}/%{sta}.%{net}.%{loc}.%{chan}.%Y.%j" MSEED/*.m >& msd2days.out

   This command specifies an organized directory path and the required filename structure. The (–u) flag's mapping of files can cause file limit problems. Use **unlimit descriptors** (UNIX) or **launchctl limit maxfiles** 10000 (Mac) to increase these limits. Use **man miniseed2days** for more information on parameters.

9. Correlate the channel ids between tables by running:
   dbfixchanids <*dbname*> in the DB directory.

10. Verify the correlation of your data and database:
    dbversdwf –tu <*dbname*> >& dbversdwf.out This checks that the times in the wfdisc agree with the mseed times.
    Also run: **dbverify** –tj <*dbname*> >& dbverify.out This checks only for the consistency of 2-table joins on all possible combinations of database tables. Check the resulting dbverify.out file for errors. If necessary, fix the batch file and repeat Step 6.

11. Create the dataless SEED volume (a.k.a the dataless) in the DB directory with the following naming convention: **mk_dataless_seed** –o NN.YY.dbname.YYYYDOYHHMM.dataless <*dbname*>
    Where: **NN** is your network code, **YY** is the year of your data, and **DOYHHMM** is the approximate **current** day-of-year-hour-minute. The dataless is a type of index of the metadata that allows you and future users to see what data are available. If any station or time range is missing from the dataless, the corresponding data are orphaned and totally inaccessible by anyone.

12. Verify the dataless. Run **seed2db** –v NN.YY.dbname.YYYYDOYHHMM.dataless >& seed2db.out

13. Last step: Please drop a note to *data_group@passcal.nmt.edu* before sending the data to PASSCAL so that we can set up a receiving area. Attach your latest dataless to this email unless it is larger than 5Mb. You can use our tool **data2passcal** to automatically send the waveform data.

See the back page for an example batch file as well as important metadata tips!