

## APPENDIX E - FIXHDR HELP

**Fixhdr** is a PASSCAL tool used to correct mseed header fields, to address timing issues and change endianness. It can be used as a graphical user interface as seen below, or from the command line. The following text describes basic usage and functionality of **fixhdr**. Note **fixhdr** searches the specified directory and all its subdirectories for mseed files.

### 1) Setting Network, Station, Location, and Channel Codes

**Fixhdr** allows one to set the network, station, location, and channel codes of the data header. One may use the **fixhdr** GUI to make simple changes to a channel name for example, or the command-line option which allows one to implement large scale, service-run-wide changes via a batch file. We recommend the use of the command line and batch file mode of operation when possible as it allows the use of a template. This makes repetitive hand entry unnecessary and minimizes the chance of human error.

Templates can be imported (**Load Header Template**) and exported (**Save Header Template**). A quick and safe way to generate the template is by building the database of your traces, which will load the current headers of your files. Then go to the **Global Modify** tab and assign global modifications of the net, network code, channel and location code associated to sample rate. After setting modifications for the stations you may save your template and run **fixhdr** in batch mode from the command line or by **Modifying Headers** under the **Trace Headers** tab.

Below is an example of **fixhdr** in batch mode (note: no GUI will appear):

```
fixhdr -m batch_file /path/to/data
```

#### a. Using the command line and batch file options to modify headers

Header fields you will need to consider are: station name, channel name, location code (optional), and network code. Please refer to Appendix X of this manual, or the Standard for the Exchange of Earthquake Data, Reference Manual, SEED Format Version 2.4 (<http://www.iris.edu/manuals/>) for channel naming conventions. Below is an example of a batch file built by saving the template with **fixhdr**:

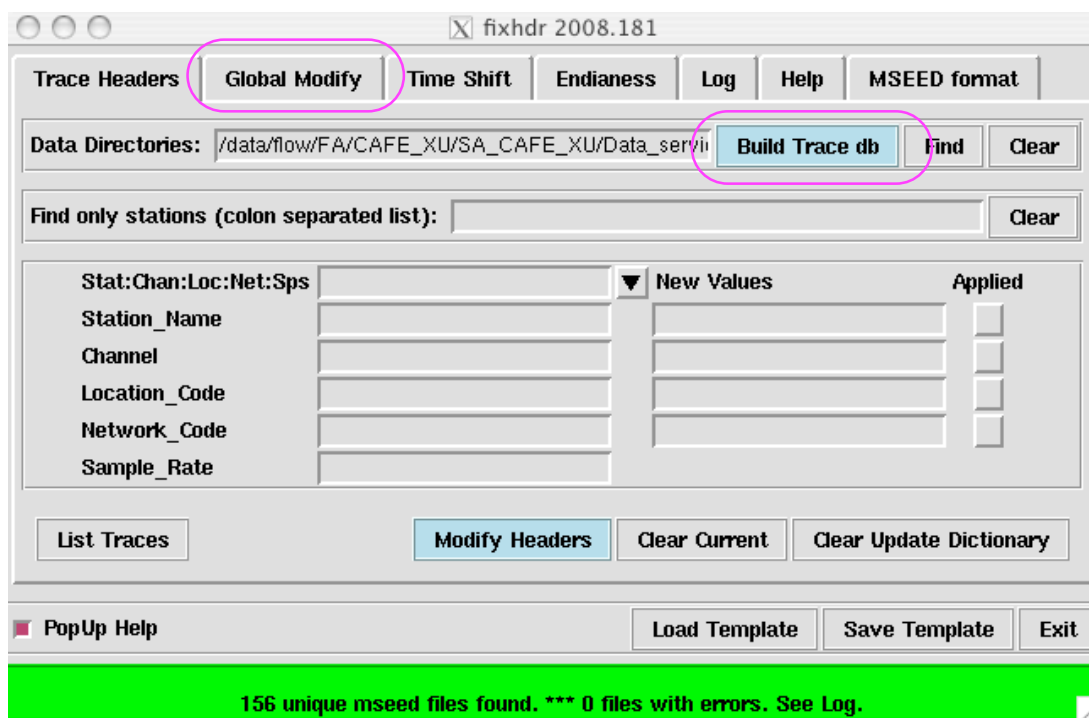
```
# Header Changes
hdrlist{
# stat:chan:loc:net:sps      new sta:chan:loc:net
0965D:1C1::XX:100.0        PA01:EHZ::YW
0965D:1C2::XX:100.0        PA01:EHN::YW
0965D:1C3::XX:100.0        PA01:EHE::YW
09511:1C1::XX:100.0        PA02:EHZ::YW
09511:1C2::XX:100.0        PA02:EHN::YW
09511:1C3::XX:100.0        PA02:EHE::YW
0969D:1C1::XX:100.0        PA03:EHZ::YW
}
```

Note in this example we are not using the location code. If you decide to use location code (let's say you use 00) it should look something like:

```
# Header Changes
hdrlist{
# stat:chan:loc:net:sps      new sta:chan:loc:net
0965D:1C1:00:XX:100.0      PA:01:EHZ:00:YW
}
```

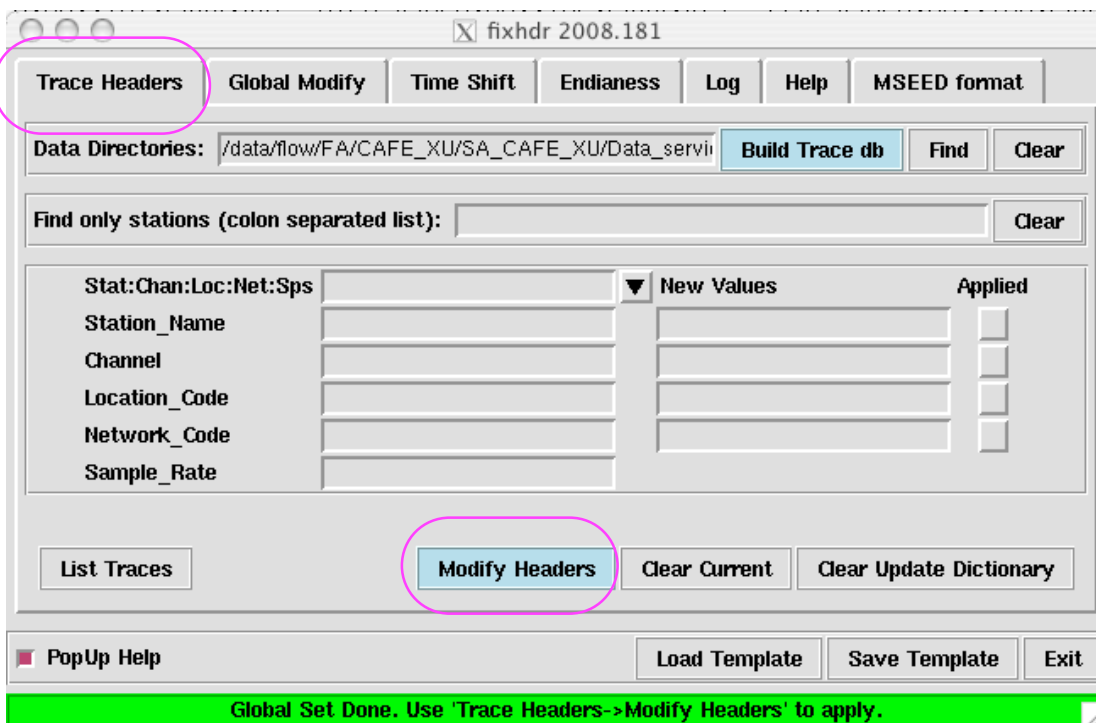
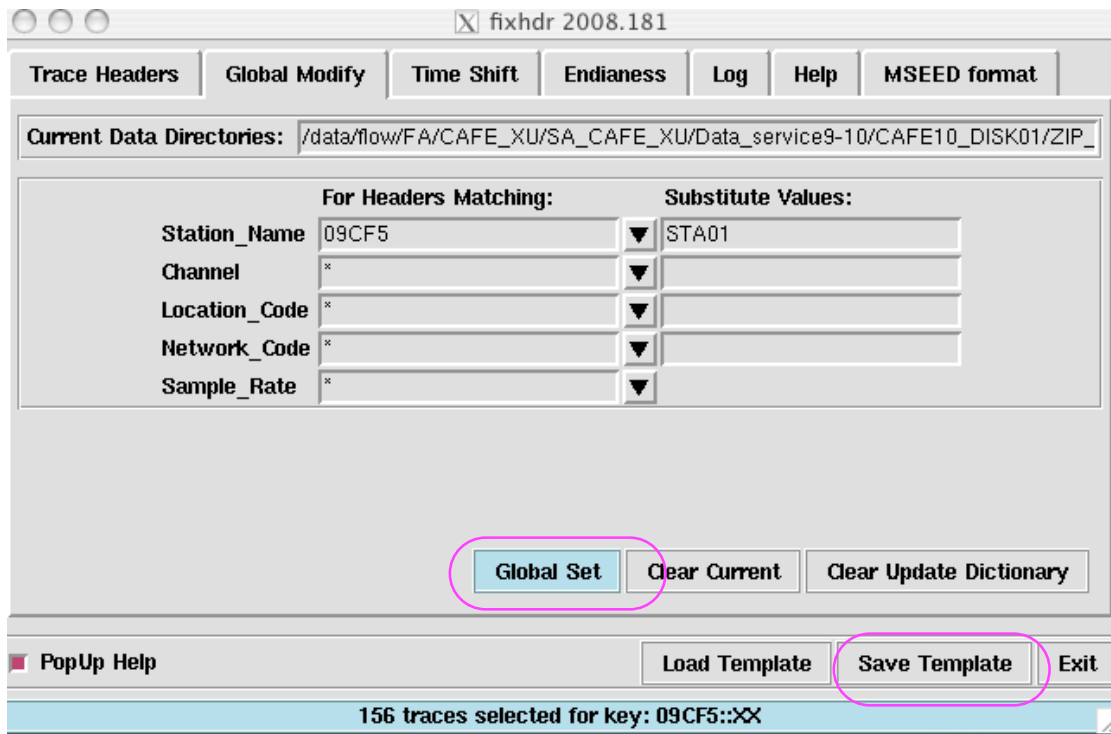
### b. Using the GUI to modify headers

To modify the headers with the GUI, first build the trace database. Locate the directory with your traces and then click **Build Trace db**. This may take a while, depending on the number and size of files. You'll have the option to locate the traces once it is running. Launching the program in the trace directory will simplify your setup.



Once you have built your trace database, select **Global Modify** and assign global modifications for station name, channel, location code, network code, and sample rate. You can save the modifications in a template file for later use, or reference then change the headers. Saving the desired modifications to a template is recommended.

To build the template via the GUI, select **Global Set** followed by **Save Template** to build and save your template. Now select **Modify Headers**, which is under the **Trace Headers** radio button, to implement the changes to the headers. (See next page.)



Templates may be imported via **Load Template** then used to operate on the files in the trace database. After loading the template, select **Modify Headers** to globally change the headers.

After completing the modification of the traces, you can take a look at the log file via the **Log** tab (saving for reference is recommended via the **Save Log File** button) and rebuild the trace db (under the Trace Headers tab) to make sure all the changes were applied as expected.

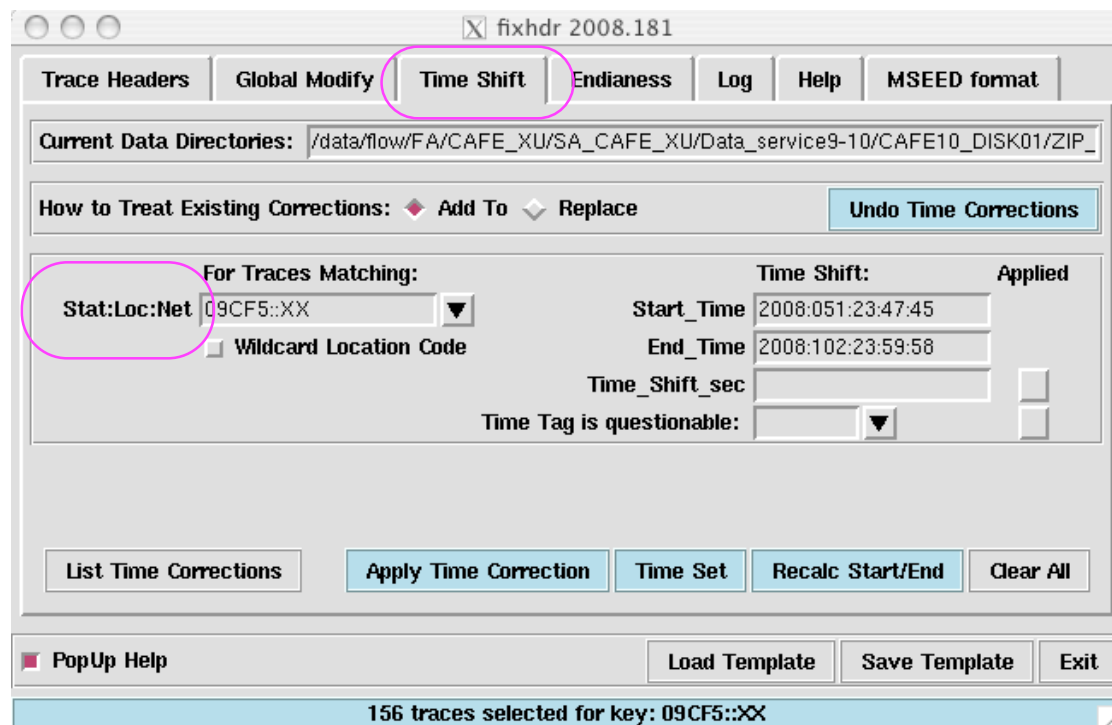
## 2) Timing shifts and Flagging questionable timing

**Fixhdr** has the capability to apply bulk shift timing corrections. Before beginning you need to know:

- 1) sta:loc:net code of the station
- 2) time shift to apply
- 3) time range for which the time shift is necessary.

Launch **fixhdr** by typing it on the command line. Build the trace database as described earlier in section 1b, “Using the GUI to modify headers”.

Select the **Time Shift** tab, then select the Stat:Loc:Net of the traces you need to correct.



Once you select a Stat:Loc:Net, fixhdr will calculate the start and end time that encompasses all of the traces it found when you executed **Build Trace db**. Adjust these start times to reflect the necessary time correction.

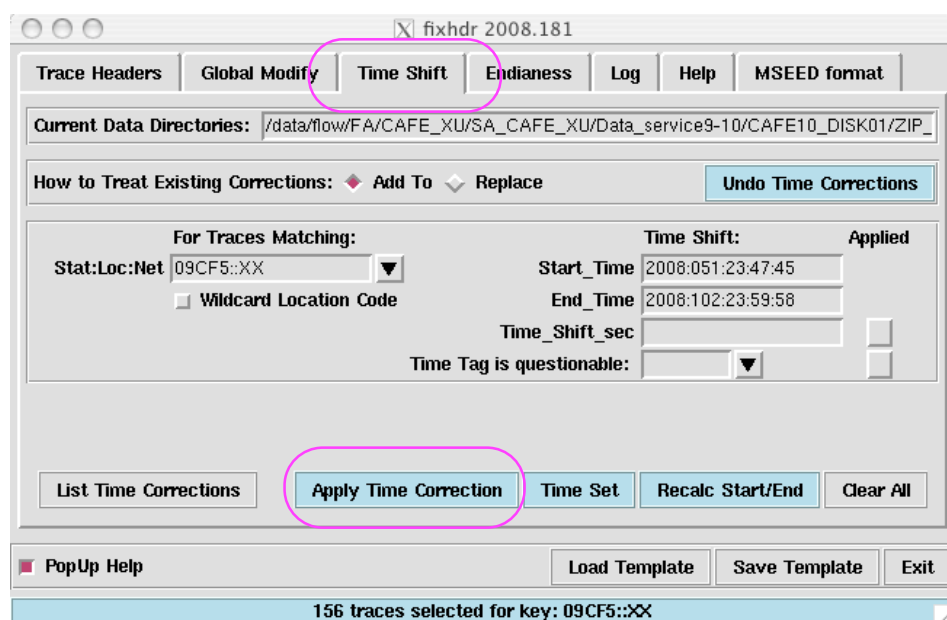
You have two options regarding how to treat previously existing timing corrections:

The first (default) is to add your correction or shift to any correction currently recorded in the mseed header (field 14, the time correction field). There are three cases that **fixhdr** recognizes:

- 1) An old shift exists and has been applied.
  - a. New shift is applied to record start time
  - b. New shift is added to time correction field
- 2) An old shift exists but has not been applied
  - a. New shift is added to old shift. Sum is applied to record start time
  - b. Sum is entered in time correction field
  - c. Activity flag Bit 1 is set
- 3) No old shift exists
  - a. New shift is applied to record start time
  - b. New shift is entered in time correction field
  - c. Activity flag Bit 1 is set

The second option is to replace any existing time correction. Again there are three cases:

- 1) An old shift exists and has been applied.
  - a. Old shift is removed and new shift is applied to record start time
  - b. New shift replaces old shift in time correction field
- 2) An old shift exists but has not been applied
  - a. New shift is applied to record start time
  - b. New shift is entered in time correction field
  - c. Activity flag Bit 1 is set
- 3) No old shift exists
  - a. New shift is applied to record start time
  - b. New shift is entered in time correction field
  - c. Activity flag Bit 1 is set

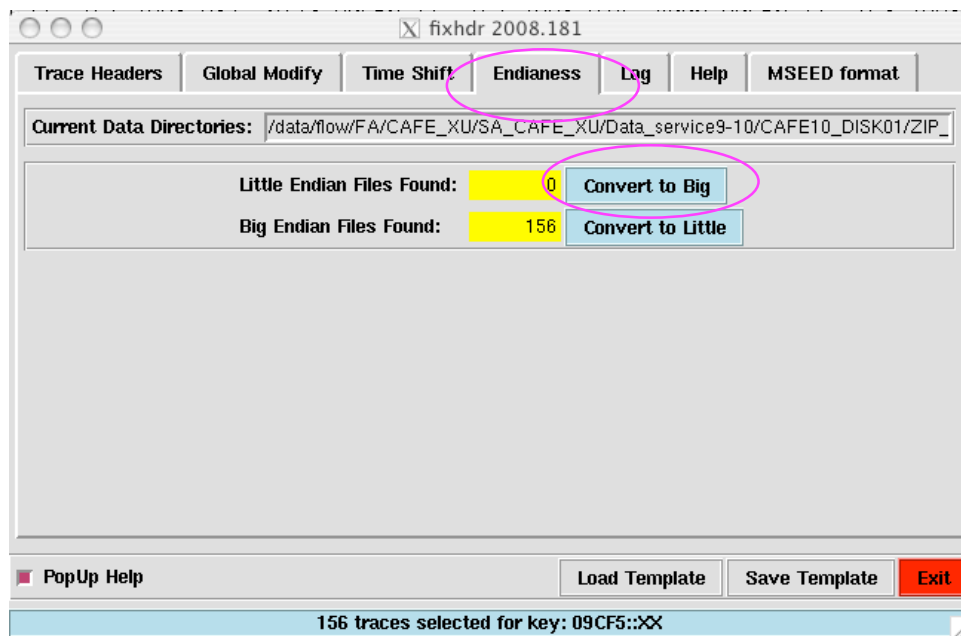


Once you've selected the Stat:Loc:Net, entered start and end times, and selected to add or replace the time shift, you need to enter the time shift in the appropriate field. Then hit **Apply Time Correction**. You may also set the **Time Tag is questionable** flag for a time period when timing quality is suspect. These time corrections may take a while if you have a large number files or large files.

All of your applied corrections will be summarized under the **Log** tab. The **Help** tab further describes the use of this program. You can check the effects of **fixhdr** time shifting by using the program **mseedpeek** to view mseed headers.

### 3) Modifying Endianness on your files

For archiving purposes we require the mseed day volumes be in big endian byte order. You can accomplish this task by building your trace db as described previously, then select **Convert to Big** (if any Little Endian files were found) under the **Endianness** tab.



Pay no attention to the skull & crossbones that occasionally appear in fixhdr. Some programmer was just having a bit of fun.