Fwd: SETI Spectrometer Data
1 message

Ekaterina Vydra <kavydra2337@eagle.fgcu.edu>   Tue, Feb 16, 2016 at 2:04 PM
To: Andy Lezcano <alezcano4033@eagle.fgcu.edu>, Austin Nafziger <arnafziger0478@eagle.fgcu.edu>,
"henk1Andrew@gmail.com" <henk1Andrew@gmail.com>

    We got the sample files!

    Sent via the Samsung Galaxy Note5, an AT&T 4G LTE smartphone

    -------- Original message --------
    From: "John K. Arballo" <John.K.Arballo@jpl.nasa.gov>
    Date: 02/16/2016 1:58 PM (GMT-05:00)
    To: Ekaterina Vydra <kavydra2337@eagle.fgcu.edu>
    Cc: Steve Levin <Steven.M.Levin@jpl.nasa.gov>, Tom Kuiper <kuiper@jpl.nasa.gov>
    Subject: Re: SETI Spectrometer Data

    Hi Katya,

    I think you may have already asked me for some data and I may have forgotten about it. I'm sorry I didn't get
    back to you.

    You should be able to access any of the data/header files via a web browser. Use the data source name (e.g.,
    "spc00441_20151208_120903" for the example header file), prepend it with "http://galileo.gavrt.org/seti/data/" and
    append ".hdr" for the header file, ".hit" for the binary data file. So, for this example...

        http://galileo.gavrt.org/seti/data/spc00441_20151208_120903.hit

    should get you the data file. It's about 69 MB, which is why I'm not just sending it to you directly.

    Are you looking for the ROACH source code? I don't think I have that.

    John

    On 2/15/2016 10:01 AM, Ekaterina Vydra wrote:

        Hi John,

        Could we get the sample file(s) associated with that header file that you provided?

        Also I believe you have the original SETI spectrometer source code that we need. If
        any of that could be posted on the GitLabs along with any other code that you
        believe would be useful for our ROACH adaptation we would really appreciate it.
        We are mostly looking forward to the binary data file associated with the sample
        header file.

        Thank you so much.

Best Wishes,

Katya

From: John K. Arballo <John.K.Arballo@jpl.nasa.gov>
Sent: Monday, January 4, 2016 1:16 PM
To: Ekaterina Vydra
Cc: Steve Levin
Subject: SETI Spectrometer Data

Hi Katya,

I hope you took some time away from your studies to enjoy the holidays.

I owe you some information about the SETI spectrometer data format. Each spectrometer hit is stored in the following C struct (I'm currently using int16_t for the spectrum_no and power but just assume uint16_t as below for now), with binary mode I/O using fread/fwrite:

```
#include <stdint.h>

struct hit_struct{
   uint16_t spectrum_no;
   uint16_t pfb_bin;
   uint16_t fft_bin;
   uint16_t power;
};
```

where
  1) spectrum_no is the spectrum number starting at 0 at the beginning of a sky frame scan. Each spectrum for bee2 is ~0.67 sec.
  2) power is just a raw power from the spectrometer
  3) pfb_bin is the coarse polyphase filter bank (PFB) bin number, ranging from 0 to 4095
  4) fft_bin is the fast Fourier transfer (FFT) bin number, ranging from 0 to 32767

The frequency is derived from 3 and 4 above as follows:

  1) The PFB bin upper and lower ranges are swapped, so the range 0 to 2047 becomes 2048 to 4095; 2048 to 4095 becomes 0 to 2047.
```
        if (pfb_bin < 2048)
          pfb_bin += 2048;
        else
          pfb_bin -= 2048;
```

  2) The FFT bin upper and lower ranges are swapped, so the range 0 to 16383 becomes 16384 to 32767; 16384 to 32767 becomes 0 to 16383.
```
        if (fft_bin < 16384)
          fft_bin += 16384;
        else
```

```
        fft_bin -= 16384;
```

  3) Our bandwidth is 200 MHz (centered at 8450 MHz), so the frequency within our 200 MHz range is then...
     200.0e6 * (pfb_bin * 32768 + fft_bin) / (32768 * 4096)
     (the above calculation is shown with integers for brevity but the actual calculation is done in double precision)

A plain text header file (see attached example file) is associated with each binary data file. Some of this is fairly obvious but I'll send you some additional explanation for this file when I get a chance.

I hope this helps. Please ask if I've left anything out or if you have other questions.

John