SdrNav00

Flexible L1 data grabber for GNSS SDR receivers

Main components

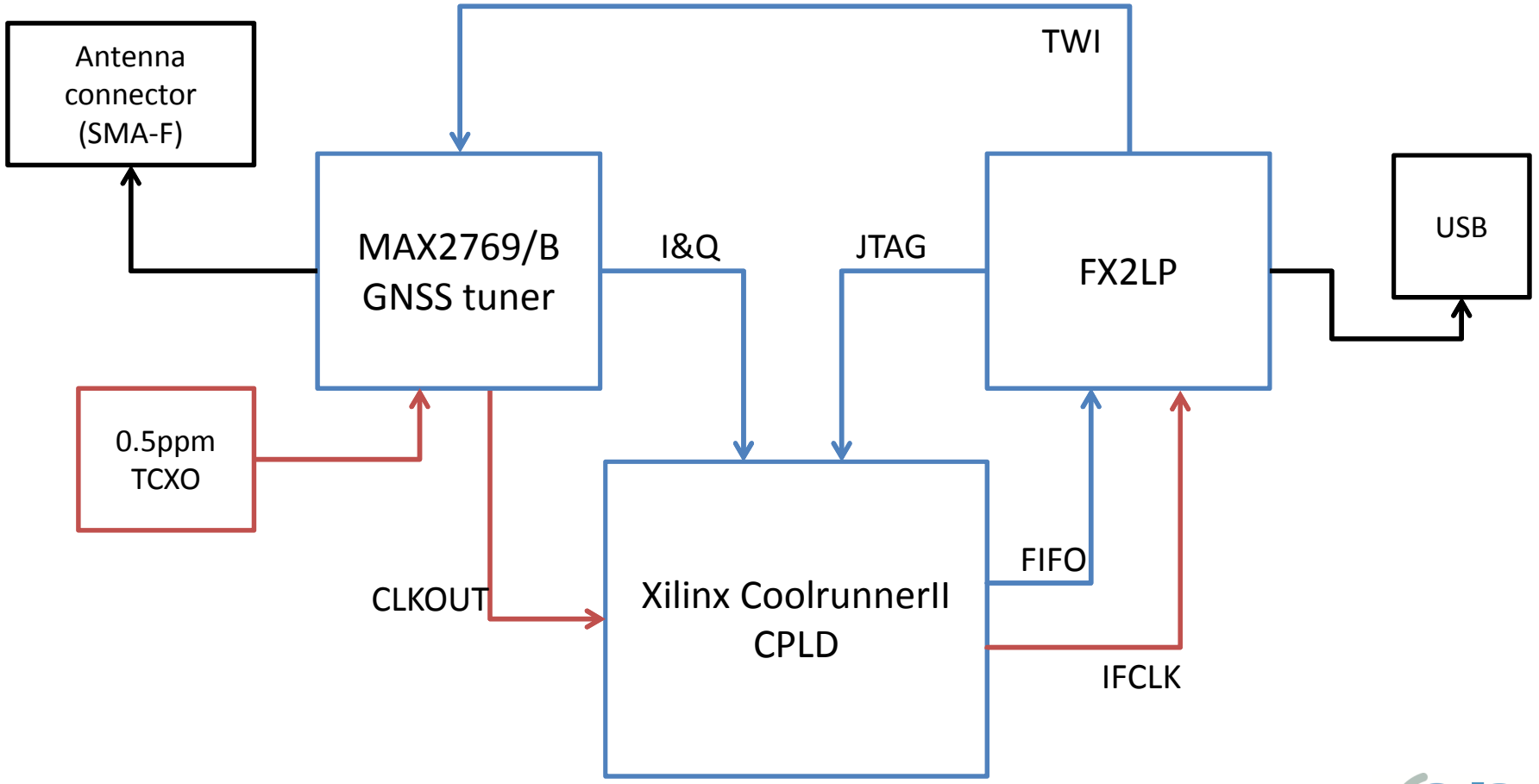
- One satellite tuner covering 1550-1610MHz band (Maxim/Dallas MAX2769)
- Minicircuits BFCN-1575+ BP filter
- Xilinx XC2C64A CPLD
- Cypress CY7C68013 USB-HS transceiver

Features

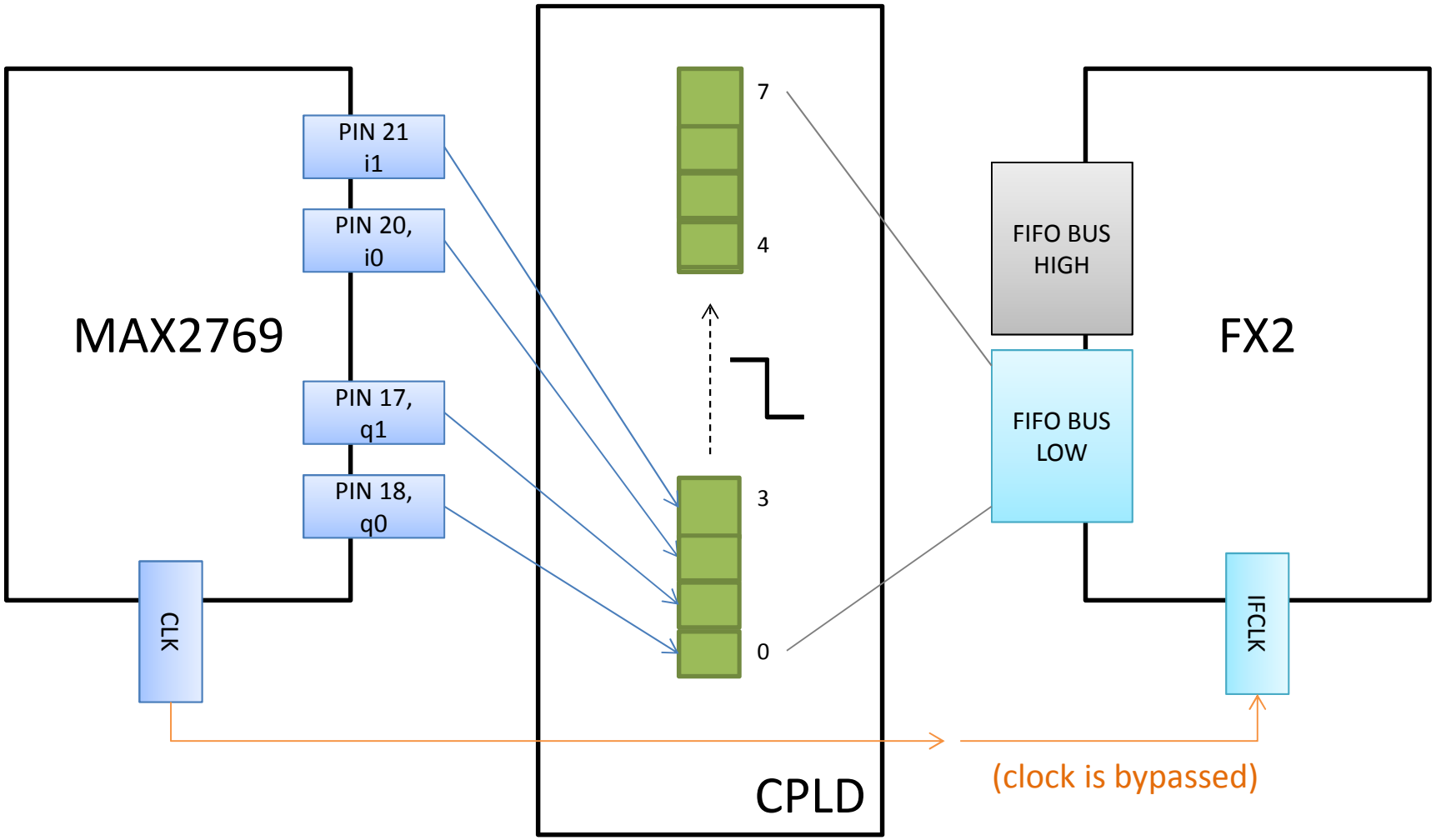
- Wide receiver bandwidth (±8MHz)
- Up to 3 bit/sample ADC
- 30MByte/sec data rate to host
- Software reconfigurable via USB
- Receives GPS+Galileo+SBAS, Glonass, Compass, QZSS
- Windows™ and Linux compatibility

one TALENT GNSS

SdrNav00 simplified block diagram

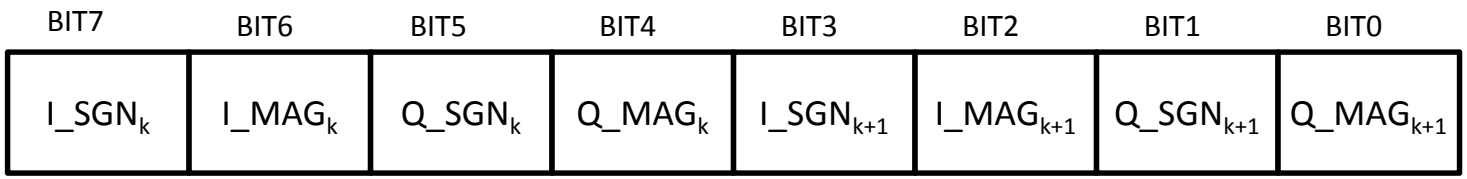


CPLD Glue Logic

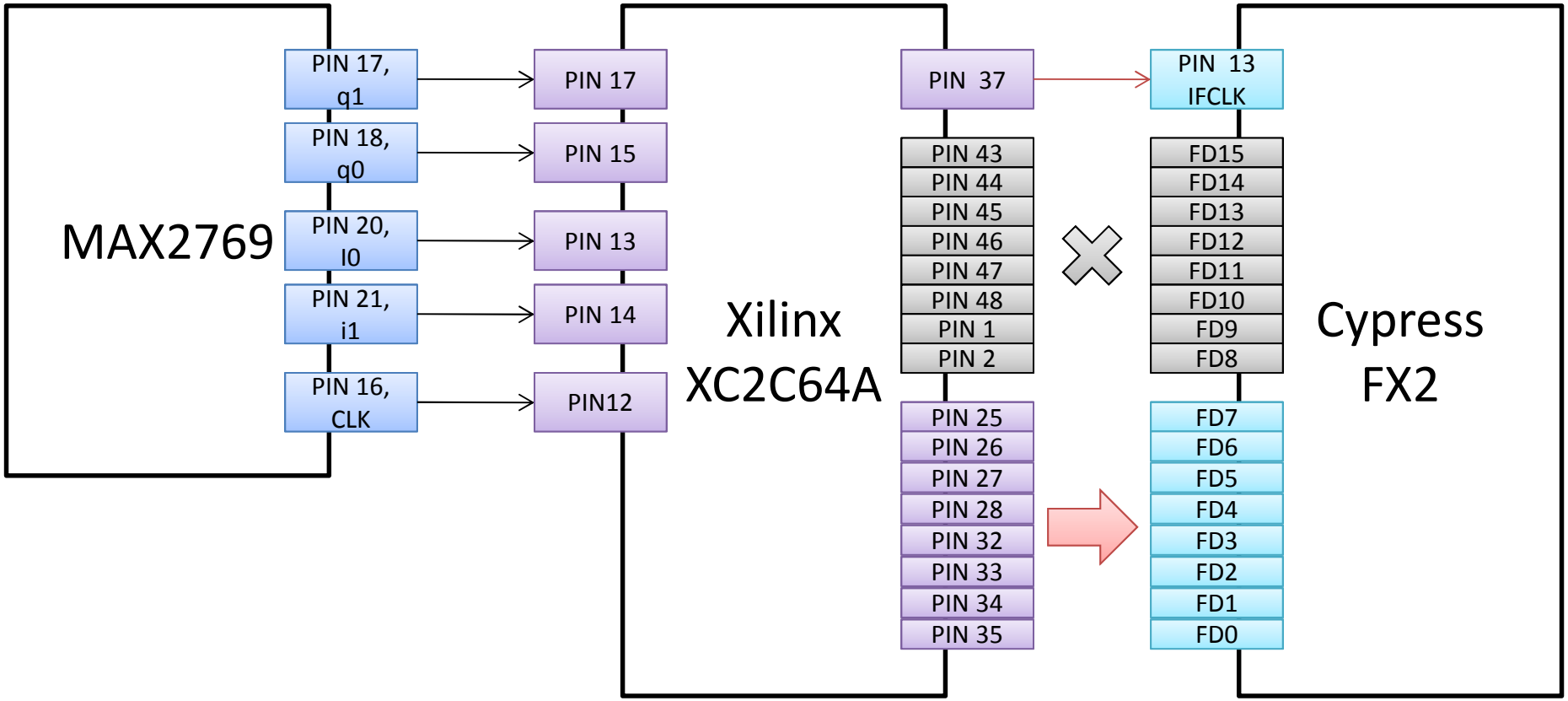


Default data packing

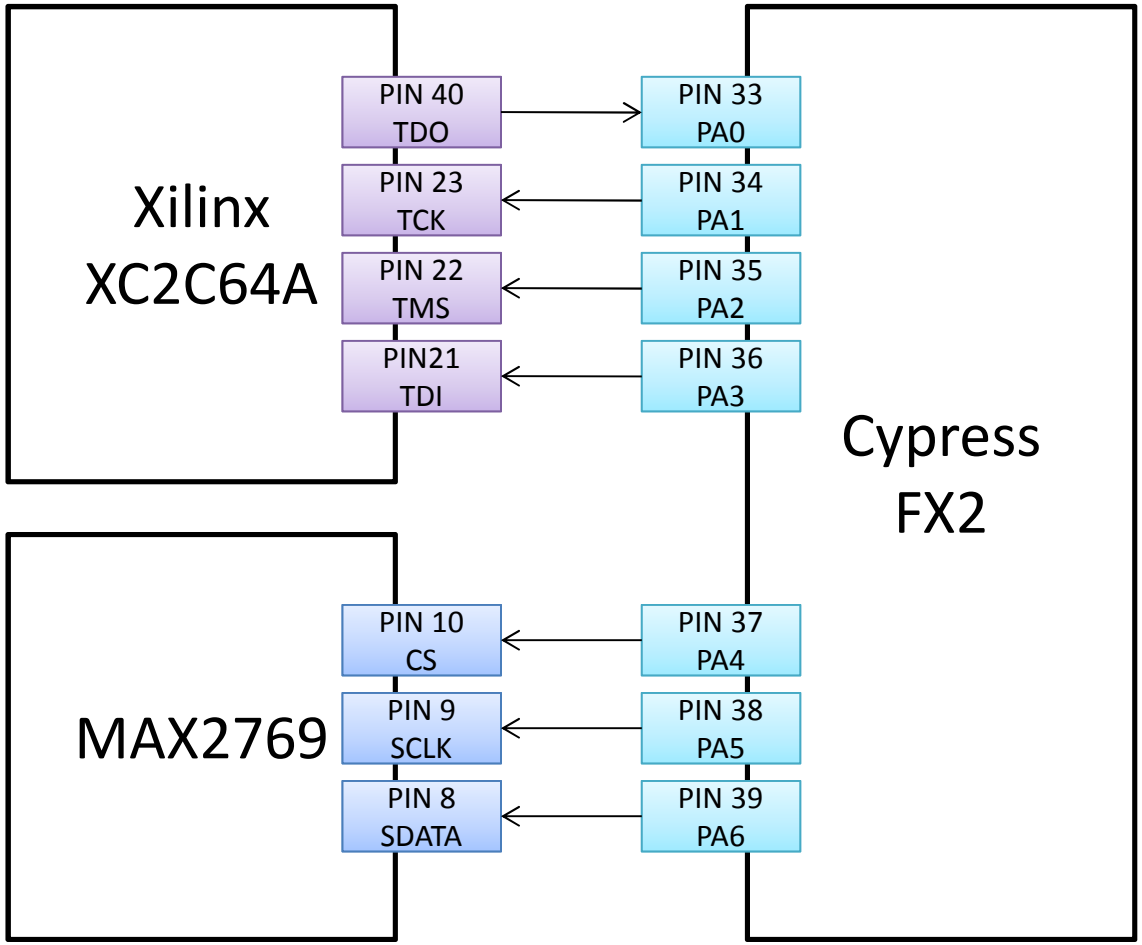
```
architecture Behavioral of main is
SIGNAL sFifo: STD_LOGIC_VECTOR (7 downto 0) := "00000000";
BEGIN
  GlueLogic:PROCESS(inCLK)
  BEGIN
    IF FALLING_EDGE(inCLK) THEN
      sFifo <= sFifo(3 downto 0) & inI1 & inI0 & inQ1 & inQ0;
    END IF;
  END PROCESS;
  outFifo  <= sFifo;
  outIFCLK <= inCLK;
END Behavioral;
```



Simplified schematic diagram (1)



Simplified schematic diagram (2)



Default MAX2769 configuration

```
% EN| IDLE| ILNA1| ILNA2| ILO| IMIX| MIXPOLE| LNA| MIXEN| ANTEN|   FCEN| FBW| F3OR5| FCENX| FGAIN
   1     0   0000     10   10    01        0   01      1      1  001101   00      0      1      1     CONF_ONE

% IQEN|      GAINREF|  -| AGCMODE| FORMAT| BITS| DRVCFG| LOEN| -| DIEID
     0  000010101010  00       00      00   010      00     1  0     00                                CONF_TWO

% GAININ|    RSV| -| PGAI| PGAQ| STRM| START| STOP| COUNT| BITS| STAMP| TIMESYN| DATASYN| RESET
  111010 1011111  1     1     0     0      0     0    111    01      1        1        0      0       CONF_THREE

% VCO| IVCO| -| REFOUT| -| REFDIV| IXTAL| XTALCAP| LDMUX| ICP| PFD| -| CPTEST| INTPLL| PWRSAV| -| -
    1     0  0       1  1      11     01    10000   0000    0    0  0     000       1       0  0  0   PLL_CONF

%          NDIV|       RDIV|   -
000011000000000  0000010000  000                                                                    N_R_DIV
%                  FDIV|        -
1000 0000 0000 0000 0000  01110000                                                                   F_DIV

%                     FRAMECOUNT
1000 0000 0000 0000 0000 0000 0000                                                                   STRM

%       L_CNT|        M_CNT| FCLKIN| ADCCLK| SERCLK| MODE
000100000000  011000011011       0       0       1     0                                            CLK

% Reserved for test mode.
0001 1110 0000 1111 0100 0000 0001                                                                   TEST_ONE
% Reserved for test mode.
0001 0100 1100 0000 0100 0000 0010                                                                   TEST_TWO
```

Using the data grabber

```
> ./sdrnav00_app -h

Usage:
sdrnav00_app [options]

Options:
    -w 'fx2fw_file_name'
    -m 'max2769_file_name`
    -f 'data_file_name`

Example:
> ./sdrnav00_app -w fx2fw.ihx -m max2769_gps.txt
....
> ./sdrnav00_app -f outfile.datz
...
> ./real_exp outfile.datz l1.dat
...
```

Note: Enter ‘q’ or ‘Q’ to stop logging to disk

Flashing the CPLD

Example

```
> ./playxsvf -v 3 sdrnav00.xsvf
XSVF Player v5.01, Xilinx, Inc. (mod by Michele Bavaro)
USAGE:  playxsvf [-v level] filename.xsvf
where:  -v level       = verbose, level = 0-4 (default=0)
        filename.xsvf = the XSVF file to execute.
....
```

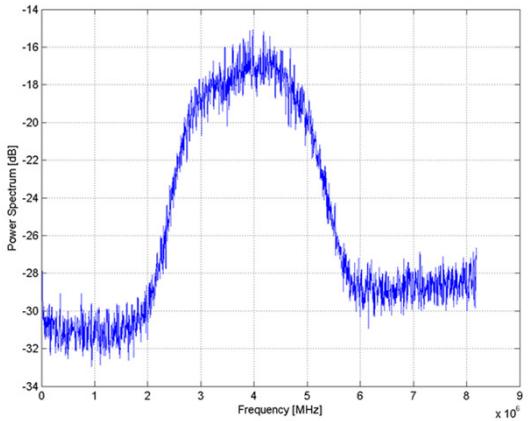
Note 1: Not necessary for normal operation, CPLD normally retains factory FW

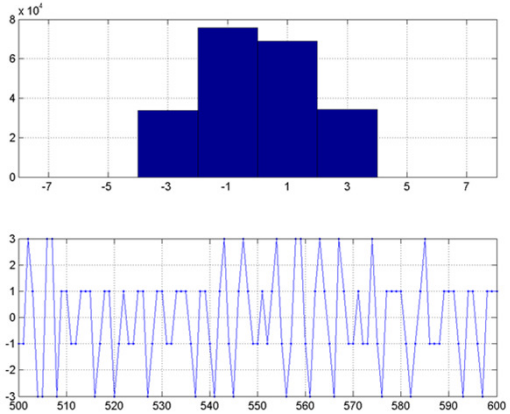
Note 2: These are expert settings, please contact One Talent GNSS before flashing

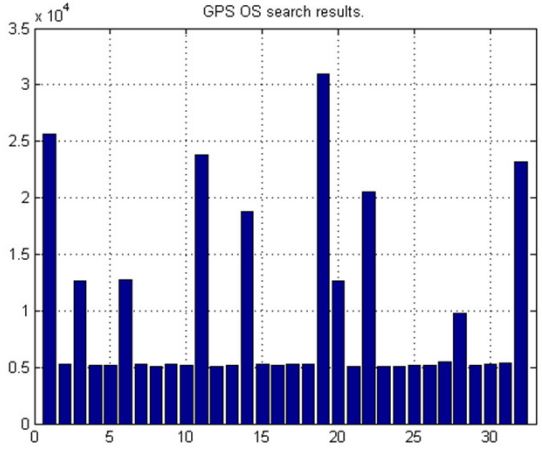
Processing the outputs with Matlab

Example

```
>> visibility_gps('C:\l1.dat', 16.368e6, 4.092e6)
```







Note: We offer Software-Defined Digital Signal Processing development (Matlab or C+ASM) on top of our SDR products to comply with special requirements our customers may have.