



Software Defined Modem software manual

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1 Running the SDM software

The SDM software that we developed has the following parameters

modem executable program:

OPTIONS:

```
-h          Show this message
-a          use also DAQ [long: --alsa]
-m          use for manual test, like normal executable [long: --manual]
-r rate    set sampling rate [long: --srate]
-i sps     set interpolation sps [long: --isps]
-g gain    set tx gain [long: --txg]
-s         use TCP server mocked DAQ [long: --server]
-c ip      use TCP client mocked DAQ that connect to server with address
           ip [long: --client]
-f         use flex frame [long: --flex]
-j         use janus [long: --janus]
-D         use DSSS frame [long: --dsss]
-C freq    set carrier frequency [long: --carrier]
-S addr    set source address [long: --saddr]
-R n       set n bit for crc [long: --crc]
-I fec     set inner fec [long: --fecin] from fec list
-O fec     set outer fec [long: --fecout] from fec list
fec list: h74, h84, h128, rep3, rep5, secDED, cv27, cv29, cv39, cv615,
rs
```

1.1 Modulation schemes

There are 3 modulation schemes currently available:

1. BPSK
2. DSSS
3. Janus

1.2 FEC schemes

There are many Forward Error Correction (FEC) schemes currently available

1. Hamming (various rates)
2. Reed-Solomon
3. Repetition
4. SECDED
5. convolutional codes (various rates)

These schemes can be set either as *inner* or *outer* FEC: there are 2 levels of encoding and they can be set independently.

1.3 Sample configurations

We propose two sample configurations for running the software

BPSK

- modulation: flexframe BPSK
- interpolation: 10 SPS
- inner FEC: convolutional (Viterbi)
- outer FEC: Reed-Solomon

```
./sdm_modem -m -I cv29 -O rs -f -i 10
```

NOTE: set the node address with -S option (e.g., -S 1 for address 1): different nodes must have different addresses.

DSSS

- modulation: DSSS
- interpolation: 3 SPS
- inner FEC: convolutional (Viterbi)
- outer FEC: Reed-Solomon

```
./sdm_modem -m -I cv29 -O rs -D -i 3
```

NOTE: set the node address with -S option (e.g., -S 1 for address 1): different nodes must have different addresses.

1.4 Use the modem

Once the modem is up and running, you can connect your app to the modem with the TCP socket `< IP > :55555`, where IP is the IP address of the board running the modem and 55555 is the port accepting connections. If the app is running in the same board of the modem, you can connect to localhost 55555. For testing purposes you can use netcat and type from a Linux terminal:

```
nc localhost 55555
```