

FORMAT OF BBADCP .rawdp FILES

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Raw BBADCP files for Southern Surveyor voyages 2/98 onwards.

These files contain averaged data from the RDI VM-150 broadband acoustic Doppler current profiler (BBADCP). Up to 200 records are in each file. Each (366 + 12\*NBINS) byte or (447 + 12\*NBINS) byte (bottom-track enabled) record contains data from a single ping. NBINS = number of bins in profile (usually 50).

The files are "normal" Unix binary, produced under Solaris 2.3 on a SUN Sparc10.

Below is a description of each record, as they are written by the C language logging program.

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Each record is written as follows:

In adcp\_filsys.c:

```
n1 = fwrite(cnfg,2,NCONFIG,rawfil);  
n2 = fwrite(cnfg2,2,NCONFIG2,rawfil);
```

In controller.c:

```
n1 = fwrite(riheader,4,NLRH,rawfil);  
n2 = fwrite(rsheader,2,NSRH,rawfil);  
if( cnfg[BTON] )  
    n3 = fwrite(bbuf+16,1,nexpect-18,rawfil);  
else  
    n3 = fwrite(bbuf+14,1,nexpect-16,rawfil);
```

Note: Velocities are recorded in cm/s

```
# define NCONFIG      90  
# define NCONFIG2    20  
# define NLRH        8  
# define NSRH       12  
  
if( cnfg[BTON] )  
    nexpect = 189 + 12*NBINS;  
else  
    nexpect = 106 + 12*NBINS;
```

Config element Description (RDI direct command)

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|    |    |                                       |
|----|----|---------------------------------------|
| 0  | BA | BT evaluation amplitude minimum       |
| 1  | BC | BT correlation magnitude minimum      |
| 2  | BD | BT delay before reacquire (ensembles) |
| 3  | BE | BT error velocity maximum (mm/s)      |
| 4  | BF | BT depth guess (dm)                   |
| 5  | BM | BT mode                               |
| 6  | BP | BT pings per ensemble                 |
| 7  | BR | BT resolution                         |
| 8  | BX | BT maximum tracking depth (dm)        |
| 9  | BZ | BT coherent ambiguity velocity (cm/s) |
| 10 | CX | Sounder sync                          |

```

11      EC      Speed of sound (m/s)
12      WA      Fish filter
13      WB      Bandwidth control
14      WC      Low correlation threshold
15      WF      Blank after transmit (cm)
16      WJ      Receiver gain
17      WM      Profiling mode
18      WN      Number of bins
19      WS      Bin length (cm)
20      WT      Pulse length (cm)
21      WV      Mode 1 ambiguity velocity (cm/s)
22      WW      Mode 1 pings before mode 4 reacquire
23      WX      Mode 4 ambiguity velocity (cm/s)

```

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```

      End of commands which we set either from the UI or in
      rdi_serial_talk.c (we do not trust the unit to remember default values)
      at startup. The CS (START) and PS1 (show system parameters) commands
      are hard-coded below. The CS command is issued when a ping is required
      and the PS command is issued in 'rdinit'.

```

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```

# define NDERIV      86      /* Start of derived values, ie those      */
                        /* that do not come from the menu.      */
# define NCONFIG    90      /* Length of config array      */
# define NRDI       24      /* The first 24 values are RDI commands
                        for which we assert default values from
                        $(FDCS_HOME)/src/adcp/config/adcp.cfg.defaults */
# define NON_INTRP_CFG 30
# define NDSP       20
# define NCONFIG2   20

```

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```

/*-----
| Define constant RDI commands - See RDI VM-ADCP Technical Manual Appendix C.
+-----*/

```

```

# define CR_CMD      "CR1\r"      /* Reset to factory defaults */
# define BK_CMD      "BK0\r"      /* Disable Water Mass Layer Mode */
# define CF_CMD      "CF10110\r"  /* Manual ping mode */
# define CL_CMD      "CL0\r"
# define CS_CMD      "CS\r"      /* Start pinging */
# define EA_CMD      "EA+0\r"
# define EB_CMD      "EB+0\r"
# define ED_CMD      "ED0\r"
# define EH_CMD      "EH0\r"
# define EP_CMD      "EP+0\r"
# define ER_CMD      "ER+0\r"
# define EX_CMD      "EX00000\r"  /* Radial beam coordinates */
# define EZ_CMD      "EZ0020001\r" /* Use external gyrocompass for heading
*/
# define PD_CMD      "PD0\r"      /* Send real water-current data set */
# define TE_CMD      "TE00:00:00.00\r" /* Time per ensemble */
# define TP_CMD      "TP000010\r"  /* Ping every 0.1 sec */
# define WD_CMD      "WD101000000\r" /* Collect velocity and echo intensity
data */
# define WE_CMD      "WE5000\r"  /* Maximum error velocity in mm/s */
# define WI_CMD      "WI0\r"      /* Don't clip data past bottom */
# define WL_CMD      "WL000010\r" /* No water reference layer */
# define WP_CMD      "WP1\r"      /* One ping per ensemble */

```

```

short config[NCONFIG]

```

```

plen      = config[16]      I
delay     = config[17]      J - note: this is 1/10ths of metres
nbins     = config[24]      Q
                               12 spare
int1_hed= config[39]      Use internal SDC if no extnl gyro?
rawlog    = config[40]      1= log raw (ping) data
ipr_cor   = config[41]      Pitch roll correction enabled
ipfile    = config[42]      Number of records per file
timon     = config[43]      1= time-based averaging
ens_len   = config[44]      Ensemble length in minutes
maxnping  = config[45]      MAX number of pings in an average
ping_intvl = config[46]    Min inter-ping time, 1/10th seconds
refon     = config[47]      1= use Ref Layer Averaging (RLA)
refb1     = config[48]      Upper RLA bin
refb2     = config[49]      Lower RLA bin
file_chng = config[50]      A new file is required
xtoff    = config[51]      Offset for xducer temp, degreesx100
xcor      = config[52]      Transducer rotation in milliradians
xdepth    = config[53]      Transducer depth cm
evmax     = config[54]      Error vel screening threshold cm/s
wmax      = config[55]      Vertical vel screening threshold cm/s
bwmax     = config[56]      If using bandwidths, units
sal       = config[57]      Surface salinity for C degreesx100
activ_3b= config[58]      "1" means allow 3-beam solutions
                               12 spare
want_att  = config[71]      Want GPS attitude program to be active
want_gps  = config[72]      Want ADCP_GPS program to be active
want_dsp  = config[73]      Want ADCP_DSP program to be active
want_hed  = config[74]      Want gyro logging program to be active
blen      = config[75]      After calculation from L command
bton      = config[76]      After calculation from FH command
                               3 spare

```

```

+-----+
| As well, there would be some config values not modified in the menu, but
| which arise from the state of the system (RDI firmware info), or the
| software (hardcoded values etc), or are reported from auxillary instruments
| (eg their s/n or setups).
+-----+

```

```

short config2[NCONFIG2]
short
  xducer_sn  = config2[0]
  xducer_hz  = config2[1]
  rom1_sn    = config2[2]
  rom2_sn    = config2[3]
  sysflag    = config2[4]
  rdisys_sn  = config2[5]
  coordfact  = config2[6]
  revday     = config2[7]      Day this s/ware was last revised
  revmonth   = config2[8]      Month this s/ware was last revised
  revyear    = config2[9]      Year this s/ware was last revised
  efilnum    = config2[10]     Current ensemble output file number
  rfilnum    = config2[11]     Current raw output file number

```

```

/*****
*
* Local vars that are simply used to package auxillary data for writing out
* with each raw ping.
*

```

```

* These are:
*
* int riheader[NLRH];
* int      0 - time (Unix - seconds)
*          1 - heading gyro time stamp (Unix seconds)
*          2 - attitude (head/pitch/roll) time stamp (Unix seconds)
*          3 - GPS velocity time stamp (Unix seconds)
*          4 - gps latitude (signed microdegrees)
*          5 - gps longitude (microdegrees 0-360)
*          6 - GPA altitude (cm)
*          7 - spare
*
* int rsheader[NSRH];
* short   0 - gyro heading (milliradians)
*          1 - GPA heading (milliradians)
*          2 - GPA pitch   (centidegrees)
*          3 - GPA roll    (centidegrees)
*          4 - gps direct U velocity (cm/s)
*          5 - gps direct V velocity (cm/s)
*          6 - deck unit electronics chassis temp (degreesx100)
*          7 - transmitter supply voltage (V)
*          8 - GPA head/pitch/roll time stamp (milliseconds)
*          9 - ping count (1=first ping for ensemble. Not incremented
*             if a BIT failure.
*         10 - GPA attflag (0=good attitude data, 1=bad data)
*         11 - Number of bytes of raw ADCP velocity data (nexpect - 14
*             or nexpect - 16).
*
*****/

```

```

int riheader[NLRH]
    riheader[0] = lstpngtim.tv_sec
    riheader[1] = timehed
    riheader[2] = timeatt
    riheader[3] = time
    riheader[4] = lat
    riheader[5] = lon
    riheader[6] = (int)(100.*altitude)

```

```

short rsheader[NSRH]
    rsheader[0] = (short)(17.4533*gyrhed)
    rsheader[1] = (short)(17.4533*athed)
    rsheader[2] = (short)(100.*pitch)
    rsheader[3] = (short)(100.*roll)
    rsheader[4] = (short) raw_u
    rsheader[5] = (short) raw_v
    rsheader[6] = 0
    rsheader[7] = 0
    rsheader[8] = time_ms
    rsheader[9] = pingcnt
    rsheader[10] = attflag
    if( cnfg[BTON] )
        rsheader[11] = nexpect - 18
    else
        rsheader[11] = nexpect - 16

```

The rest of the record is composed of the contents of the binary output data buffer without the 14 byte or 16 byte (BT ON) header or the checksum at the end of the buffer. See Appendix D of "RD Instruments Acoustic Doppler Current Profilers Vessel Mount Technical Manual" for detailed

format.