

FORMAT OF BBADCP .adp FILES

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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 2153 byte record contains a single average, which usually is taken over 3 minutes but can be taken over a different number of minutes OR over a specified number of "pings".

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. In Fortran they are read as fixed record length of 2153 bytes.

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Each record is written as follows:

```
n1 = fwrite(iout,4,NIOUT,ensfil);
n2 = fwrite(sout,2,NSOUT,ensfil);
n3 = fwrite(cnfg_out,2,NCONFIG,ensfil);
n4 = fwrite(cnfg2_out,2,NCONFIG2,ensfil);
n5 = fwrite(leader,1,NLEADER,ensfil);
n6 = fwrite(ucout,1,NUCOUT,ensfil);
```

Note: Velocities are recorded in cm/s in signed short (+/- 12.70 m/s )

```
# define NIOUT      6
# define NSOUT     444
# define NLEADER   85
# define NUCOUT   936
# define NCONFIG   90
# define NCONFIG2  20
```

```
int iout[NIOUT]
  gpslat   = iout[0]      GPS latitude in signed microdegrees
  gpslon   = iout[1]      GPS longitude in signed microdegrees
  startsec = iout[2]      Start time of ensemble (sec since 1970)
  finishsec= iout[3]      End time of ensemble (sec since 1970)
                2 spare

short sout[NSOUT]
  pingcnt  = sout[0]      Number of pings this ensemble
  vlcnt1   = sout[1]      count of rejected vels for each beam
  vlcnt2   = sout[2]
  vlcnt3   = sout[3]
  vlcnt4   = sout[4]
  wcnt     = sout[5]      count of total vertical vel rejects
  evcnt    = sout[6]      count of total error vel rejects
  btu      = sout[7]      Bottom track components cm/s
  btv      = sout[8]
  btw      = sout[9]
  bte      = sout[10]
  gpsdu    = sout[11]     mean direct GPS ship's velocities, in cm/s
  gpsdv    = sout[12]
  gpsu     = sout[13]     position-derived GPS ship's velocities, in cm/s
```

```

gpsv      = sout[14]
gpsnfix   = sout[15]      Number of GPS fixes used
gpsstat   = sout[16]      GPS quality status
xtave     = sout[17]      transducer temp (centidegrees)
avbtm     = sout[18]      Bottom depth (m)
tempchas  = sout[19]      Electronics chassis temp degx100
voltxmit  = sout[20]      Transmitter supply voltage VX10
head      = sout[21]      Gyro heading milliradians
headvar   = sout[22]      Gyro heading variance milliradians
att_head  = sout[23]      Attitude sensor heading milliradians
pitch_av  = sout[24]      Pitch, signed,          degreesx100
pitch_sd  = sout[25]      Pitch std dev, signed, degreesx100
pitch_mx  = sout[26]      Pitch max, signed,      degreesx100
roll_av   = sout[27]      Roll mean, signed,      degreesx100
roll_sd   = sout[28]      Roll std dev, signed,   degreesx100
roll_mx   = sout[29]      Roll max, signed,      degreesx100
uref      = sout[30]      Ref layer velocity components cm/s
vref      = sout[31]
wref      = sout[32]

27 spare
st_u      = 60            start of u velocity (els 60-187)  cm/s
st_v      = 188          start of v velocity (els 188-315)
st_w      = 316          start of w velocity (els 316-443)

```

```

unsigned char leader[NLEADER] See RDI VM BBADCP Technical manual

```

```

unsigned char ucout[NUCOUT]
nref      = ucout[0]      accum count for reference layer
nbt       = ucout[1]      number of BT pings accepted
bt3beam   = ucout[2]      BT velocity counts (total and 3 b)
nbtz      = ucout[3]      Bottom depth count
styear    = ucout[4]      Ensemble start time
stmon     = ucout[5]
stmday    = ucout[6]
sthour    = ucout[7]
stmin     = ucout[8]
stsec     = ucout[9]
endyear   = ucout[10]    Ensemble start time
endmon    = ucout[11]
endmday   = ucout[12]
endhour   = ucout[13]
endmin    = ucout[14]
endsec    = ucout[15]
numrecs   = ucout[16]    Number of this ens in the file (1-200)
hedcnt    = ucout[17]    Count of fresh gyro data
attcnt    = ucout[18]    Count of fresh pitch/roll data
hederr    = ucout[19]    Count of missed external gyro data
20 spare
st_cnt    = 40           # vels for each bin (els 40 - 167)
st_3beam  = 168          # 3 beam solved vels / bin (els 168 - 295)
st_ve     = 296          RMS plus mean error velocity (els 296 - 423)
st_e1     = 424          Echo intensity, beam 1, RDI units (424-551)
st_e2     = 554          "      "      beam 2      "      "      (552-679)
st_e3     = 680          "      "      beam 3      "      "      (680-807)
st_e4     = 808          "      "      beam 4      "      "      (808-935)

```

Config element Description (RDI direct command)

```

-----
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)
-----

```

```

-----
|      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'.
|
+-----*/

```

```

# define NDERIV      86      /* Start of derived values, ie those */
                        /* that do not come from the menu. */
# define NCONFIG     90      /* Length of cnfg_out 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      /* Length of cnfg2_out array */

```

```

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

```

```

+-----+
| As well, there would be some cnfg_out 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 cnfg2_out[NCONFIG2]
short
  xducer_sn  = cnfg2_out[0]
  xducer_hz  = cnfg2_out[1]
  rom1_sn    = cnfg2_out[2]
  rom2_sn    = cnfg2_out[3]
  sysflag    = cnfg2_out[4]
  rdisys_sn  = cnfg2_out[5]
  coordfact  = cnfg2_out[6]

```

|          |                 |                                     |
|----------|-----------------|-------------------------------------|
| revday   | = cnfg2_out[7]  | Day this s/ware was last revised    |
| revmonth | = cnfg2_out[8]  | Month this s/ware was last revised  |
| revyear  | = cnfg2_out[9]  | Year this s/ware was last revised   |
| efilnum  | = cnfg2_out[10] | Current ensemble output file number |
| rfilenum | = cnfg2_out[11] | Current raw output file number      |