

Identification:

prange = F pressure sensor range (psia).
psn=S pressure sensor serial number.
*serialnumber=N CTD serial number.

Operating:

autobinavg=y Automatically average stored data into bins when profile is stopped due to pressure less than pcutfff.
autobinavg=n Do not automatically average stored data into bins when profile is stopped due to pressure less than pcutoff.
binaverage Average stored data into bins.
dtdp Send last calculated value for dt/dp.
fp Power analog electronics, take pressure sample, send pressure data, power off..
fpt Run pump 0.25 seconds, power analog electronics, take pressure sample and temperature sample, send pressure and temperature data, power off.
outputpts=y If outputting real-time data during profile, output pressure, temperature, and salinity.
outputpts=n If outputting real-time data during profile, output only pressure.
pcutoff=N Set pcutoff=N decibars.
pts Power analog electronics, run pump, wait tswait seconds, take sample, send sample, power off.
qs Power off digital and analog electronics, enter low power quiescent state. Quiescent state is entered automatically when not profiling and a command has not been received for 2 minutes.
resetoffset Sample pressure for 1 minute. Store measured pressure as new pressure offset. Maximum allowed offset is 2 percent of full scale.
resumeprofile Start profile, store t, c, and p in SRAM once per second if outputpts=n, once per 1.1 seconds if outputpts=y.
resumeprofileN Wait N seconds with pump running, start profile, store t, c, p in SRAM once per second.
startprofile Set samplenum = 0, start profile, store t, c, p in SRAM once per second .
startprofileN Set samplenum = 0, wait N seconds with pump running, start profile, store t, c, p in SRAM once per second.

stopprofile Stop profile, if number of stopprofile commands received since last startprofile command is > 1 calculate dt/dp, power off. Profile halted automatically when pressure is less than pCutOff or profile time has exceeded 30,000 seconds. Value for dt/dp is calculated as:

t = temperature from last sample before receiving stopprofile command.

p = pressure from last sample before receiving stopprofile command.

oldt = temperature from last sample before receiving previous stopprofile command.

oldp = pressure from last sample before receiving previous stopprofile command.

$dt/dp = (t - oldt) / (oldp - p)$

slp Send last pressure sample.

tswait=N Set delay before pts sample to N seconds. Applies to pts command and hardware activated pts sample.

Status:

dan Display number of bins created when data was averaged (4 characters followed by <CR><LF>).

dc Display calibration coefficients.

ddn Display number of samples (5 characters followed by <CR><LF>).

ds Display CTD settings.

nbin Display number of bins created when data was averaged.

Upload Data:

dd Dump all unaveraged data in engineering units.

ddS,F Dump unaveraged data in engineering units, scans S through F.

ddh Dump all unaveraged data in HEX format.

ddhS,F Dump unaveraged data in HEX format, scans S through F.

da Dump all bin averaged data in engineering units.

daS,F Dump bin averaged data in engineering units, bins S through F.

dah Dump all bin averaged data in HEX format.

dahS,F Dump bin averaged data in HEX format, bins S through F.

Engineering Units Data Format without number of scans per bin:

ppppp.pp,ttt.tttt,sss.ssss<CR><LF>

p = pressure in decibars

ttt.tttt = temperature in ITS-90 (Deg C)

sss.ssss = salinity

Engineering Units Data Format with number of scans per bin:

ppppp.pp,ttt.tttt,sss.ssss, n<CR><LF>

p = pressure in decibars

ttt.tttt = temperature in ITS-90 (Deg C)

sss.ssss = salinity

n = number of scans in this bin average

HEX Data Format without number of scans per bin (Refer to encode.c V 1.3 by Dana Swift):

PPPPTTTTSSSS<CR>LF>

PPPP = 4 HEX characters representing pressure

TTTT = 4 HEX characters representing temperature

SSSS = 4 HEX characters representing salinity

HEX Data Format with number of scans per bin (Refer to encode.c V 1.3 by Dana Swift):

PPPPTTTTSSSSNN<CR>LF>

PPPP = 4 HEX characters representing pressure

TTTT = 4 HEX characters representing temperature

SSSS = 4 HEX characters representing salinity

NN = number of scans in this bin average

Bin Averaging Parameters (stored in EEPROM):

top_bin_interval=F

top_bin_size=F

top_bin_max=F

middle_bin_interval=F

middle_bin_size=F

middle_bin_max=F

bottom_bin_interval=F

bottom_bin_size=F

includetransitionbin=y Add two transition bins.

includetransitionbin=n Do not add two transition bins.

includenbin=y include number of scans per bin with averaged data

includenbin=n do not include number of scans per bin with averaged data

The two transition bins are:

top_bin_max + (top_bin_interval / 2) to top_bin_max + (middle_bin_interval / 2)

middle_bin_max + (middle_bin_interval / 2) to middle_bin_max + (bottom_bin_interval / 2)

bin averaging notes:

Bin Average is divided into three sections: top, middle, and bottom

interval: Spacing between bins. If interval is 10 decibars in top section, then bin centers will be at 0, 10, 20 decibars.

size: Scans from bin center $\pm$ size/2 will be included in average. Size is $\leq$ interval.

max: Maximum pressure for section; bottom section has no maximum pressure.

SBE 41CP performs bin averaging *without* interpolation.

SBE 41CP processes approximately 90 scans per second when running binaverage.

Calibration Coefficients (entered at factory):

*serialnumber=N serial number of this CTD sensor.

ta0=F temperature A0 coefficient = F.

ta1=F temperature A1 coefficient = F.

ta2=F temperature A2 coefficient = F.

ta3=F temperature A3 coefficient = F.

tcaldate=S string for temperature calibration date.

cg=F conductivity G coefficient = F.

ch=F conductivity H coefficient = F.

ci=F conductivity I coefficient = F.

cj=F conductivity J coefficient = F.

wbotc=F conductivity circuit temperature coefficient=F.

ctcor=F conductivity cell thermal coefficient = F.

cpcor=F conductivity cell pressure coefficient = F.

ccaldate=S string for conductivity calibration date.

pa0=F pressure A0 coefficient = F.

pa1=F pressure A1 coefficient = F.

pa2=F pressure A2 coefficient = F.

ptha0=F pressure temperature sensor A0 coefficient = F.

ptha1=F pressure temperature sensor A1 coefficient = F.

ptha2=F pressure temperature sensor A2 coefficient = F.

ptca0=F pressure temperature compensation offset A0 coefficient = F.

ptca1=F pressure temperature compensation offset A1 coefficient = F.

ptca2=F pressure temperature compensation offset A2 coefficient = F.

ptcb0=F pressure temperature compensation span B0 coefficient = F.

ptcb1=F pressure temperature compensation span B1 coefficient = F.

ptcb2=F pressure temperature compensation span B2 coefficient = F.

poffset=F pressure sensor offset=F (decibars).

pcaldate=S string for pressure calibration date.

Testing (factory use only):

memorytest	Test static RAM and EEPROM, EEPROM contents are not modified.
loadprofile	Load 10050 scan dummy profile into SRAM.
Loadprofile=N	Load N scan dummy profile into SRAM.
analogon	Power analog electronics.
analogoff	Power off analog electronics.
pumpfast	Run pump at fast speed.
pumpslow	Run pump at slow speed.
pumpmon	Run pump at fast speed for 2.5 seconds, then run pump at slow speed.
pumpoff	Turn off pump.
ts	Power analog electronics, take sample, send sample, power off.
tc	Power analog electronics, take 100 conductivity measurements, power off analog electronics, output is S/m.
tcr	Power analog electronics, take 100 conductivity measurements, power off analog electronics, output is raw frequency.
tp	Power analog electronics, take 100 pressure measurements, power off analog electronics, output is decibars.
tptr	Power analog electronics, take 100 pressure measurements, power off analog electronics, output is raw A/D counts from pressure and pressure temperature.
tt	Power analog electronics, take 100 temperature measurements, power off analog electronics, output is degrees C.
ttr	Power analog electronics, take 100 temperature measurements, power off analog electronics, output is raw A/D counts.