

# PROGRAMMING

TAPS uses command keys to invoke operations and/or menu screens for data entry. Most of these commands and menus have been described as part of the explanations of operating modes. This section will describe only those commands and menus not already described in the rest of the manual.

In all that follows, it is assumed that TAPS has been powered on and connected to a PC running a terminal program such as HyperTerm. Further, it is assumed that TAPS is not taking data when command keys are pressed. It is possible to enter most of the following screens while TAPS is operating, however.

## STATUS

Typing an "S" produces the STATUS screen display. This display shows the current operating mode of TAPS together with appropriate setup and operating parameters and the amount of data stored in TAPS. The content of these screens differs by mode; these are described in the appropriate CAST MODE and SOUNDER MODE sections of this manual.

Cast mode produces a screen like the one below:

---

TAPS-6 ACOUSTIC PROFILER SYSTEM

S/N 15

S/W VERSION 7.25

```
CAST MODE : INTERNAL RECORDING
NUMBER OF CASTS STORED      = 0
TURN-ON DEPTH                = 2.50 M
TURN-OFF DEPTH               = 1.50 M
MAXIMUM OPERATING DEPTH     = 190.00 M
MAXIMUM SAFE DEPTH          = 194.10 M
MEAN SAMPLE RANGE           = 125 CM
CURRENT BATTERY VOLTAGE     = 23.45 VDC
CURRENT TIME & DATE          = 09:16:15 09/12/01
CURRENT DEPTH                = 0.00 M
CURRENT TEMPERATURE         = 24.27 C
PINGS PER DATA SET         = 4
PERCENTAGE OF MEMORY USED   = 0.0 %
FREQUENCIES: 265 420 700 1100 1850 3000 KHZ
CALs = -64.9 -62.4 -61.9 -48.9 -38.5 -25.9 dB
SENSOR #1: -
SENSOR #2:
```

---

This screen summarizes the state of TAPS—operating mode and parameters, memory contents, calibration constants, and real-time information including the clock setting, temperature and battery voltage. Computed quantities include the Maximum Safe Depth (based upon the pressure rating of the installed sensor).

Status in SOUNDER mode (EXTERNAL RECORDING) looks like the example on the next page. This screen differs from CAST mode in that there are no turn-on or turn-off depths, no mean sample range, and no displayed cal constants. The number of range bins is now displayed along with the maximum

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S/N 15  
S/W VERSION 7.25

SOUNDER MODE: EXTERNAL RECORDING  
OUTPUT MODE IS BINARY  
NUMBER OF RANGE BINS = 145  
MAX RANGE = 18.500  
CURRENT BATTERY VOLTAGE = 23.45 VDC  
CURRENT TIME & DATE = 09:43:40 09/12/01  
CURRENT DEPTH = 0.10 M  
CURRENT TEMPERATURE = 23.99 C  
PINGS PER DATA SET = 32  
SENSOR #1: -  
SENSOR #2: -

---

TAPS-6 ACOUSTIC PROFILER SYSTEM  
S/N 15  
S/W VERSION 7.25

SOUNDER MODE: INTERNAL RECORDING  
PROGRAMMED START TIME = 03/11 12:00  
PROFILE TIME INTERVALS = 15 MIN  
# PROFILES REQUESTED = 96  
# OF PROFILE SETS STORED = 0  
NUMBER OF RANGE BINS = 145  
MAX RANGE = 18.500  
CURRENT BATTERY VOLTAGE = 23.16 VDC  
CURRENT TIME & DATE = 08:44:46 03/05/02  
CURRENT DEPTH = 0.02 M  
CURRENT TEMPERATURE = 19.84 C  
PINGS PER DATA SET = 32  
PERCENTAGE OF MEMORY USED = 0.0 %  
SENSOR #1: -  
SENSOR #2: -

---

range (range of the last bin). The data output mode (BINARY or ASCII) is displayed on this screen only. Since time, date, depth and temperature are part of the SOUNDER data set, these values are displayed on the STATUS screen. The STATUS screen for INTERNAL SOUNDER mode is similar to this screen. The starting date and time and the number of profiles to save are displayed in addition to the SOUNDER data. If data exist in data RAM, the number of profiles stored and the percentage of memory

used will be displayed. If no data exist in data RAM, these values will be zero.

## REAL-TIME CLOCK

The date and time may be viewed by typing a "T". This results in a display like

07:43:08 03/31/98

where the first set of numbers is the time in HH:MM:SS format and the second set of numbers is the date in MM/DD/YY format.

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Typing a “CTRL-T” opens a dialog to set the real-time-clock. You will be prompted to enter the date in the form YY\_MM\_DD where the underline represents a SPACE character. Hit ENTER when finished entering the date. Then you are prompted to enter the time in the form HH\_MM\_SS. Enter a time several seconds greater than the actual time and press ENTER. TAPS will now ask you to press ENTER when the time matches the time you entered.

### BATTERY VOLTAGE

You can display the current battery voltage by typing a “V” at almost any time. This will result in a simple display like

23.46

which is the battery voltage at the time the command key was pressed. Note that if TAPS is operating in REMOTE MODE, this may represent the external voltage rather than the battery voltage, depending upon which source has the higher voltage.

### DUMP DATA

Data is stored internally in TAPS in a non-volatile RAM. At the end of a CAST MODE or INTERNAL SOUNDER MODE deployment, these data may be transferred (or dumped) by typing “D”. This results in the message

```
Setup data capture and press <CR>
```

Press ENTER when you have opened a capture file and data will begin transferring from TAPS to the PC. Close the capture file when data stop streaming to the PC.

The format for the data depends upon the mode (CAST or SOUNDER) and upon your selection of ASCII or BINARY in SOUNDER mode. See the

appropriate chapter in this manual for data formats.

The “D” command is also used in EXTERNAL SOUNDER MODE to dump a single data set. Data will be dumped to the terminal program whether or not data were ever taken. The format will depend upon the choice of ASCII or BINARY made when this mode was programmed.

### ERASE DATA

The data RAM must be erased periodically to make room for new data. This is done by typing “E”. You are prompted to ensure that you really wanted to erase data; enter “Y” if so.

Data may be un-erased by typing “CTRL-D” if no new data have been stored since the last erase. An erase command only changes some internal data pointers—it doesn’t actually erase the data in memory. Un-erase consists of re-creating these pointers by inspection of the data RAM.

Storage of new data inserts new end-of-data markers, however, making it impossible to re-create the old data structure.

### REPROGRAM

Typing “CTRL-P” opens the programming menu. This is the main menu for setting the operating mode and parameters for TAPS. Selection of appropriate parameters is described in the CAST MODE and SOUNDER MODE sections of this manual.

If TAPS is in CAST mode, typing CTRL-P will start the dialog in the figure on the next page. After displaying the current mode, you are asked to enter a code value for the mode you desire. Note that this may be the same mode as currently exists. In the example below,

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the mode is left as CAST by simply typing ENTER after the display of the current mode.

If the number of pings per average is acceptable, pressing ENTER will keep the current value (as shown). Otherwise, a new value should be entered.

The turn-on and turn-off depths are displayed next. Keep in mind that the TAPS turns off at a lesser depth than it turns on. Turn-off depth must be less

than the Turn-on depth. It is best if these are significantly different depths (significant depends upon the depth sensor installed in your TAPS).

The program will then display the maximum safe depth, computed from the depth sensor rating held in memory (see the next section). You are then asked for the maximum operating depth for TAPS; this should be no greater than the maximum safe depth.

---

```
REPROGRAM OPERATING PARAMETERS:
ENTER NEW DATA OR <CR> TO ACCEPT CURRENT VALUE
```

```
OPERATING MODES INCLUDE:
  0 = CAST MODE
  1 = SOUNDER MODE, EXTERNAL RECORDING
  2 = SOUNDER MODE, INTERNAL RECORDING
  3 = INSTRUMENT MODE, EXTERNAL RECORDING:
```

```
CURRENT MODE      = 0      =>  CAST MODE
  ENTER NEW MODE (0 TO 3) =
# PINGS/AVERAGE = 4
TURN-ON DEPTH [ >=.5M ] = 5.00 2.5
TURN-OFF DEPTH [ >=.2M ] = 3.00 1.25
MAX SAFE DEPTH = 194.10 M
MAX OPERATING DEPTH = 150.00 180
```

```
CHANGE BAUD RATE (Y/N)?
```

```
SELECT EXTERNAL SENSOR CODES FROM THE FOLLOWING LIST
```

```
  0 = NO SENSOR INSTALLED
  1 = SBE-4 CONDUCTIVITY SENSOR
  2 = WETSTAR FLUOROMETER
  3 = SEATECH FLUOROMETER
  4 = OTHER
```

```
EXTERNAL SENSOR # 1 CODE = 0
EXTERNAL SENSOR # 2 CODE = 0
```

```
MAKE THESE CHANGES PERMANENT (Y/N)? N
```

---

You can change baud rates if desired. If you answer Y to the baud rate prompt, you will be shown different baud rates available; enter the appropriate code number and TAPS will prompt you to make the same change in your terminal

program and then press ENTER. Make sure you change the baud rate on your PC BEFORE you press enter as TAPS continues from here at the new baud rate.

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Lastly, you can enter code values to signal the presence of external sensors. The presence of a code value (>0) tells the operating program to turn on power to the external sensors and measure their outputs during normal data collection. You should set these values to zero if no sensors are being used.

The code values are saved with the header information of a data set and output (in CAST and SOUNDER-INTERNAL modes).

Finally, you are asked if these values should be saved 'permanently'. If you answer "Y", then these values are saved to EEPROM in the cpu.

After a few seconds, TAPS will display the STATUS screen showing the new parameters. At the end of the status screen will be a notice that TAPS power must be cycled to fully install these parameters. If you have made only minor changes (such as the number of pings or turn-on depth), TAPS will operate properly despite this notice. If you have changed modes, however, it is wise to cycle power before operating TAPS again.

Programming for INSTRUMENT mode is similar to that for CAST mode. The only difference is that no turn-on or

turn-off depths are entered as INSTRUMENT mode begins running when power is applied—no depth checks are made in this mode. Usually you will select a small number of pings per average (1-3) to enhance the data rate in INSTRUMENT mode.

Changing to SOUNDER mode yields a different dialog. In the example below, EXTERNAL RECORDING SOUNDER mode has been selected. You are asked to verify that it is ok to erase data RAM as part of changing modes; answer "Y" if this is ok.

It is generally the case that you will want to take more pings per average in SOUNDER mode than in CAST mode. Enter the new value at the prompt.

The maximum range that appears when you change from CAST mode will always be as shown in the example, as will the number of range bins. This is the place to enter the number of range bins you want in your data. When you have entered this value, the new effective maximum range will be displayed.

If you are using EZSOUND to collect data in SOUNDER mode, you will want to select BINARY data. If you are using a terminal program or other text-based program to collect data, select ASCII.

---

```
REPROGRAM OPERATING PARAMETERS:
ENTER NEW DATA OR <CR> TO ACCEPT CURRENT VALUE

OPERATING MODES INCLUDE:
  0 = CAST MODE
  1 = SOUNDER MODE, EXTERNAL RECORDING
  2 = SOUNDER MODE, INTERNAL RECORDING
  3 = INSTRUMENT MODE, EXTERNAL RECORDING:

CURRENT MODE      = 0      =>  CAST MODE
ENTER NEW MODE (0 TO 3) =  1
CHANGING OPERATING MODES REQUIRES DATA MEMORY BE CLEARED
IS THIS OK (Y/N)? Y
  DATA RAM HAS BEEN CLEARED
# PINGS/AVERAGE =  4    32
```

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```
MAXIMUM RANGE = 8.750
# DEPTH BINS = 68 145
NEW MAXIMUM RANGE = 18.375
OUTPUT MODE (0=ASCII/1=BINARY) = 1

CHANGE BAUD RATE (Y/N)? Y
  1 = 1200 BAUD
  2 = 2400 BAUD
  3 = 4800 BAUD
  4 = 9600 BAUD
CHOICE -> 2
CHANGE YOUR TERMINAL BAUD RATE TO MATCH CHOICE AND HIT RETURN

SELECT EXTERNAL SENSOR CODES FROM THE FOLLOWING LIST
  0 = NO SENSOR INSTALLED
  1 = SBE-4 CONDUCTIVITY SENSOR
  2 = WETSTAR FLUOROMETER
  3 = SEATECH FLUOROMETER
  4 = OTHER

EXTERNAL SENSOR # 1 CODE = 0
EXTERNAL SENSOR # 2 CODE = 0

MAKE THESE CHANGES PERMANENT (Y/N)? Y
```

---

In this example, we have changed baud rates.

**NOTE: if you change baud rate in any PROGRAMMING screen, this value will persist until you change it again, whether or not you answer "Y" to the MAKE THESE CHANGES PERMANENT prompt.**

In this example, no external sensors were selected. There is no reason why external sensors cannot be used in SOUNDER mode, however.

INTERNAL SOUNDER mode shows yet another version of the programming screen. The example below shows selection of this mode from CAST mode. Selection of the number of pings and depth bins follows as shown above.

Next, TAPS displays the current time and date of the RTC in TAPS, followed by a request that you set the start date and time for data collection. Enter the month, day, hour and minute at which you want

TAPS to begin taking data (see the SOUNDER section of this manual for more details on this setup).

You are prompted to enter the time interval, in minutes, between data sets followed by the total number of data sets you wish to store. The number in parenthesis shows the maximum number that data RAM will hold.

Estimation of the operating life of TAPS is important in selecting the data interval and number of data sets. An Excel spreadsheet is provided on the data CD for estimation of TAPS operating life as a function of these parameters. Estimation of data RAM capacity is part of this spreadsheet.

Following this is the baud rate and external sensor dialog described above. If you select "Y" at the final prompt, a new STATUS screen will be displayed showing the new setup.

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---

REPROGRAM OPERATING PARAMETERS:

ENTER NEW DATA OR <CR> TO ACCEPT CURRENT VALUE

OPERATING MODES INCLUDE:

- 0 = CAST MODE
- 1 = SOUNDER MODE, EXTERNAL RECORDING
- 2 = SOUNDER MODE, INTERNAL RECORDING
- 3 = INSTRUMENT MODE, EXTERNAL RECORDING:

CURRENT MODE = 0 => CAST MODE

ENTER NEW MODE (0 TO 3) = 2

CHANGING OPERATING MODES REQUIRES DATA MEMORY BE CLEARED

IS THIS OK (Y/N)? Y

DATA RAM HAS BEEN CLEARED

# PINGS/AVERAGE = 4 32

MAXIMUM RANGE = 8.750

# DEPTH BINS = 68 145

NEW MAXIMUM RANGE = 18.375

TIME NOW IS 16:55:42 03/11/03

DATA COLLECTION START DATE/TIME:

MONTH = 48 11

DAY = 48 05

HOUR = 48 12

MINUTE = 48 00

SOUNDER PROFILE TIME INTERVAL (1-255 MIN) = 48 15

PROFILES TO STORE (MAX = 65536 ) = 5 144

CHANGE BAUD RATE (Y/N)? N

SELECT EXTERNAL SENSOR CODES FROM THE FOLLOWING LIST

- 0 = NO SENSOR INSTALLED
- 1 = SBE-4 CONDUCTIVITY SENSOR
- 2 = WETSTAR FLUOROMETER
- 3 = SEATECH FLUOROMETER
- 4 = OTHER

EXTERNAL SENSOR # 1 CODE = 0 1

EXTERNAL SENSOR # 2 CODE = 0 2

MAKE THESE CHANGES PERMANENT (Y/N)? Y

---

## PROGRAMMING

### REPROGRAM INTERNAL CONSTANTS

Certain internal constants used by TAPS are programmable via the CTRL-Z command. This command invokes a dialog like the one shown on the next page.

First, you are warned that this command can alter important parameters. You are asked to type a "Y" if you wish to go on.

Next, you will be prompted six times to enter (cast mode) calibration constants. If the current values are correct, just press ENTER after each prompt. If a value needs to be entered, type the complete value with a minus sign at the beginning.

In the example, only the first value is entered; the remainder are accepted as-is.

The depth sensor rating for your TAPS is provided in the calibration section of this manual. Enter the rating in psia. TAPS will display the resultant resolution of this sensor in mm per bit of ADC resolution.

A scale factor is usually required to make TAPS depths agree with other sensors (e.g., a ctd). The current value is displayed; a new value may be entered as needed. Similarly, the current value of temperature sensor offset is displayed; a new value may be entered or the current value kept by pressing ENTER.

---

```
WARNING: THIS COMMAND ALTERS IMPORTANT OPERATING PARAMETERS
        IS THIS WHAT YOU WANT TO DO (Y/N)? Y
```

```
ENTER <CR> TO KEEP EXISTING VALUES
ENTER CAL CONSTANTS AS FP NUMBERS (EX: -45.3)
ENTER C1:  -67.3
```

```
ENTER C2:
```

```
ENTER C3:
```

```
ENTER C4:
```

```
ENTER C5:
```

```
ENTER C6:
```

```
ENTER DEPTH SENSOR MAX PRESSURE IN PSI:  300
```

```
DEPTH CONVERSION FACTOR = 474 IN MM/100 PER BIT
```

```
DEPTH SENSOR SCALE FACTOR = 1.056
```

```
TEMP SENSOR OFFSET = 0.000
```

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## RESET PARAMETERS

The command "CTRL-R" reads the TAPS setup parameters from EEPROM and re-sets these values into TAPS operating memory. There are relatively few times when you will need this command.

One instance where this command may prove useful is when you are re-programming TAPS and then decide you wish you had left it as it was. So long as you do not store the new parameters in EEPROM (at the end of the REPROGRAM screen), pressing "CTRL-R" will restore the last set of parameters.

## TEST MODE

Typing "CTRL-X" will produce the test menu. This menu is described in detail in the Test and Maintenance section of this manual.