

AT Dial Commands

DSP-4100 / CLOVER-2000

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Engineering Document E2010 Rev -
May 7, 1999

1. Introduction

DSP4100/2K modems now include a simple AT dial up command interface. This document describes operation of the AT dial interface in the *.S28 file.

2. AT Command Activation

After the S28 file is loaded, the DSP4100 will start up in 8000 command mode. To switch the DSP4100 to AT command mode, the following 8000 command must be issued:

```
806F 8001          --> Switch to AT command mode
"NOW USING AT COMMAND SET..." <-- Command acknowledgment
```

Any option other than 8001 will return an invalid parameter error message. After the "NOW USING AT.." message is transmitted to the serial port, the DSP4100 will perform a hard reset to activate AT command mode. From this point forward, only AT commands will be recognized by the DSP4100.

When the 806F 8001 command is received, the DSP4100 checks the AT dialing parameter save array in the EEPROM. If the checksum over the saved values indicates that the parameters are correct as stored, then those parameters remain unchanged. If the checksum fails, then the factory default values are programmed before the hard reset is performed.

To switch back to the 8000 command interface, the following AT command must be issued:

```
AT$Z<cr>          --> Switch to 8000 command mode
"SWITCHING TO $8000 COMMAND SET..." <-- Command acknowledgement
```

After the "SWITCHING..." message is returned, the DSP4100 will perform a hard reset to activate 8000 command mode. From this point forward, only 8000 commands will be recognized by the DSP4100.

3. AT Commands

Rather than attempt to implement all AT commands, HAL has elected to implement a simple AT command set to control the DSP4100 operation. The following is the *complete* DSP-4100 AT command set:

AT\$Acallsign	Set MYCALL to "callsign"; a maximum of 8 letters or numbers
T\$Bnnn	Set ROBUST RETRY count to nnn; 1 to 255 valid, 10 default
AT\$Cnnn	Set CCB RETRY count to nnnn; 1 to 255 valid, 9 default.
AT\$Dnnn	Set CHAT COUNT to nnn; 0 to 255 valid, 1 default.
AT\$En	Set CLOVER BIAS to n; 0(ROBUST), 1(NORMAL), or 2(FAST) valid, 1 default.
AT\$Fnnnnn	Set CLOVER MASK to nnnnn; 0 to 65535 valid, 0 default.
AT\$Gn	Enable CW ID; 0(OFF) or 1(ON) valid, 0 default.
AT\$Hn	Enable ECHO AS SENT; 0(OFF) or 1(ON) valid, 0 default.
AT\$J	Restore FACTORY DEFAULT settings.
AT\$Z	Switch to 8000 command set.
AT&V	Show all parameter settings.
ATDcallsign	
ATDTcallsign	Start CLOVER CALL to "callsign"; a maximum of 8 letters and numbers
ATS0=n	Set RINGS TO ANSWER; 0(OFF) and 1 to 9 valid, 0 default.

The AT&V command is the only way to display the current parameter settings. Unlike the typical modem AT command set, issuing the command without an argument does *not* show the current setting. A typical AT&V screen is shown below:

AT&V<cr>

```

MYCALL ($Ac..c): K9CW
ROBUST RETRY ($B[1-255]): 10
CCB RETRY ($C[1-255]): 9
CHAT COUNT ($D[0-255]): 1
CLOVER BIAS ($E[0-2]): 1(NORMAL)
CLOVER MASK ($Fnnnn): CLEAR
CW ID ($G[0/1]): 0(OFF)
ECHO AS SENT ($H[0/1]): 0(OFF)
RINGS TO ANSWER (S0=[0-9]): 1

```

If the Clover Mask is set to some value other than 0, the CLEAR status message is changed to SET, but the actual value is not displayed.

4. EEPROM Details

The AT dialing parameters are stored in the serial EEPROM memory on the DSP4100 board. Stored in the EEPROM array is an AT enable flag followed by a parameter save area and a two-byte checksum value. To avoid switching to the AT command set accidentally, the following procedure is repeated whenever the DSP4100 performs a hard reset.

```

IF
  AT enable flag, EEPROM[2], is not equal 1
THEN
  Start 8000 command mode.
ELSE IF
  EEPROM[3..4] equals 'AT' AND
  Checksum over EEPROM[3] to EEPROM[21] matches EEPROM[22..23]
THEN
  Start AT command mode
ELSE
  Set EEPROM[2] to 0
  Start 8000 command mode

```

Note that the only way for AT command mode to start is if the AT enable flag in location EEPROM[2] is set to 1, the string "AT" starts the parameter array, and the checksum from EEPROM[3] to EEPROM[21] matches the value saved in EEPROM[22] and EEPROM[23].

The checksum is a simple 16 bit rotate and XOR calculation. The initial value of the checksum is set to -1, then for each byte of the EEPROM array the sum is rotated left one bit and the EEPROM byte is XOR'd with the low byte of the sum. The calculated checksum value is stored, high byte first, in EEPROM[22] and EEPROM[23]. When testing the EEPROM array for valid parameters, the checksum is calculated using the bytes from EEPROM[3] to EEPROM[21], then that value is XOR'd with the high and low bytes in EEPROM[22] and EEPROM[23]. If there is no error, the result will be 0.

Switching from AT command to 8000 command mode does not change the AT dialing parameter array and these values are restored when AT command mode is again activated.