AT Dial Commands

DSP-4100 / CLOVER-2000

HAL Communications Corp.
Engineering Document E2010 Rev. A
September 13, 2000

1. Introduction

The DSP4100 and DXP38 modems include a simple AT dial up command interface that will let these units work with standard dial up modem terminal and email programs. This document summarizes the AT command operation.

2. AT Command Activation

The DSP4100 can be configured to start up in either 8000 command mode, the factory default setting, or AT command mode. To switch the DSP4100 to AT command mode, the following command must be issued:

PC		DSP4100	DESCRIPTION
$806F $8001	→		Switch to AT command mode
	←	"NOW USING AT COMMAND SET"	Acknowledge command

After the "NOW USING…" acknowledgement message is transmitted on the serial port, the DSP4100 will perform a hard reset to activate AT command mode. From this point on, only AT commands will be recognized by the DSP4100. Note that the AT command mode only supports Clover operation.

When the Switch to AT Mode ($806F $8001) command is received, the DSP4100 checks the AT dialing parameters saved in non-volatile memory. If the checksum over the saved values indicates that the parameters are correct as stored, those parameters are loaded when AT command mode starts. If the checksum fails, the factory default values are used.

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

PC		DSP4100	DESCRIPTION
AT$Z<cr>	→		Switch to 8000 cmd mode
	←	"SWITCHING TO $8000 COMMAND SET"	Acknowledge command

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

3. AT Commands

The DSP4100 uses a limited number of AT commands to control Clover operation. The parameters entered by these AT commands are stored in non-volatile memory so that they do not need to be re-entered when the DSP4100 is next turned ON.

AT COMMAND	DESCRIPTION	DEFAULT
AT$Acallsign	Set MYCALL to “callsign”; max 8 letters/numbers	
AT$Bnnn	Set ROBUST RETRY count to nnn; 1 to 255 valid	10
AT$Cnnn	Set CCB RETRY count to nnn; 1 to 255 valid	9
AT$Dnnn	Set CHAT COUNT to nnn; 0 to 255 valid	1
AT$En	Set CLOVER BIAS to n; 0=ROBUST, 1=NORMAL, 2=FAST	1
AT$Fnnnnn	Set CLOVER MASK to nnnnn; o to 65536 valid	0
AT$Gn	Enable CW ID; 0=OFF, 1=ON	0
AT$Hn	Enable ECHO AS SENT; 0=OFF, 1=ON	0
AT$J	Restore FACTORY DEFAULT settings	
AT$Kn	Set RX GAIN to n; 1=0 dB, 2=6 dB, 3=12 dB	1
AT$Z	Switch to 8000 command mode	
AT&V	Show all parameter settings	
ATDTcallsign	Start CLOVER CALL to “callsign”; max 8 letters/numbers	
ATS0=n	Set RINGS TO ANSWER to n; 0=OFF and 1 to 9 valid	0

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 summary is shown below:

AT&V<cr> → [Show parameter settings]

MYCALL($Ac..c): KFL1234
ROBUST RETRY ($B[1-255]): 10
CCB RETRY ($C[1-255]):1
CHAT COUNT ($D[0-255]): 1
CLOVER BIAS ($E[0-2]): 1(NORMAL)
CLOVER MASK ($Fnnnnn): CLEAR
CW ID ($G[0/1]): 0(OFF)
ECHO AS SENT ($H[0/1]): 0(OFF)
RX GAIN ($K[1-3]): 1(0 dB)
RINGS TO ANSWER (S0=[0-9]): 0

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

4. AT Mode EEPROM Details

The AT dialing parameters are stored in the non-volatile EEPROM memory on the DSP4100 board. Stored in the EEPROM array is an AT enable flag followed by a parameter save area and a twy byte checksum value. To avoid switching to the AT command mode 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..23].

The checksum is a simple 16 bit rotate and XOR calculation. The initial value of the checksum is set to $FFFF 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 found in EEPROM[22] and EEPROM[23]. If there is no error, then result will be $0000, and the checksum is correct.