

SECTION V. MAINTENANCE

13.5.1 INTRODUCTION

This section contains the preventive and corrective maintenance procedures for the Codex 3600 Series modem. Preventive maintenance consists of periodic visual inspections for physical damage and cleaning the device with a clean cloth to remove dust. The Codex 3600 Series modem and its Flex-cartridge are field replaceable units (FRU's). The Flex-cartridge may be replaced to correct a defective cartridge, or a new Flex-cartridge may be installed to provide software updates. The Codex 3600 Series modem is a low maintenance item.

13.5.2 PREVENTIVE MAINTENANCE

13.5.2.1 Routine Inspection and Cleaning. The Codex 3600 Series modem is inspected and cleaned every 90 days in the same manner as other components of the acquisition control unit (ACU) (Chapter 2, Section V). Cleaning of the Codex 3600 Series modem outer case is required to prevent dust and debris buildup on the unit. The front dress panel must be properly secured (figure 13.1.3). The modem must not be removed from its rack for inspection and cleaning.

13.5.3 CORRECTIVE MAINTENANCE

13.5.3.1 Corrective Maintenance Philosophy. The first indication that the operator may observe of a possible modem problem is that ASOS has not received a request for data (poll) from ADAS in a predetermined period of time (5 minutes in ACU S/W version 2.0 and 6 minutes in ACU S/W version 2.2); in this case, ASOS writes a message to the SYSLOG to this effect. This does not mean that the modem is malfunctioning. The ADAS network operation may be causing a suspension of polling. If polling is not resumed, the ASOS site technician notifies the cognizant ADAS network personnel that ASOS is not receiving the ADAS poll. The modem can then be checked via the network and, if possible, the problem corrected. If the problem cannot be corrected, the cognizant ADAS personnel can advise the ASOS site technician of the action to be taken. The Codex 3600 Series modem with its Flex-cartridge is an FRU. After coordinating with cognizant ADAS personnel, the ASOS site technician may be asked to check the modem locally; in this case, the technician may perform the troubleshooting procedures described in paragraph 13.5.3.3. In coordination with ADAS network management, the ASOS site technician may be asked to perform maintenance procedures for the Codex 3600 Series modem, which requires the use of the BERT (Bit Error Rate Tester) software package and the technicians laptop computer.

13.5.3.2 Bit Error Rate Tester. The BERT is a software program resident in the ASOS directory of the technician's laptop computer. The BERT is used to perform error rate tests of the Codex modem. The BERT can count the number of bit errors, calculate the percentage of error-free seconds and sync lost seconds, and sync lost occurrences. The BERT transmits and receives RS-232 compatible signals. The device generates 5 pseudorandom repeating sequences from 63 to 32,767 bits in length and generates FOX messages (i.e., quick brown fox).

13.5.3.3 CODEX 3600 Series Modem Troubleshooting. Troubleshooting of the modem is performed in coordination with cognizant ADAS network personnel for the purpose of isolating the modem as the source of a problem. In this case, the procedures described in this paragraph are performed to isolate the modem as the cause of the problem. A three-step approach is used. First, the quick check procedures (table 13.5.1) are performed. If no problem is found, menu-driven tests from the local front panel (Signal Quality Test and Self Test) are performed in accordance with the procedures described in tables 13.5.2 and 13.5.3, respectively.

Third, if the modem passes its menu-driven tests and the problem persists, the BERT Test (table 13.5.4) is performed when installing a new modem. If any problem is found as result of any test and the problem cannot be corrected or if after all tests have been conducted, the problem persists, the modem is replaced in accordance with the procedure described in table 13.5.5. The testing procedures used in troubleshooting the Codex 3600 Series modem are summarized as follows:

| <u>Test</u> | <u>Procedure Table Reference</u> |
|---------------------|----------------------------------|
| Quick Check | 13.5.1 |
| Signal Quality Test | 13.5.2 |
| Self Test | 13.5.3 |
| BERT Test | 13.5.4 |

13.5.4 REMOVAL AND INSTALLATION PROCEDURES

13.5.4.1 **General.** The table references for the removal and installation procedures for the modem and Flex-cartridge are as follows:

| <u>Unit To Be Replaced</u> | <u>Removal/Installation Table Reference</u> |
|----------------------------|---|
| Codex 3600 Series Modem | 13.5.5 |
| Flex-cartridge | 13.5.6 |

13.5.4.2 **Codex 3600 Series Modem Removal and Installation.** The removal and installation procedures for the Codex 3600 Series modem provided in table 13.5.5 include instructions for configuring the replacement modem (described in table 13.5.7) and for the use of the pocket BERT for testing the replacement modem (described in table 13.5.4).

Table 13.5.1. Codex 3600 Series Modem Quick Checks

| Problem | Cause | Solution |
|-----------------------------------|---|--|
| Cabling problems exist | This occurs when operating over restoral lines or if a new piece of equipment has recently been added to network. | Check all cable connections and electrical outlets. |
| TST LED is ON | Local or remote device may be running a diagnostic test. | Clear test in progress by pressing NO LOOP, or ENTER? and CLT TST* category. |
| The device continuously retrains. | Slaves are not turned on or are disconnected. Receive level is too high. CD threshold is too high. | Power on slave and verify processing. Lower transmit level at Master or increase carrier detect threshold. Lower carrier detect threshold through CD THR: parameter located under LS ANGL+ lead parameters. Restart and monitor operation. |
| Blind time is too short. | | Reconfigure round robin blind time through LS STP: parameter located under ANLG + lead parameter. |

Table 13.5.1. Codex 3600 Series Modem Quick Checks -CONT

| Problem | Cause | Solution |
|---|---|---|
| Improper configuration (refer to table 13.5.7). | Improper configuration has been entered. | Review CONFIG menu to ensure correct selections as shown in table 13.5.7 and change any nondefault parameters as necessary. |
| Device has no power. | DC inhibit switch is in STANDBY position. | Place dc inhibit switch in ON position. |
| TESTING is displayed continuously on front panel. | Poor handling during shipment. | Reseat cards, including Flex-cartridge and turn device OFF, then ON. Check DIAGNOS* category for possible failures. |
| ALM LED is ON. | | Check DIAGNOS* category for possible failures. |

Table 13.5.2. Codex 3600 Series Modem Signal Quality Test

| Step | Procedure |
|------|---|
| 1 | Observe RSQ LED on front panel. <ul style="list-style-type: none"> a. RSQ ON reflects good signal. b. RSQ flashing reflects marginal signal quality. c. RSQ OFF reflects poor signal quality. |
| | NOTE When RSQ remains off for any length of time, it may indicate that the device is operating at a data rate that is too high for current line conditions. The ASOS maintenance technician can confirm that a problem exists in the telephone lines by checking the signal-to-noise (SNR) ratio and error probability (ERP) in the CQMS* category of the STATUS menu (figure 13.3.3). In order to configure or test the modem from its own front panel, the ASOS maintenance technician must first remove the device from network control by using the REMOTE menu, the MISC* category, and the OVERRIDE parameter (figure 13.3.16). The following steps assume that the technician has properly logged onto the modem using his password. |
| 2 | Press REMOTE key on front panel four times. MISC* is displayed. |
| 3 | Press down arrow. OVERRIDE is displayed. |
| 4 | Press right arrow. ENABLE is displayed. |
| 5 | Press <ENTER>. The ENABLE indicator flashes, indicating that network control has been overridden. |
| 6 | Press STATUS key on front panel three times. CQMS* is displayed. |
| 7 | Press down arrow twice. SNR=XXX is displayed, where XXX equals the SNR in decibels. The SNR is measured after it has passed through the receiver's equalizer. It is not the SNR of the telephone line, as the equalizer reduces the effects of certain types of channel distortion. |
| 8 | Press down arrow once. ERP=XXX is displayed where XXX equals the probability of error in percent. Error probability, which acts as a confirmation of line deterioration, increases as the amount of distortion increases. The ASOS maintenance technician evaluates the ERP as follows: <ul style="list-style-type: none"> a. 0 to 30% = Good b. 31 to 70% = Fair c. 71 to 99% = Marginal 100% triggers the RSQ indicator to turn off, indicating that the unit cannot pass data. |

Table 13.5.2. Codex 3600 Series Modem Signal Quality Test -CONT

| Step | Procedure |
|--|--|
| NOTE | |
| The ASOS maintenance technician must disable OVERRIDE in order to restore network control by performing the following steps. | |
| 9 | Press REMOTE key on front panel. MISC* is displayed. |
| 10 | Press down arrow. OVERRIDE is displayed. |
| 11 | Press right arrow. ENABLE is displayed. |
| 12 | Press right arrow. DISABLE is displayed |
| 13 | Press <ENTER>. The DISABLE indicator flashes, indicating that network control has been restored (i.e., OVERRIDE of network control has been disabled). The NC LED on the front panel is illuminated. |

Table 13.5.3. Codex 3600 Series Modem Self-Test

| Step | Procedure |
|--|--|
| NOTE | |
| Review the TEST menu on figure 13.3.8. If power has been turned off to the modem, the password may have to be reentered in order to access the test menu. When the TEST menu key is pressed and if the modem asks for a password, reenter password using the right arrow key and enter 5215. When the display shows WELCOME, complete the following steps. During the self-test, the device disconnects itself from network control, generates test patterns through the internal circuitry, and displays the test results on the front panel. | |
| 1 | Press TEST key five times to display SELF*. SELF* is displayed. |
| 2 | Press down arrow. START is displayed. |
| 3 | Press <ENTER>. TESTING is displayed. The modem performs an internal loopback test. When complete, PASSED or FAILED is displayed. If FAILED is displayed, replace modem. If PASSED is displayed, inform ADAS network manager that modem has passed self-test. |

Table 13.5.4. BERT Test

| Step | Procedure |
|--|--|
| NOTE | |
| The technician's laptop computer, the BERT software program, and this procedure are used to test the modem. The Serial BERT (Async) software program should already be loaded onto the technician's laptop; if not, it should be installed using the instructions contained in the documentation accompanying the BERT software package. | |
| 1 | Place modem power switch at rear of unit to OFF (position 0). |
| 2 | Connect laptop (with FRONTLINE Serial BERT Async) to modem as shown on figure 13.5.1. <ul style="list-style-type: none"> a. Connect serial port on laptop to Port 1 on modem. b. Plug an RJ-11 connector with pin 1 looped to pin 3 and pin 2 looped to pin 4 into connector J8 on the I/O panel of the ACU. |
| 3 | Configure the BERT as follows: <ul style="list-style-type: none"> a. Pattern = 2047 b. Block size = 10k c. Test length = 5 minutes d. Insert errors = 0 seconds e. Parity = None |

Table 13.5.5. Codex 3600 Series Modem Removal and Installation

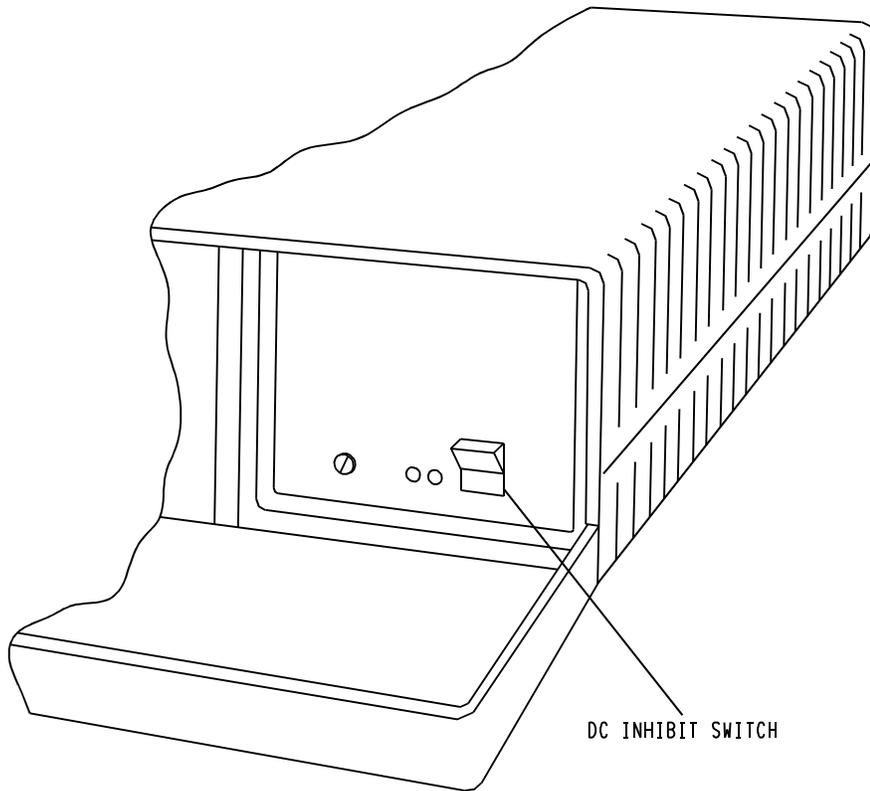
| Step | Procedure |
|-------------------------|---|
| REMOVAL | |
| Tools Required: None | |
| 1 | If ACU is a Class I system, turn facility power to ACU OFF. If ACU is a Class II system, set UPS POWER SWITCH on UPS (1A4) to OFF. |
| 2 | Place modem power switch at rear of unit to OFF (position 0). |
| 3 | Disconnect all cables and power cord from rear panel of modem. |
| 4 | Loosen restraining strap holding modem in place. |
| 5 | Slide modem out of ACU rack. |
| INSTALLATION | |
| Tools Required: None | |
| 1 | If ACU is a Class I system, turn facility power to ACU OFF. If ACU is a Class II system, set UPS POWER SWITCH on UPS (1A4) to OFF. |
| 2 | Slide modem into ACU rack in position 1A1 onto brackets. |
| 3 | Secure modem in place by running strap (62828-90341-3) through 1-inch slot in angle brackets and fastening strap over modem. |
| 4 | Run modem power cord behind brackets to peripheral cable assembly (W79) and plug into empty socket. |
| 5 | If ACU is a Class I system, turn facility power to ACU ON. If ACU is a Class II system, set UPS POWER SWITCH on UPS (1A4) to ON. |
| 6 | Place modem power switch at rear of unit to ON (position 1). |
| 7 | Verify that modem completes power-on diagnostics by observing that ALM indicator on front panel is not illuminated. |
| 8 | Using procedure described in table 13.5.7, configure modem, then perform the following steps. |
| 9 | At rear of modem, remove power by setting modem rocker power switch to OFF (position 0). |
| 10 | If ACU is a Class I system, turn facility power to ACU OFF. If ACU is a Class II system, set UPS POWER switch on UPS (1A4) to OFF. |
| 11 | Locate cable from SIO board used for modem being replaced and connect cable to DTE PORT 1 connector on rear panel of modem being installed. |
| 12 | Connect RJ-45 connector end of phone cable (62828-42045-10) to LEASE port on rear panel of modem being installed. |
| 13 | Install RJ-11 connector end of phone cable (62828-42045-10) installed in step 12 to phone filter on ACU I/O panel at connector J8. |
| 14 | If ACU is a Class I system, turn facility power to ACU ON. If ACU is a Class II system, set UPS POWER switch on UPS (1A4) to ON. |
| 15 | At rear of modem, apply power by setting modem power rocker switch to ON (position 1). |
| 16 | Verify power up by performing the following steps: <ul style="list-style-type: none"> a. After WAITING indication extinguishes on alphanumeric display and transmission rate (9.6 for a Standard modem and 19.2 for a Premium modem) appears, press STATUS key. b. Press STATUS key again. DIAGNOS* appears. c. Using down arrow, drop to PASSED. If PASSED is displayed, perform the following steps. If FAILURE is displayed, notify ADAS cognizant personnel. |

Table 13.5.5. Codex 3600 Series Modem Removal and Installation - CONT

| Step | Procedure |
|--|--|
| NOTE | |
| The ASOS maintenance technician must disable OVERRIDE in order to restore network control by performing the following steps. | |
| 17 | Press REMOTE key on front panel. MISC* is displayed. |
| 18 | Press down arrow. OVERRIDE is displayed. |
| 19 | Press right arrow. ENABLE is displayed. |
| 20 | Press right arrow. DISABLE is displayed. |
| 21 | Press <ENTER>. The DISABLE indicator flashes, indicating that network control has been restored (i.e., OVERRIDE of network control has been disabled). The NC LED on the front panel is illuminated. |

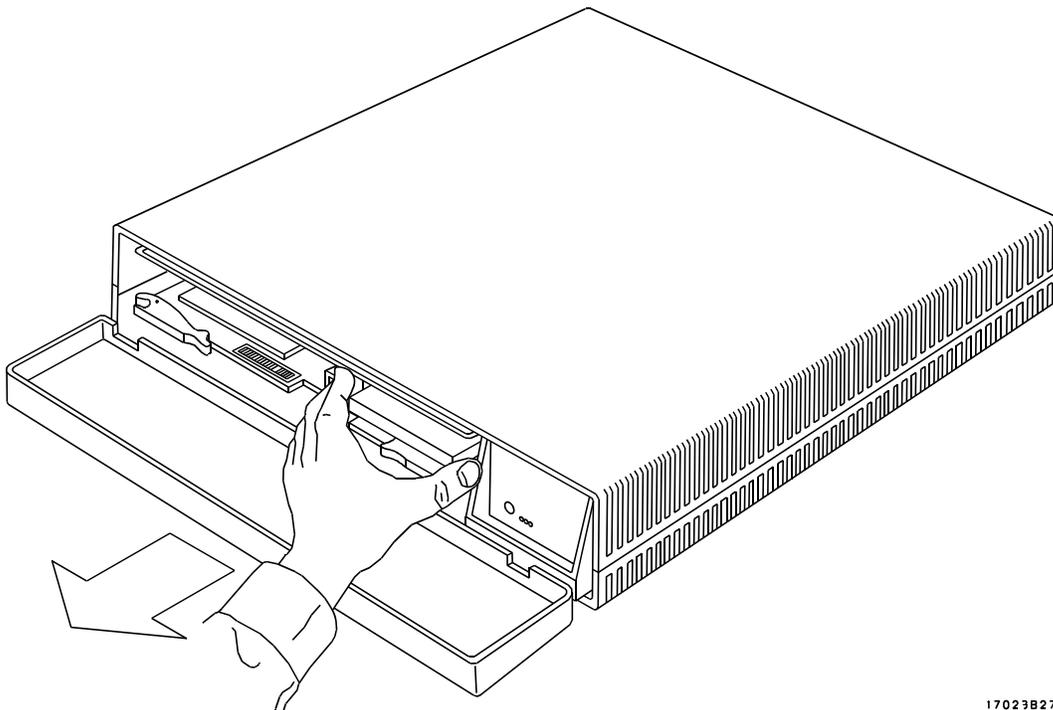
Table 13.5.6. Flex-Cartridge Removal and Installation

| Step | Procedure |
|--|--|
| REMOVAL | |
| Tools Required: None | |
| NOTE | |
| The 3600 modem is shipped from Codex with the Flex-cartridge installed. | |
| 1 | Open front panel. |
| CAUTION | |
| Ensure that the dc inhibit switch is in STANDBY position prior to removing the flex cartridge. Failure to comply could result in equipment damage. | |
| 2 | Place dc inhibit switch in STANDBY position (refer to figure 13.5.2) to disable dc power. This allows removal of the cartridge without disconnecting the modem. |
| 3 | Firmly grasp left and right sides or top and bottom of Flex-cartridge and pull it from its rear connector (refer to figure 13.5.3). Hold processor card in place during this step to prevent processor card from becoming dislodged. |
| INSTALLATION | |
| Tools Required: None | |
| CAUTION | |
| Ensure that the dc inhibit switch is in STANDBY position prior to removing the flex cartridge. Failure to comply could result in equipment damage. | |
| 1 | Align new Flex-cartridge with left and right guides and firmly slide cartridge into place until it engages rear connectors. |
| 2 | Place dc inhibit switch in ON position. |
| 3 | Close front panel. |



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Figure 13.5.2. Disabling DC Power Through the DC Inhibit Switch



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Figure 13.5.3. Removing and Installing the Flex-Cartridge

Table 13.5.7. Configuring the Codex 3600 Series Modem

| Step | Procedure |
|--|--|
| <p style="text-align: center;">NOTE</p> <p>Review the menu hierarchy described in Section III before configuring the modem in accordance with the following steps. Use the menu hierarchy as a guide in configuring the modem.</p> <p>There are two configuration setups for the Codex modem: Standard (multipoint) and Premium (point-to-point). Follow the strapping instructions for the particular Flex-cartridge (Standard or Premium) in the Codex modem.</p> | |
| STANDARD MODEM | |
| 1 | Apply power to the modem and turn power on. |
| 2 | <p>Press REMOTE. ENTR PSW is displayed. Enter 5215 as the password. To enter the password:</p> <ol style="list-style-type: none"> a. Press right arrow. The left-most digit now flashes, indicating that it may be changed. b. Press ADV# key to change value of current digit until correct value is displayed. c. Press the right arrow to advance to the next digit. d. Continue performing steps b and c until all four digits (5215) have been entered. e. Press ENTER when correct password is displayed. WELCOME displays on the LED screen. |
| 3 | Press REMOTE four times or until MISC* is displayed. Press the down arrow once or until OVERRIDE: is displayed. Press the right arrow twice or until ENABLE is displayed. Press ENTER. |
| 4 | <p>Press CONFIG once or until DEVICE* is displayed. If ENTR PSW is displayed, enter 5215 as in step 2. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>LOAD DEF: Press ENTER to signify yes. Press down arrow.</p> <p>MODE: Press right arrow until 3600 is displayed, then press ENTER. Press down arrow.</p> <p>MAX RTE: Press right arrow until 4.8 is displayed, then press ENTER. Press down arrow.</p> <p>PORT/CH: Press right arrow, use ADV# and right arrow to input 12345678. Press ENTER.</p> |
| 5 | <p>Press CONFIG twice or until ANALOG * is displayed. Press the down arrow once, SELECT > is displayed. Press the right arrow once or until LS ANLG+ is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>OP MODE: Press right arrow until MP-S is displayed. Press ENTER. Press down arrow.</p> <p>RATE_0: Press right arrow until 4.8 is displayed. Press ENTER. Press down arrow.</p> <p>TX LEVEL: Press right arrow until -13 DBM is displayed. Press ENTER.</p> |
| 6 | <p>Press CONFIG until ANALOG * is displayed. Press the down arrow once, SELECT > is displayed. Press the right arrow three times or until DTE + is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>MUX MODE: Press right arrow until B is displayed. Press ENTER. Press down arrow.</p> <p>TIMING: Press right arrow until LOOPBACK is displayed. Press ENTER. Press down arrow.</p> <p>SPD CTL: Press right arrow until REMOTE is displayed. Press ENTER</p> |

Table 13.5.7. Configuring the Codex 3600 Series Modem - CONT

| Step | Procedure |
|----------------------|--|
| 7 | <p>Press CONFIG until PORTS* is displayed. Press the down arrow once, SELECT > is displayed. Press the right arrow until PORT 1 + is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>DATA CL: Press right arrow until SYNC EXT is displayed. Press ENTER. Press down arrow.</p> <p>P1 STP1: Press right arrow once. Use right arrow and ADV# keys to display 00000000. Press ENTER. Press down arrow.</p> <p>P1 STP2: Press right arrow once. Use right arrow and ADV# keys to display 00000010. Press ENTER.</p> |
| 8 | <p>Press CONFIG until NWK CTL* is displayed. Use down arrow to sequence through the following selections. Verify/set :</p> <p>ADDRESS: Use right arrow and ADV# keys to display default address. Press ENTER. Press down arrow.</p> <p>NC STP1: Press right arrow once. Use right arrow and ADV# keys to display 00000000. Press ENTER.</p> |
| 9 | <p>Press REMOTE until MISC* is displayed. Use the down arrow to sequence display to OVERRIDE. Press right arrow until DISABLE is displayed. Press ENTER. Codex is now configured.</p> |
| PREMIUM MODEM | |
| 1 | <p>Apply power to the modem and turn power on.</p> |
| 2 | <p>Press REMOTE. ENTR PSW is displayed. Enter 5215 as the password. To enter the password:</p> <ol style="list-style-type: none"> a. Press right arrow. The left-most digit now flashes, indicating that it may be changed. b. Press ADV# key to change value of current digit until the correct value is displayed. c. Press right arrow to advance to next digit. d. Continue performing steps b. and c. until all four digits (5215) have been entered. e. Press ENTER when correct password is displayed. WELCOME displays on LED screen. |
| 3 | <p>Press REMOTE four times or until MISC* is displayed. Press the down arrow once or until OVERRIDE: is displayed. Press the right arrow twice or until ENABLE is displayed. Press ENTER.</p> |
| 4 | <p>Press CONFIG until DEVICE * is displayed. If ENTR PSW is displayed, enter 5215 as in step 2. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>LOAD DEF: Press ENTER to signify yes. Press down arrow.</p> <p>MODE: Press right arrow until 3600 is displayed, then press ENTER. Press down arrow.</p> <p>MAX RTE: Press right arrow until 19.2 is displayed, then press ENTER. Press down arrow.</p> <p>PORT/CH: Press right arrow, use ADV# and right arrow to input 12345678. Press ENTER.</p> |
| 5 | <p>Press CONFIG twice or until ANALOG * is displayed. Press the down arrow once, SELECT > is displayed. Press the right arrow until LS ANLG+ is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>OP MODE: Press right arrow until TURBO is displayed. Press ENTER. Press down arrow.</p> <p>RATE_0: Press right arrow until 19.2 is displayed. Press ENTER. Press down arrow.</p> <p>TX LEVEL: Press right arrow until -13 DBM is displayed. Press ENTER.</p> |

Table 13.5.7. Configuring the Codex 3600 Series Modem - CONT

| Step | Procedure |
|------|--|
| 6 | <p>Press CONFIG until ANALOG* is displayed. Press the down arrow once, SELECT > is displayed. Press the right arrow until DTE + is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>MUX MODE: Press right arrow until UDM1 is displayed. Press ENTER. Press down arrow.</p> <p>TIMING: Press right arrow until LOOPBACK is displayed. Press ENTER. Press down arrow.</p> <p>SPD CTL: Press right arrow until REMOTE is displayed. Press ENTER</p> |
| 7 | <p>Press CONFIG until PORTS* is displayed. Press the down arrow once, SELECT > is displayed. Press the right arrow until PORT 1 + is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>DATA CL: Press right arrow until SYNC EXT is displayed. Press ENTER. Press down arrow.</p> <p>P1 STP1: Press right arrow once. Use right arrow and ADV# keys to display 00001000. Press ENTER. Press down arrow.</p> <p>P1 STP2: Press right arrow once. Use right arrow and ADV# keys to display 00000010. Press ENTER.</p> |
| 8 | <p>Press CONFIG until NWK CTL* is displayed. Use the down arrow to sequence through the following selections. Verify/set :</p> <p>ADDRESS: Use right arrow and ADV# keys to display default address. Press ENTER. Press down arrow.</p> <p>NC STP1: Press right arrow once. Use right arrow and ADV# keys to display 00000000. Press ENTER.</p> |
| 9 | <p>Press REMOTE until MISC * is displayed. Use down arrow to sequence display to OVERRIDE. Press right arrow until DISABLE is displayed. Press ENTER. Codex is now configured.</p> |