SECTION III. OPERATION

1.3.1 INTRODUCTION

System maintenance operations are performed from the operator interface device (OID) terminal or from the remote maintenance monitoring terminal (described in paragraph 1.3.14). From either of these terminals, users can access the diagnostic program screens that are an integral part of the system; change the system configuration; change output port assignments, parameters, and message formats; change communications port characteristics; enable and disable communications ports; change the dialing mode between pulse and tone; request 2-hour archive of 5-minute observations for 15 days; turn sensors on or off; turn sensor report processing on or off; change selected site constants such as date, time, latitude, longitude, and elevation; make log entries; and reset the system. By using the handset in conjunction with its designated OID terminal, the technician can also record, play back, and control automated voice messages. The functions that a user can perform on the ASOS depend on how the user signs on the system. There are four levels of users that sign on to the system: observers, air traffic controllers (ATC's), system managers, and technicians. In addition, an unsigned user has certain capabilities on the system. Some functions can be performed by more than one type of user. For example, the technician and system manager have the same maintenance capabilities under the MAINT (maintenance) function. The ASOS Software User's Manual identifies the functions assigned to each type of user. This section provides control and indicator information for the OID and printer, descriptions of all maintenance screens, and detailed system maintenance operating procedures. Additional information on the other ASOS screens and operating procedures are provided in the ASOS Software User's Manual.

1.3.2 OPERATOR INTERFACE DEVICE (OID) CONTROLS AND INDICATORS

The OID is a standard cathode ray tube (CRT) terminal. The keyboard (Figure 1.3.1) is divided into four functional areas: the main keypad, editing keypad, auxiliary keypad, and function keypad. The editing keypad contains the arrow, REMOVE, and edit keys. The arrow keys are used to move the cursor to the different fields on the screen. The REMOVE key is used to delete the character under the cursor. The edit keys are used to move the cursor to a specific point on the screen when editing log entries. The auxiliary keypad is used to access the maintenance/operator screens. The keypad on the OID screen overlays the auxiliary keypad area such that the function in the upper left corner of the OID keypad is represented by key 7 and the function in the lower right corner of the OID keypad is represented by key 3. The function keypad contains the HELP key, which is used to access the system help feature. Help can also be accessed by pressing the 0 key on the auxiliary keypad. Function keys F12 and F20 control the system's audio alarm. Pressing F12/F20 permanently disables the alarms. Pressing F12/F20 again enables the alarms. The audio alarm can be disabled for the current alarm by pressing the F11 or F19 key. Additional information on the OID and its use is provided in the ASOS Software User's Manual and the associated computer terminal manual at your site.

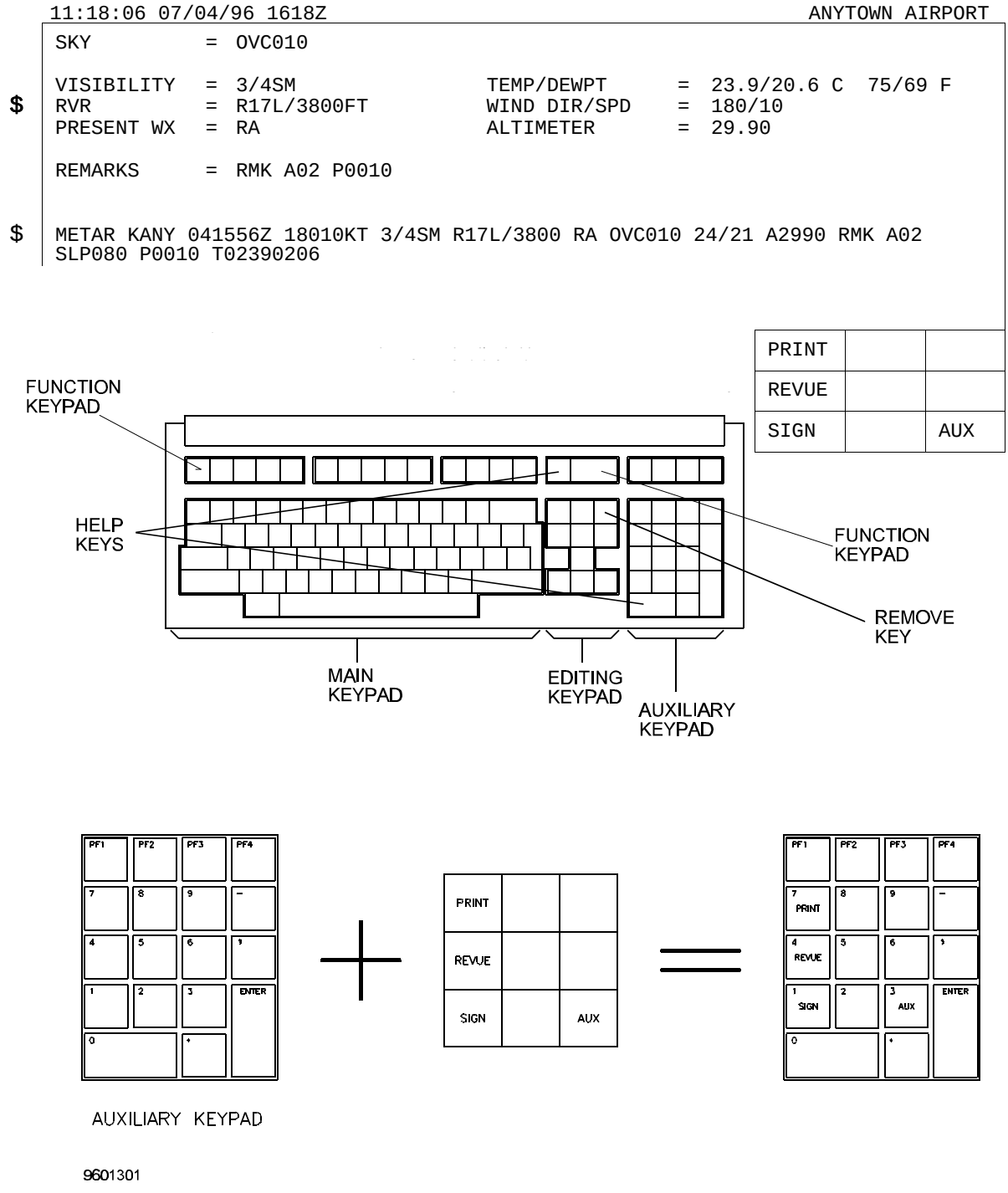


Figure 1.3.1. OID Keyboard Controls and Indicators

1.3.3 PRINTER CONTROLS AND INDICATORS

The printer controls and indicators are described in the Panasonic dot matrix printer manual.

1.3.4 MAINTENANCE SCREEN DESCRIPTIONS

1.3.4.1 **Introduction**. The ASOS technician uses the maintenance screens to interface with the ASOS continuous self-test (CST) program, which runs continuously during normal system operation. The program monitors the operational status of all ASOS hardware by reading and writing diagnostic data between the central processing unit (CPU) and the system hardware components. The self-test is repeated every 7 minutes and the results are entered into the system log. The technician interface screens provide a TEST key that is used to specify testing for sensors and/or field replaceable units (FRU's).

Certain items, specifically the wind sensor, the model 1088 temperature/dewpoint sensor, and telephone modems in the ACU, provide internal detailed diagnostics. These detailed diagnostics are not run as part of the normal CST cycle but are run on demand. If, during normal system data processing, a sensor failure is detected by the sensor processing program, the sensor processing program issues a command to the sensor to run its detailed diagnostic program. This command forces the sensor into an immediate detailed test. If the sensor fails its detailed diagnostic, an FRU failure message is entered into the maintenance log. The technician may also manually initiate the detailed diagnostics by pressing the TEST key on the wind sensor or the 1088 screens.

The telephone modems in the ACU may be configured for either dial-up operation (operating on the public switched telephone network) or leased line operation. As mentioned above, the modems provide an internal detailed diagnostic program, known as a system analog loopback (SAL) test. ASOS diagnostics test dial-up modems by initiating the internal SAL. However, running the SAL test disrupts normal data transmission (disconnects the telephone user). For this reason, the modems are tested every 7 minutes only when they are not in use (on-line). If a modem is on-line when it is scheduled for testing, the test is skipped until the next 7-minute cycle. The technician can perform an on-demand test of a selected dial-up modem at any time by pressing the TEST key on the modem maintenance screen, which immediately initiates the internal SAL. Therefore, the technician must be aware that if the modem is on-line, pressing TEST will disrupt current data transmission. Leased line modems are always on-line and therefore are not tested at all by the ASOS software; neither can a technician test them on demand.

The self-test/diagnostic program uses a series of easily accessible screens to display test results and to enable the technician to run specific portions of the diagnostic program. The screens are arranged in a hierarchical manner such that the key element of the system is displayed on the first maintenance screen. The units under each element of the system are accessed by placing the cursor on the element (i.e., ACU or DCP) and pressing the SEL key. The elements in that area are displayed on the OID. The process of moving the cursor and pressing the SEL key is repeated until the specific unit (i.e., sensor, board, or power supply screen) is displayed on the OID. Figure 1.3.2 illustrates the hierarchy of the maintenance screens.

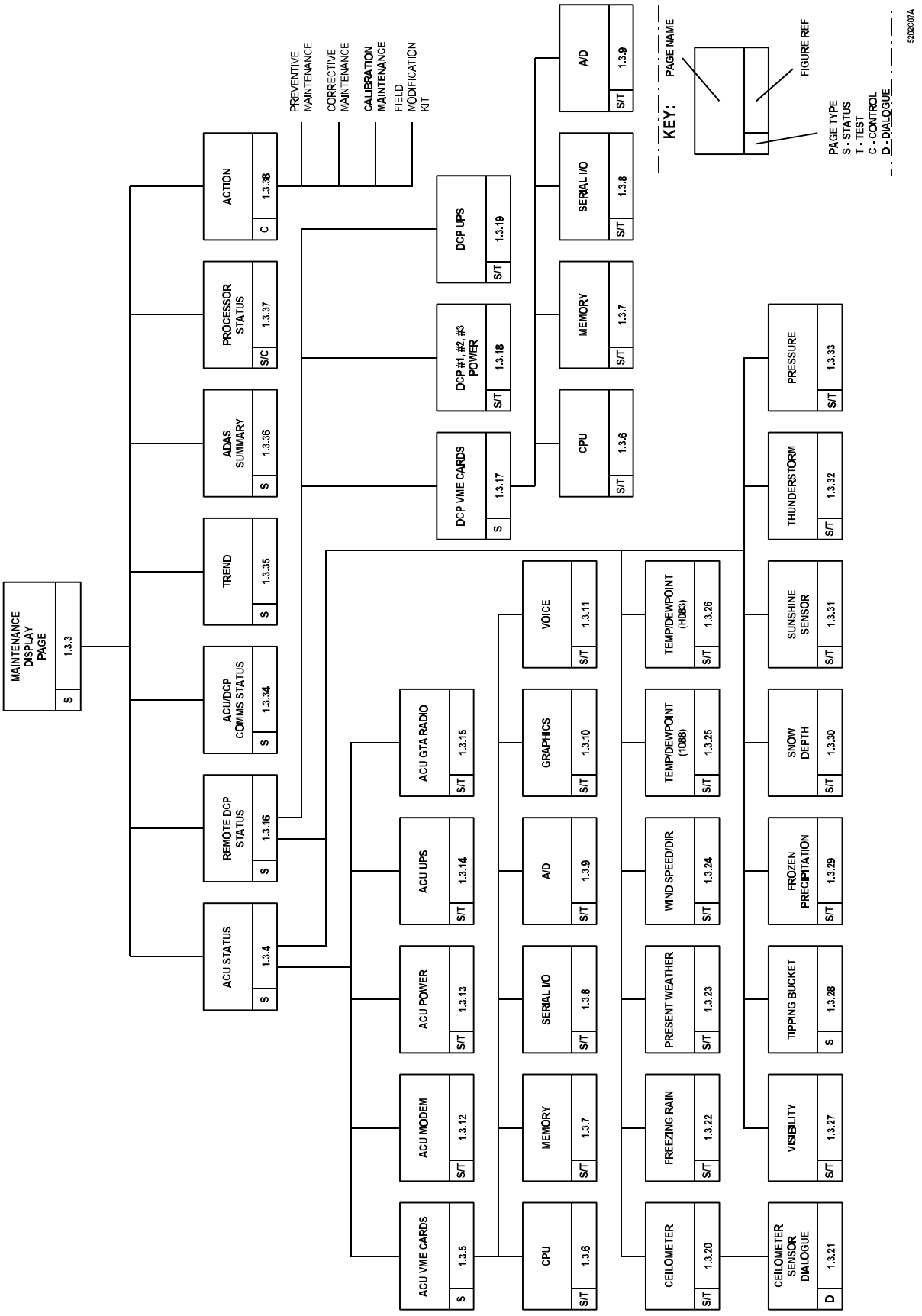


Figure 1.3.2. Maintenance Screens Hierarchy

1.3.4.2 **Maintenance Screen Keypad**. The maintenance screen keypad, which is located in the lower right corner of each screen, enables the technician to access the different maintenance screens, print individual screens, and perform on-demand diagnostic tests on an individual element of the ASOS hardware. The keypad provides up to eight active key functions. The purpose of each of these keys is as follows:

a. PRINT - Enables the currently displayed screen to be printed on the printer. PRINT function is not available to remote (dial-in) users (paragraph 1.3.14.1).

b. PREV/NEXT - Enables the cursor to be moved to the different fields on the currently displayed screen.

c. SEL - Enables the selection of a specific maintenance screen indicated by the position of the cursor.

d. TEST - For items with internal detailed diagnostic capability (1088, wind sensor, and ACU telephone modems), initiates detailed testing. For all other hardware, selects items on displayed screen for testing. T's are displayed on screen until items are tested during next CST cycle. CST results (pass or fail) are then displayed.

e. EXIT - Returns the user to the 1-minute screen on the OID.

f. CLEAR - Clears all counters for the fail count fields on the screen displayed and all screens summarized by this field.

g. BACK - Returns the user to the previous screen/keypad.

h. POWER - Appears on DCP Sensor Screens to enable the technician to control power to the individual sensors.

1.3.4.3 **Maintenance Screen Status Indicator Fields**. The maintenance screen status indicator fields are located to the right of each screen field. The status indicator field indicates the present operational status of the respective hardware components displayed on a screen. These fields display either a P (pass), T (testing), C (conditional), F (fail), or D (degraded) character depending on the present status of the unit or the result of the last continuous diagnostic or on-demand diagnostic test. An * (asterisk) is placed in the field if the item has not yet been tested.

A numeric fail count may be displayed to the right of the status indicator field. The fail count increments each time the status field transitions from P to F. It also increments each time the status field transitions from T (when the TEST key is pressed) to F. The fail count does not increment if F status is continually displayed by successive CST cycles. In most cases, the presence of a fail count generates the maintenance flag ($) in the next METAR. Sensor report processing OFF also produces a $. The CLEAR key, when pressed, clears all fail counts on the displayed screen and all screens beneath it on the maintenance hierarchy.

The C (conditional) indication is displayed on a summary-type screen to indicate that a hardware item is currently passing its CST but that failures have been generated (fail count(s) present on a lower screen in the maintenance hierarchy). For example, on the DCP screen, a C status would appear for the visibility sensor if the subordinate visibility screen showed the sensor passing CST but a fail count was still displayed. Using the CLEAR key to erase the fail count would change the visibility status on the DCP screen from C to P.

The system operates somewhat differently for tests associated with the serial input/output (SIO) boards and telephone modems. Before describing this in detail, it is important to make the following distinction between fail counts and accumulated failures.

a. Fail Count - Numeric value displayed on modem or SIO screen. Indicates transitions from P to F or T to F as described above (does not generate a $ in observation).

b. Accumulated Failures - Internal count kept by the CST indicating the actual number of failed test responses received (since the internal counter was last cleared). Accumulated failures generate a $ as described below.

When there are fewer than five accumulated failures (and the test is currently passing), a $ is not placed in the observation and a status of C (conditional) is reflected on the next higher screen. When the accumulated failures reach five or more (and the test is currently passing), a status of D is displayed (and is reflected on the next higher screen) and a $ is placed in the observation.

At 0600 LST each day, the number of accumulated failures is summarized in the system (maintenance) log as a code 9999 message. If the number of accumulated failures is less than five at this time, the system automatically clears the accumulated failure counter, the displayed fail count, and the associated C status. If the number of accumulated failures is five or more, the displayed fail count is cleared, but the accumulated failure counter is not cleared and the D (degraded) status is still reported.

The technician can use the CLEAR key for these tests. When pressed, the CLEAR key erases the number of accumulated failures and the displayed fail count. As a result, the C or D status is canceled (P is displayed) and any associated $ is removed from the observation.

1.3.4.4 **Sensor Data Quality, Report Process, and Sensor Response Fields**. Each sensor screen contains three additional test fields: data quality, report process, and sensor response. These fields identify operational data transmission status to the technician. The data quality field is controlled by the sensor processing program; specifically, by the processing algorithm for the sensor. If the algorithm determines that the data being received from the sensor are logically incorrect, the sensor processing program displays an F (fail) status in the data quality field. Table 1.3.1 lists the failure conditions for each sensor. The report processing field indicates whether or not a sensor algorithm is using the data being reported by the sensor. When report processing is on (status = Y), the algorithm is using the sensor data to update the 1-minute screen. When report processing is off (status = N), the algorithm ignores the sensor data, and the corresponding 1-minute
$ field reports missing (unless a value is manually entered by an observer). During sensor configuration, report
$ processing is off. The report processing status is conditioned from the review sensor status screen. The sensor response field displays a failed status (F) whenever the sensor does not respond to a data request from the sensor processing program or the self-test program and a pass status (P) when the sensor is responding when polled. Sensor response is also called sensor status.

Table 1.3.1. Sensor Data Quality Algorithm Checks

Sensor	Check
Wind direction	a. Must vary more than 1 degree during 5-minute period in which the 2-minute average wind speed exceeds 5 knots. b. Must have at least 18 (of 24 total) samples present in current 2-minute period.
Temperature/dewpoint	a. TA must vary by more than 0.1°F over a 60-minute period. b. TA must not change more than 6°F over a 1-minute period. c. TD cannot be more than 2 degrees greater than TA. d. TD must vary by more than 0.1°F over a 60-minute period. e. TD must not change more than 6°F over a 1-minute period. f. Must have at least 4 (of 5 total) samples present in current 5-minute period. g. In the event that the temperature/dewpoint sensor stops reporting, the system reports the last values for 15 minutes. If a new temperature or dewpoint value is not provided within 15 minutes, respective parameter is marked missing. At least four readings in the last 5 minutes must be available before a new value can be calculated. If new value for temperature or dewpoint is not computed in last 15 minutes, respective sensor is marked missing. Sensor must provide at least four valid readings within 5 minutes for system to compute new value.
Visibility	a. Extinction coefficient must be between 65.6 and 0.00 /km. b. Must not drop from a reading of 7 miles or more to a reading of less than 2 miles in 1 minute with a wind speed of less than 7 knots. c. Must be greater than 2 miles if TA-TD is greater than 5°F. d. Must have at least 8 (of 10 total) samples present in current 10-minute period.
Day/night	a. Sensor must report N (night) at midnight. b. Sensor must report D (day) at noon.
Present weather	a. If sensor indicates snow, TA must indicate a temperature of less than 38°F. b. If sensor indicates liquid precipitation, TA must be greater than 28°F. c. Must have at least 8 (of 10 total) samples present in 10-minute period.
Liquid precipitation	a. Rain gauge sends optical pulse to DCP with each tip of its tipping bucket. Pulses must be greater than 50 milliseconds long. b. Must indicate precipitation accumulation if the present weather sensor has indicated 10 or more moderate or heavy occurrences of precipitation since the previous hourly observation.
Sky	Must not be missing more than 2 consecutive ceilometer samples or more than 4 total samples (of 60 total) in current 30-minute period.
Pressure	a. Sensor must report within ±0.04 inHg of other 1 or 2 pressure sensors. b. Must not be missing more than 1 sample (of 10 total) in current 1-minute period or more than 2 samples in current 12-hour period.
Freezing rain	Must have at least 12 samples (of 15 total) samples present in current 15-minute period.
Snow depth	a. Must indicate between 0 and 99 inches. b. Must not exceed a rate of change of 2 inches per minute. c. Must vary by more than 0.5 inch when the present weather sensor report indicates snow (S) or heavy snow (S+) over a 30-minute period and the 5-minute average TA is less than 32°F.
Thunderstorm	a. Number of lightning strikes for each range must be less than 4000. $ b. Must not be missing more than 3 consecutive thunderstorm samples in current 15-minute period. $

1.3.4.5 **Maintenance Screen Description**. The maintenance screen (Figure 1.3.3) provides overall test status information to the technician. It also enables the technician to access the next level status and test screens. The function of each field is described in table 1.3.2.

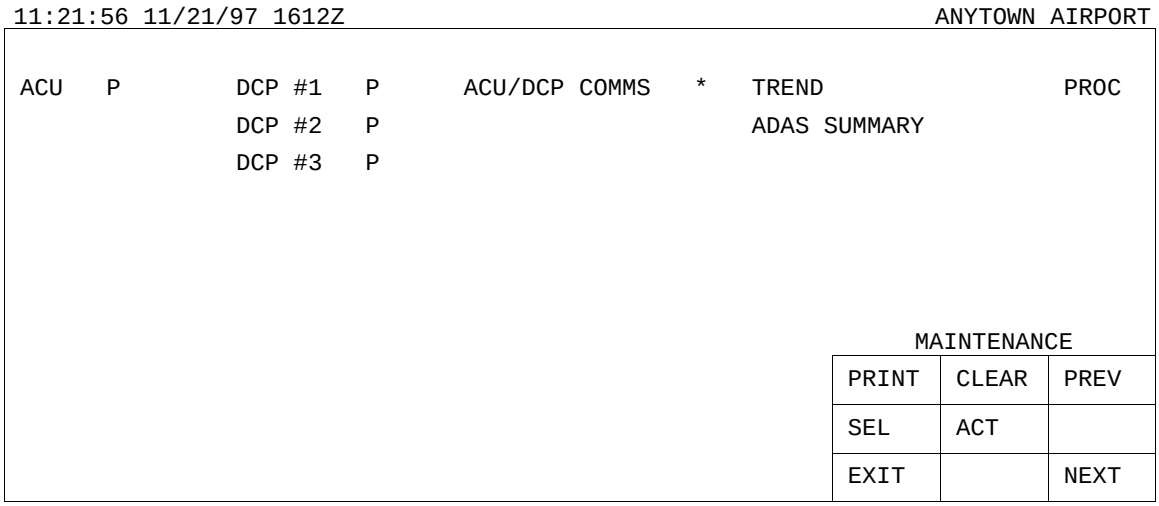


Figure 1.3.3. Maintenance Screen

1.3.4.6 **Maintenance Action Selection**. An important function of the maintenance screen is the ACT key on the MAINTENANCE keypad. This key permits the technician to access the maintenance action screens from which maintenance tasks are started and documented in the system maintenance log. The technician enters unit/assembly stock numbers and unit serial numbers to screens that specify preventive, corrective, or calibration maintenance tasks. Field modification kit numbers are entered on a field modification kit screen.

Table 1.3.2. Maintenance Screen Field Descriptions

Field	Description
ACU	Displays the summary status of all hardware items in the ACU cabinet and any associated local sensors. The SEL key enables the technician to select the ACU status screen, where the individual status of ACU hardware and local sensors can be found.
DCP #1 DCP #2 DCP #3	Displays the summary status of all hardware items in the respective data collection package (DCP) along with its associated sensors. The SEL key enables the technician to access the DCP status screen of interest, where the individual status of DCP hardware and corresponding sensors can be found.
ACU/DCP COMMS	Displays the status of the intercommunications devices in the ASOS configuration (DCP to ACU communications). The SEL key enables the technician to select the ACU/DCP communications status screen.
TREND	Displays the communication status of the ACU and DCP radios (RF modems). The SEL key enables the technician to select the trend screen, from which the technician can check the communication link between the ACU and DCP(s).
ADAS SUMMARY	Displays ADAS communication log entries per hour. The SEL key enables the technician to select the ADAS summary screen.
PROC	Displays the operational status of the ACU and DCP processors. The SEL key enables the technician to select the processor status screen, from which the technician may reset the ACU or DCP.

1.3.4.7 **ACU Status Screen**. The ACU status screen (Figure 1.3.4) displays the status of each ACU local sensor and hardware area and provides menu commands to access sensor diagnostic and hardware status functions. This screen pertains to the ACU only (the DCP has a separate, similar screen). The function of each field on the ACU status screen is described in table 1.3.3. Each sensor screen under the ACU status screen is similar to the same type sensor screen under the DCP status screen because the sensor tests (and sensors) are identical. Since most sensors are typically configured as part of the DCP at the majority of ASOS installation sites, the sensor screens are described in this section under the DCP status screen. These screens will not be covered again under the ACU status screen. However, the sensor screens that appear under the ACU status screen do not have the three sensor power-related items that appear on the DCP sensor screens. The sensor power-related items consist of the POWER key that enables the technician to turn DCP sensor power on and off, a POWER CONTROL status field that indicates whether sensor power is on or off, and a POWER STATUS field that indicates the status of sensor power as a pass or fail condition.

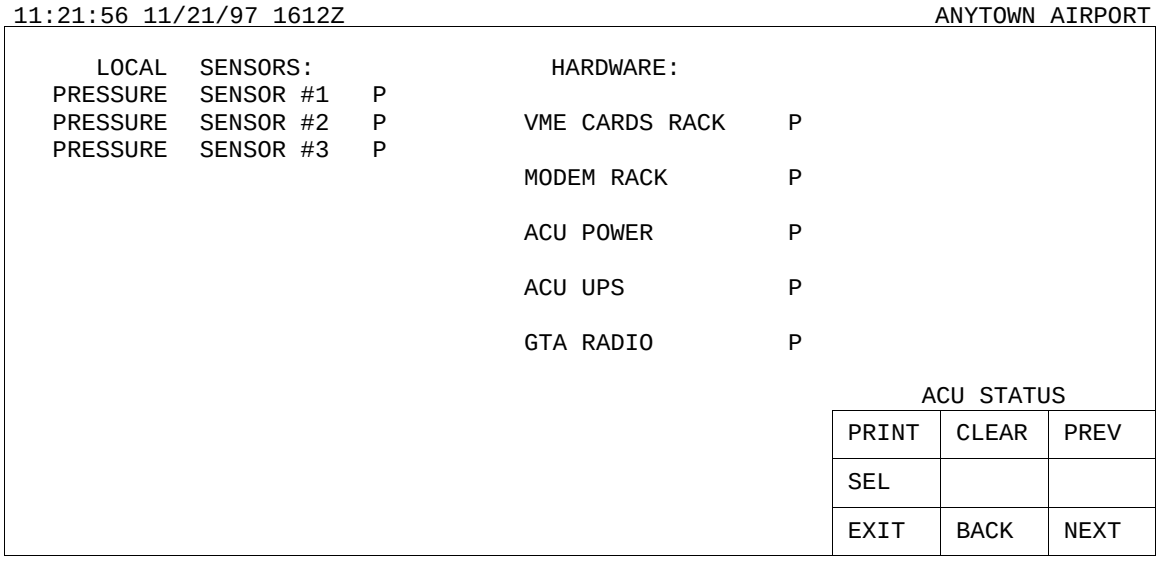


Figure 1.3.4. ACU Status Screen

Table 1.3.3. ACU Status Screen Field Descriptions

Field	Description
LOCAL SENSORS	Displays the status of each of the sensors configured as a local sensor in the ACU, and enables the technician to select a specific sensor screen.
VME CARDS RACK	Displays the summary status of all boards located in the ACU VME card rack, and enables the technician to select the ACU VME cards screen.
MODEM RACK	Displays the summary status of all modems located in the ACU modem rack, and enables the technician to select the ACU modem screen.
ACU POWER	Displays the status of all power-related functions in the ACU. Enables the technician to display individual status screens.
ACU UPS	Displays the summary status of the UPS in the ACU, and enables the technician to select individual status screens.
GTA RADIO	Displays the summary status of the GTA radio in the ACU, and enables the technician to select the ACU GTA radio screen.

1.3.4.8 **ACU VME Cards Screen**. The ACU VME cards screen (Figure 1.3.5) pertains only to the ACU. This screen displays the test status of each board in the VME card rack. The ACU VME cards screen also enables the technician to select a specific board's diagnostic screen.

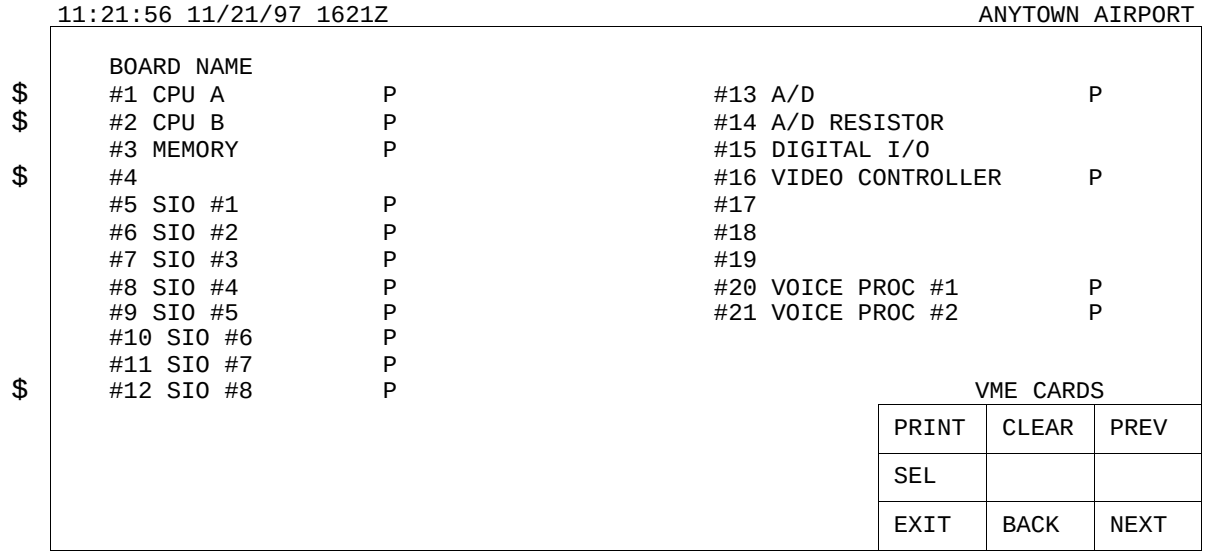


Figure 1.3.5. ACU VME Cards Screen

1.3.4.9 **CPU Screen**. The CPU screen (Figure 1.3.6) pertains to both the ACU and the DCP. The ACU always contains two CPU's. The primary CPU operates the system while the other is the backup, or redundant, CPU. Because this screen summarizes the status of both CPU's, the identical screen is displayed regardless of whether the technician selects CPU A screen or the CPU B screen (from the VME cards screen). The top half of the CPU screen displays the CST status for the primary CPU, while the bottom part of the screen identifies the current redundant CPU and displays the pass/fail status of its internal built-in test. The function of each field on the CPU screen is described in table 1.3.4.

The DCP contains either one or two CPU's, depending on site configuration. When the DCP contains two CPU's, this screen operates the same as described above for the ACU. When the DCP contains only one CPU, there is no redundant CPU and only the top part of the screen is applicable.

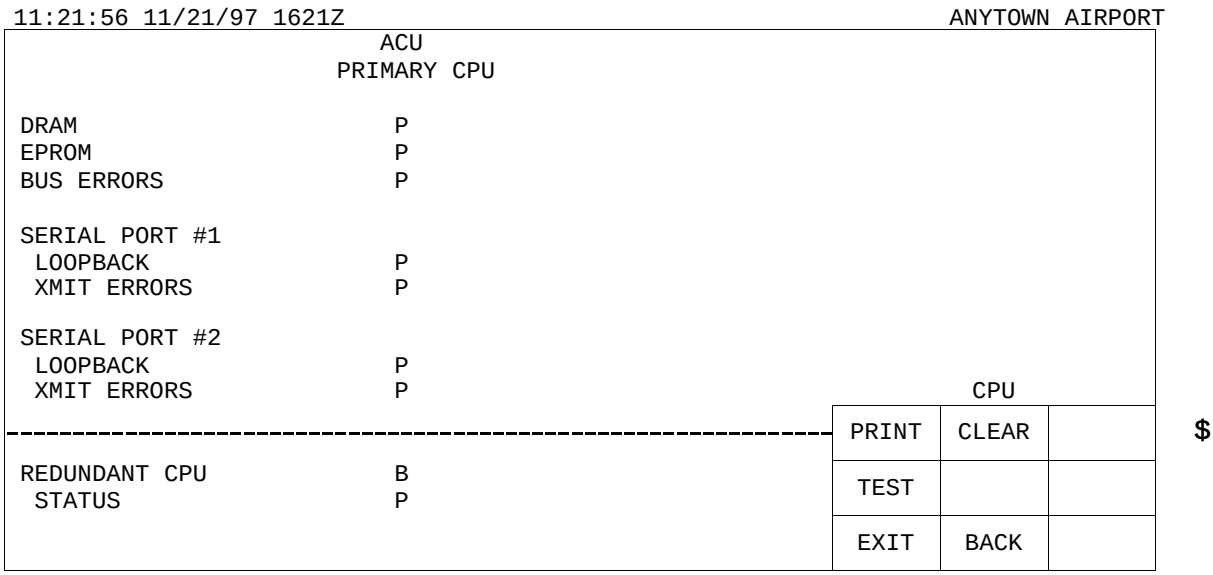


Figure 1.3.6. CPU Screen

Table 1.3.4. CPU Screen Field Descriptions

Field	Description
DRAM	Displays the results of the dynamic random access memory (DRAM) test. This test is based on an alternating pattern of 1's and 0's. The output status (P = pass or F = fail) is displayed upon completion of a data comparison.
EPROM	Displays the results of the erasable programmable read only memory (EPROM) test. This test is based on a checksum. The checksum must be equal to the last byte stored in the EPROM. The output status (P = pass or F = fail) is displayed upon completion of the checksum comparison.
BUS ERRORS	Displays the results of the bus errors test. The bus errors test is based on a memory write to a specific address. The contents of the memory addressed are then evaluated and the output status (P = pass or F = fail) is displayed.
SERIAL PORT	This test ensures that the CPU can communicate with its internal UART (two ports). For each port, the CPU reads the UART interrupt sector register and tests for bus errors. The status field indicates a P (pass) if no bus errors occurred and indicates an F (fail) if bus errors were encountered.
LOOPBACK	Displays the results of the loopback test. This test ensures that the CPU can communicate with its internal UART (two ports). For each port, the CPU reads the UART interrupt sector register and tests for bus errors. The status field indicates a P (pass) if no bus errors occurred and indicates an F (fail) if bus errors were encountered.
XMIT ERRORS	Displays the results of the XMIT errors test. This test checks for errors encountered during data transmission (or incoming data) and is based on the UART status register contents. The register contents are evaluated for parity errors, framing errors, and overrun errors on incoming data. If such errors occur for two out of three consecutive CST cycles, an F (fail) is displayed in the status field; otherwise, the status field indicates P (pass).
REDUNDANT CPU	Indicates which CPU is being used as the redundant CPU.
STATUS	Indicates the status of the redundant CPU: P (pass) indicates functioning and F (fail) indicates not operating correctly.

1.3.4.10 **Memory Screen**. The memory screen (Figure 1.3.7) pertains to both the ACU and DCP (although DCP screen shows no EPROM line). This screen displays the results of the diagnostic test performed on the major functional circuits on each memory board in the system. The function of each field on the memory screen is described in table 1.3.5.

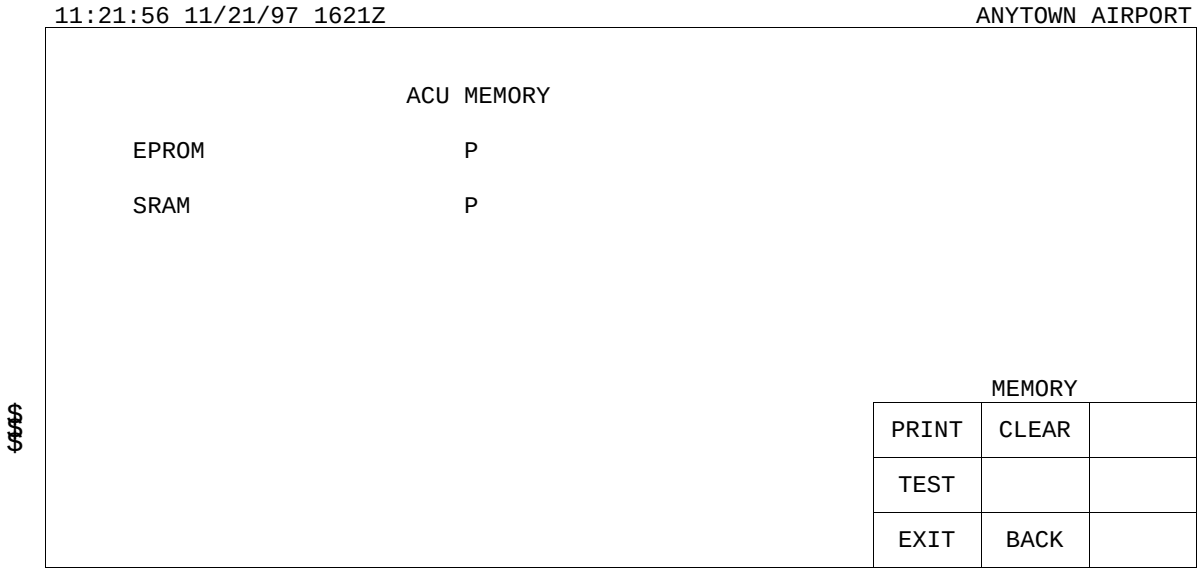


Figure 1.3.7. Memory Screen

Table 1.3.5. Memory Screen Field Descriptions

Field	Description
EPROM	From the ACU memory board, displays the results of the EPROM test. This test is based on checksum. The checksum must be equal to the last byte stored in the EPROM. The output status (P = pass or F = fail) is displayed upon completion of the checksum comparison. For the DCP memory board, this field is not displayed because the board contains no EPROM.
SRAM	Displays the results of the SRAM test. This test indicates whether or not the CPU can access the SRAM without encountering bus errors. The CPU reads from an SRAM location and tests for bus errors. The status field indicates a P (pass) if no bus errors occurred or an F (fail) if bus errors did occur.

1.3.4.11 **Serial I/O Screen**. The serial I/O screen (Figure 1.3.8) pertains to both the ACU and DCP. This screen displays the results of the diagnostic test performed on the major functional circuits on a serial I/O (SIO) board. The function of each field on the serial I/O screen is described in table 1.3.6. When fewer than five LOOPBACK failures have been detected and the port is currently passing the LOOPBACK test, a $ is not added to the observation and a status of C (conditional) is reflected on the next higher screen. When five or more LOOPBACK failures have occurred and the port is currently passing this test, a status of D (degraded) is displayed for the port (and is also reflected on the next higher screen) and a $ is added to the observation. At 0600 LST each day, the number of accumulated failures is summarized in the system (maintenance) log. The system operates identically for XMIT ERROR failures. The technician can use the CLEAR key to reset the fail counts and clear the C or D status indication. Paragraph 1.3.4.3 provides additional information on SIO test reporting.

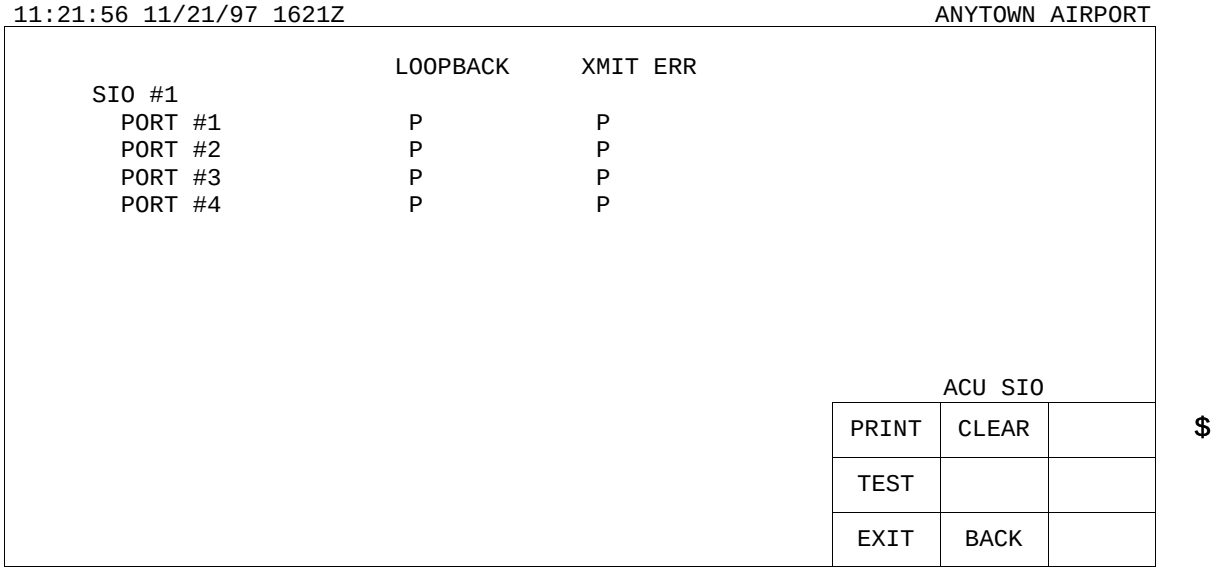


Figure 1.3.8. Serial I/O Screen

Table 1.3.6. Serial I/O Screen Field Descriptions

Field	Description
LOOPBACK	Displays the results of the loopback test. This test ensures that the CPU can communicate with the two UART's (four ports total) on the SIO board. For each port, reads the UART vector interrupt register and tests for bus errors. The status field indicates a P (pass) if no bus errors occurred, an F (fail) if bus errors were encountered, or a D if more than five errors have been detected and the test is currently passing.
XMIT ERRORS	Displays the results of the XMIT errors test. This test checks for errors encountered during data transmission (on incoming data) and is based on the UART status register contents. The register contents are evaluated for parity errors, framing errors, and overrun errors on incoming data. The status field indicates a P (pass) if no errors occurred, an F if errors were detected, or a D if more than five errors occurred and the test is currently passing.

1.3.4.12 **A/D Screen Description**. The A/D screen (Figure 1.3.9) pertains to both the ACU and DCP, and is essentially the same for both. The ACU contains one analog-to-digital (A/D) card which is used for self-tests of power supply voltages within the ACU cabinet. The DCP contains either one or two A/D boards. The first DCP A/D board is used to self-test cabinet voltages and to sense whether the first eight sensors are on or off. The second A/D board is installed in DCP's that contain more than eight sensors.

The diagnostic test performs two functional tests on each A/D board: register readback and reference voltage tests. The register readback test sends control words to the control register on the board and reads the data back via a status register also located on the A/D board. Failure of the register readback test indicates a failure of the A/D board to properly store command data or a possible I/O failure. The reference voltage test checks the operation of the A/D conversion circuits by checking the value of a +2.5 vdc precision reference voltage in the ACU or DCP cabinet.

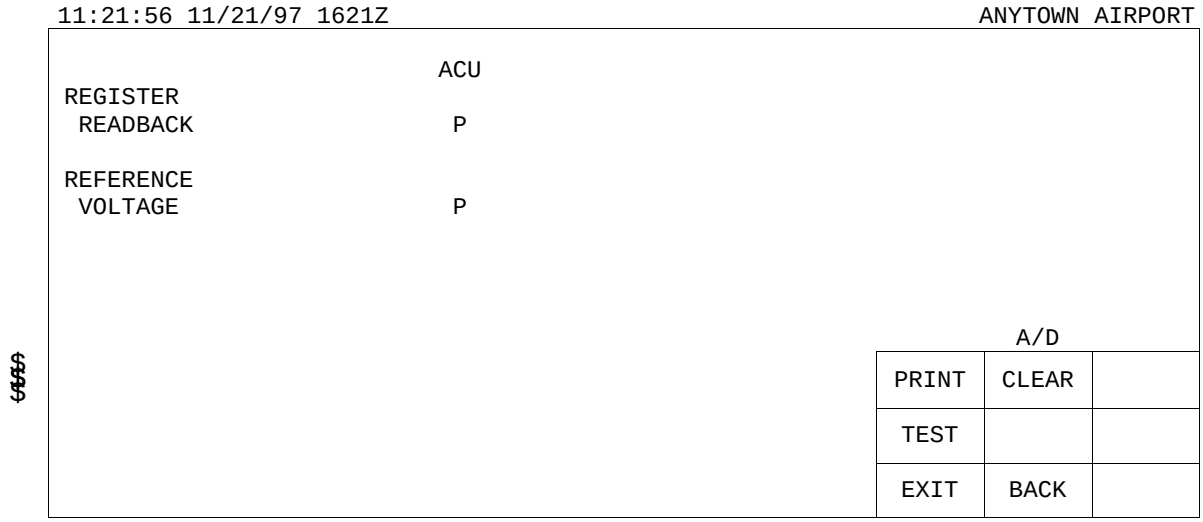


Figure 1.3.9. A/D Screen

1.3.4.13 **Graphics Screen**. The graphics screen (Figure 1.3.10) pertains to the ACU only. This screen displays the results of the diagnostic test performed on the major functional circuits on the video controller board. The function of each field on the graphics screen is described in table 1.3.7.

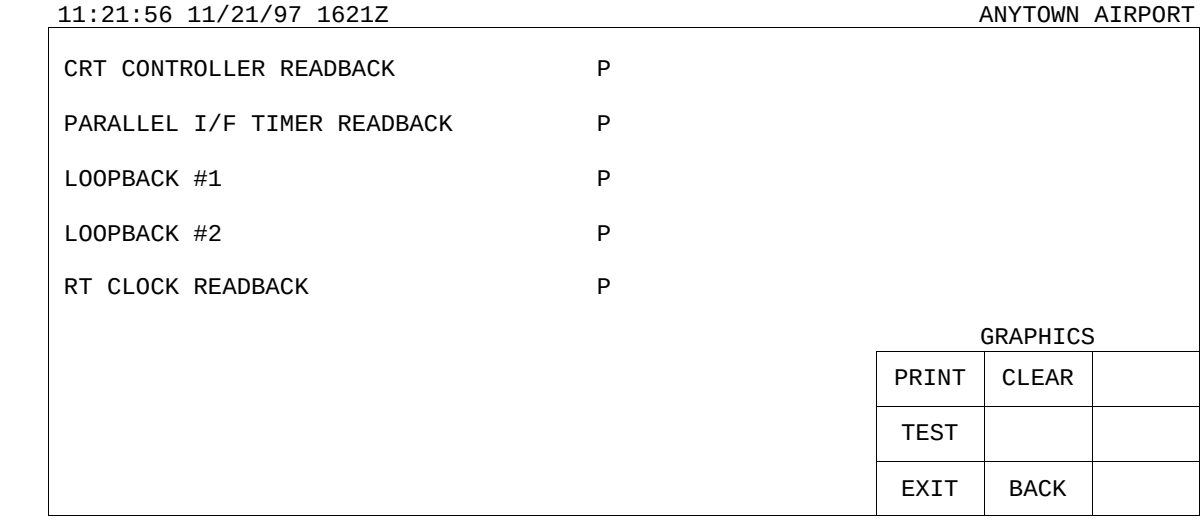


Figure 1.3.10. Graphics Screen

Table 1.3.7. Graphics Screen Field Descriptions

Field	Description
CRT CONTROLLER READBACK	Displays the results of the CRT controller readback test. This test is based on cursor position, which is stored in a register on the video controller board. This register is read twice to ensure that the cursor remains stationary. The cursor positions are compared and the output status (P = pass or F = fail) is displayed.
PARALLEL I/F TIMER READBACK	Displays the results of the parallel I/F timer readback test. This test checks hardware that is only used for diagnostic purposes. The parallel I/F timer readback test is based upon a write/read routine. The data are evaluated and the output status (P = pass or F = fail) is displayed. Failure of this test does not necessitate the replacement of the video controller board. Failure of the CRT controller readback test and/or the RT clock readback test in conjunction with failure of this test indicates a real-time failure.
LOOPBACK	Displays the results of the loopback tests. This test checks hardware that is only used for diagnostic purposes. The loopback test is based upon a write/read routine. The data are evaluated and the output status (P = pass or F = fail) is displayed. Failure of this test does not necessitate the replacement of the video controller board. Failure of the CRT controller readback test and/or the RT clock readback test in conjunction with failure of this test indicates a real-time failure.
RT CLOCK READBACK	Displays the results of the RT clock readback test. The RT clock readback test tests clock calendar timing. Numbers from an RT clock chip are read and evaluated, and the output status (P = pass or F = fail) is displayed. ASOS does not use the RT clock on the video board.

1.3.4.14 **Voice Screen**. The voice screen (Figure 1.3.11) pertains only to the ACU. This screen displays the results of the diagnostic test performed on the major functional circuits on the voice CPU/memory and voice recorder/playback boards in the system. The function of each field on the voice screen is described in table 1.3.8.

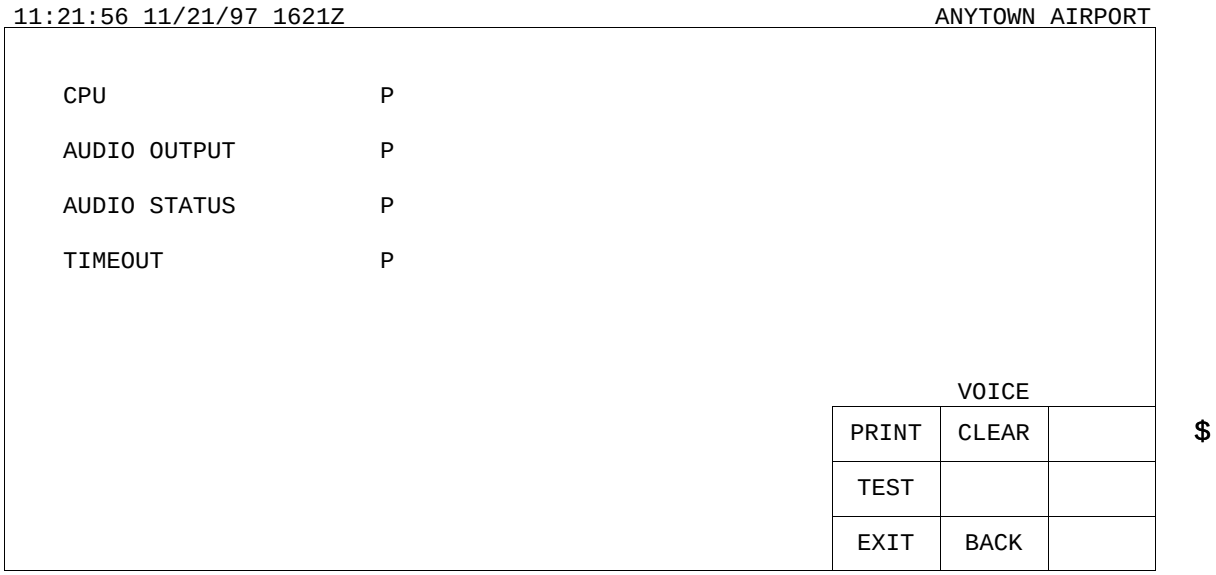


Figure 1.3.11. Voice Screen

Table 1.3.8. Voice Screen Field Descriptions

Field	Description
CPU	Displays the results of the CPU test. The CPU test specifically tests the operational status of the voice CPU/memory board. Inputs to the status field are based on a digital input received from the A/D converter. The CPU status is evaluated and the output status (P = pass or F = fail) is displayed.
AUDIO OUTPUT	Displays the results of the audio output test. The audio output test tests the operation of the voice recorder/playback board and indirectly tests the voice CPU/memory board. The audio output test is based on an internal audio test that checks the audio circuitry and the output status (P = pass or F = fail) is displayed.
AUDIO STATUS	Displays the results of the audio status test. The audio status test tests the operation of the voice recorder/playback board and indirectly tests the voice CPU/memory board. The audio status test is based upon a monitored audio line. Inputs to the status field are based on a digital input received from the A/D converter. The status is evaluated and the output status (P = pass or F = fail) is displayed.
TIMEOUT	Displays the results of the timeout test. The timeout test specifically tests the operational status of the voice CPU/memory board watchdog timer. The status is determined by the watchdog timer response, which is evaluated and the output status (P = pass or F = fail) is displayed.

1.3.4.15 **ACU Modem Screen**. The ACU modem screen (Figure 1.3.12) pertains only to the ACU. This screen displays the port assignments for each modem and the status of the last internal system analog loopback (SAL) test performed on the individual modems. The telephone modems in the ACU may be configured for either dial-up operation (on the public switched telephone network) or leased line operation. This screen displays only dial-up modems. The dial-up modems are tested (SAL is run) automatically every 7 minutes as long as they are not in use (on-line). If a modem is on-line when it is scheduled for testing, the test is skipped until the next 7-minute cycle. The technician can perform an on-demand test of a selected dial-up modem at any time by pressing the TEST key, which immediately initiates the internal SAL. Therefore, the technician must be aware that if the modem is on-line, pressing TEST will disrupt current data transmission. Leased line modems are not displayed on this screen because modems are always on-line and therefore are not tested at all by the ASOS software; neither can a technician test them on-demand. The STATUS field associated with each modem shows the current CST status for each modem. A status of P or F indicates that the modem is currently passing or failing its internal SAL test. An associated fail count is incremented each time that the status changes from P to F (or T to F). When fewer than five failures have been detected and the modem is currently passing, a $ is not added to the observation and a status of C (conditional) is reflected on the next higher screen. When five or more failures have occurred and the modem is currently passing, a status of D (degraded) is displayed for the modem (and is also reflected on the next higher screen) and a $ is added to the observation. At 0600 LST each day, the number of accumulated failures is summarized in the system (maintenance) log. The technician can use the CLEAR key to reset the fail counts and clear the C or D status indication. If a test has not been performed for a particular modem, an * is displayed in the status field. Paragraph 1.3.4.3 provides additional information on modem failure reporting.

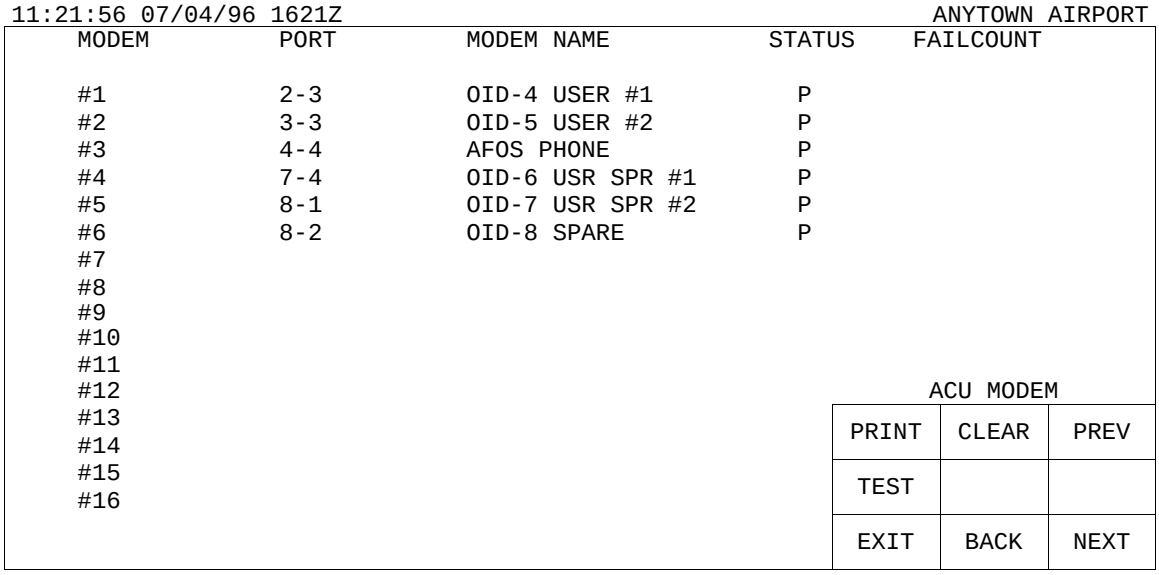


Figure 1.3.12. ACU Modem Screen

1.3.4.16 **ACU Power Screen**. The ACU power screen (Figure 1.3.13) pertains only to the ACU. This screen displays the status of all power-related functions within the ACU. The test result fields indicate the status of the various power supplies as a P (pass) or F (fail) condition.

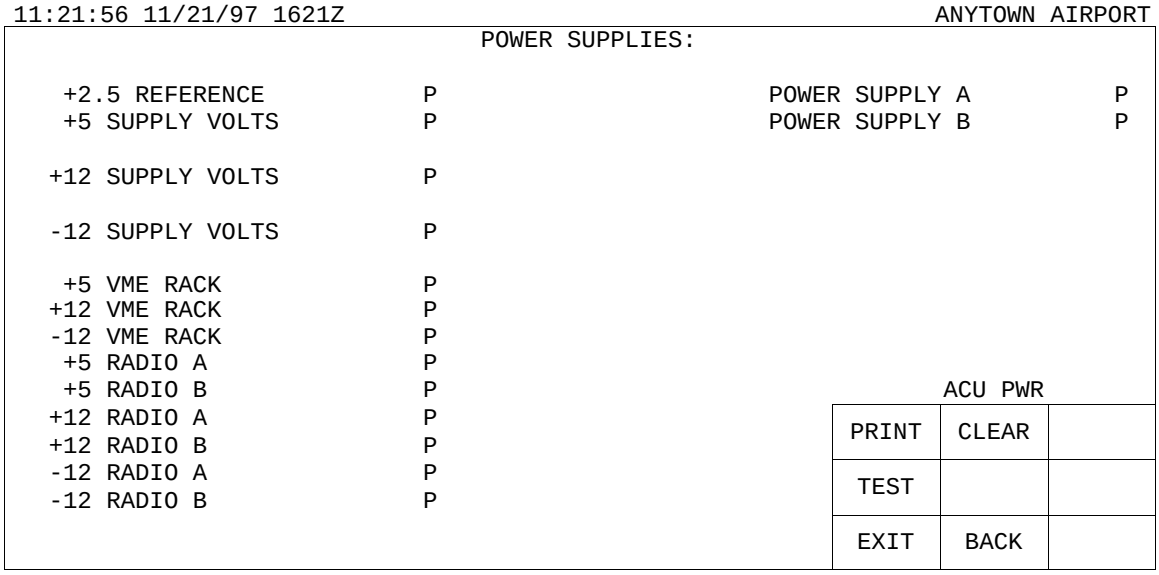
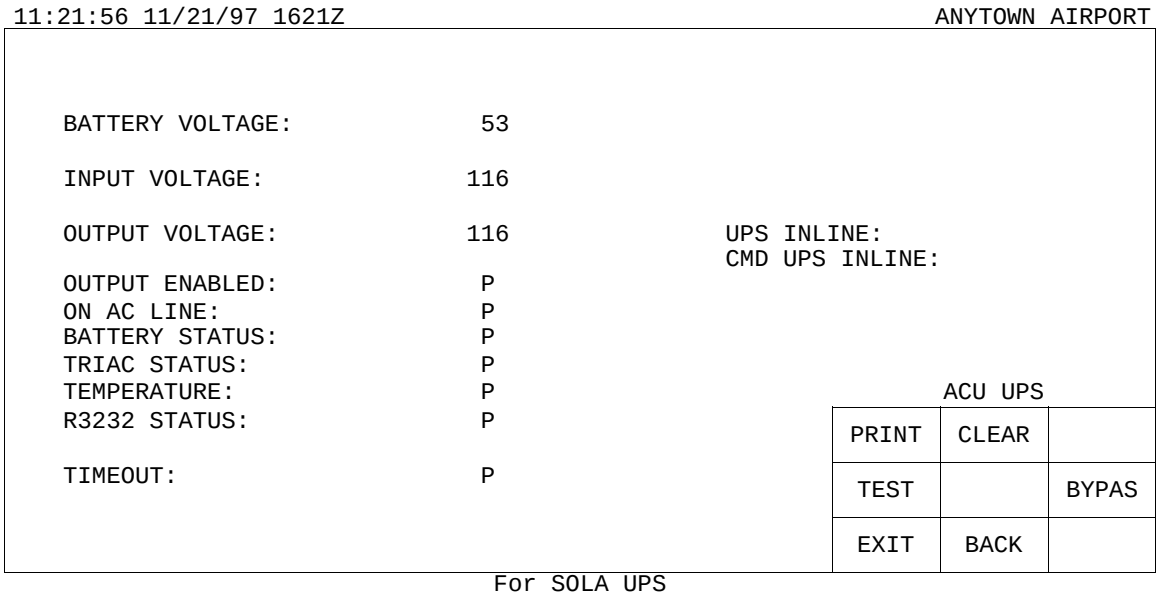
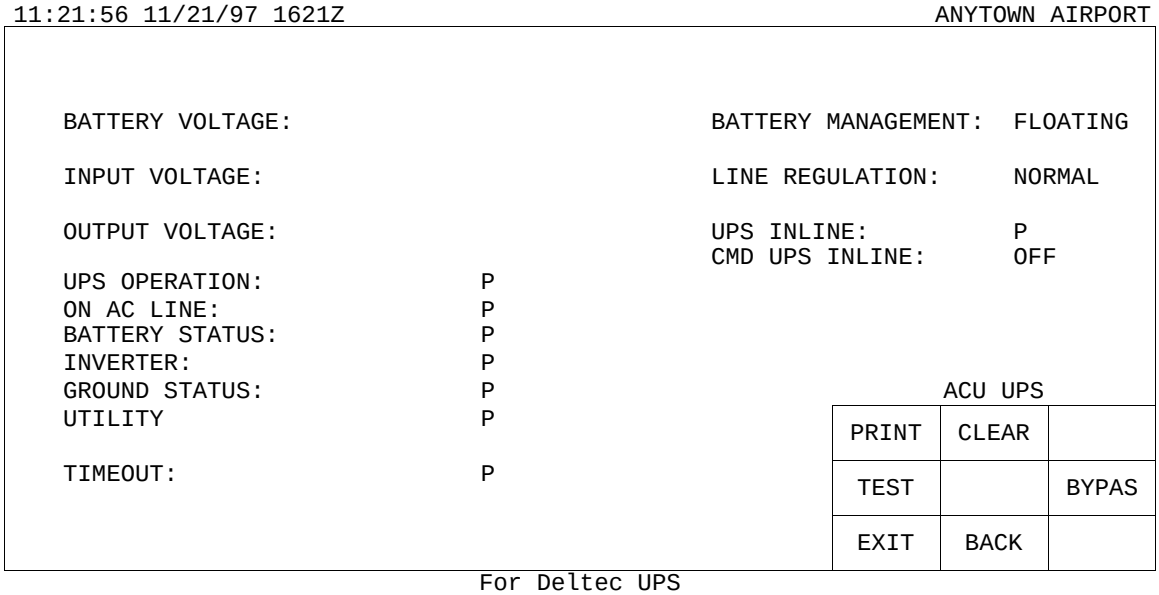


Figure 1.3.13. ACU Power Screen

1.3.4.17 **ACU UPS Screen**. There are two types of power supply assemblies that may be installed in the
$ ACU: SOLA UPS, which is installed in ACU serial numbers 437 and below (40044-10), and Deltec UPS, which is installed in serial numbers 438 and above (40044-30, -40, and -70). Figure 1.3.14 contains the two types of OID screens available, and table 1.3.9 describes the function of each field on the ACU UPS screen.
$



$ For SOLA UPS



$ For Deltec UPS

Figure 1.3.14. ACU UPS Screen

Table 1.3.9. ACU UPS Screen Field Descriptions

Field	Description
SOLA UPS	$
BATTERY VOLTAGE	Displays a numeric value indicating the present backup battery voltage.
INPUT VOLTAGE	Displays a numeric value indicating the present input line voltage to the UPS.
OUTPUT VOLTAGE	Displays a numeric value indicating the present ac output voltage from the UPS to the rest of the ACU.
OUTPUT ENABLED	Indicates that UPS output is on (pass) or off (fail).
ON AC LINE	Indicates whether the UPS is using facility (line) voltage (P) or generating ac voltage from battery (in inverter mode) (F).
BATTERY STATUS	Indicates the present battery status in the ACU as a P (pass) or F (fail).
TRIAC STATUS	Indicates the present status of tap-changing TRIAC's on the UPS 1.5 Kva inverter board as a P (pass) or F (fail).
TEMPERATURE	Indicates present temperature status in the ACU as a P (pass) or F (fail). If fail, inverter board is in overheat alarm and shuts off UPS.
RS232 STATUS	Indicates the present status of the UPS RS232 communications as a P (pass) or F (fail).
TIMEOUT	Indicates the present status of the UPS watchdog timer as a P (pass) or F (fail).
UPS INLINE	Displays P when UPS is inline or F when UPS is bypassed.
CMD UPS INLINE	Bypasses UPS when set to OFF or places UPS inline when set to ON.
Deltec UPS	$
BATTERY VOLTAGE	Displays a numeric value indicating the present backup battery voltage.
INPUT VOLTAGE	Displays a numeric value indicating the present input line voltage to the UPS.
OUTPUT VOLTAGE	Displays a numeric value indicating the present ac output voltage from the UPS to the rest of the DCP.
UPS OPERATION	Indicates that UPS is functioning in a normal (P) or abnormal (F) manner.
ON AC LINE	Indicates whether the UPS is using facility (line) voltage (P) or generating ac voltage from the battery (in inverter mode) (F).
BATTERY STATUS	Indicates present battery status in the DCP as a P (pass) or F (fail).
INVERTER	Indicates whether the internal inverter is operating in overvoltage or undervoltage status.
GROUND STATUS	F indicates a ground failure in facility wiring.
UTILITY	Checks for an overvoltage or unsynchronized signal from facility power.
TIMEOUT	Indicates the present status of the UPS watchdog timer as a P (pass) or F (fail).
BATTERY MANAGEMENT	Indicates if the current from the batteries is FLOATING, RESTING, CHARGING, or DISCHARGING.
LINE REGULATION	Indicates if the UPS is maintaining a STEP-UP, STEP DOWN, or NORMAL status.
UPS INLINE	Displays P when UPS is inline or F when UPS is bypassed.
CMD UPS INLINE	Bypasses UPS when set to OFF or places UPS inline when set to ON.

1.3.4.18 **GTA Radio Screen**. The GTA radio screen (Figure 1.3.15) pertains only to the ACU and applies to application software version 2.1 or higher. This screen displays the status of all GTA radio-related functions in the ACU. Table 1.3.10 describes the function of each field on the ACU GTA radio screen.

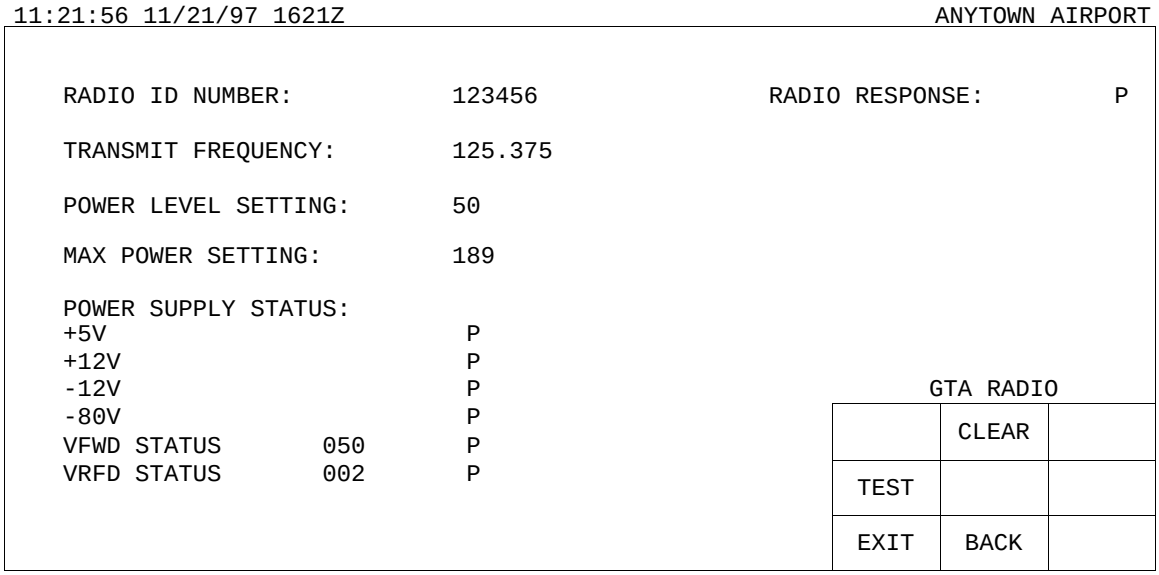


Figure 1.3.15. ACU GTA Radio Screen

Table 1.3.10. ACU GTA Radio Screen Field Descriptions

Field	Description
RADIO ID NUMBER	Displays a numeric value indicating the designator specific to each radio.
TRANSMIT FREQUENCY	Displays a numeric value indicating the current command value. This value will equal the command frequency (117.975 to 136.975 in increments of 0.025).
POWER LEVEL SETTING	Displays a numeric digital value indicating the command power level. This value is equal to commanded power level (0 to 255).
MAX POWER SETTING	Displays a numeric digital value indicating the maximum power level. Each GTA radio has a unique maximum power level (0 to 255).
POWER SUPPLY STATUS	Consists of four individual tests: +5V, +12V, -12V, and -80V.
+5V	Indicates that the internal measured operating voltage is within the tolerances of 3V to 7V.
+12V	Indicates that the internal measured operating voltage is within the tolerances of 9.6V to 14.4V.
-12V	Indicates that the internal measured operating voltage is within the tolerances of -9.6V to -14.4V.
-80V	Indicates that the internal measured operating voltage is within the tolerances of -96V to -64V.
VFWD STATUS	Displays the digital value of the VFWD between 000 and 255.
VRFD STATUS	Displays the digital value of the VRFD between 000 and 255.
RADIO RESPONSE	Indicates if the ACU is capable of communicating with the radio.

1.3.4.19 **Remote DCP Status Screen Description**. The remote DCP status screen (Figure 1.3.16) displays the operational status of each sensor connected to the DCP as well as the status of all hardware in the DCP pertaining only to the DCP. This screen pertains to the DCP only (the ACU has a separate, similar screen). If the ASOS is equipped with optional uninterruptible power supplies (UPS's), each DCP may contain either one or two UPS's. UPS #2 is provided only if the number of sensors connected to the DCP provides a load too large for a single UPS. This second UPS would be mounted in a separate cabinet, referred to as an auxiliary DCP, behind the basic DCP cabinet. The remote DCP status screen also enables the technician to select the associated screen for each of the status fields on the screen. The function of each field is described in table 1.3.11.

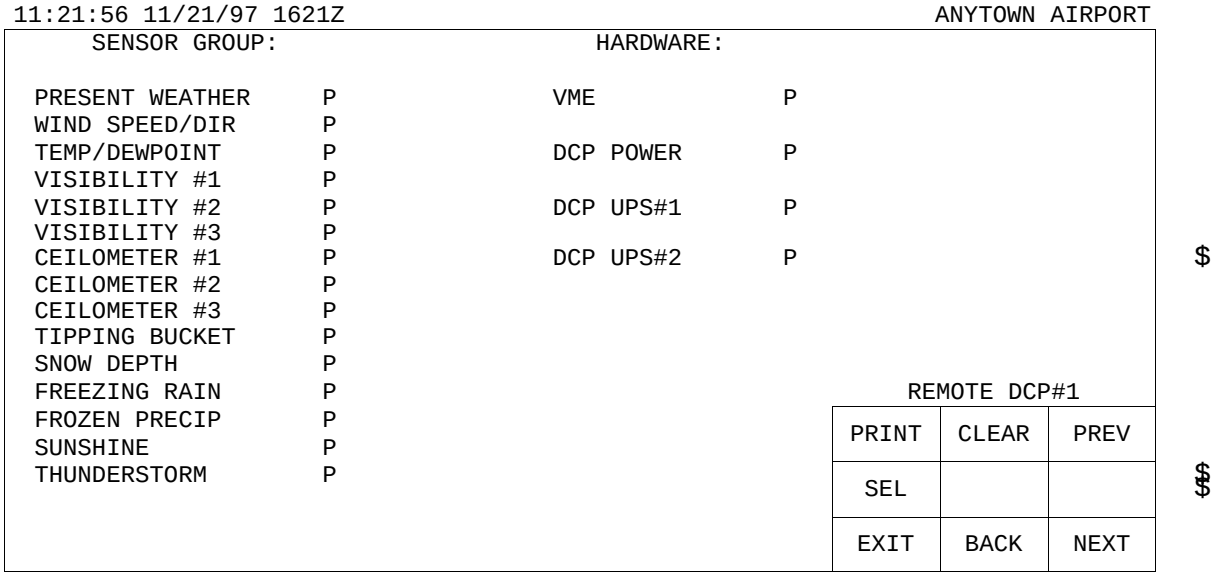


Figure 1.3.16. Remote DCP Status Screen

Table 1.3.11. Remote DCP Status Screen Field Descriptions

Field	Description
SENSOR GROUP	Displays the status of each of the sensors connected to the DCP, and enables the technician to select a specific sensor screen.
VME	Displays the summary status of all boards located in the DCP VME card rack, and enables the technician to select the DCP VME cards screen.
DCP POWER	Displays the summary status of the DC power supplies in the DCP, and enables the technician to select individual status screens.
DCP UPS #1	Displays the status of all power-related functions in the DCP. Enables the technician to display individual status screens.

1.3.4.20 **DCP VME Cards Screen Description.** The DCP VME cards screen (Figure 1.3.17) pertains only to the DCP. This screen displays the test status of each board in the VME card rack. The DCP VME cards screen also enables the technician to select the diagnostic screen of a specific board.

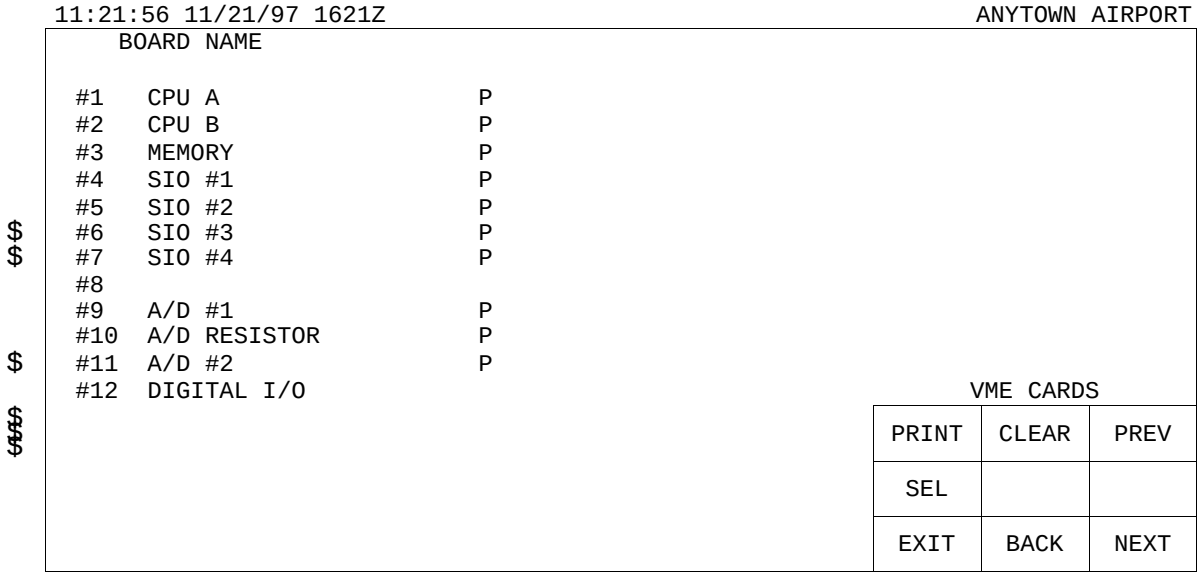


Figure 1.3.17. DCP VME Cards Screen

1.3.4.21 **DCP #1, #2, #3 Power Screen**. The DCP #1, #2, #3 power screen (Figure 1.3.18) pertains to the DCP only. This screen indicates the status of all power-related functions within the DCP's. The test result fields indicate the status of the various power supplies as a P (pass) or F (fail) condition.

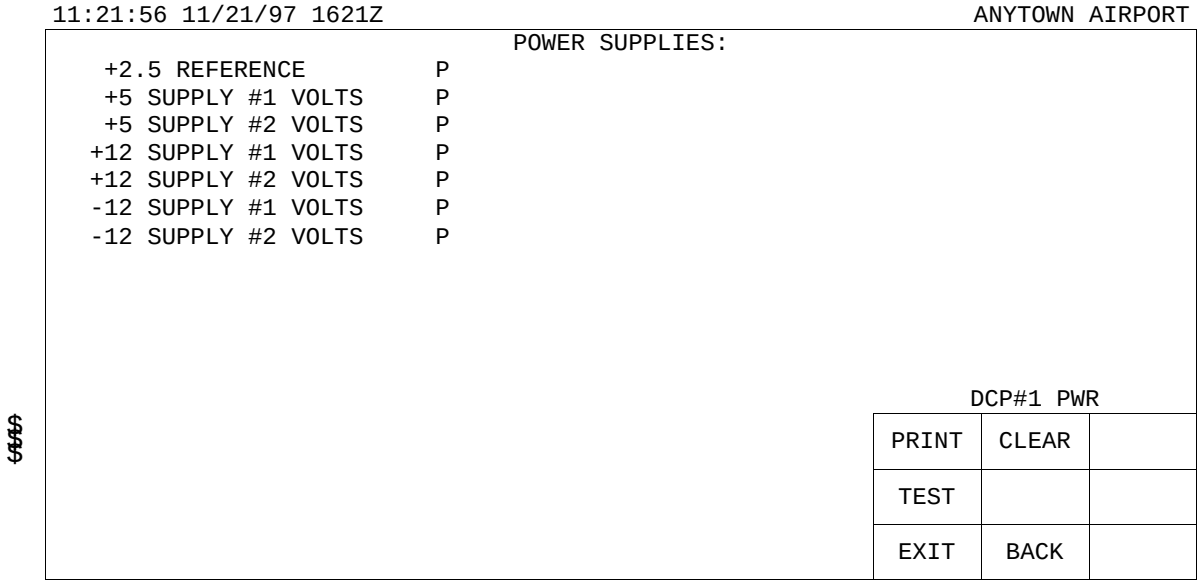


Figure 1.3.18. DCP #1, #2, #3 Power Screen

1.3.4.22 **DCP UPS Screen**. There are two types of uninterruptible power supplies that may be installed in the DCP: A SOLA UPS, which is installed in DCP serial numbers 438 and below, or a Deltec UPS, which is installed in serial numbers 439 and above. Figure 1.3.19 contains the two types of OID screens available, and table 1.3.12 describes the function of each field on the DCP UPS screen. $

```
11:21:56 11/21/97 1621Z                                   ANYTOWN AIRPORT

BATTERY VOLTAGE:            72

INPUT VOLTAGE:             116

OUTPUT VOLTAGE:            118              UPS INLINE:                P
                                            CMD UPS INLINE:            OFF
OUTPUT ENABLED:             P
ON AC LINE:                 P
BATTERY STATUS:             P
TRIAC STATUS:               P
TEMPERATURE:                P
RS232 STATUS:               P                          DCP#1 UPS#1
                                          +-------+-------+-------+
TIMEOUT:                    P             | PRINT | CLEAR |       |
                                          +-------+-------+-------+
                                          | TEST  |       | BYPAS |
                                          +-------+-------+-------+
                                          | EXIT  | BACK  |       |
                                          +-------+-------+-------+
```

For SOLA UPS $

```
11:21:56 11/21/97 1621Z                                   ANYTOWN AIRPORT

BATTERY VOLTAGE:            56              BATTERY MANAGEMENT:    FLOATING

INPUT VOLTAGE:             120              LINE REGULATION:       NORMAL

OUTPUT VOLTAGE:            119              UPS INLINE:            P
                                            CMD UPS INLINE:        OFF
UPS OPERATION               P
ON AC LINE:                 P
BATTERY STATUS:             P
INVERTER:                   P
GROUND STATUS:              P
UTILITY:                    P                          DCP#1 UPS#1
                                          +-------+-------+-------+
TIMEOUT:                    P             | PRINT | CLEAR |       |
                                          +-------+-------+-------+
                                          | TEST  |       |       |
                                          +-------+-------+-------+
                                          | EXIT  | BACK  |       |
                                          +-------+-------+-------+
```

For Deltec UPS $

Figure 1.3.19. DCP UPS Screen

Table 1.3.12. DCP UPS Screen Field Descriptions

Field	Description
$ **SOLA UPS**	
BATTERY VOLTAGE	Displays a numeric value indicating the present backup battery voltage.
INPUT VOLTAGE	Displays a numeric value indicating the present input line voltage to the UPS.
OUTPUT VOLTAGE	Displays a numeric value indicating the present ac output voltage from the UPS to the rest of the DCP.
OUTPUT ENABLED	Indicates that UPS output is on (P) or off (F).
ON AC LINE	Indicates whether the UPS is using facility (line) voltage (P) or generating ac voltage from battery (in inverter mode) (F).
BATTERY STATUS	Indicates present battery status in the DCP as a P (pass) or F (fail).
TRIAC STATUS	Indicates the present status of tap-changing TRIAC's on the UPS 1.5 Kva Inverter Board as a P (pass) or F (fail).
TEMPERATURE	Indicates the present temperature status of the UPS 1.5 Kva Inverter Board as a P (pass) or F (fail). If fail, inverter board is in overheat alarm and shuts off UPS.
RS232 STATUS	Indicates the present status of the UPS RS232 communications as a P (pass) or F (fail).
TIMEOUT	Indicates the present status of the UPS watchdog timer as a P (pass) or F (fail).
UPS INLINE	Displays P when UPS is inline or F when UPS is bypassed.
CMD UPS INLINE	Bypasses UPS when set to OFF or places UPS inline when set to ON.
$ **Deltec UPS**	
BATTERY VOLTAGE	Displays a numeric value indicating the present backup battery voltage.
INPUT VOLTAGE	Displays a numeric value indicating the present input line voltage to the UPS.
OUTPUT VOLTAGE	Displays a numeric value indicating the present ac output voltage from the UPS to the rest of the DCP.
UPS OPERATION	Indicates that UPS is functioning in a normal (P) or abnormal (F) manner. Normal indicates that utility is OK, battery is OK, and UPS is operating from facility ac power. Abnormal indicates failure of any of the above conditions.
ON AC LINE	Indicates whether the UPS is using facility (line) voltage (P) or generating ac voltage from the battery (in inverter mode) (F).
BATTERY STATUS	Indicates present battery status in the DCP as a P (pass) or F (fail).
INVERTER	Indicates whether the internal inverter is operating in overvoltage or undervoltage status. P indicates voltage within range, and F indicates voltage outside range.
GROUND STATUS	F indicates a ground failure in facility wiring.
UTILITY	Checks for an overvoltage or unsynchronized signal from facility power.
TIMEOUT	Indicates the present status of the UPS watchdog timer as a P (pass) or F (fail).
BATTERY MANAGEMENT	Indicates if the current from the batteries is FLOATING, RESTING, CHARGING, or DISCHARGING. FLOATING indicates trickle charge, RESTING indicates no charge to or discharge from battery, CHARGING indicates that UPS is charging battery, and DISCHARGING indicates that battery is discharging.
LINE REGULATION	Indicates if the UPS is maintaining a STEP-UP, STEP DOWN, or NORMAL status.
UPS INLINE	Displays P when UPS is inline or F when UPS is bypassed.
CMD UPS INLINE	Bypasses UPS when set to OFF or places UPS inline when set to ON.

1.3.4.23 **Ceilometer and Ceilometer Sensor Dialogue Screens**. The ceilometer screen (Figure 1.3.20) and the ceilometer sensor dialogue screen (Figure 1.3.21) pertain to the DCP when a ceilometer is configured to the DCP and to the ACU when a ceilometer is configured as a local sensor. The ceilometer screen displays the current operating status of the selected ceilometer (cloud height sensor) and provides the means for direct communication (direct dialogue mode) with the sensor. The ASOS polls the ceilometer for status reports every 30 seconds. The reports comprise cloud height, sensor diagnostics, and operating mode indicators. The diagnostic and operating mode indicators are displayed along the left side of the screen. Table 1.3.13 describes the function of each field. Direct dialogue mode allows the technician to monitor and change ceilometer parameters and obtain in-depth status and operating information regarding the sensor. The direct mode also allows the technician to perform sensor troubleshooting procedures and specify sensor operating parameters. Pressing the DIALG key displays the ceilometer sensor dialogue screen. In direct dialogue mode keyboard entries (ceilometer commands) are displayed in the ENTER COMMAND: field of the screen. When the technician presses the enter key, the ceilometer CPU receives the ceilometer commands. Power to the ceilometer can be toggled on or off by pressing the POWER key. The POWER CONTROL field indicates the state of sensor power (ON/OFF) and POWER STATUS indicates the status of the power as a P (pass) or F (fail) condition. Chapter 9, Section III provides detailed information on available ceilometer commands and ceilometer output message interpretation.

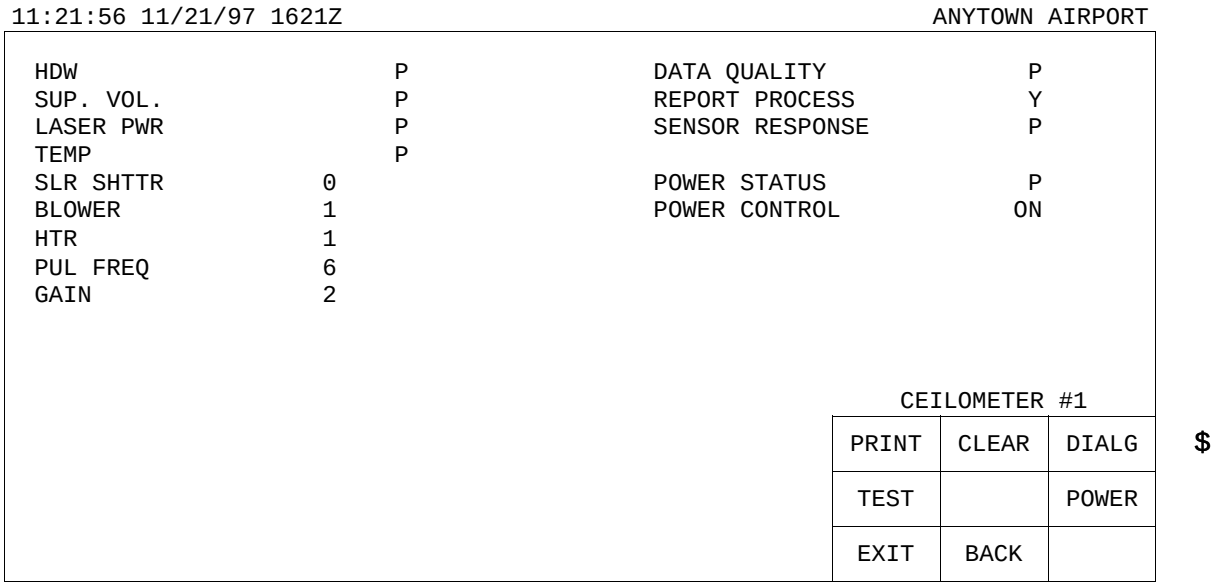


Figure 1.3.20. Ceilometer Screen

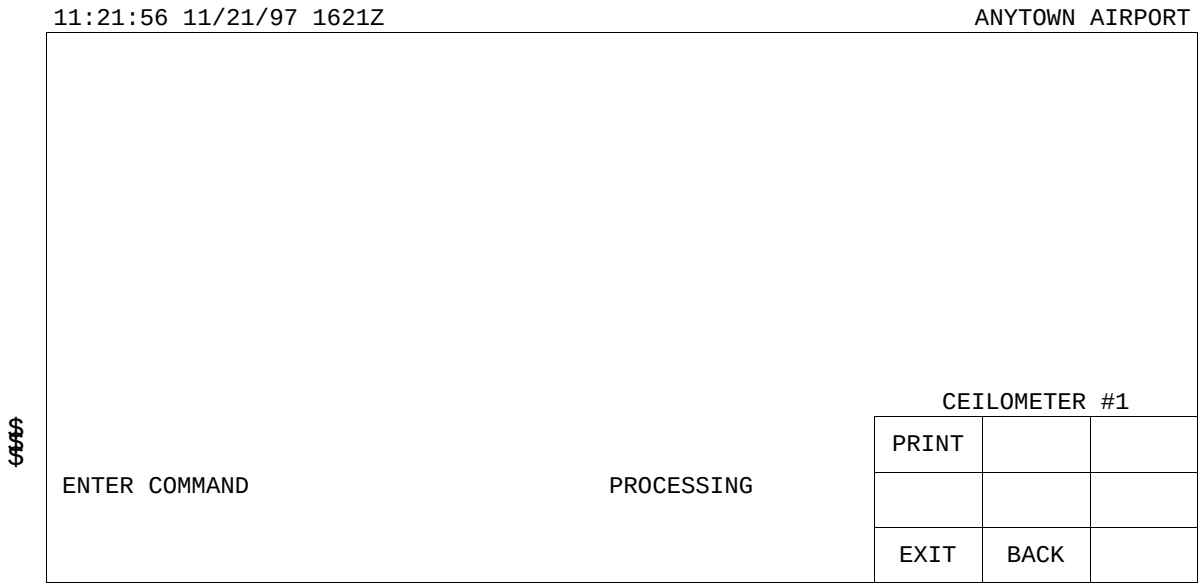


Figure 1.3.21. Ceilometer Sensor Dialogue Screen

Table 1.3.13. Ceilometer Screen Field Descriptions

Field	Description
HARDWARE	Indicates status of general hardware alarm bit sent by ceilometer. If ceilometer detects a malfunction in its operation, this field is set to F to indicate that maintenance of the sensor is required.
SUP. VOL.	Indicates status of the supply voltage alarm bit sent by ceilometer. This field is set to F when ceilometer diagnostic detects a failure of any power supply reference in the sensor.
LASER PWR	Indicates status of laser power low alarm bit sent by ceilometer. This field is set to F when ceilometer diagnostic detects that transmitted laser power level is below its normal level.
TEMP	Indicates status of temperature alarm bit sent by ceilometer. This field is set to F when ceilometer detects a failure in heating system of the sensor.
SLR SHTTR	Indicates the present status of the ceilometer's optional solar shutter (0 = off, 1 = on).
BLOWER	Indicates present status of ceilometer's window conditioner blower (0 = off, 1 = on).
HTR	Indicates present status of ceilometer's window conditioner heater (0 = off, 1 = on).
PUL FREQ	Indicates the present transmitter pulse repetition frequency as follows: 0 = 620 Hz 4 = 830 Hz 1 = 660 Hz 5 = 910 Hz 2 = 710 Hz 6 = 1000 Hz 3 = 770 Hz 7 = 1120 Hz
GAIN	Indicates the present gain of the receiver amplifier as follows: 0 = 250 (low) 2 = 930 (high)

1.3.4.24 **Freezing Rain Screen**. The freezing rain screen (Figure 1.3.22) pertains to the DCP when a freezing rain sensor is configured to the DCP and to the ACU when such a sensor is configured as a local sensor. The freezing rain screen displays the current operational status of the freezing rain sensor. The screen displays the present status of the data quality checks, report process, and sensor status functions. In addition, power to the sensor can be turned on and off using the POWER key. The POWER CONTROL field on the screen indicates the state of sensor power (ON/OFF) and the POWER STATUS field indicates the status of sensor power as a P (pass) or F (fail) condition.

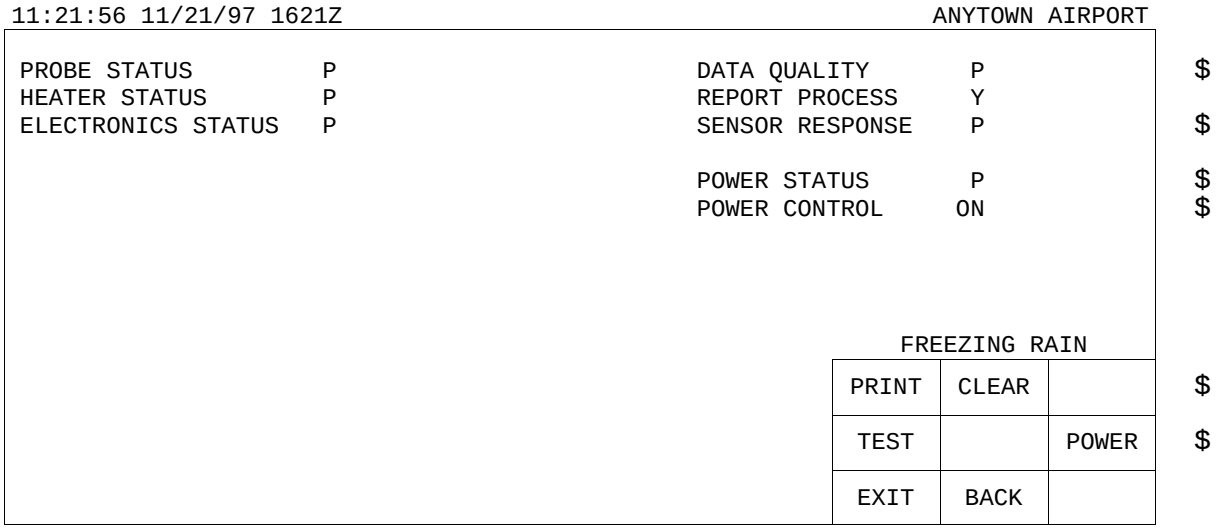


Figure 1.3.22. Freezing Rain Screen

1.3.4.25 **Present Weather Sensor Screen**. The present weather sensor screen (Figure 1.3.23) pertains to the DCP when a present weather sensor is configured to the DCP and to the ACU when such a sensor is configured as a local sensor. This screen displays the current operational and self-test data being received from the sensor. The field of most importance to the technician is the ERROR STATUS CODE field, which indicates, via a four-digit code, the status of FRU's in the sensor. A status code of 0000 indicates that all FRU's are currently passing the present weather internal self-test. A value other than 0000 indicates a failure of one or more FRU's. Definitions for all possible codes are provided in table 1.3.14 along with definitions of all the other fields on the screen. The POWER key enables the technician to turn sensor power on/off. POWER CONTROL indicates the state of sensor power as ON or OFF. POWER STATUS indicates the status of sensor power as a P (pass) or F (fail).

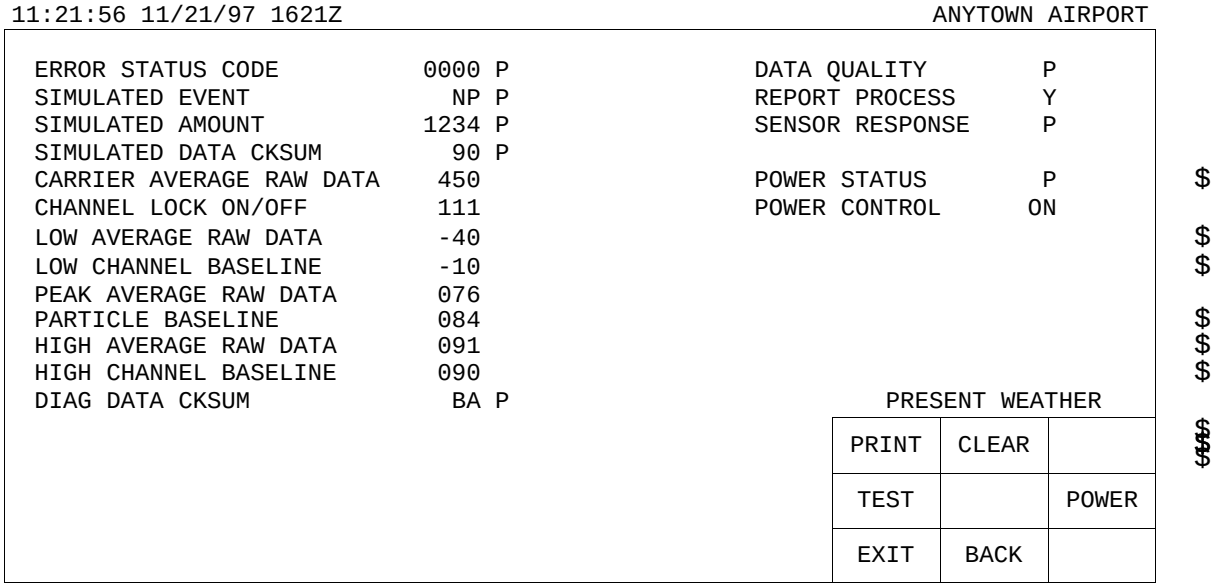


Figure 1.3.23. Present Weather Sensor Screen

Table 1.3.14. Present Weather Sensor Screen Field Descriptions

Field	Description
ERROR STATUS CODE	Displays the current status of the FRU's in the sensor. The definition of each code is provided below: **NOTE** The present weather sensor will attempt to reset itself whenever it detects a failure. During this reset process, the ERROR STATUS CODE field displays the code 80 along with the detected error. For example, the code 0280 identifies the failure as heater power supply (ASOS Designator A1PS1) and indicates that the sensor is attempting to reset itself. Code — Definition 0000 — All FRU's are functioning properly. 0080 — Present weather sensor system reset is in process. This is only a status field that informs the technician when the sensor is performing an automatic reset. Upon completion of this process, the 8 changes back to a 0. 0100 — Frame Assembly malfunction 0200 — Heater Power Supply (24V) malfunction 0300 — Heater Power Supply (24V) and Frame Assembly 0400 — Signal Processor #2 Card (SP2) 0500 — Signal Processor #2 Card (SP2) and Frame Assembly 0600 — Signal Processor #2 Card (SP2) and Heater Power Supply (24V) 0700 — Heater Power Supply (24V), Frame Assembly, and Signal Processor #2 Card (SP2) 0800 — Signal Processor #1 Card (SP1) 0900 — Frame Assembly and Signal Processor #1 Card (SP1) 0A00 — Signal Processor #1 Card (SP1) and Heater Power Supply (24V) 0B00 — Signal Processor #1 Card (SP1), Heater Power Supply (24V), and Frame Assembly 0C00 — Signal Processor #1 Card (SP1) and Signal Processor #2 Card (SP2) 0D00 — Signal Processor #1 Card (SP1), Signal Processor #2 Card (SP2), and Frame 0E00 — Signal Processor #1 Card (SP1), Signal Processor #2 Card (SP2), and Heater Power Supply (24V) 0F00 — Signal Processor #1 Card (SP1), Signal Processor #2 Card (SP2), Frame, and Heater Power Supply (24V) 1000 — Receiver AGC Card (AGC) 2000 — Transmitter Card (TX) 3000 — Receiver AGC Card (AGC) Transmitter Card (TX) 4000 — Analog Power Supply (15V) 5000 — Receiver AGC Card (AGC) Analog Power Supply (15V) 6000 — Transmitter Card (TX) Analog Power Supply (15V) 7000 — Receiver AGC Card (AGC) Transmitter Card (TX) Analog Power Supply (15V) 8000 — Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU) 9000 — Receiver AGC Card (AGC) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU) A000 — Transmitter Card (TX) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU)

Table 1.3.14. Present Weather Sensor Screen Field Descriptions -CONT

Field	Description
ERROR STATUS CODE (CONT)	Code Definition B000 Receiver AGC Card (AGC) Transmitter Card (TX) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU) C000 Analog Power Supply (15V) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU) D000 Receiver AGC Card (AGC) Analog Power Supply (15V) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU) E000 Transmitter Card (TX) Analog Power Supply (15V) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU) F000 Receiver AGC Card (AGC) Transmitter Card (TX) Analog Power Supply (15V) Transmitter/Digital Power Supply (5V) and Microprocessor Card (MPU)
SIMULATED EVENT	Displays the results of simulated events test. The simulated events test consists of the sensor sending a preset event back during diagnostic testing. This event is checked against the correct value stored in the diagnostic test program.
SIMULATED AMOUNT	Displays the results of the simulated amounts test. The simulated amounts test consists of the sensor sending a preset event back to the ACU during diagnostic testing. This event is checked against the correct value stored in the diagnostic test program.
SIMULATED DATA CKSUM	Displays the results of the checksum error test. This test sums the ASCII bytes of data being received from the sensor and compares this value to a checksum value received directly from the sensor. If the two values do not match, the system assumes that a communications error has occurred and indicates a fail status in the CKSUM field.
CARRIER AVERAGE RAW DATA	Displays the corresponding 1-minute averaged raw data in tens of millivolts being received from signal processor #1. These data are used to monitor signal strength and accidental blockage or source failure.
DIAG DATA CKSUM	Displays the results of the checksum error test. This test sums the ASCII bytes of data being received from the sensor and compares this value to a checksum value received directly from the sensor. If the two values do not match, the system assumes that a communications error has occurred and indicates a fail status in the DIAG DATA CKSUM field.

1.3.4.26 **Wind Speed and Direction Sensor Screen**. The wind speed and direction sensor screen (Figure 1.3.24) pertains to the DCP when a wind sensor is configured to the DCP and to the ACU when a wind sensor is configured as a local sensor. This screen displays the current self-test data received from the wind sensor. The diagnostic program performs two levels of testing on the wind sensor. The first level is used during the normal on-line diagnostic and provides the diagnostic program with the overall status of the sensor, simulated wind direction and speed, and a data transmission checksum value. The data are evaluated by the diagnostic program to determine if a fault exists in the wind sensor. If so, the diagnostic program automatically executes the second level test, which provides detailed self-test data on all circuitry in the wind sensor. A technician performing an on-demand diagnostic can also execute the second level test by pressing the TEST key with the wind speed and direction sensor screen displayed on the OID. The data from both the first and second level tests are displayed on the screen. The specific data received during these tests and a description of each of the fields on the wind speed and direction sensor screen are provided in table 1.3.15. When the on-demand test is exercised, the sensor cannot be brought back on line immediately.

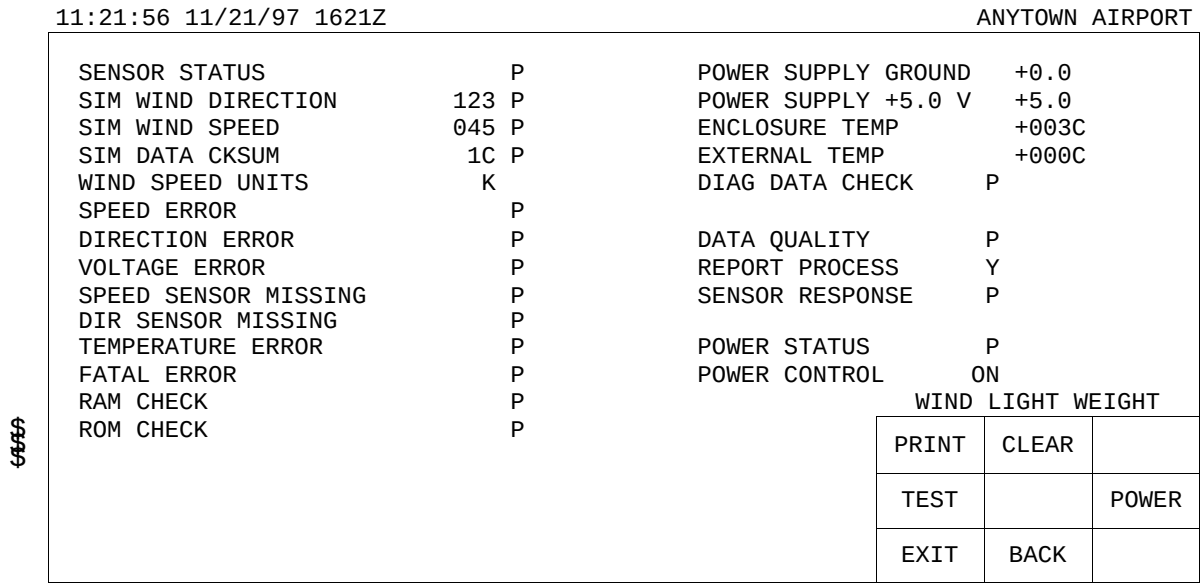


Figure 1.3.24. Wind Speed and Direction Sensor Screen

Table 1.3.15. Wind Speed and Direction Sensor Screen Field Descriptions

Field	Description
SENSOR STATUS	Indicates the overall operational status of the wind sensor. Received during both first and second levels of testing.
SIM WIND DIRECTION	Displays the results of the simulated wind direction test. This test is performed by having the wind sensor control processor send the value 123 instead of the actual wind direction data. Received during both first and second levels of testing.
SIM WIND SPEED	Displays the results of the simulated wind speed test. This test is performed by having the wind sensor control processor send the value 045 instead of the actual wind speed data. Received during both first and second levels of testing.
SIM DATA CKSUM	Displays the results of the checksum test. This test sums the values received for sensor ID, sensor status, and wind direction and speed and compares the value to a checksum value received from the wind sensor. Failure of this test indicates a transmission error between the sensor and the DCP. Received during second level testing.
WIND SPEED UNITS	The units field displays current units for wind speed as follows: K = Knots M = MPH m = Meters/second R = Revs/minute P = Pulses/second
SPEED ERROR	This field contains the speed error flag. If this parameter checks good, a P (pass) is indicated in the status field. If this parameter checks bad, an F (fail) is indicated in the field.
DIRECTION ERROR	This field contains the direction error flag. If this parameter checks good, a P (pass) is indicated in the status field. If this parameter checks bad, an F (fail) is indicated in the field.
VOLTAGE ERROR	Displays the operational status of the wind sensor's power supply. Indicates a pass or fail status.
SPEED SENSOR MISSING	This field contains the speed head missing flag. If this parameter checks good, a P (pass) is indicated in the status field. If this parameter checks bad, an F (fail) and the associated fail count are indicated in the status field.

Table 1.3.15. Wind Speed and Direction Sensor Screen Field Descriptions -CONT

Field	Description
SPEED SENSOR MISSING	This field contains the speed head missing flag. If this parameter checks good, a P (pass) is indicated in the status field. If this parameter checks bad, an F (fail) and the associated fail count are indicated in the status field.
DIR SENSOR MISSING	This field contains the direction head missing flag. If this parameter checks good, a P (pass) is indicated in the status field. If this parameter checks bad, an F (fail) and the associated fail count are indicated in the status field.
TEMPERATURE ERROR	This field contains the internal temperature (too hot, too cold) failure flag.
FATAL ERROR	Displays the results of an internal test performed on the wind sensor's processor. A fail status in this field indicates the failure of the wind sensor's processor. Received during second level testing.
RAM CHECK	Displays the results of the wind sensor's internal RAM test. During this test, the wind sensor's internal processor checks its internal RAM by writing data to it and then reading the data back. Received during second level testing.
ROM CHECK	Displays the results of the wind sensor's internal ROM test. During this test, the wind sensor's internal processor performs a checksum type test on its internal ROM. Received during second level testing.
POWER SUPPLY GROUND	Displays the results of the power supply ground test. This test measures the potential difference between the ground terminal at the +5V power supply and the ground terminal at the processor circuit board located in the wind direction assembly. The test detects poor ground within the sensor. This condition may be the result of loose wires or corrosion. Received during second level testing.
POWER SUPPLY +5.0 V	Displays the results of wind sensor's +5V power supply test. Total failure of the +5V power supply results in a loss of all wind sensor data. Received during second level testing.
ENCLOSURE TEMP	This field displays the enclosure temperature in degrees Fahrenheit. The allowable range is 32 to 122 degrees F.
EXTERNAL TEMP	For ASOS, always displays "000C" (not used).
DIAG DATA CHECK	Displays the results of the level 1 checksum test. This test sums the values received for sensor ID, sensor status, and wind direction and speed and compares the value to a checksum value received from the wind sensor. Failure of this test indicates a transmission error between the sensor and the DCP.

1.3.4.27 **Temperature/Dewpoint (Model 1088) Screen**. The temperature/dewpoint (model 1088) screen (Figure 1.3.25) pertains to the DCP when a model 1088 sensor is configured to the DCP and to the ACU when a model 1088 sensor is configured as a local sensor. This screen displays the current status of each of the model 1088 diagnostic tests. The screen also displays the present status of the data quality checks, operating status, and sensor status functions. The screen allows the technician to perform on-demand diagnostic testing of the model 1088 temperature/dewpoint sensor. Pressing the TEST key causes the sensor's internal extended diagnostics to be executed within the sensor. The internal extended diagnostic issues a T2 command that is received by the sensor's calibrator assembly. In response, the calibrator assembly substitutes known precision resistors in paths normally occupied by the temperature sensing elements. This simulates ambient temperatures of 32 and 122 degrees Fahrenheit, and these calibration values are displayed with decimal accuracy on the screen in respective SIMULATED TEMP DATA and SIMULATED DEWPOINT DATA fields. As shown on figure 1.3.25, these values correlate to the P (pass) condition, which is displayed in the adjacent field. When this diagnostic capability is exercised, the sensor cannot be brought back on line immediately. Pressing the POWER key turns sensor power on and off. The status of POWER CONTROL indicates if sensor power is turned on (ON/OFF). POWER STATUS indicates the status of the sensor power as a P (pass) or F (fail) condition. table 1.3.16 describes each field on the temperature/dewpoint (model 1088) screen.

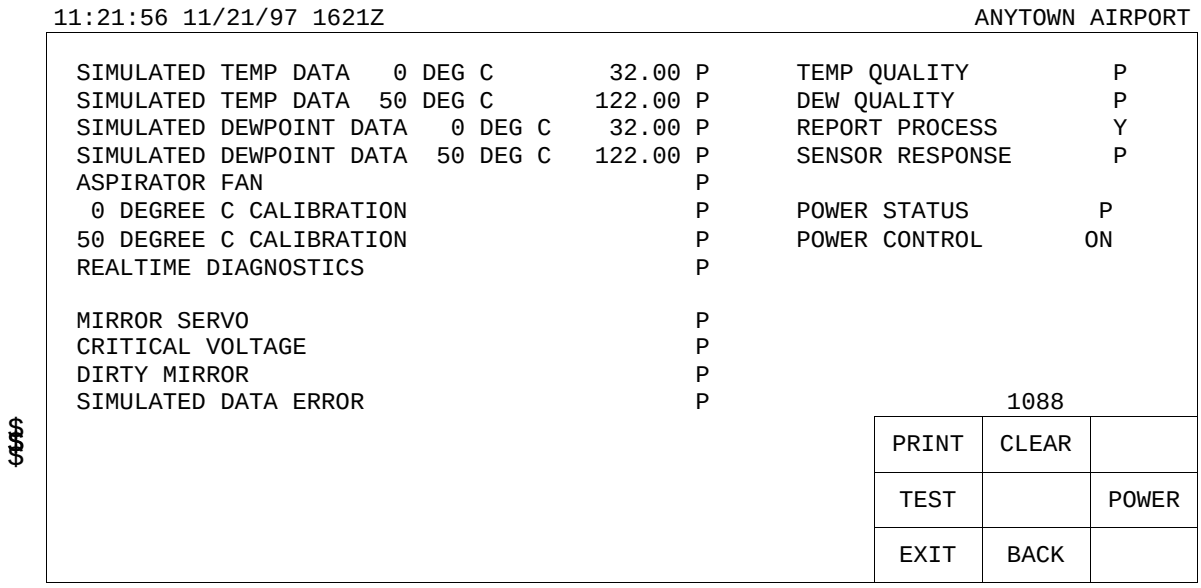


Figure 1.3.25. Temperature/Dewpoint (Model 1088) Screen

Table 1.3.16. Temperature/Dewpoint (Model 1088) Screen Field Descriptions

Field	Description
SIMULATED TEMPERATURE DATA - 0 DEG C	Displays results of the simulated 0 degrees C temperature test. This test is performed by switching a precision 100-ohm resistor into the measurement path of the model 1088 in place of the temperature sensor. The value of the resistor is such that the model 1088 should return a reading of 0 degrees C if measurement circuitry is functioning properly.
SIMULATED TEMPERATURE DATA - 50 DEG C	Displays results of the simulated 50 degrees C temperature test. This test is performed by switching a precision 120-ohm resistor into the measurement path of the model 1088 in place of the temperature sensor. The value of the resistor is such that the model 1088 should return a reading of 50 degrees C if measurement circuitry is functioning properly.
SIMULATED DEWPOINT DATA - 0 DEG C	Displays results of the simulated 0 degrees C dewpoint test. This test is performed by switching a precision 100-ohm resistor into the measurement path of the model 1088 in place of the dewpoint sensor. The value of the resistor is such that the model 1088 should return a reading of 0 degrees C if measurement circuitry is functioning properly.
SIMULATED DEWPOINT DATA - 50 DEG C	Displays results of the simulated 50 degrees C dewpoint test. This test is performed by switching a precision 120-ohm resistor into the measurement path of the model 1088 in place of the dewpoint sensor. The value of the resistor is such that the model 1088 should return a reading of 50 degrees C if measurement circuitry is functioning properly.
ASPIRATOR FAN	Displays results of the aspirator fan motion test. The test ensures that the aspirator fan is running by checking for airflow through the aspirator. The test monitors the value of two thermal resistors; one in the airflow path and the other out of the airflow path. The cooling effects of the moving air lowers the resistance of the thermal resistor located in the airflow path. If the two resistive values become equal, the system detects this condition as a loss of airflow, indicating a fan failure.
0 DEG C CALIBRATION	Indicates results of the model 1088 internal 0 degrees C calibration check. The simulated temperature and temperature dewpoint resistors are used as the calibration references for this test.

Table 1.3.16. Temperature/Dewpoint (Model 1088) Screen Field Descriptions -CONT

Field	Description
50 DEG C CALIBRATION	Indicates the results of the model 1088 internal 50 degrees C calibration check. The simulated temperature and temperature dewpoint resistors are used as the calibration references for this test.
REALTIME DIAGNOSTICS	Indicates by the presence of a T in the status field when the system is performing a real-time diagnostic (system diagnostic) or the model 1088 is performing an autobalance cycle.
MIRROR SERVO	Indicates the status of the mirror servo control circuitry and the current position of the test/operate mode switch in the model 1088. If the mode switch is in the test position, the MIRROR SERVO field indicates a fail status.
CRITICAL VOLTAGE	Indicates that one of the power supplies in the model 1088 is out of tolerance.
DIRTY MIRROR	Indicates the status of the dewpoint mirror in the aspirator. The test monitors the position of the autobalance dial. If the dial indicates a reading between 450 and 500, the DIRTY MIRROR field indicates a fail status.
SIMULATED DATA ERROR	Indicates a summary status of the simulated 0 and 50 degrees C temperature and dewpoint status tests.

1.3.4.28 **Temperature/Dewpoint (Model H083) Screen**. The temperature/dewpoint (model H083) screen (Figure 1.3.26) pertains to the DCP when a model H083 sensor is configured to the DCP and to the ACU when a model H083 sensor is configured as a local sensor. This screen displays the current operational status of the model H083 temperature/dewpoint sensor. The model H083 sensor has limited self-test capability and supplies only one maintenance related field: THERMAL RUNAWAY. The THERMAL RUNAWAY field indicates the status of the dewpoint mirror control servo loop. If a fault occurs within this loop that allows the mirror temperature to rise above 65 degrees C, the sensor automatically issues a cooling command to the mirror assembly and reports this condition to the diagnostic program by setting the THERMAL RUNAWAY status bit to F. Pressing the POWER key turns sensor power on and off. The status of POWER CONTROL indicates if sensor power is turned on (ON/OFF). POWER STATUS indicates the status of the sensor power as a P (pass) or F (fail) condition.

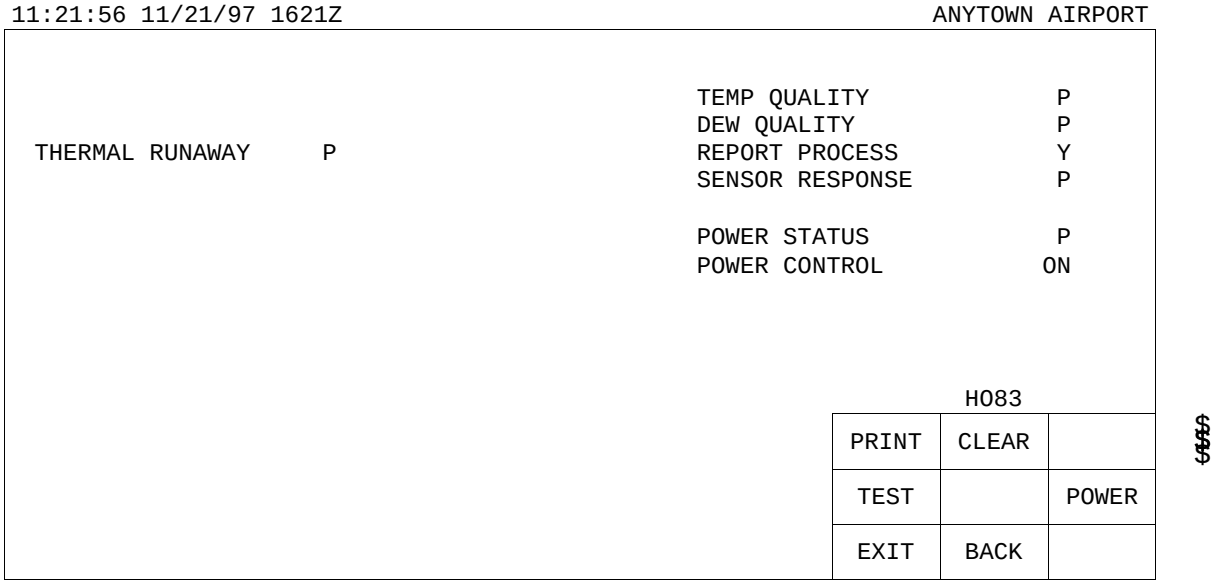


Figure 1.3.26. Temperature/Dewpoint (Model H083) Screen

1.3.4.29 **Visibility Sensor Screen**. The visibility sensor screen (Figure 1.3.27) pertains to the DCP when a visibility sensor is configured to the DCP and to the ACU when such a sensor is configured as a local sensor. This screen displays the current self-test data received from the visibility sensor. From these data, the diagnostic program determines the operational status of the sensor. If the diagnostic program detects a malfunction in the sensor, it invokes the detailed diagnostic on the sensor. The system initiates this diagnostic by issuing a command to the visibility sensor, which responds by displaying the data on the visibility sensor screen. These data provide the detailed test results of the key sensor circuits. As a result, the functional components of the system as well as the diagnostic circuitry are tested. The functions of each field on the visibility sensor screen are provided in table 1.3.17.

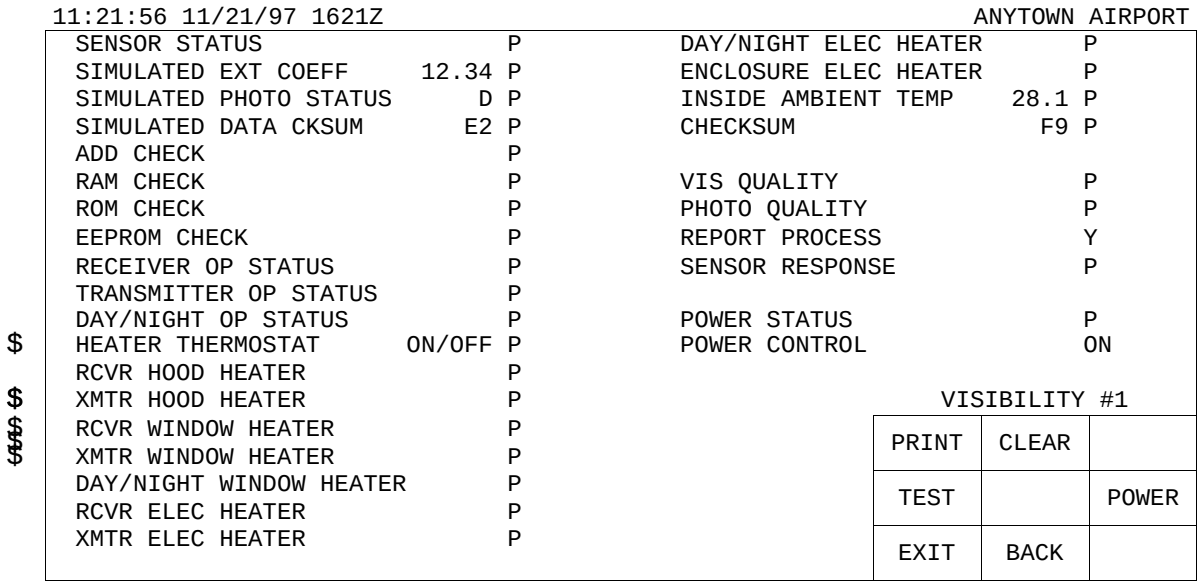


Figure 1.3.27. Visibility Sensor Screen

Table 1.3.17. Visibility and Day/Night Sensor Screen Field Descriptions

Field	Description
SENSOR STATUS	The status field contains a symbol indicating visibility sensor status. A P is displayed for pass and an F is displayed for fail.
SIMULATED EXT COEFF	The simulated extinction coefficient value is 12.34/km. If value on screen matches this value, a P (pass) is indicated in the status field. If value does not match this value, an F (fail) and the associated fail count are indicated in the status field.
SIMULATED PHOTO STATUS	The simulated photometer status is D indicating day. If the value on the screen matches this value, a P (pass) is indicated in the status field. If the value does not match this value, an F (fail) and the associated fail count are indicated in the status field.
SIMULATED DATA CKSUM	If the simulated checksum of this test matches the correct value, a P (pass) is indicated in the status field. If the value does not match this value, an F (fail) and the associated fail count are indicated in the status field.
ADD CHECK	In this test, the processor writes data values to RAM locations. To each location, the value that is written is equal to that location's address. After all locations are written to, the processor reads back data and compares the stored data to the address. A P (pass) in the status field indicates a match between the values written to and read from each address. An F (fail) and associated fail count in the status field indicate that the values read from one or more addresses did not match the values written to those addresses.
RAM CHECK	In the RAM test, the processor writes known values to selected addresses in RAM and then reads them back. An F (fail) and the associated fail count are reported in the status field if any of the values written to a given location in RAM are not the same when they are read back. A P (pass) is reported in the status field if all the values written to a given location in RAM are the same when they are read back.

Table 1.3.17. Visibility and Day/Night Sensor Screen Field Descriptions -CONT

Field	Description
ROM CHECK	In the ROM test, the processor reads each address in ROM and calculates the checksum. The last address in ROM contains the twos complement of the checksum of all other ROM locations. When this value is added into the checksum of the rest of the ROM, a result of zero should be obtained. A P (pass) in the status field indicates a healthy ROM. An F (fail) and the associated fail count in the status field indicate a failed ROM.
EEPROM CHECK	In the EEPROM test, the processor reads each address in EEPROM and calculates the checksum. The last address in EEPROM contains the twos complement of the checksum of all other EEPROM locations. When this value is added into the checksum of the rest of the EEPROM, a result of zero should be obtained. When a recalibration occurs, the values of the EEPROM are changed. The visibility sensor automatically writes the proper twos complement value into the last location of EEPROM. A P (pass) in the status field indicates that the EEPROM checksum is zero. An F (fail) and associated fail count in the status field indicate that the EEPROM checksum value is other than zero.
RECEIVER OP STATUS	The general operation of the receiver is continuously monitored as a part of taking visibility measurements. This field indicates the receiver status (P = pass, F = fail).
TRANSMITTER OP STATUS	The number of flashes is continuously monitored as a part of taking visibility measurements, and there should be two flashes per second. This field indicates the status of the transmitter (P = pass, F = fail).
DAY/NIGHT OP STATUS	This field indicates the status of the day/night sensor (P = pass, F = fail).
HEATER THERMOSTAT	This field indicates the status of the heater circuit (P = pass, F = fail).
RCVR HOOD HEATER	This field indicates the status of the receiver hood heater (P = pass, F = fail).
XMTR HOOD HEATER	This field indicates the status of the transmitter hood heater (P = pass, F = fail).
RCVR WINDOW HEATER	This field indicates the status of the receiver window heater (P = pass, F = fail).
XMTR WINDOW HEATER	This field indicates the status of the transmitter window heater (P = pass, F = fail).
DAY/NIGHT WINDOW HEATER	This field indicates the status of the day/night window heater (P = pass, F = fail).
RCVR ELEC HEATER	This field indicates the status of the receiver electronics heater (P = pass, F = fail).
XMTR ELEC HEATER	This field indicates the status of the transmitter electronics heater (P = pass, F = fail).
DAY/NIGHT ELEC HEATER	This field indicates the status of the day/night electronics heater (P = pass, F = fail).
ENCLOSURE ELEC HEATER	This field indicates the status of the electronics enclosure heater (P = pass, F = fail).
INSIDE AMBIENT TEMP	This test monitors the temperature, in degrees C, inside the controller enclosure. The allowable range is 20 to 70 degrees C. If the value on the screen is within this range, a P (pass) is indicated in the status field. If the value is not within range, an F (fail) and the associated fail count are indicated in the status field.
VIS QUALITY	This field indicates whether or not visibility data received from sensor is valid (logically correct) when compared to the standard specified in the data quality monitoring algorithm. A P (pass) (data quality meets the standard required by monitoring test algorithm) and an F (fail) and the associated fail count (data quality does not meet the standard required by monitoring test algorithm or sensor failed diagnostics) indicate pass/fail conditions.
PHOTO QUALITY	This field indicates whether or not photometer data received from the sensor is valid (logically correct) when compared to the standard specified in the data quality monitoring algorithm. A P (pass) (data quality meets the standard required by monitoring test algorithm) and an F (fail) and the associated fail count (data quality does not meet the standard required by monitoring test algorithm or sensor failed diagnostics) indicate pass/fail conditions.

$
$

1.3.4.30 **Tipping Bucket Sensor Screen**. The tipping bucket sensor screen (Figure 1.3.28) pertains to the DCP or ACU. The screen contains one sensor field that displays DATA QUALITY status as a P (pass) or F (fail). Data quality is reckoned during moderate or heavy rain in a 10-minute period. During this time, if

at least one tip of the bucket occurs, a P status is indicated on the screen. If no tips occur during 10 minutes, an F status is displayed. An F status can be cleared only if a tip occurs or if a deconfiguration is followed by a reconfiguration. Deconfiguring the tipping bucket, however, may have an adverse effect on daily and monthly summary data. While the sensor is deconfigured, estimated values are placed in the summaries for a period of time. Eventually, missing will be reported on the summary screens.

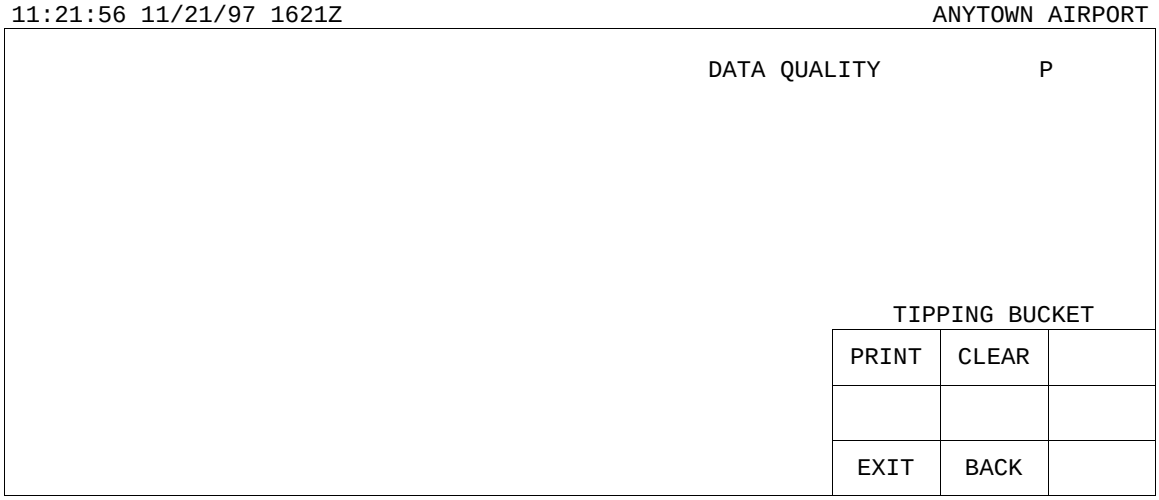
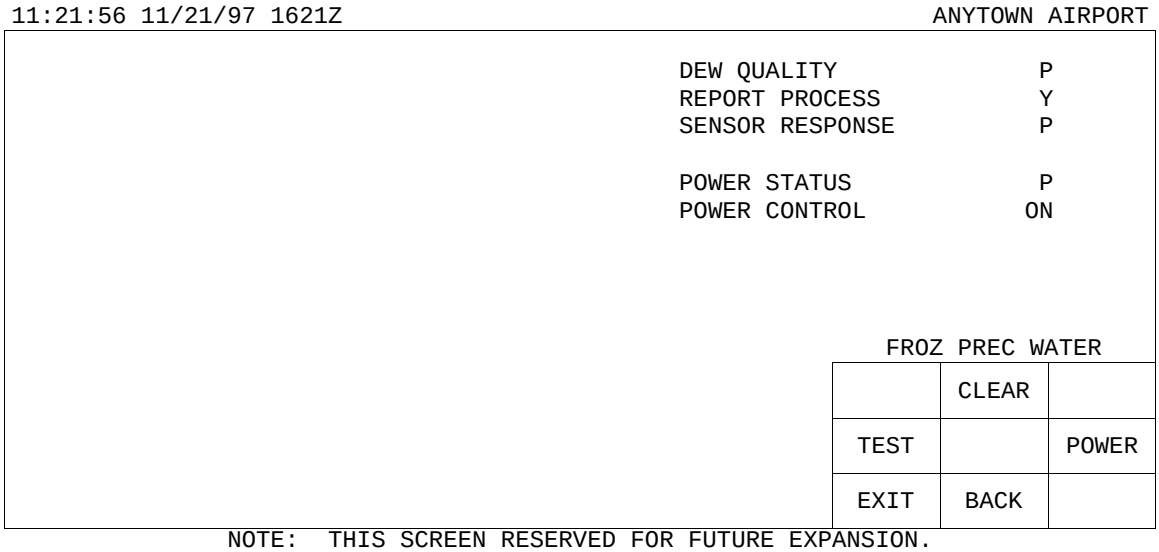


Figure 1.3.28. Tipping Bucket Sensor Screen

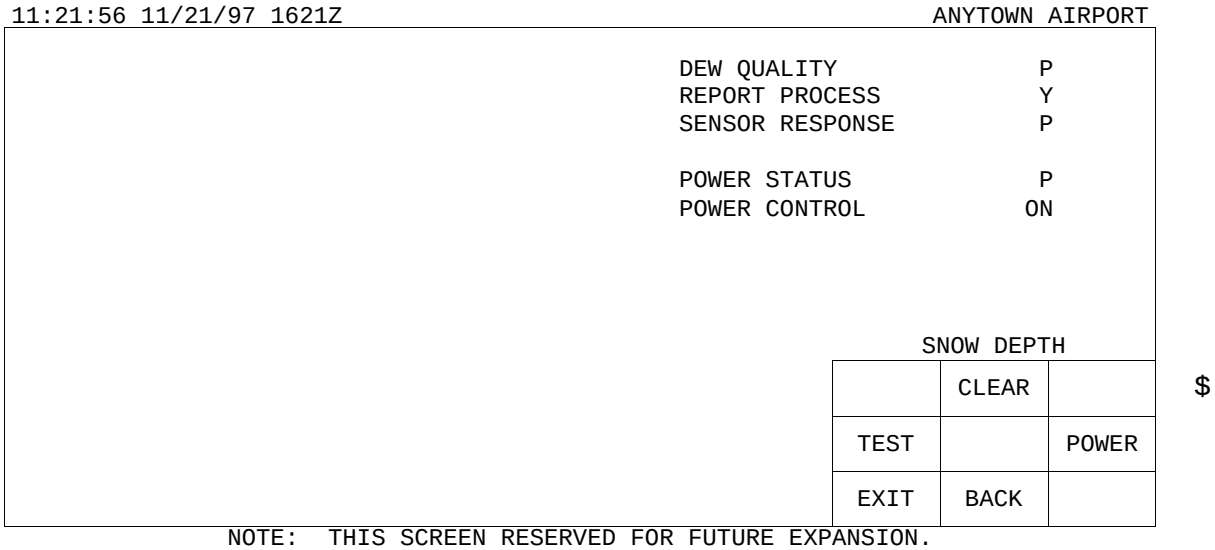
1.3.4.31 **Frozen Precipitation Screen**. The frozen precipitation screen (Figure 1.3.29) pertains to the DCP when a frozen precipitation sensor is configured to the DCP and to the ACU when such a sensor is configured as a local sensor. Currently, there is no frozen precipitation sensor in the operational baseline (this screen is for future expansion). The frozen precipitation screen displays the current operational status of the frozen precipitation sensor. The screen displays the present status of the data quality checks, report process, and sensor status functions. In addition, power to the sensor can be turned on and off using the POWER key. The POWER CONTROL field on the screen indicates the state of sensor power (ON/OFF) and the POWER STATUS field indicates the status of sensor power as a P (pass) or F (fail) condition.



NOTE: THIS SCREEN RESERVED FOR FUTURE EXPANSION.

Figure 1.3.29. Frozen Precipitation Screen

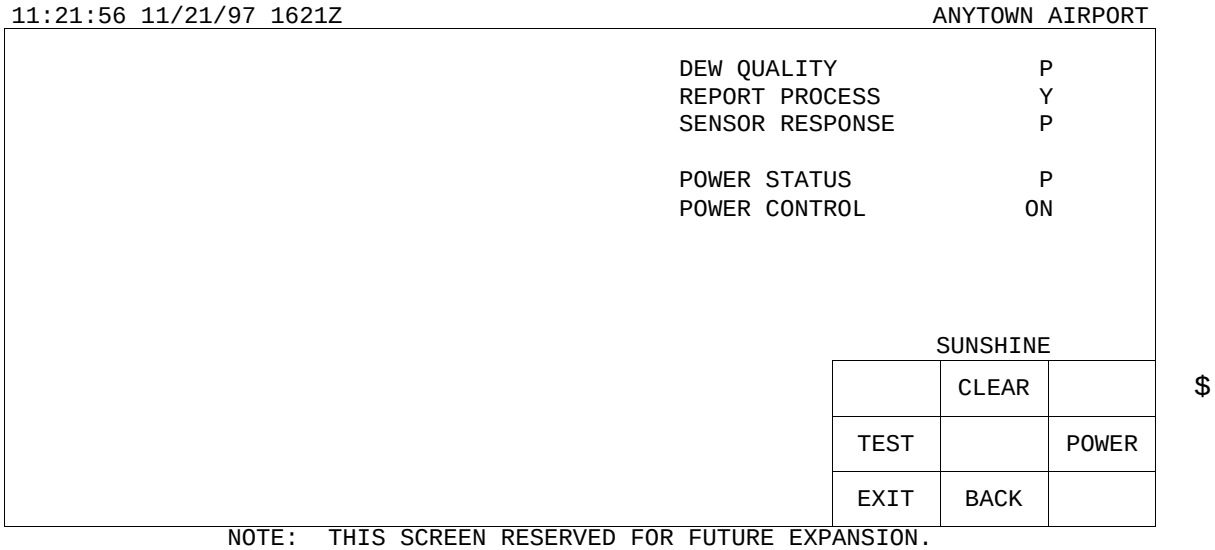
1.3.4.32 **Snow Depth Screen**. The snow depth screen (Figure 1.3.30) pertains to the DCP when a snow depth sensor is configured to the DCP and to the ACU when such a sensor is configured as a local sensor. Currently, there is no snow depth sensor in the operational baseline (this screen is for future expansion). The snow depth screen displays the current operational status of the snow depth sensor. The screen displays the present status of the data quality checks, report process, and sensor status functions. In addition, power to the sensor can be turned on and off using the POWER key. The POWER CONTROL field on the screen indicates the state of sensor power (ON/OFF) and the POWER STATUS field indicates the status of sensor power as a P (pass) or F (fail) condition.



NOTE: THIS SCREEN RESERVED FOR FUTURE EXPANSION.

Figure 1.3.30. Snow Depth Screen

1.3.4.33 **Sunshine Screen**. The sunshine screen (Figure 1.3.31) pertains to the DCP when a sunshine sensor is configured to the DCP and to the ACU when such a sensor is configured as a local sensor. Currently, there is no sunshine sensor in the operational baseline (this screen is for future expansion). The sunshine screen displays the current operational status of the sunshine sensor. The screen displays the present status of the data quality checks, report process, and sensor status functions. In addition, power to the sensor can be turned on and off using the POWER key. The POWER CONTROL field on the screen indicates the state of sensor power (ON/OFF) and the POWER STATUS field indicates the status of sensor power as a P (pass) or F (fail) condition.



NOTE: THIS SCREEN RESERVED FOR FUTURE EXPANSION.

Figure 1.3.31. Sunshine Screen

$ 1.3.4.34 **Thunderstorm Screen**. The thunderstorm screen (Figure 1.3.32) pertains to the DCP when a
$ thunderstorm sensor is configured to the DCP and to the ACU or SCA when such a sensor is configured
$ as a local sensor. The thunderstorm screen displays the current operational status and self-test data being
$ received from the sensor. Pressing the TEST key causes the sensor's internal diagnostics to be executed
$ within the sensor. The screen displays the present status of the data quality checks, report process, and
$ sensor status functions. In addition, power to the sensor can be turned on and off using the POWER key.
$ The POWER CONTROL field on the screen indicates the state of sensor power (ON/OFF) and the
$ POWER STATUS field indicates the status of sensor power as a P (pass) or F (fail) condition.

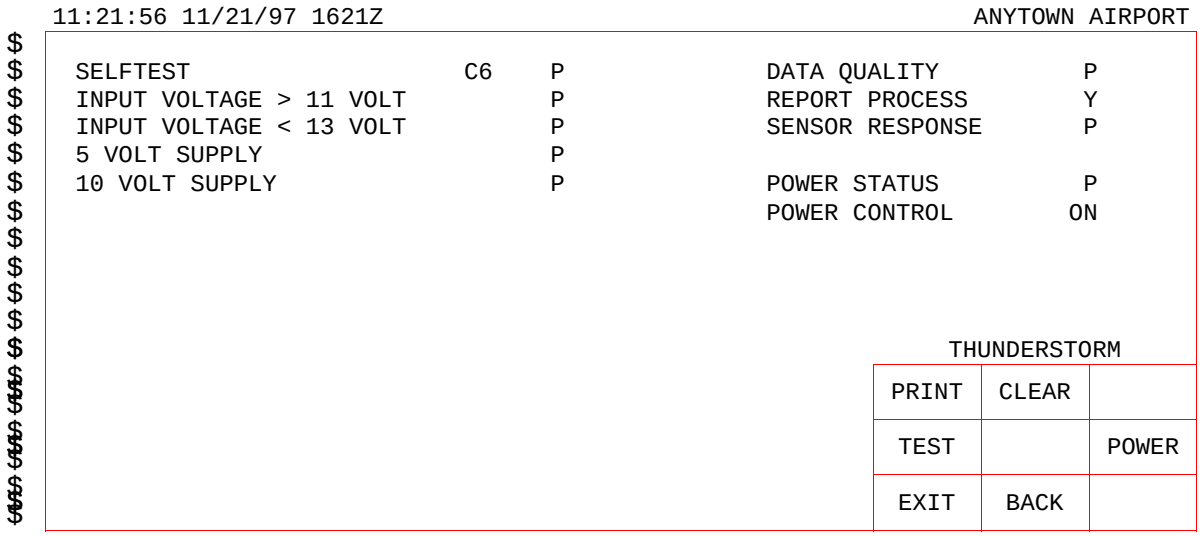


Figure 1.3.32. Thunderstorm Screen

$ 1.3.4.35 **Pressure Sensor Screen**. The pressure sensor screen (Figure 1.3.33) pertains to the DCP when
$ pressure sensors are configured to the DCP and to the ACU or SCA when pressure sensors are configured
$ as local sensors. This screen displays the current operational status of the pressure sensor. Either sensor #1, #2, or #3 can be called up by the technician. Data quality, report process, and sensor status functions are displayed on this screen.

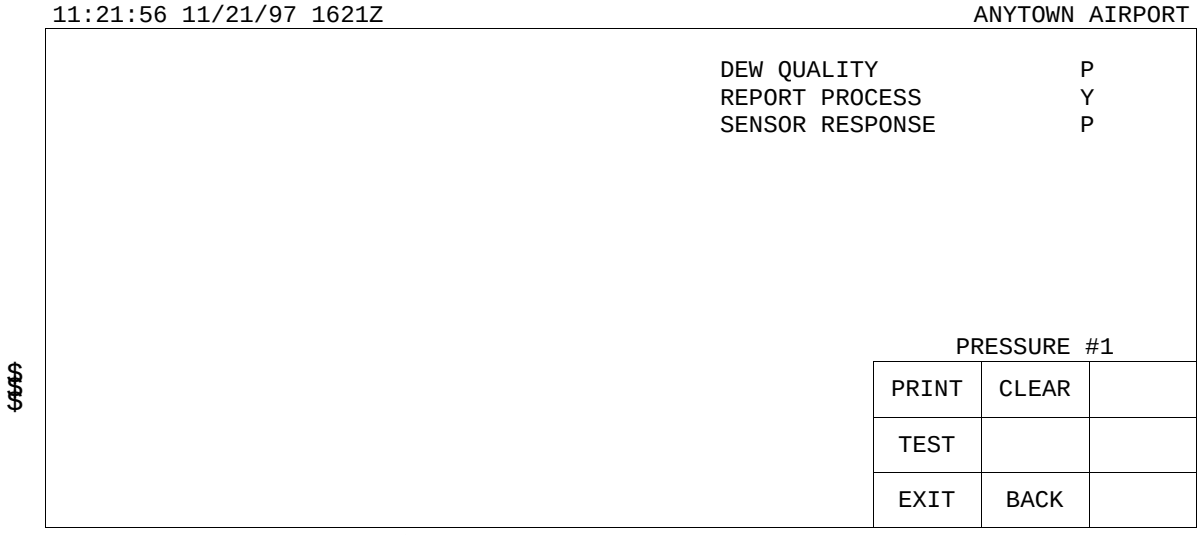


Figure 1.3.33. Pressure Sensor Screen

1.3.4.36 **ACU/DCP Communications Status Screen**. The ACU/DCP communications status screen (Figure 1.3.34) shows the test status of the communications link between the ACU and the DCP. The communications link can be either a radio link, using rf modems (radios) in the ACU and DCP, or may be hardwired, using line drivers. Depending on site configuration, either one or two radios/line drivers may be installed in both the ACU and the DCP. The first radio/line driver is referred to as radio/line driver A, and the optional second radio/line driver is referred to as radio/line driver B. Where radio links are used, omnidirectional antennas are usually used at the ACU and at each DCP. At certain sites where co-channel interference has been experienced, yagi antenna arrays replace the omnidirectional antennas. The yagi antenna is a seven-element array, PN 62828-90413-2, with 10 dB gain and 14 dB front:back ratio. The yagis are usually oriented for vertical polarization, but may be oriented horizontally to further isolate ACU-DCP links. Additionally, five watt attenuators of 3 dB, 6 dB, 10 dB, 20 dB, or 30dB (PN 62828-90424-2, -3, -4, -5 and -6 respectively) may be installed to reduce transmit power into the yagi antennas. Combinations of these attenuators reduce interference to an accepTable level. $

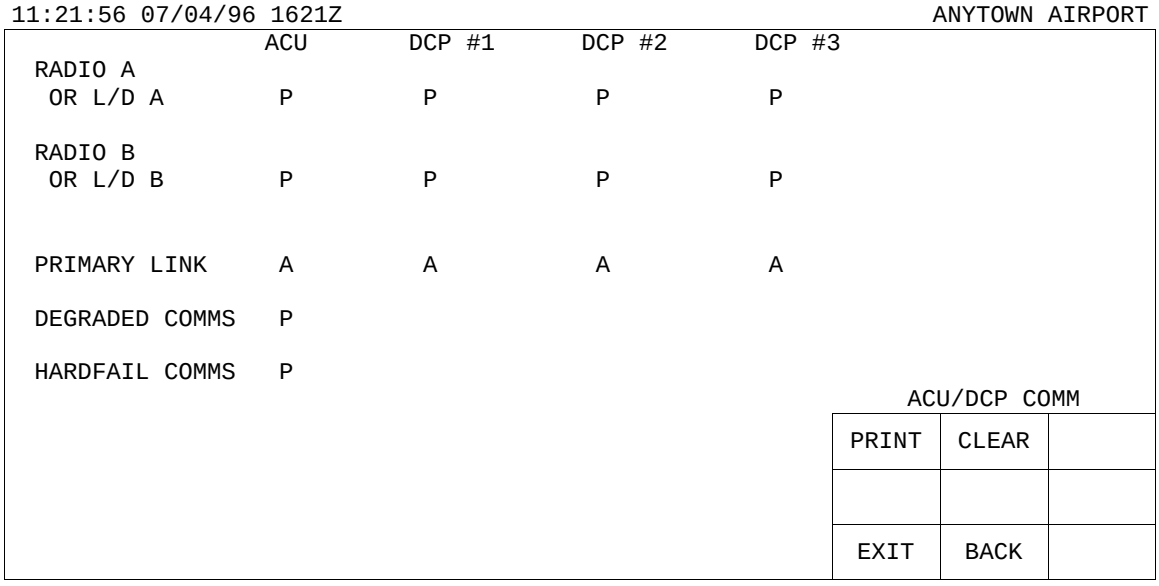


Figure 1.3.34. ACU/DCP Communications Status Screen

The ACU/DCP communications status screen shows the current test status for all radios/line drivers in the ACU and in DCP's 1, 2, and 3. The PRIMARY LINK field at the bottom of the screen identifies which radio/line driver in each cabinet is currently being used for data communication. The primary assignment does not change unless there is a failure in the primary device, in which case, the backup radio/line driver (if available) becomes the new primary device.

The system updates the status on the ACU/DCP communications status screen as the various links are tested during CST. One ACU/DCP link is tested each minute. As there is no TEST key associated with this screen, the technician cannot manually select to test the ACU/DCP communications links.

RF noise, maintenance actions, and line-of-sight obstructions can cause temporary interruptions, or glitches, in ACU/DCP communications. For this reason, the system software allows a certain amount of degradation in ACU/DCP communication before appending a $ to the observation as described in the following paragraphs.

When an ACU/DCP communications failure is detected, an F status indication is displayed in the appropriate field in the upper half of the screen and the associated fail count is incremented. This fail count does not cause a $ in the observation.

At 6 a.m. (local standard time) each day, the system evaluates the ACU/DCP communications failures that occurred over the last 24 hours. These failures are summarized on the trend screen and the fail counts on the ACU/DCP communications status screen are cleared. If the number of communications failures exceeds 20 percent, the status of the DEGRADED COMMS field on the ACU/DCP communications status screen is changed to C and a $ is added to the observation to indicate the need for maintenance action. The maintenance technician can clear the C status by pressing the CLEAR key.

The HARDFAIL COMMS field is used to indicate a complete failure in ACU/DCP communications. An F is placed in the appropriate field in the event that communications failures are detected continuously for a period of 1 minute. When this occurs, the corresponding fail count is incremented and a $ is added to the observation. The technician can clear these fail counts (and the $) by pressing the CLEAR key.

1.3.4.37 **Trend Screen**. The trend screen (Figure 1.3.35) supplies performance information on the ACU and DCP radios. At 6 a.m. local standard time each day, the fail counts from the ACU/DCP communications status screen (Figure 1.3.34) are transferred to the trend screen. This screen lists the number of all radio or line driver communications fail counts by date for the previous 31 days. Data are grouped into four clusters: two for each radio/line driver. Each cluster consists of three columns. The first column in each cluster provides the date of occurrence using the mm/dd format. The second column displays fail counts as indicated on the ACU/DCP communications status screen (Figure 1.3.34), and the third column displays a percentage value indicating the number of failed communication attempts compared to the number of tries.

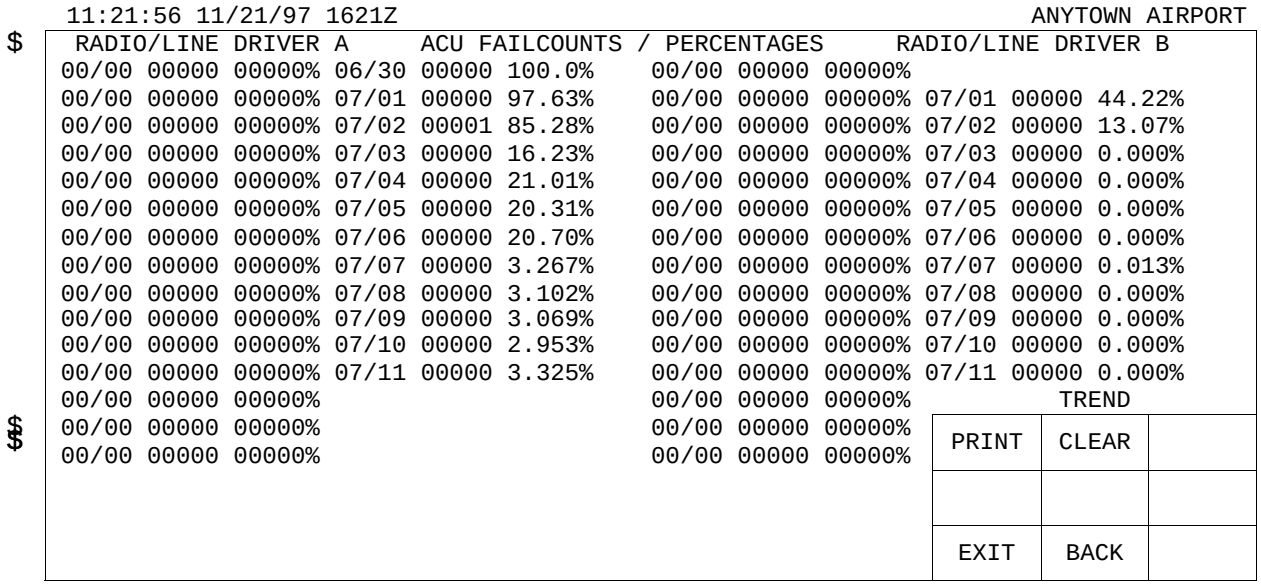


Figure 1.3.35. Trend Screen

1.3.4.38 **ADAS Summary Screen**. The ADAS summary screen (Figure 1.3.36) provides a record of communication status between ADAS and ASOS. This screen displays continuous hourly counts over a 24-hour period to indicate any of four status conditions that occur during each hour. These status conditions include the following : SP (ADAS has started polling ASOS), LP (ASOS has lost poll from ADAS), LNK (ADAS-ASOS link established), and DIS (ADAS has disconnected from ASOS).

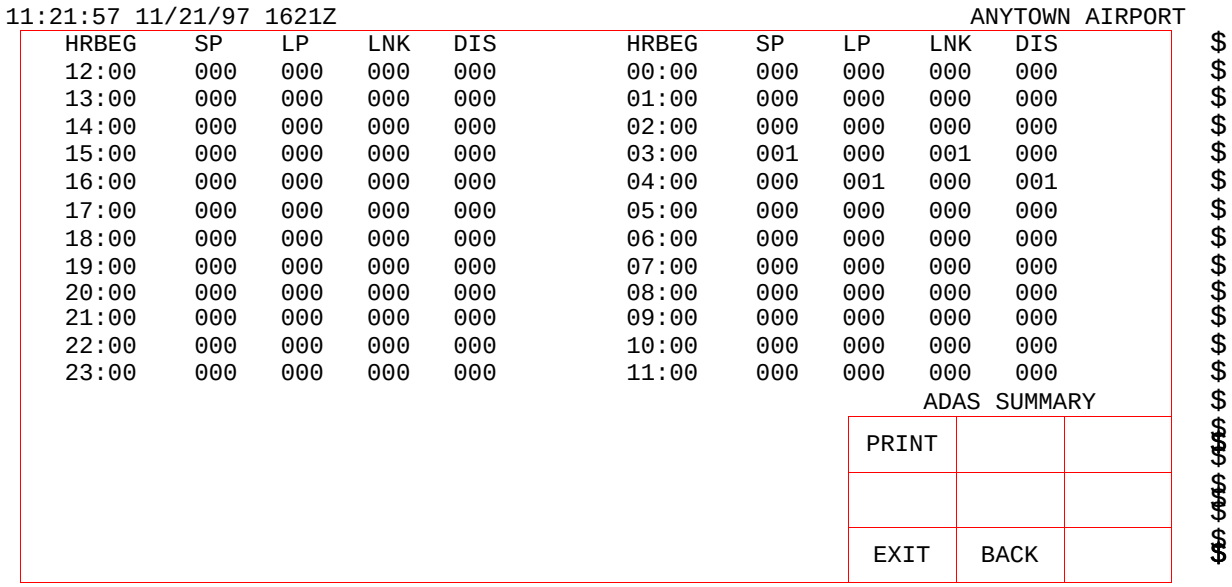


Figure 1.3.36. ADAS Summary Screen

1.3.4.39 **Processor Status Screen**. The processor status screen (Figure 1.3.37) pertains to both the ACU and DCP. This screen enables the technician to observe the operational status of the ACU and DCP processors, reinitialize the ACU and DCP's processors, and generate selective error message reports. The technician has the option on the DCP's to perform either a hard or soft initialization. A hard initialization resets the DCP's CPU's, clears memory and downloads the system software to the DCP. A soft initialization resets the CPU's but does not clear memory.

NOTE

Exercising the RESET function in the ACU field initializes a system reset which forces the system into the power-up initialization sequence.

The START PRINT and END PRINT functions enable specific portions of the Maintenance Error Log to be printed. To print specific portions of the log, the cursor is placed at the START PRINT field. The desired error code number is entered to begin the report. The cursor is then placed at the END PRINT field and the desired error code number is entered to end the report. The designated portion of the log is then automatically printed on the printer. If a user error is detected when the START PRINT or END PRINT error code number is entered, the system generates an audio alarm (beep), displays an error message, and then exits the mode. The user must then reenter the START PRINT and END PRINT values. Possible errors include non-numeric characters and a start number greater than the end number.

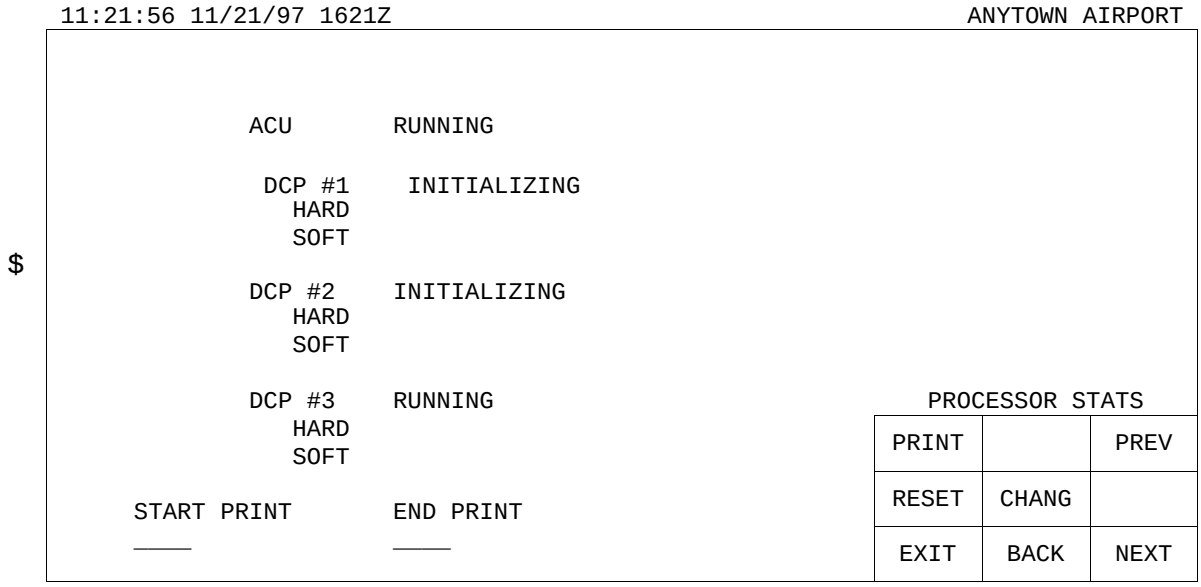


Figure 1.3.37. Processor Status Screen

1.3.4.40 **Maintenance Action Screen**. The maintenance action screen (Figure 1.3.38) enables the technician to start the system maintenance log (START key) and to select four maintenance data entry screens from which he enters unit stock numbers, serial numbers, and field modification kit numbers. These entries are recorded in the system maintenance log (SYSLG) to correlate equipment identification with servicing tasks. Preventive maintenance (PREVT key), corrective maintenance (CORR key), calibration (CAL key), and field maintenance kit (FMK key) screens are selected from the maintenance ACTION keypad. An ABORT key returns the technician to the 1-minute screen and does not save entries on the screen.

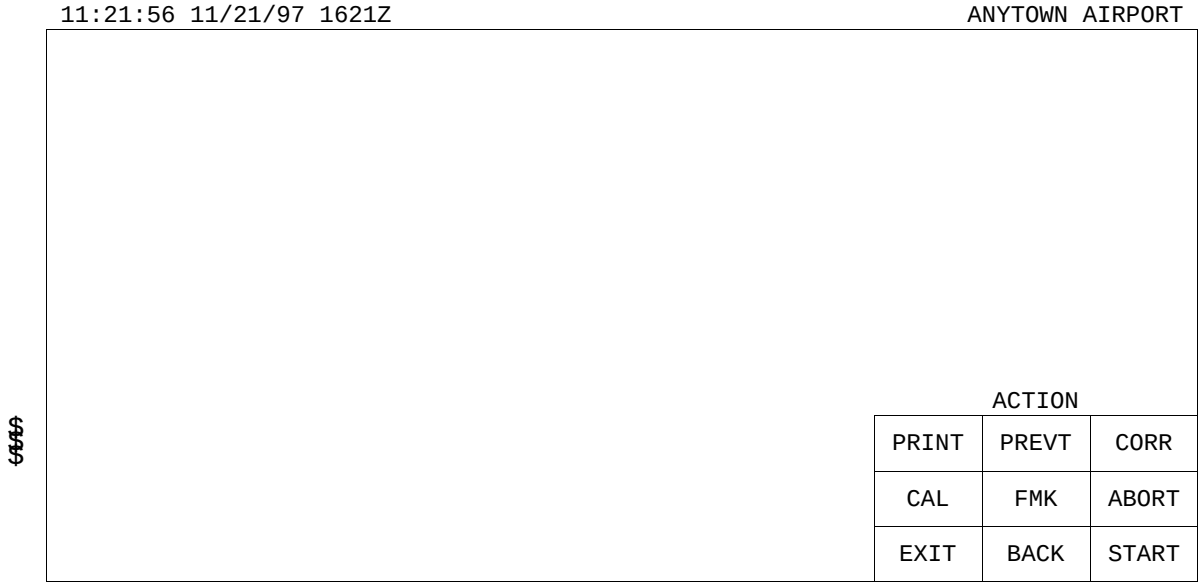


Figure 1.3.38. Maintenance Action Screen

1.3.4.41 **Preventive Maintenance Action Screen**. The preventive maintenance action screen (Figure 1.3.39) is used by the technician to enter agency stock numbers (ASN's) and unit serial numbers into the system maintenance log when preventive maintenance is being applied to units within ASOS. ASN's for ASOS cabinets and FRU's are based on the assembly reference designator listed in the Parts List reference designator column (located after the last chapter). The reference designator is used in conjunction with the ASOS designator (S100) to determine the ASN as follows: S100-(reference designator). Examples of how this screen is used are illustrated by air filter cleaning in the ACU (paragraph 2.5.2.1) and check memory board LOW BATT indicator (paragraph 2.5.2.4). For the cleaning task, the Parts List (located after the last chapter) shows the reference designator of the ACU blower filter to be 1FL1. Therefore, the agency stock number for this part is S100-1FL1. This number is typed in the AGENCY STOCK NUMBER field. Similarly, agency stock number S100-1A2A3 is typed to specify the LOW BATT indicator on the ACU memory board. For the UNITS SERIAL NUMBERS field, numbers are acquired from visual inspection of the assemblies and typed in the field. The preventive maintenance action screen prompts the technician to verify if all entered data are correct. A Y entry stores these numbers in the system maintenance log and clears the screen for entry of numbers pertaining to the next unit used in preventive maintenance. Any additional data relevant to the task may be entered directly on the SYSLG screen (paragraph 1.3.13). The preventive maintenance action screen keypad is identical to the maintenance action screen keypad.

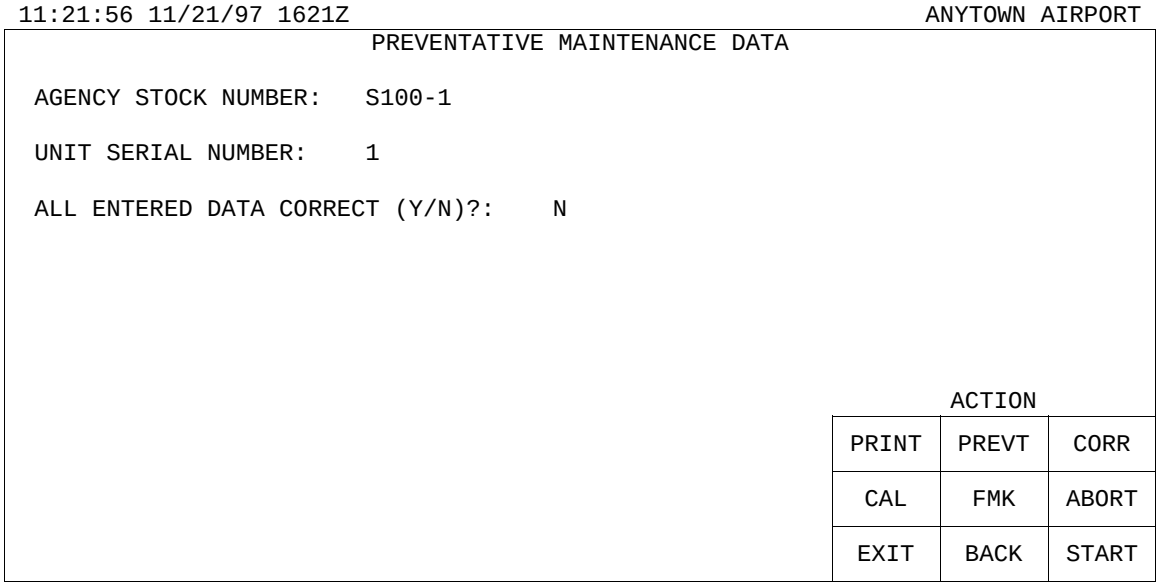


Figure 1.3.39. Preventive Maintenance Action Screen

1.3.4.42 **Corrective Maintenance Action Screen**. The corrective maintenance action screen is identical in layout to the preventive maintenance action screen (Figure 1.3.39). This screen is used by the technician to enter agency stock numbers and unit serial numbers into the system maintenance log when ASOS assemblies and units are repaired or removed and replaced. Pertinent agency stock numbers are acquired by referencing the Parts List (located after the last chapter). Unit serial numbers are acquired from engraved or stenciled identification data. Using the OID keyboard, the technician enters number data in the same manner as described for the preventive maintenance action screen. If additional related data are to be entered, the technician may enter the data directly on the SYSLG screen (paragraph 1.3.13).

1.3.4.43 **Calibration Maintenance Action Screen**. The calibration maintenance action screen is identical in layout to the preventive maintenance action screen (Figure 1.3.39). This screen is used by the technician to enter agency stock numbers and unit serial numbers into the system maintenance log when ASOS assemblies and units are calibrated. Pertinent agency stock numbers are acquired by referencing the Parts $
List (located after the last chapter). Unit serial numbers are acquired from engraved or stenciled identification $
data. Using the OID keyboard, the technician enters number data in the same manner as described for the preventive maintenance action screen. If additional related data are to be entered, the technician may enter the data directly on the SYSLG screen (paragraph 1.3.13).

1.3.4.44 **Field Modification Kit Action Screen**. The field modification kit action screen (Figure 1.3.40) enables the technician to enter field modification kit numbers. When a field modification kit is installed in ASOS, its number is entered on this screen and stored in the system maintenance log. A Y entered in the ALL ENTERED DATA CORRECT (Y/N)? field stores the kit number and clears the screen. Any additional data related to the field modification kit number may be entered directly on the SYSLG screen (paragraph 1.3.13). The field modification kit action screen keypad is identical to the maintenance action screen keypad.

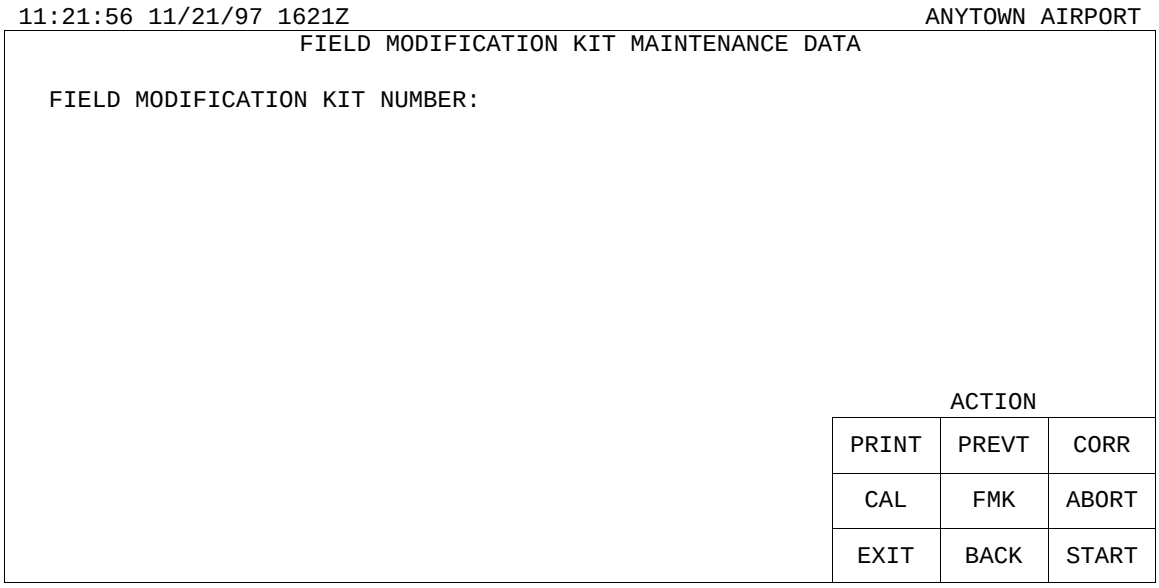


Figure 1.3.40. Field Modification Kit Action Screen

1.3.5 SYSTEM POWER ON PROCEDURES

Chapters 2 and 3 provide procedures to power up the ACU peripherals and the DCP, respectively. When powering up an entire system, these procedures are used to power up the ACU and its associated DCP's. It does not matter which order the cabinets are powered up. After the ACU and DCP's are powered up, the system performs whatever initialization is necessary and automatically begins normal operation.

1.3.6 SYSTEM SIGN-ON

To sign on to the system as a maintenance technician, the procedure provided in table 1.3.18 is performed.

Table 1.3.18. System Sign-On Procedures

Step	Procedure
1	At OID, ensure that 1-minute screen is displayed; if not, press EXIT key.
2	Press SIGN key. The OID displays the message ENTER YOUR INITIALS.
3	Enter two or three alphabetic characters and press RETURN. The OID displays the message ENTER PASSWORD.
4	Enter your maintenance password and press RETURN. If the sign-on is successful, the system displays all other users currently on the system; otherwise, the system displays an error message and sounds an alarm. **NOTE** If an observer or ATC is presently signed on at any OID, neither the system manager nor the technician can make any changes to system configuration, site physical characteristics data, or passwords.
5	The listing of users signed on to the system is only displayed for a brief period of time and then removed by the system. Use the AUX-USERS subfunction to review the list again if desired.
6	If signed on as a technician, the MAINT key is displayed in the keypad area of the screen and can be used to access the technician interface screens.

1.3.7 SYSTEM SIGNOFF

To sign off the system, the procedure provided in table 1.3.19 is performed.

Table 1.3.19. System Signoff Procedures

Step	Procedure
1	At OID, ensure that 1-minute screen is displayed. If not, press EXIT key until the 1-minute screen is displayed.
2	Press SIGN key. The OID displays the message ENTER YOUR INITIALS.
3	Enter the two or three alphabetic characters used to sign on the system and press RETURN. The OID displays the message ENTER PASSWORD (or press RETURN to sign off).
4	Press RETURN. If signed on as a technician or supervisor, the MAINT field is removed from the OID keypad screen.

1.3.8 RUNNING ASOS DIAGNOSTICS

The ASOS diagnostics run continuously and repeat approximately every 7 minutes. Upon completion of a diagnostic test, the system automatically logs the results in the maintenance log. In addition to the continuously running diagnostic, the technician can run direct dialogue tests on certain sensors. Procedures for running the direct dialogue tests are provided in the respective sensor chapter. To run specific parts of the ASOS diagnostics, the procedures provided in table 1.3.20 are performed.

1.3.9 MONITORING/CONTROLLING SENSOR POWER FROM THE OID

Electrical power to each sensor can be remotely monitored and controlled from the individual sensor screens at the OID. Turning sensor power off suspends all communications between the sensor and the ACU. The system also logs a power off message in the maintenance log and displays an M in the sensor status field on the 1-minute screen. Sensor power should only be removed from the sensor at the DCP or at the actual sensor for maintenance or emergency situations. When power is removed from a sensor in either manner, a sensor power failure error is generated. To monitor sensor power status or to turn power on or off for a specific
$ sensor, the procedures provided in table 1.3.21 are performed. Power supplied to the local sensors cannot
$ be controlled via the sensor screens.

Table 1.3.20. Running ASOS Diagnostics

Step	Procedure
	NOTE If an observer or ATC is presently signed on at any OID, neither the system manager nor the technician can make any changes to system configuration, site physical characteristics data, or passwords.
1	Sign on the system as a technician using the procedure in table 1.3.18.
2	At OID, press MAINT key. The maintenance screen is displayed on the OID and indicates the present status of the system.
3	To run a specific portion of the diagnostic test, use the PREV/NEXT keys to move the cursor to the subassembly to be tested and press SEL key. The OID displays the appropriate status screen.
4	Using the PREV/NEXT keys, move the cursor to the item to be tested and press SEL key. The OID displays the item's status screen.
5	For units with built-in extended diagnostics (i.e., wind sensor, 1088 sensor, and ACU modems), the extended diagnostics are initiated immediately and the results are reported when the diagnostics are complete. For all other units, the T's remain on the screen until the unit is next tested during the CST, and the results of that test are then reported. Typically, this requires less than 1 minute but should take no longer than a full CST cycle (7 minutes). If the T's remain displayed longer, the unit is probably not responding to the CST checks. The technician should ensure that the unit is properly installed in the system and turned on. If any unit fails, or if the T's remain displayed even though the unit is installed and turned on, the technician should refer to the applicable Chapter for specific troubleshooting and removal and replacement procedures.
6	Upon repair of the fault, repeat steps 1 through 5.
7	To return to the next higher status screen, press BACK key.

Table 1.3.21. Monitoring/Controlling Sensor Power

Step	Procedure
	NOTE If an observer or ATC is presently signed on at any OID, neither the system manager nor the technician can make any changes to system configuration, site physical characteristics data, or passwords.
1	Sign on the system as a technician.
2	At OID, press MAINT key. The maintenance screen is displayed on the OID and indicates the present status of the system.
3	Using the PREV/NEXT keys, position the cursor on the selected DCP field and press SEL key. The OID displays the remote DCP screen.
4	Using the PREV/NEXT keys, position the cursor at the selected sensor field and press SEL key. The OID displays the desired sensor screen.
5	Press the POWER key on the keypad to toggle the sensor power on/off. The POWER CONTROL field on the screen indicates the status of sensor power as on or off.
6	To return to the remote DCP screen, press BACK key.

1.3.10 RECONFIGURING THE SYSTEM

Reconfiguration of the system requires both a hardware and software change. The technician can reconFigure the hardware system at any time. Usually, hardware reconfiguration may be required as a result of a system malfunction or a modification to the system. The hardware change consists of connecting the cables from the input/output (I/O) boards in the DCP('s) to the fiberoptic boards that communicate with the sensors. The hardware change must then be identified to the software system via the site configuration screen. The site configuration (SITE CONFG) screens are used to perform the software change portion of reconfiguration. The site configuration screens and their functions are described in paragraph 1.3.16. The system should be reconfigured when adding new sensors. In addition to reconfiguring sensor input/output channels, the technician may also identify the number of CPU's, UPS's, A/D's, I/O boards, modems, and video boards presently in the system and at which OID the handset is located. In the DCP, the only hardware items that cannot be reconfigured are the UPS's. For a system so equipped, UPS #1 is always connected to SIO #1 CHANNEL 1 and UPS #2 is always connected to SIO #3 CHANNEL 2.

1.3.10.1 **Configuring the OID**. The OID's must be properly configured to interface with the ASOS. The ASOS requires terminals which communicate using a VT220 style format. The OID is configured using the procedures provided in table 1.3.22. These procedures are provided specifically for the Link MC70 terminal. Additional information is contained in the terminal vendor manual located on-site.

Table 1.3.22. Configuring the OID Terminal

Step	Procedure
1	Apply power to the LINK MC_{70} OID. **NOTE** Press the HELP key 2 times in succession to repaint the screen.
2	At the OID keyboard, press the F3 (SET-UP) key. The OID displays the terminal setup directory. **NOTE** The ENTER key referenced in this procedure is located in the auxiliary keypad area of the keyboard. DO NOT use the ENTER key located in main keypad area.
3	Using the cursor keys, move right to the SCREEN submenu.
4	Verify that the functions below are displayed: WIDTH CHANGE CLEAR ON SCREEN COLUMNS 80 SCREEN DATA LINES 24 PAGE COLUMNS 132 PAGE LINES 24/25 PAGE LINE MULTIPLIER 1 NUMBER OF PAGES 1 NUMBER OF SESSIONS 1 SESSION DISPLAY, SPLIT 1, FULL POWER-ON TAB STOPS OFF TAB STOPS
5	Using the cursor keys and ENTER key, select and toggle each field that does not contain the correct information.
6	Using the cursor keys, move right to the MODES submenu.

Table 1.3.22. Configuring the OID Terminal -CONT

Step	Description
7	Verify that the functions below are displayed. FEATURE LOCK OFF CONTROLS MODE INTEPRT RECEIVED CR CR RECEIVED LF LF TRANSMIT MODE 8-BIT TRANSFER/PRINT/SEND ANSWERBACK MESSAGE BELL SETTINGS PERSONALITY
8	Using the cursor keys and ENTER key, select and toggle each field that does not contain the correct information.
9	Using the cursor keys and ENTER key, select BELL SETTINGS.
10	BELL TONE AND BELL VOLUME are user preference and may be set accordingly. Press SHIFT UP-ARROW to return to the MODES submenu.
11	Using the cursor keys and ENTER key, select PERSONALITY.
12	Using the cursor keys and ENTER key, select VT320/VT220. If the entry is changed, an ARE YOU SURE? (Y/N)Y verification message is displayed. Press ENTER. The system returns to the MODES submenu.
13	Using the cursor keys, move right to the DISPLAY submenu.
14	Verify that the functions below are displayed: SCREEN SAVER OFF SCREEN SAVER MODE BLANK REVERSE SCREEN OFF SCROLL SPEED JUMP TOP STATUS LINE BLANK HOST MESSAGE OFF SCREEN RESOLUTION 16x16 DISPLAY FUNCTIONS CURSOR DISPLAY
15	Using the cursor keys and ENTER key, select and toggle each field that does not contain the correct information.
16	Using the cursor keys and ENTER key, select CURSOR DISPLAY.
17	BLINK and CURSOR COLOR are user preference and may be set accordingly. Press SHIFT UP-ARROW to return to the DISPLAY submenu.
18	Using the cursor keys, move right to the ATTRIBUTES submenu.
19	Verify that the functions below are displayed: SETUP MENU COLOR BLUE FOREGROUND COLOR WHITE BACKGROUND COLOR NORMAL COLORS BOLD COLORS DIM COLORS BORDER COLOR NORMAL ATTRIBUTES BOLD ATTRIBUTES DIM ATTRIBUTES

Table 1.3.22. Configuring the OID Terminal -CONT

Step	Description
20	Using the cursor keys and ENTER key, select and toggle each field that does not contain the correct information.
21	Using the cursor keys, move right to the PORT submenu.
22	Verify that the functions below are displayed: COMMUNICATIONS MODE FULL DPX ON-LINE/LOCAL ON-LINE TRACE BOTH PORT A SETTINGS PORT B SETTINGS COMMUNICATIONS CARTRIDGE SESSION RESOURCES
23	Using the cursor keys and ENTER key, select and toggle each field that does not contain the correct information.
24	Using the cursor keys and ENTER key, select PORT A SETTING.
25	Verify that the functions below are displayed: TRANSMIT BAUD RATE 9600 RECEIVE BAUD RATE RCV=XMIT DATA/STOP/PARITY BITS 8/1/NONE RECEIVE HANDSHAKE NONE TRANSMIT HANDSHAKE NONE TRANSMIT LIMIT NONE BREAK 250 MS INTERFACE RS-232C MODEM CONTROL ASCII DISCONNECT DELAY OFF
26	Press SHIFT UP-ARROW to return to the PORT submenu.
27	Using the cursor keys and ENTER key, select SESSION RESOURCES.
28	Verify that the functions below are displayed: PRTA PRTB BUF1 BUF2 SESSION 1 HOST AxPr ACTV SESSION 2 ACTV
29	Press SHIFT UP-ARROW to return to the PORT submenu.
30	Using the cursor keys, move right to the KEYBOARD submenu.
31	Verify that the functions below are displayed: KEY AUTOREPEAT OFF KEYCLICK MEDIUM KEYBOARD LANGUAGE US NATIONAL MODE OFF CHARACTER SET MULTNATL CORNER KEY OFF KEY DEFINITIONS LOCK OFF KEY FUNCTIONS KEY MODES USER-DEFINED KEYS
32	Using the cursor keys and ENTER key, select and toggle each field that does not contain the correct information.
33	Using the cursor keys, move right to the EXIT submenu.

Table 1.3.22. Configuring the OID Terminal -CONT

Step	Description
34	Verify that the functions below are displayed: EXIT SETUP EXIT SETUP AND CANCEL CHANGES EXIT SETUP AND SAVE RESTORE LAST SAVED DEFAULT ALL DEFAULT USER-DEFINED KEYS
35	Using cursor keys and ENTER key, select EXIT SETUP AND SAVE. An ARE YOU SURE? (Y/N)Y verification message is displayed. Select ENTER. The OID exits the setup procedure.

1.3.10.2 **Configuring the Remote Terminals**. The remote terminals provide qualified ASOS users with the capability to access the ASOS from off-site locations (described in paragraph 1.3.14). When configuring the remote terminal, the following parameter values are recommended:

a. 2400 baud (300 to 28.8k baud also available dependent upon modem installed) $

b. No parity

c. 8 data bits

d. 1 stop bit

e. Full duplex

1.3.10.3 **Deconfiguring and Reconfiguring Sensors to a Remote DCP**. Configuring a sensor to a remote DCP consists of assigning the sensor to an available SIO port on the DCP using the sensor configuration screen. Similarly, deconfiguring a sensor consists of removing an assigned port from the same screen. When a visibility sensor or ceilometer configuration is changed, the system requires the operator to access the sensor algorithm configuration screen (paragraph 1.3.16.3) and ensure that algorithm parameters (sensor location, priority, etc) are correct for the configured sensors. Whenever a sensor is configured to the system, the technician must ensure that is properly installed and that it is physically connected to the specified port. Table 1.3.23 provides a procedure for deconfiguring and reconfiguring a sensor to a remote DCP. Deconfiguring a sensor results in the loss of archive data and accumulated daily/monthly summary data. For this reason, the technician should not deconFigure any sensor unless permanently removing that sensor type or unless instructed by specific maintenance procedures. Sensor report processing is turned off while $
configuring the sensor. $

Table 1.3.23. Sensor DeconFigure and ReconFigure Procedure

Step	Procedure
	SENSOR DECONFIGURATION
	CAUTION Deconfiguring sensor will result in loss of accumulated daily and monthly summary data. Do not deconFigure sensor unless that type of sensor is being removed from system permanently (unless instructed by other maintenance procedures).
1	At OID, sign on to system as a technician.
2	Access sensor configuration screen (paragraph 1.3.16.2) by pressing REVUE-SITE-CONFIG-SENSOR keys.
3	On sensor configuration screen, press CHANG key. A cursor is displayed over the first SIO port. Message SYSTEM MODIFICATIONS flashes at top of screen.

Table 1.3.23. Sensor DeconFigure and ReconFigure Procedure -CONT

Step	Description
4	Using PREV and NEXT keys, move cursor to highlight code for sensor to be deconfigured.
5	To deconFigure sensor, enter two asterisks (**) in place of highlighted sensor code.
6	Press BACK key to cause system to accept new configuration. Message SYSTEM MODIFICATIONS is removed when system has accepted change.
7	If deconfigured sensor was visibility or ceilometer, press ALGOR key to display sensor-algorithm configuration screen (paragraph 1.3.16.3). Review to ensure that sky/visibility algorithm, primary assignments, priorities, etc, are correct per system manager specification.
8	Press EXIT key to return to 1-minute screen.
	SENSOR RECONFIGURATION
1	At OID, sign on to system as a technician.
2	Access sensor configuration screen (paragraph 1.3.16.2) by pressing REVUE-SITE-CONFIG-SENSOR keys.
3	**NOTE** If no SIO ports are available, a new SIO board must be added to the system and must be configured on the hardware configuration screen (paragraph 1.3.16.1). Select an available SIO port on which to conFigure sensor (available slots denoted by double asterisks (**)).
4	Ensure that sensor being configured is physically connected to the selected SIO port as follows: **NOTE** If fiberoptic module corresponding to selected SIO slot is not installed in the system, technician must install it in the DCP and then connect sensor to this module. a. Referring to port assignments for DCP SIO boards (Table 3.4.1), determine which fiberoptic module in DCP corresponds to SIO port selected for sensor. b. Physically connect sensor being configured to this fiberoptic module.
5	On sensor configuration screen, press CHANG key. A cursor is displayed over the first DCP SIO port. Message SYSTEM MODIFICATIONS flashes at top of screen.
6	Using PREV and NEXT keys, move cursor to highlight asterisks at SIO port selected for sensor.
7	To conFigure sensor, enter two-character code for sensor being configured. A list of allowable codes is provided in paragraph 1.3.16.2.
8	Press BACK to cause system to accept new configuration. Message SYSTEM MODIFICATIONS is displayed at top of OID until system has accepted change.
9	If configured sensor is visibility or ceilometer, press ALGOR key to display sensor-algorithm configuration screen (paragraph 1.3.16.3). Review to ensure that sky/visibility algorithm, primary assignments, priorities, etc, are correct per system manager specification.
10	Message SYSTEM MODIFICATIONS is removed when system has accepted change.
11	Press EXIT key to return to 1-minute screen.

1.3.11 **DCP DOWNLOAD**

DCP initialization or download can be initiated by the technician via the PROC screen. The technician may have to reinitialize the DCP after performing preventive or corrective maintenance or as an attempt to correct a data communication problem within the system (e.g., such as the loss of data from a sensor or DCP). System initialization is performed automatically when power is applied to the system. The DCP's are initialized by performing the procedures provided in table 1.3.24. For systems with multiple remote DCP's, performing a download to a system interrupts ACU communication with all others (until the download is complete).

Table 1.3.24. DCP Download Procedures

Step	Procedure
1	At OID 1-minute screen, sign on as a technician. The MAINT key is displayed in the keypad area of the OID.
2	Press MAINT key. The OID displays the maintenance screen.
3	Using PREV/NEXT keys, position the cursor over the PROC field and press SEL key. The OID displays the processor status screen.
4	Using PREV/NEXT keys, position the cursor over the selected DCP HARD field and press RESET key. The respective status field displays INITIALIZING while the unit is initializing. The progress of the download can be monitored by the PERCENT COMPLETE message displayed at the top of the screen. When the download is complete, the DCP status field changes to RUNNING.
5	Using EXIT key, return to 1-minute screen.

1.3.12 REVIEWING/PRINTING THE SYSTEM MAINTENANCE LOG

The system maintenance log contains maintenance data for the previous 31 days and the current day. A four-digit error code is associated with each message that appears in the system log. The ASOS Software Users Manual contains a complete listing by error code number of all system log error messages. Any ASOS operator can review and print the system maintenance log one screen at a time without being signed on the system. The entire log or portions of the log can be printed using the processor status (PROC) screen. Only operators signed on as technicians or managers can change or add entries to the maintenance log. To review/print the system maintenance log data from the system log screen, the procedure provided in table 1.3.25 is performed. To print the complete system maintenance log or selected portions of the log, the procedures provided in table 1.3.26 are performed using the processor status screen.

Table 1.3.25. Reviewing/Printing the System Maintenance Log From the System Log Screen

Step	Procedure
	NOTE A listing of the system log maintenance error codes is provided in the ASOS Software User's Manual, Section 4.
1	At 1-minute screen, press REVUE key. The OID displays the REVIEW keypad on the OID.
2	Press SYSLG key. The OID displays the system log screen.
3	Using PREV/NEXT keys, page through the maintenance data.
4	To view the maintenance data for a specific date, press DATE key. The system displays the ENTER DATE: MM/DD/YY prompt. Enter the desired date and press RETURN. The OID displays the maintenance log data starting at the date specified.
5	To search for maintenance codes, specific dates, or recent days, press FILTR key. The Review-SYSLOG-FILTR function prompts the user to enter a maintenance code, specific date, or recent day. After entering the desired filter values, press BACK key and if a match is found, that portion of the maintenance log is displayed. When selecting specific date(s) on the filter screen, month and year must be included (e.g., 03/01/91 and 03/05/91).
6	To print the maintenance log data displayed on the OID, press PRINT key. The maintenance log data displayed on the OID is printed on the printer.
	NOTE Maintenance log data can only be printed one OID screen at a time. Refer to table 1.3.26 to print larger portions.
7	Press EXIT key to return to 1-minute screen.

Table 1.3.26. Printing the System Maintenance Log

Step	Procedure
	NOTE A listing of the system log maintenance error codes is provided in the ASOS Software User's Manual, Section 4.
1	At OID 1-minute screen, sign on as a technician. The MAINT key is displayed in the keypad area of the OID.
2	Press MAINT key. The OID displays the maintenance screen.
3	Using PREV/NEXT keys, position the cursor over the PROC field and press SEL key. The OID displays the processor status screen.
4	Using PREV/NEXT keys, position the cursor over the START PRINT field and press CHANG key.
5	Enter the error number where the system maintenance log printout is to begin and press RETURN. The cursor moves to the END PRINT field. Enter the error number where the printout is to end and press RETURN. The requested system maintenance log data are printed on the printer.
6	Press EXIT key to return to 1-minute screen.

1.3.13 ENTERING DATA INTO THE SYSTEM MAINTENANCE LOG

Data entry to the system maintenance log can only be made by operators who are signed on to the system as technicians or system managers. The entry can be multiple lines and can be time tagged by using the DATE function before entering the maintenance comment. The technician should make entries into the system maintenance log whenever preventive or corrective actions are performed on the system; however, upon successful repair of an FRU, the diagnostic automatically logs that the FRU has been repaired. Log entries should clearly define the maintenance action performed. Data are entered into the system maintenance log using the procedures provided in table 1.3.27.

Table 1.3.27. Making System Maintenance Log Entries

Step	Procedure
1	At 1-minute screen, sign on as a technician or system manager.
2	At 1-minute screen, press REVUE key. The OID displays the REVIEW keypad on the OID.
3	Press SYSLG key. The OID displays the system log screen. **NOTE** If the log entry is being made at the current time, omit step 4.
4	Press DATE key. The OID displays a prompt for month/day/ year. Enter the selected month (1 to 12), the selected day of the month (1 to 31), and year and press RETURN. The system displays the log entry for the date specified on the first line of the log screen.
5	Press WRITE key, enter message using the OID keyboard, and then press EXIT or BACK. The message can be a maximum of 200 characters. The entry is recorded in the system log (at the bottom of the log).

1.3.14 REMOTE MAINTENANCE MONITORING

The ASOS provides a remote maintenance monitor (RMM) capability that allows an off-site user, using a terminal (or personal computer) and a telephone modem, to dial into the ASOS on one of its user ports. When a call is made to the ASOS, the system requests the user to enter an access code. Depending on how the user enters the access code, one of four modes may be selected: remote OID mode, direct command mode, monochrome monitor mode, and ASCII terminal mode. Except for the last mode, a VT-220 (monochrome) terminal or a VT-320 (color) terminal must be used. A personal computer may also be used, as long as a VT-220/320 emulation program is employed. Paragraph 1.3.10.2 provides information on setting up serial communications for an RMM terminal. The following paragraphs provide information on each of the four available modes.

1.3.14.1 **Remote OID Mode**. This mode is accessed by dialing into the ASOS using a telephone modem and a VT-320/220 terminal. After the telephone connection is made, the system prompts the user to enter a remote access code. This code must be properly entered, using all uppercase letters, within 30 seconds. Up to three attempts may be made. When the access code is properly entered, the 1-minute screen is displayed and the remote terminal functions as an OID. The user may then operate the system as an unsigned user or sign on to the system as a technician or system manager (observers and ATC's are not allowed from a remote monitor). The user then has all of the same capabilities as provided by the local OID's, with the exception that there is no print capability. When the user operates as an unsigned user, the ASOS disconnects the user if there is no activity for a period of 5 minutes.

1.3.14.2 **Direct Command Mode**. The direct command mode allows a remote user to directly access the data in the various ASOS logs (communications, edit, system, OBS, daily summary log, etc). This mode is accessed in the same manner as the remote OID mode, except that the pound sign (#) is typed at the beginning of the remote access code (#CODE). When the access code is properly entered, a CMD> prompt is displayed. The user then enters commands as described in table 1.3.28 and the following paragraphs. $

a. All arguments are optional. If no arguments are entered, all entries for the selected command are displayed. Any arguments entered indicate a range of data to be displayed. The default arguments are as follows:

start date	01/01/0000
start time	00:00
end date	12/31/9999
end time	23:59

b. For any of the commands where the user can enter dates and times (e.g., OBS, 5MIN, SHEF, SYSLOG, LEDWI, THUNDER, COMLOG, ADAS, ALDARS, and EDITLOG commands), the following logic applies. If the start date only is entered with the command, the default start time is used and the end date and time are assumed to be the current system date and time. If the start date and start time only are entered with the command, the end date and time are assumed to be the current system date and time. If the start date, start time, and end date only are entered with the command, the default end time is used. $ $

c. For the SYSLOG and COMLOG commands, in addition to the date and time arguments, the user can also enter a single code or two codes. Any code entry must be directly followed by a C (i.e., 9999C). Entering a single code value indicates that all log entries with the designated code are to be displayed. Entering two code values indicates a range of codes to be displayed. The user must enter the code value(s) as the last argument(s); however, the code argument(s) can be entered with any combination of the remainder of the SYSLOG/COMLOG valid arguments. $ $ $

d. For the ARC5MIN command, the user must enter a valid archive index (i.e., 1, 2, or 3). Archive data are then displayed if available.

e. For the TREND command, the user must enter a valid device number (i.e., 0 = ACU, 1 = DCP #1, 2 = DCP #2, and 3 = DCP #3). If device is enabled, data are displayed.

f. For any of the commands where the user can only enter dates (i.e., the DAILY and DSM commands), the following logic applies. If the start date only is entered with the command, the end date is assumed to be the current system date.

Table 1.3.28. Direct Command Mode Commands

	Command	Results
	NOTE The following commands can be entered for the direct command mode, where MM indicates a month, DD indicates a day, HHMM indicates a time, I indicates an archive index, and CODE 1 and CODE2 indicate SYSLOG code:	
	12HR1 HHMM HHMM	Outputs 12-hour screen one data.
	12HR2 HHMM HHMM	Outputs 12-hour screen two data.
	12HRP HHMM HHMM	Outputs 12-hour 15-minute precipitation data.
	12HRC1 HHMM HHMM	Outputs 12-hour ceilometer #1 data, if ceilometer #1 is configured.
	12HRC2 HHMM HHMM	Outputs 12-hour ceilometer #2 data, if ceilometer #2 is configured.
	12HRC3 HHMM HHMM	Outputs 12-hour ceilometer #3 data, if ceilometer #3 is configured.
	12HR HHMM HHMM	Outputs all 12-hour data.
	5MIN MMDD HHMM MMDD HHMM	Outputs 5-minute observation data.
$	ADAS MMDD HHMM MMDD HHMM	Outputs ADAS summary data.
$	ALDARS MMDD HHMM MMDD HHMM	Outputs ALDARS lightning data.
	ARC5MIN I	Outputs archived 5-minute observation data.
	BYE	Exits direct command mode.
$	CLOUD HHMM HHMM	Outputs cloud layer cover factor data.
$ $	COMLOG MMDD HHMM MMDD HHMM CODE1 CODE2	Outputs communications log data.
	DAILY MMDD MMDD	Outputs daily data.
$	DSM MMDD MMDD	Outputs Daily Summary Message data.
$ $	EDITLOG MMDD HHMM MMDD HHMM	Outputs edit log data.
	HELP	Outputs help information for the direct command mode.
	LEDWI MMDD HHMM MMDD HHMM	ASOS maintains a 12-hour archive of present weather sensor (LEDWI) reports (C command responses). This archive is not available on normal OID screens, but is available remotely using this LEDWI command. Refer to Chapter 7 for format of LEDWI C data.
	MONTH	Outputs monthly data.
$	MSM	Outputs Monthly Summary Message data.
$	OBS MMDD HHMM MMDD HHMM	Outputs observation data.
	SHEF MMDD HHMM MMDD HHMM	Outputs SHEF observation data.
	SYSLOG MMDD HHMM MMDD HHMM CODE1 CODE2	Outputs system log data.
$ $	THUNDER MMDD HHMM MMDD HHMM	Outputs thunderstorm sensor data.
$	TREND D	Outputs rf communication trend data.
$	XMODEM	Toggles from/to Xmodem mode.

g. For any of the commands where the user can only enter times (i.e., the 12-hour and cloud screens), the following logic applies. If no arguments are entered with the command, the end date and time are assumed to be the time of the most recent 12-hour archive and the start date and time are assumed to be the date and time of 13 hours prior to end time. If the start time only is entered with the command, the end time is assumed to be the time of the most recent 12-hour archive.

h. All times entered are assumed to be local standard time. The user must append a Z to the time entry to access Zulu time. All times, LST or UTC, are converted to the correct type automatically before data are accessed (i.e., all 12-hour data are displayed with UTC times and the remainder of the data are displayed with LST times).

i. The direct command mode also allows the user to enter any keystroke to exit a command while data are being output and to use <CTRL Q> and <CTRL S> to stop and start scrolling.

j. For the XMODEM command, the user is prompted to direct DCM data to a file or a screen output. $ $

1.3.14.3 **Monochrome Monitor Mode**. The monochrome monitor mode is accessed in the same manner as the remote OID mode, except that a dollar sign ($) is typed at the beginning of the remote access code ($CODE). The monitor then functions as an OID in the same manner as the remote OID mode but without the color capabilities.

1.3.14.4 **ASCII Terminal Mode**. The ASCII terminal mode is accessed in the same manner as the remote OID mode, except that an asterisk (*) is typed at the beginning of the remote access code (*CODE). This mode is for use with all "dumb" terminals. The user has limited available options, which are displayed at the bottom of the screen. Number keys are used instead of keypad keys. The information scrolls across the screen in typical ASOS format excluding borders and colors, and is only available for review (not editing or changing). When prompted, the user may enter dates and times in MMDD and HHMM format.

1.3.15 SYSTEM POWER OFF PROCEDURES

Chapters 2 and 3 provide power-off procedures for the ACU/peripherals and the DCP, respectively. Should it become necessary to power down the entire system, the ACU/peripherals and the DCP's are powered off according to these procedures. It does not matter in what order the ACU and DCP's are powered down.

1.3.16 SITE CONFIGURATION SCREENS

Site configuration screen (Figure 1.3.41) provides the technician and system manager access to the configuration data specific to his site. This screen and its subfunctions can be used by the technician and system manager as both a source of information and a tool in reconfiguration. The configuration screens provide five standard key functions. The purpose of each is as follows:

a. PRINT - Enables the currently displayed screen to be printed on the printer.

b. PREV/NEXT - Enables the cursor to be moved to the different fields on the currently displayed screen.

c. BACK - Causes the previous screen to be displayed.

d. CHANG - Causes the screen function to go into an edit mode. After making change, BACK or EXIT key must be pressed for system to incorporate change.

e. EXIT - Causes the current screen to be exited and the 1-minute screen to be displayed on the OID.

Of special interest to the technician is the sensor (SENSR) and hardware (HDWE) configuration screens. The sensor screen is used to conFigure the sensor-to-serial I/O port scheme. The hardware screen is used to identify the number of CPU's, UPS's, A/D's, I/O boards, modems, and video boards in the system.

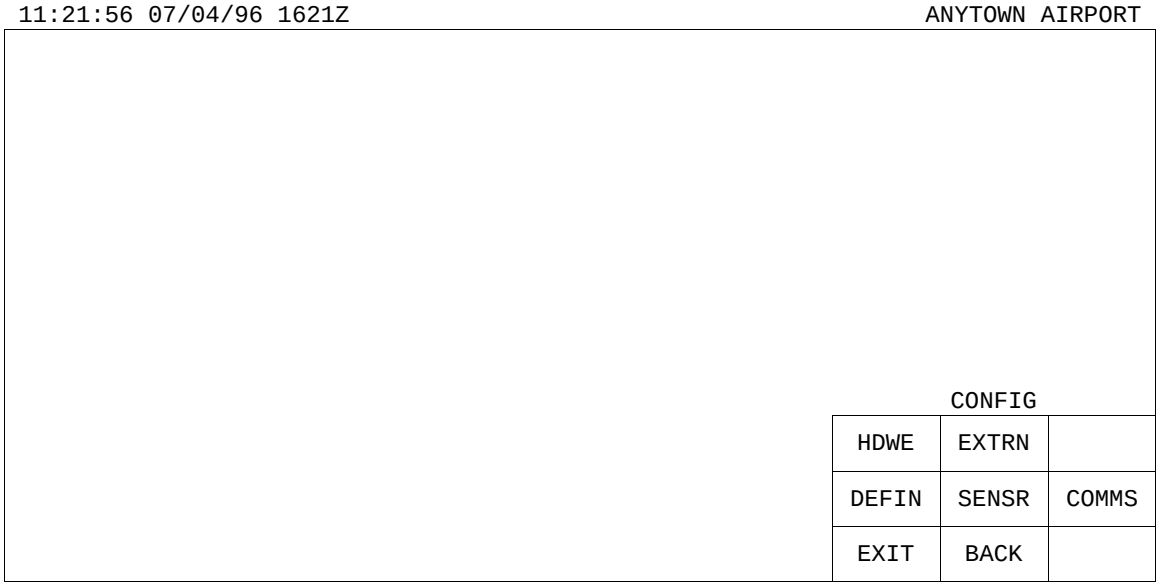


Figure 1.3.41. Site Configuration Screen

1.3.16.1 **Hardware Configuration Screen**. The hardware configuration screen (Figure 1.3.42) enables the user to review and change the recorded quantities of CPU's, SIO's, UPS's, video cards, and A/D cards presently in the ACU and DCP's. The VOICE PORT field permits the location of the FAA handset to be specified as either OID-1 PRIMARY or OID-2 SECONDARY. This field must be set correctly to permit entry of voice messages from the respective OID. The CHANG key is used to enter the change mode. The user can change the hardware quantities using the arrow keys and keyboard. The DCP STATUS and VOICE PORT fields are changed using the arrow keys and the sequence (SEQN) key.

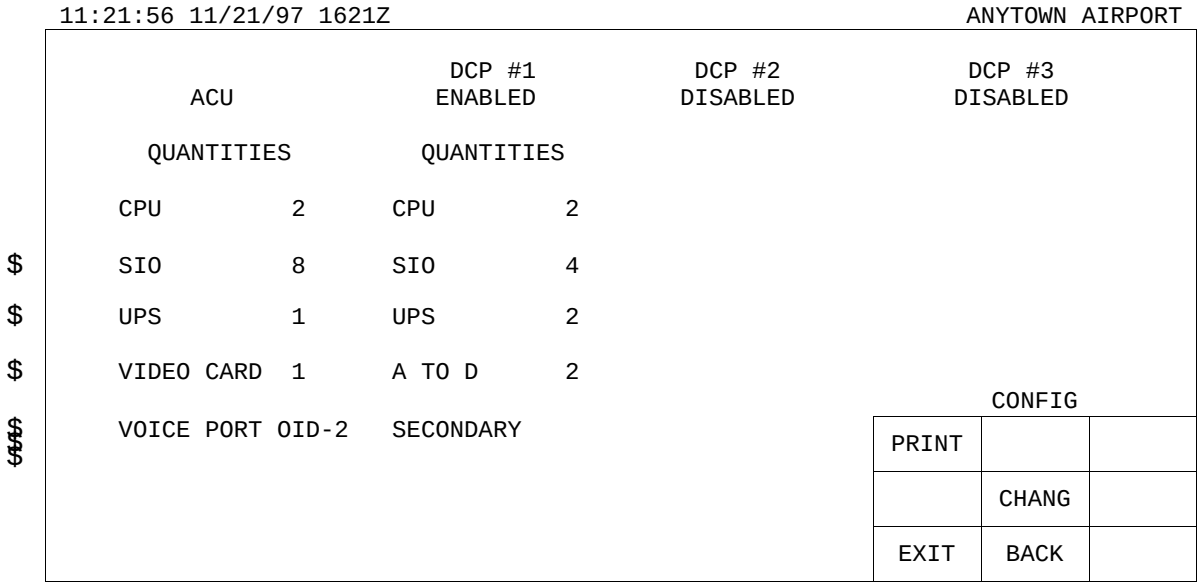


Figure 1.3.42. Hardware Configuration Screen

1.3.16.2 **Sensor Configuration Screen**. The sensor configuration screen (Figure 1.3.43) enables the user to review and change the recorded sensor-to-serial I/O port scheme at the DCP's. By pressing the CHANG key, the user can change the configuration using the arrow keys and the keyboard. The two-character field presented under each I/O port can have one sensor assigned. A sensor-I/O port assignment is changed by typing over the existing sensor code. A list of sensor codes is provided in table 1.3.29. Fields are provided to record local sensors and pressure sensors. These fields can be changed in the same manner as sensor code assignments on the screen. By pressing the ALGOR key on the keypad, the algorithm configuration screen is displayed.

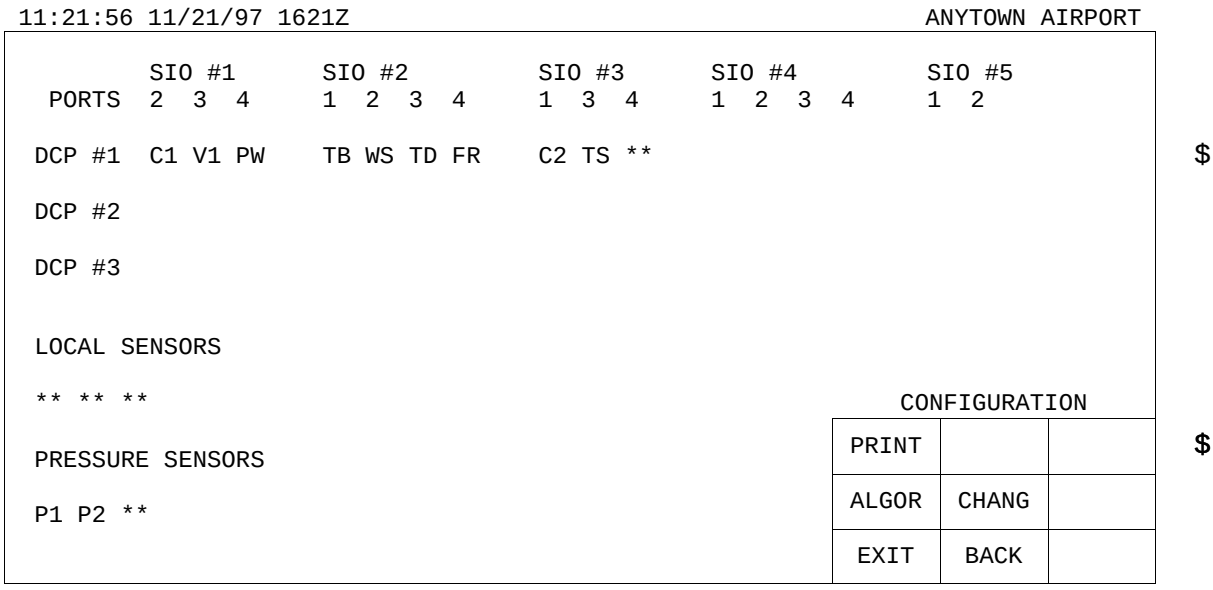


Figure 1.3.43. Sensor Configuration Screen

Table 1.3.29. Sensor Codes

Sensor Code	Definition
TD	Temperature/dewpoint sensor
WS	Wind speed/direction sensor
V1-V3	Visibility sensors
SD	Snow depth sensor
FR	Freezing rain sensor
FP	Frozen precipitation sensor
SS	Sunshine sensor
C1-C3	Ceilometer sensors
TB	Tipping bucket sensors
PW	Present weather sensors
TS	Thunderstorm sensor
P1-P3	Pressure sensors

1.3.16.3 **Sensor-Algorithm Configuration Screen**. The sensor-algorithm configuration screen (Figure 1.3.44) enables the user to review and change the recorded sky and visibility sensor algorithm configurations. These configurations are single-sensor, backup, and meteorological discontinuity. In addition, the user can review and assign sensor specific information such as primary and secondary sensors, sensor elevation, location, representative sensor, and priority. Because setup of algorithms for a particular site is the responsibility of the system manager, the technician should make no change to this screen except under direction of the system manager. Additional information on sensor algorithms can be obtained from the ASOS User's Guide (an NWS publication) or by contacting the system manager.

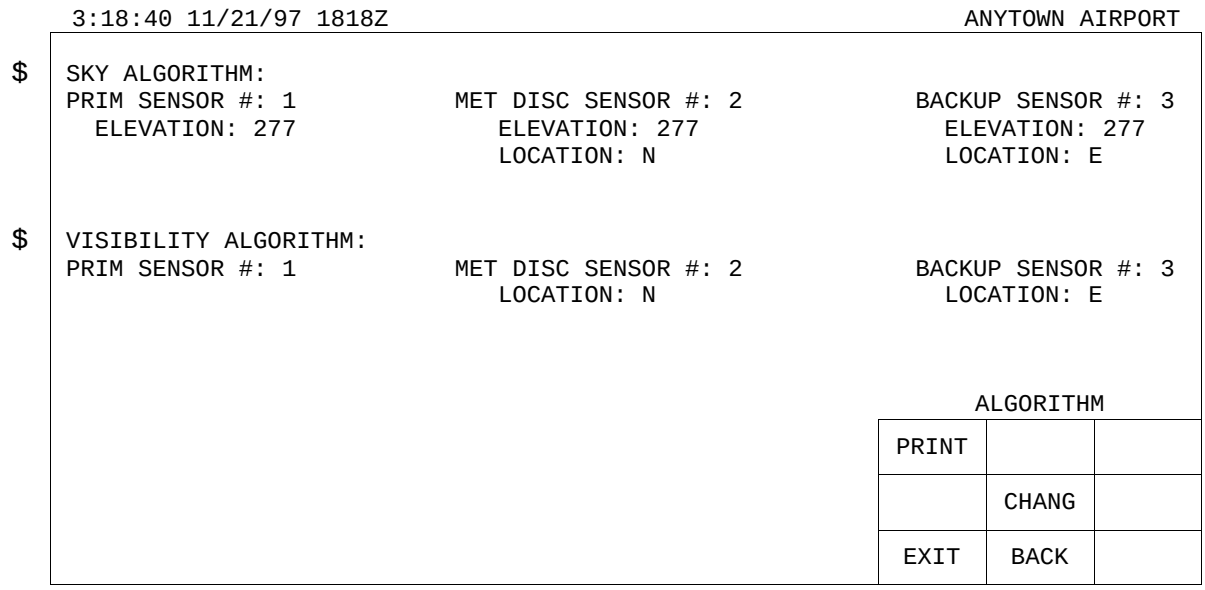


Figure 1.3.44. Sensor-Algorithm Configuration Screen

1.3.16.4 **Define Configuration Screen**. The define configuration screen (Figure 1.3.45) enables the user to review and change the recorded sensor and hardware configurations and types. New definitions should be made only in conjunction with an actual change of hardware or other sensors. For the sensors and hardware items, the configuration type, model number, or vendor is listed. By pressing the CHANG key, the user is presented with a change keypad. The PREV/NEXT keys are used to select the field to be changed. When the field to be changed is highlighted, a SEQN key on the change keypad is used to sequence through all of the allowable entries for that field. When the new entry is displayed, the screen can be exited and the new entry remains in the field.

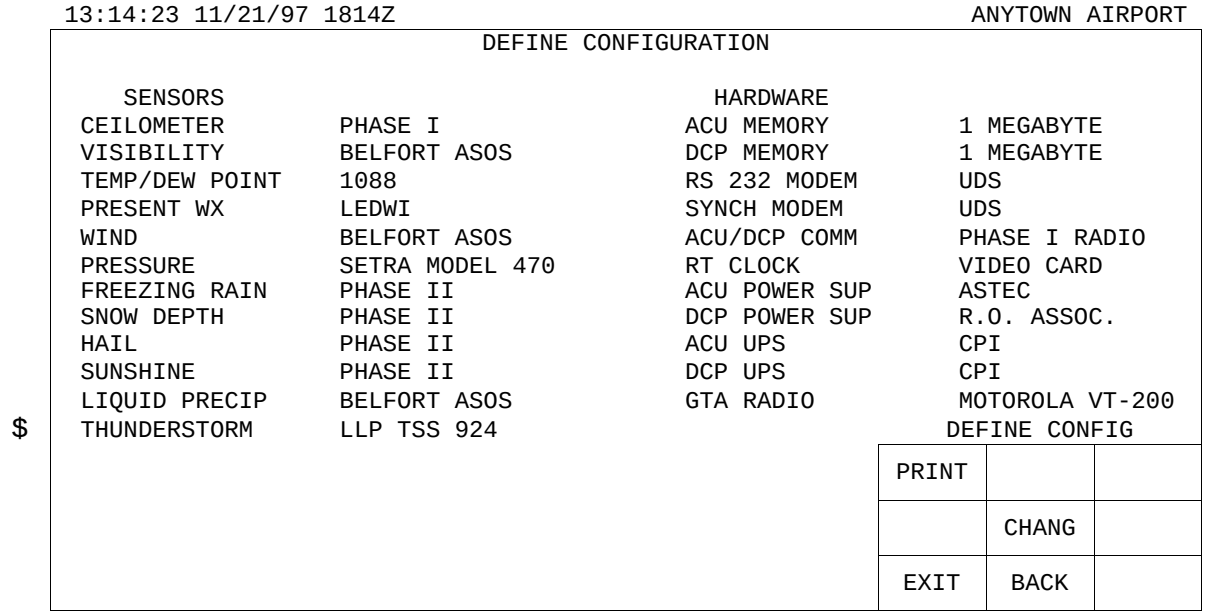


Figure 1.3.45. Define Configuration Screen

1.3.16.5 **ACU Serial Communications Screen**. The ACU serial communications screen (Figure 1.3.46) provides access to the configuration and parameter data for each of the serial I/O communication ports. This screen provides the recorded equipment-to-I/O port scheme currently in use in the system. The SIO key is used to move the cursor to the next I/O port. By pressing the CHANG key, the user can change data on the display using the keyboard. The equipment-to-I/O port scheme recorded for software use and the hardware configuration must match for proper communication operations. In addition, the ACU serial communications screen provides fields for communication status, baud rate, parity select, bits/character, and stop bits for the configuration of any desired communication scheme. When configuring a GTA radio to the ACU, there are two fields that must be completed: FREQUENCY and POWER LEVEL. These two fields are mandatory and must be completed before exiting the COMMS screen. These fields may also be changed at the front panel of the radio; when this is done, the ACU copies and reads the current setting and stores it as a final setting and displays it on the ACU serial communications screen. The figure applies only to systems operating application software version 2.1 or higher. For earlier versions, radio adjustments must be made manually at the radio.

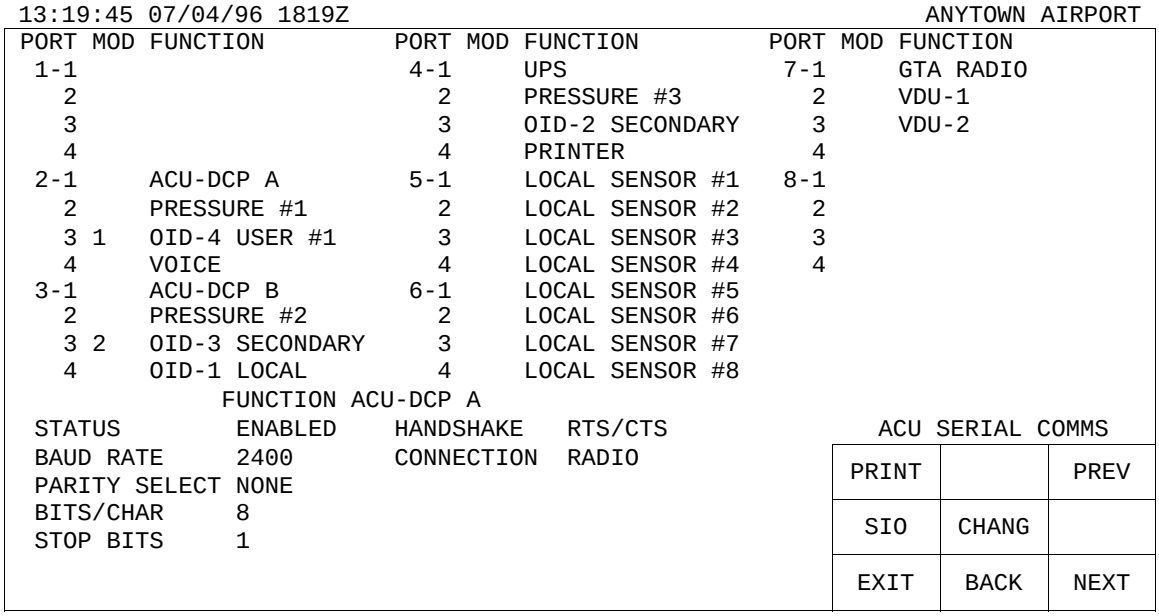


Figure 1.3.46. ACU Serial Communications Screen

1.3.16.6 **External Communications Screen**. The external communications screen (Figure 1.3.47) enables the user to review and change external communication information. This information is used by the system software in communication with the various ASOS customers. The communication consists of user address and codes, product type, message formats, and transmission parameters. By pressing the CHANG key and using the keyboard, the user can change the external communications data fields. The PRODUCT ID is automatically set depending on site commissioning status (site physical screen).

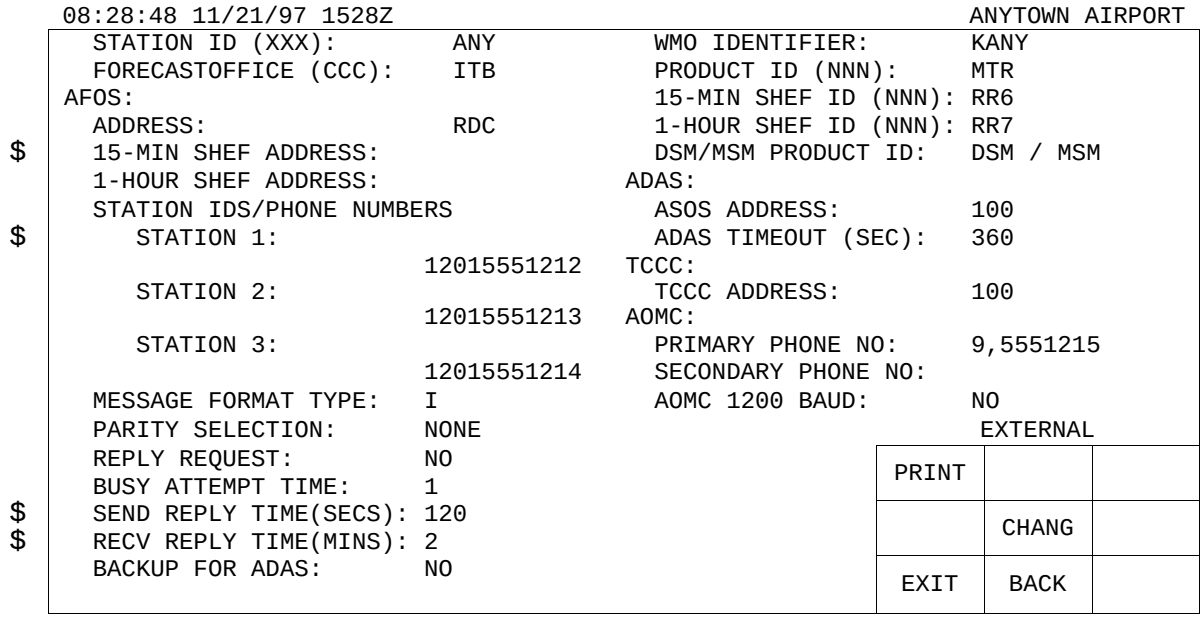


Figure 1.3.47. External Communications Screen

1.3.17 **SITE SCREENS**

In addition to the site configuration screens, the technician can access the five other types of site screens. The technician has the capability to review the site specific information on the physicals (PHYS), version (VERSN), normals (NORML), pressure (PRESS), and criteria (CRIT) screens. These site specific screens are described in the following paragraphs.

1.3.17.1 **Site Physical Screen**. The site physical screen (Figure 1.3.48) provides access to the site specific physical characteristics. In addition, the report time, edit time, transmit time, and SHEF transmit times are provided. Only the system manager and technician can make changes to this screen. Only the system manager can make changes to the "COMMISSIONED:" field.

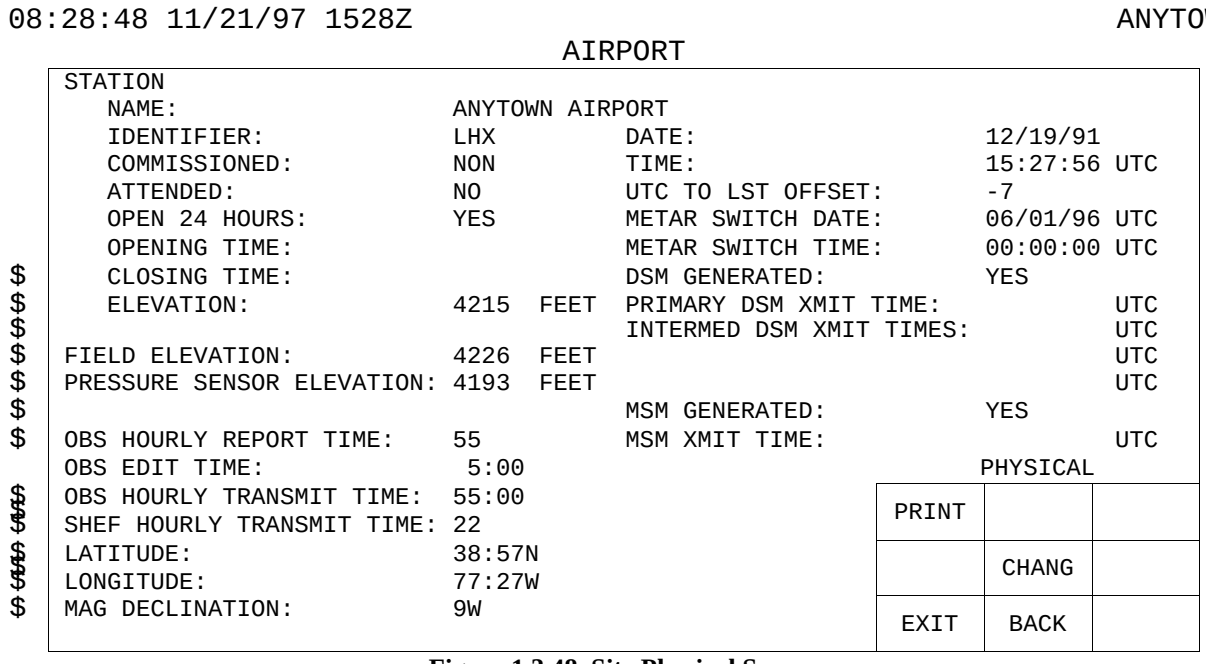


Figure 1.3.48. Site Physical Screen

1.3.17.2 **Site Version Screen**. The site version screen (Figure 1.3.49) provides access to software version (SW), sensor firmware version (SENSR), and AOMC communications (AOMC) information. The SW screen (Figure 1.3.50) provides the current versions of software being used in the ASOS at the site. These fields are automatically updated by the system. The sensor firmware version screen (Figure 1.3.51) provides an indication of the version of sensor firmware being used in the ASOS. An identifier consisting of up to seven characters is provided for each sensor. This identifier can be changed by pressing the CHANG key. The AOMC screen (Figure 1.3.52) provides access to AOMC communications information, consisting of upload/download statuses and dates. During system operation, all changes made to the site specific screens are put in files to be routed to the AOMC for recording purposes. When a file is pending, an upload request is displayed in the STATUS field. The technician or system manager can manually upload or download this information if desired. Records of system changes can be obtained from the AOMC. By using the PREV/NEXT keys, the user can select a desired field. Then, using the UP-LD key, the user can cause an upload of status data (transmit to the AOMC). Using the DN-LD key, the user can cause a download of status data (to the ASOS ACU). The CNCL key allows the user to cancel events that are not in progress on the current cursor line. Automatic events cannot be canceled. If an observer or air traffic controller is signed on to the system, downloads cannot be performed.

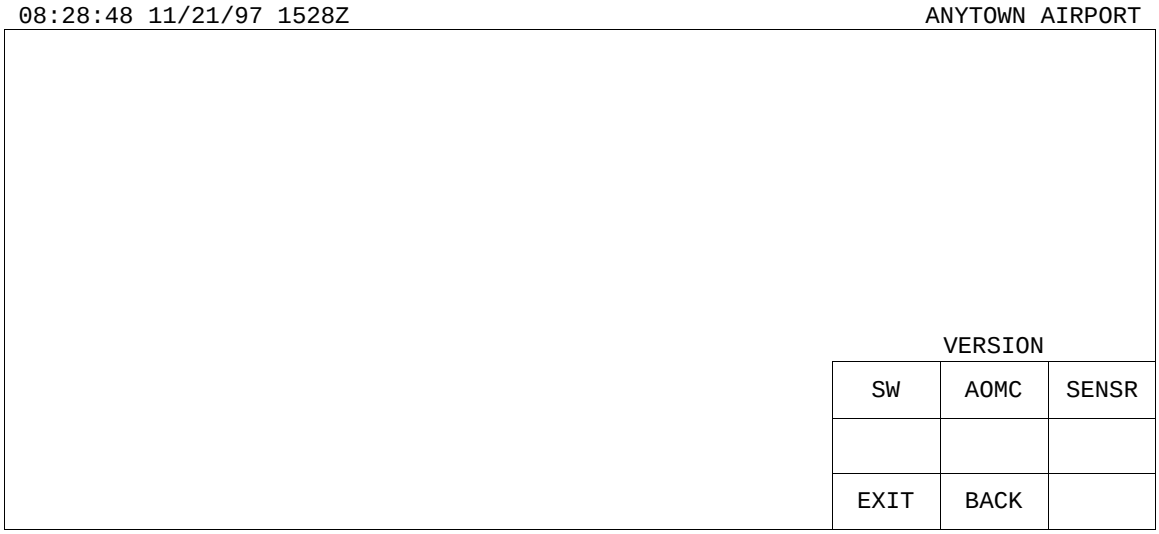


Figure 1.3.49. Site Version Screen

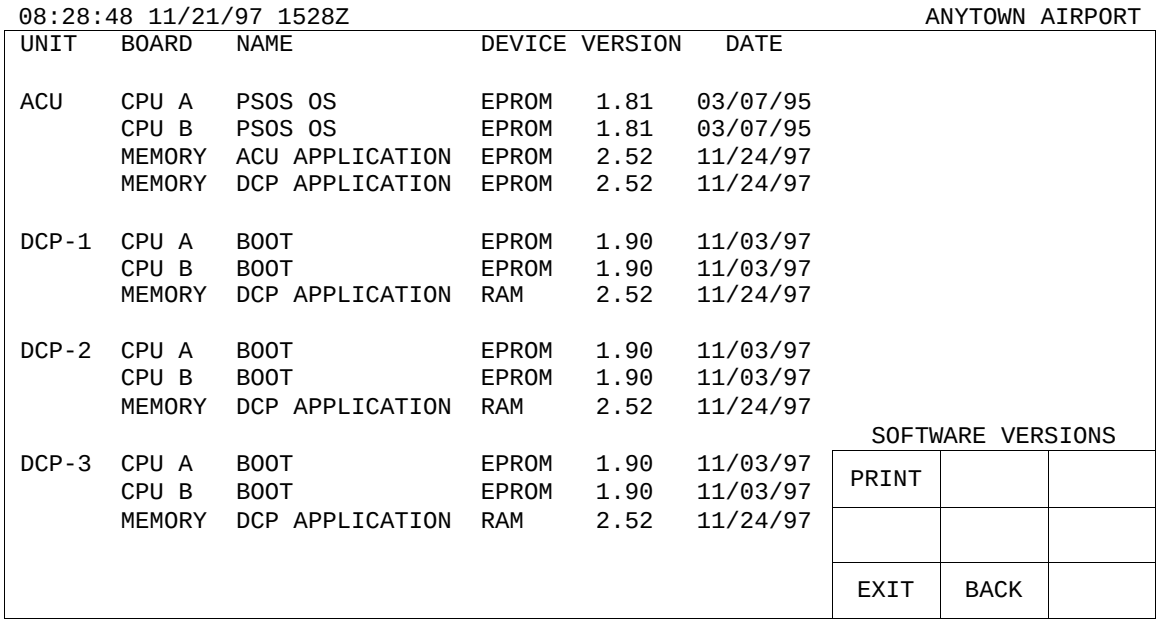


Figure 1.3.50. SW Screen

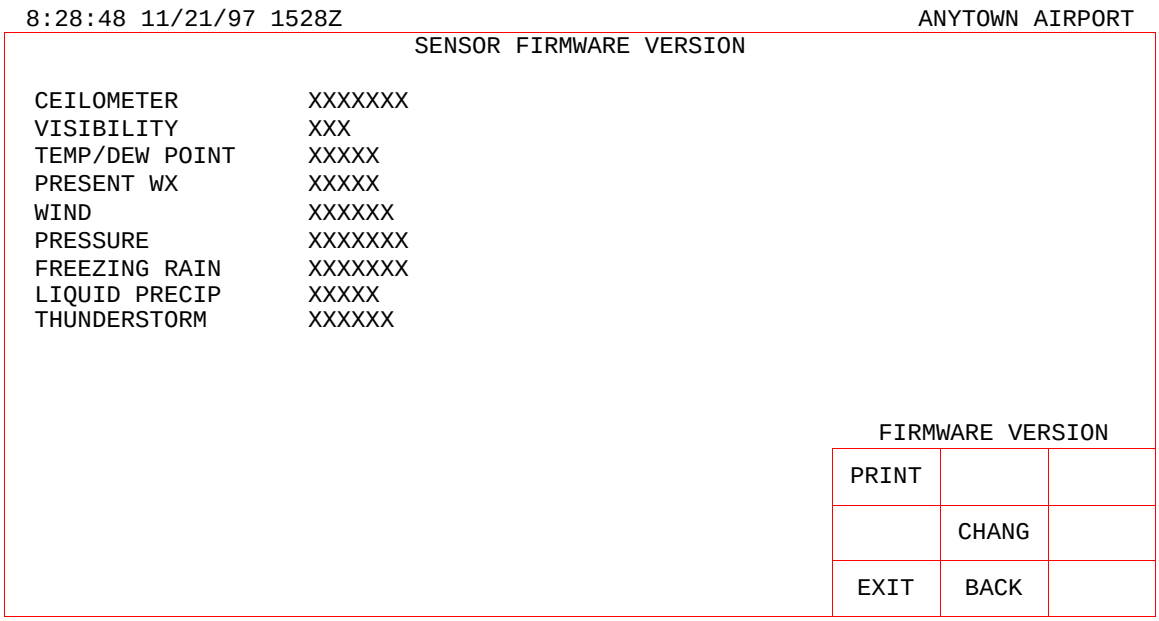


Figure 1.3.51. Sensor Firmware Version Screen

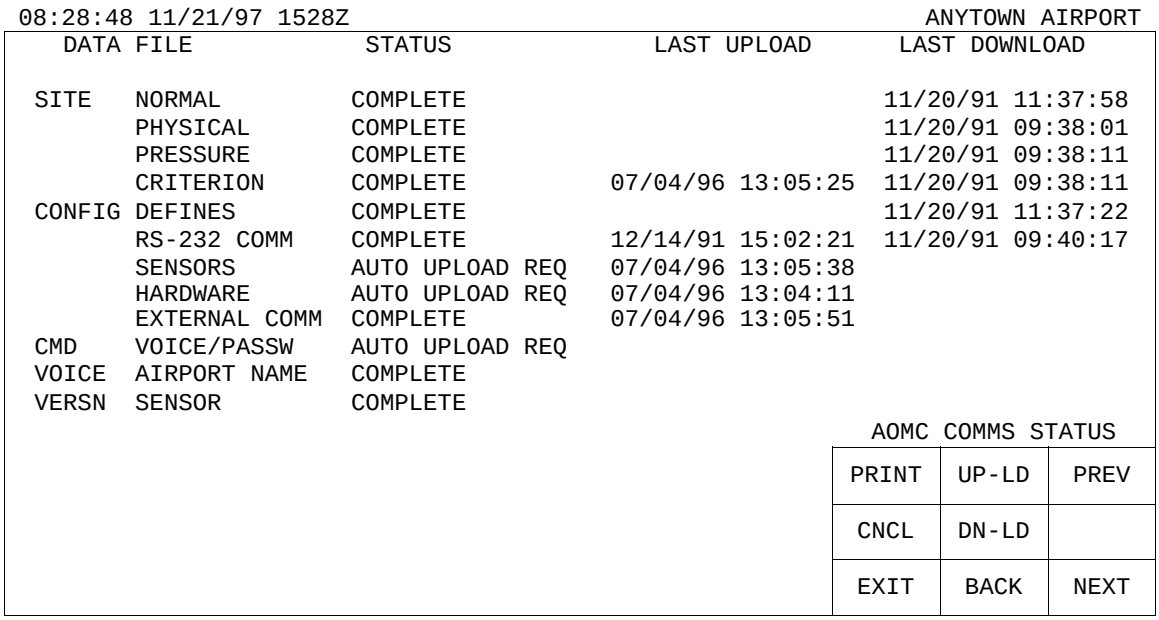


Figure 1.3.52. AOMC Screen

1.3.17.3 **Site Normals Screen**. The site normals screen (Figure 1.3.53) provides access to the site specific normals for various weather parameters. Site normal data for 12 months are stored. Only the system manager can make changes to this screen.

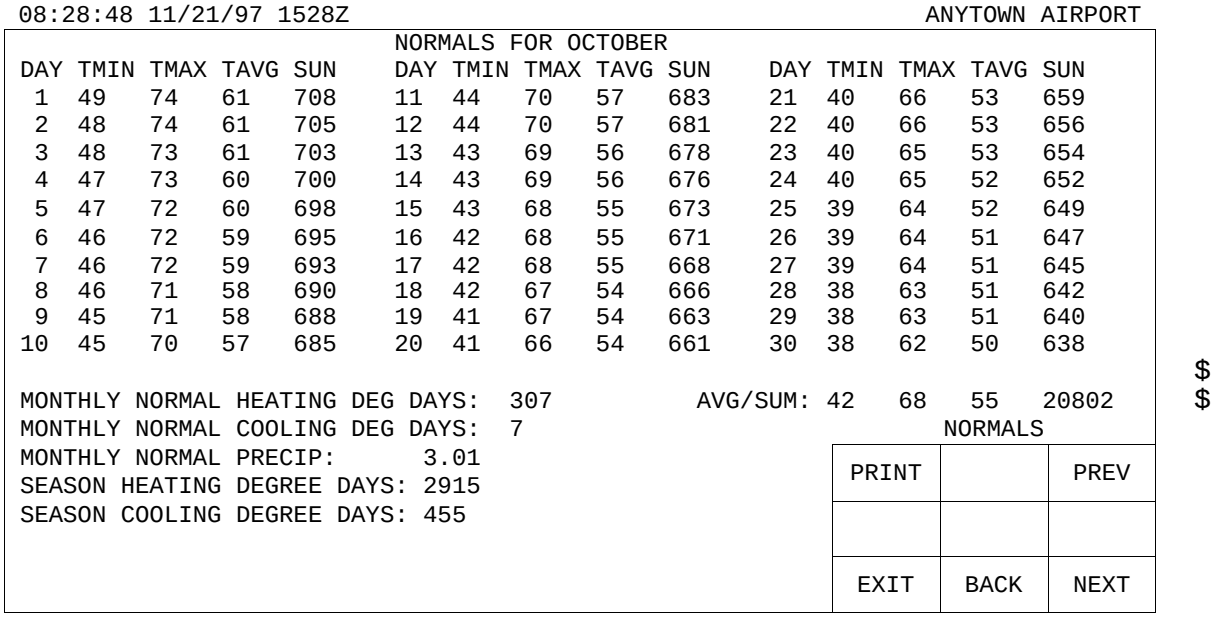


Figure 1.3.53. Site Normals Screen

1.3.17.4 **Site Pressure Screen**. The site pressure screen (Figure 1.3.54) provides access to the site specific pressure data. Only the system manager can make changes to this screen.

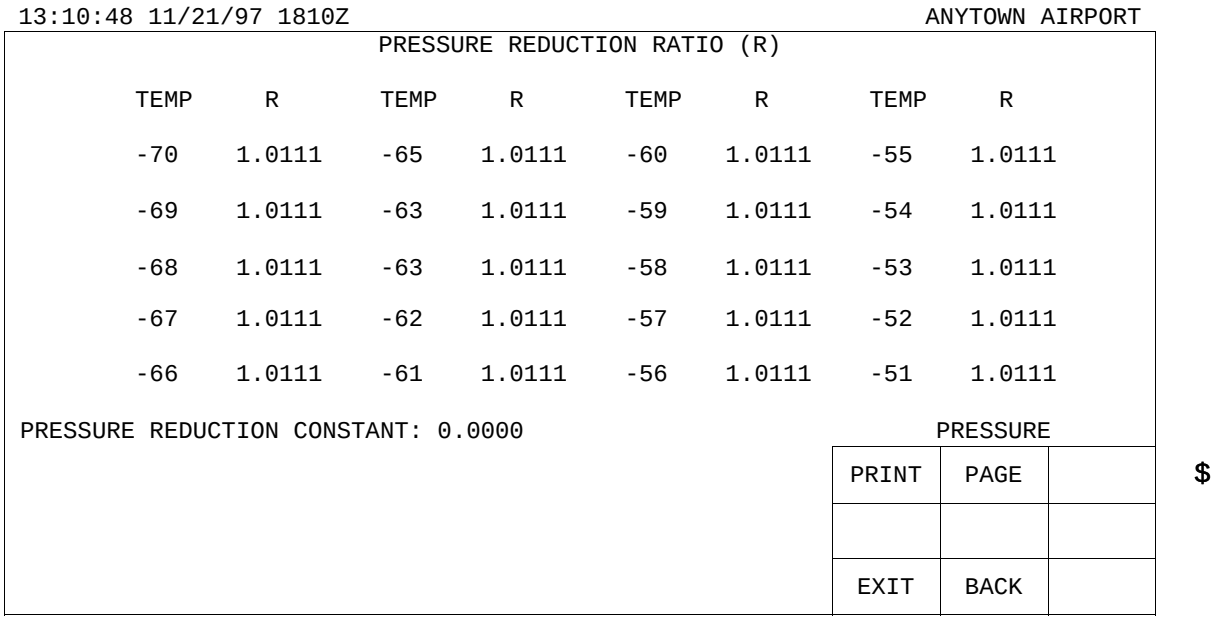


Figure 1.3.54. Site Pressure Screen

1.3.17.5 **Site Criteria Screen**. The site criteria screen (Figure 1.3.55) consists of three screens that define the conditions that cause automatic special alerts, local alerts, and SHEF alerts to be generated by the system. By using the PAGE key, the user can move between three screens in a circular fashion. Only the system manager can make changes to this screen.

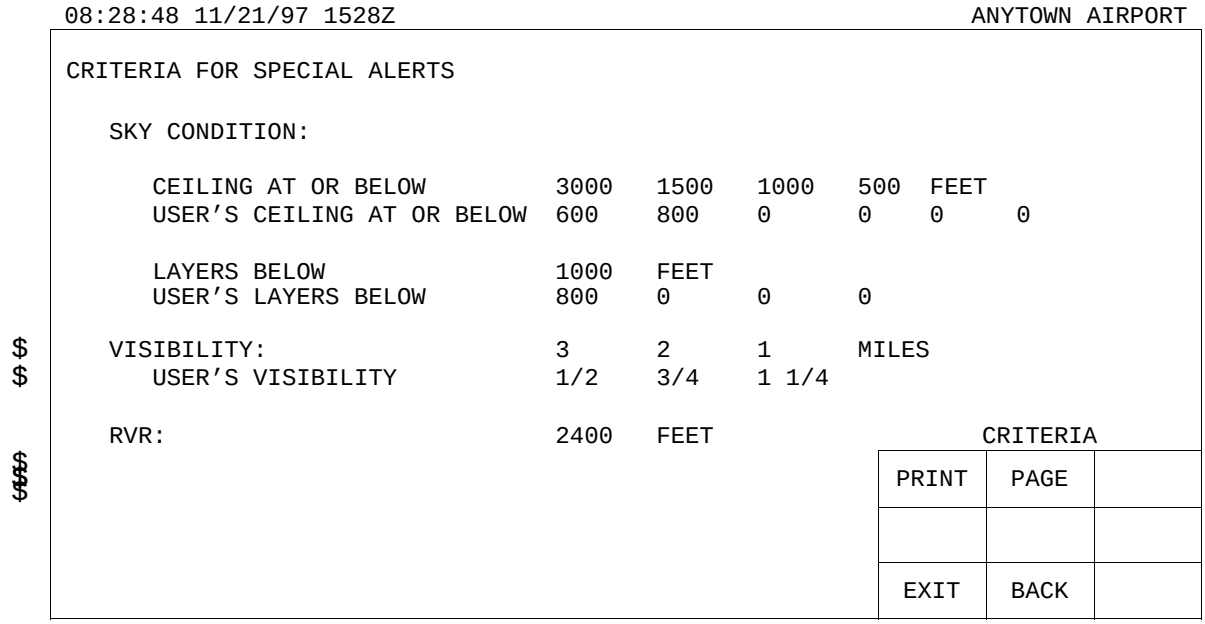


Figure 1.3.55. Site Criteria Screen (Sheet 1 of 3)

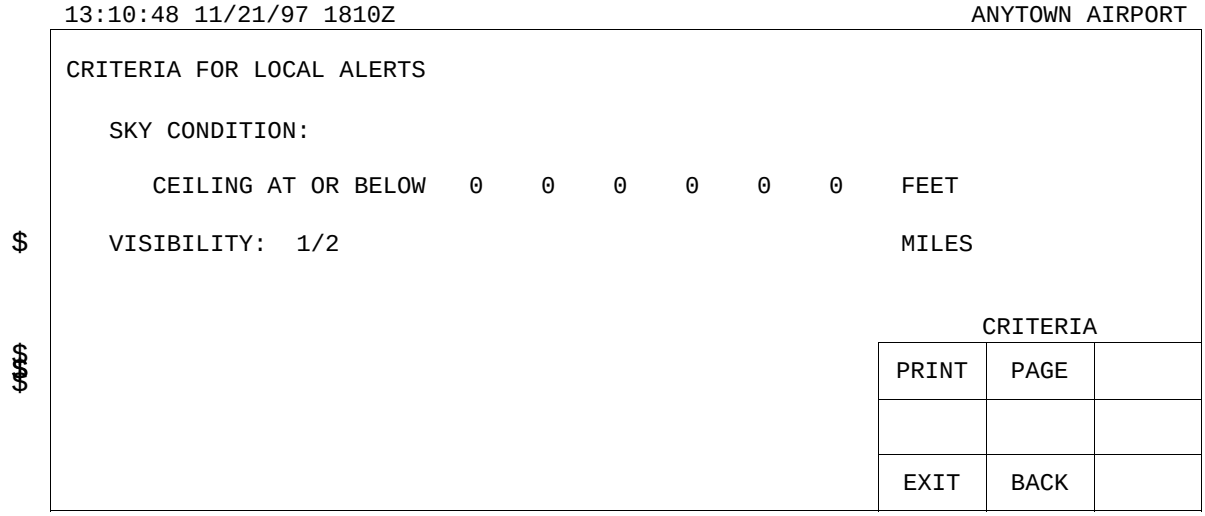


Figure 1.3.55 Site Criteria Screen (Sheet 2)

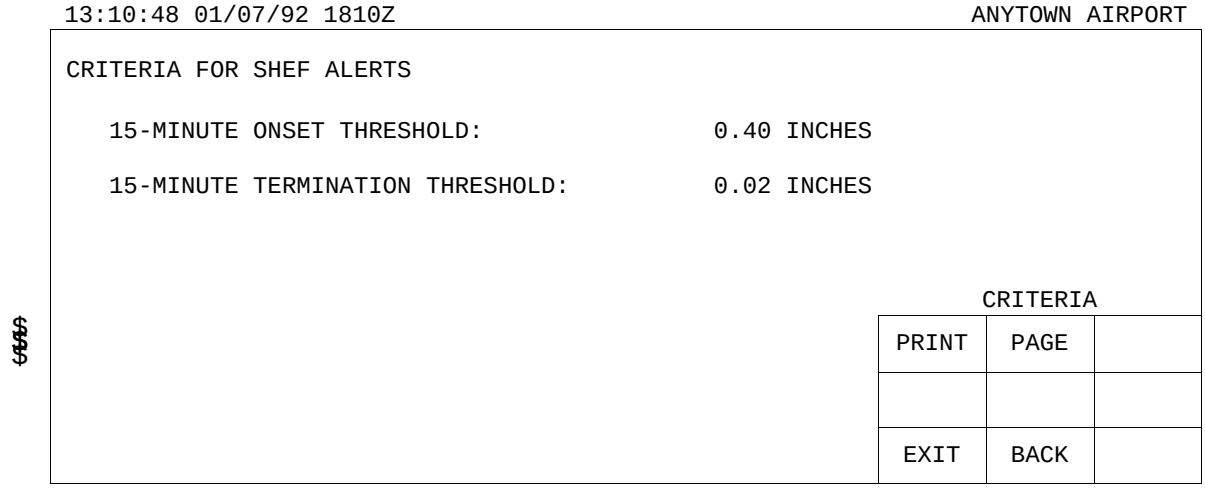


Figure 1.3.55. Site Criteria Screen (Sheet 3)