MicroLab®
OWNER'S MANUAL

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Chapter 1
INTRODUCTION

DESCRIPTION OF MICROLAB

Micro Audiometrics Corporation is dedicated to hearing health care through the manufacture of microprocessor ear testing instrumentation and data management systems. MicroLab has been carefully engineered to provide reliable manual and automatic pure tone audiometry. Data management, convenience, accuracy, and ease of use are also given a high priority since these more practical considerations weigh heavily in the effectiveness of hearing health care. Features found in MicroLab have taken many years of evolution to perfect and may be further improved by user suggestions. Please contact us if you have any questions or suggestions about our products.

MicroLab is a compact audiometer capable of manual and/or computerized automatic testing. Up to 150 audiograms may be collected and stored in the instrument's battery backed-up buffer memory. The instrument design integrates a multipurpose keypad, an alphanumeric/graphics liquid crystal display (LCD), earphones, response button, and a serial interface into a compact audiometer controlled by an on-board microprocessor. Optional talk-over circuitry allows the audiometer to be used for sound-treated room applications. The instrument can display results immediately on the screen, print hard copy reports to a separate printer, or transfer test results directly to a host computer for database management.

This manual uses the following notations to illustrate user interaction with the MicroLab.

> **KEY ENTRIES** appear in < > ; e.g., **<END>**.

> **MULTIPLE ENTRIES** must be entered in the order shown; i.e., **<4> <Y$_R$>** means press **<4>**, then press **<Y$_R$>**.

> **LCD DISPLAY MESSAGES** appear in the manual as shown:

```
+-----------------+
|     MICRO       |
|  AUDIOMETRICS   |
|     EM###       |
+-----------------+
```

Chapter 2
INSTALLATION

This chapter describes how to set up MicroLab, what happens after turning on the power, and how to prepare MicroLab for testing.

CONNECTIONS

Connect the headphones to the jack labeled **PHONE** and the patient response button to the jack labeled **BUTTON** on the side panel on the MicroLab.

Reports are transmitted from the instrument through a 5-pin DIN connector mounted near the rear of the instrument. Either a MicroLab compatible printer or a host computer (IBM-PC compatible) with data acquisition software (contact factory for details) may be attached to the MicroLab via this connector. Refer to the next section on GETTING READY TO TEST for instructions on how to output data to a printer or to an external computer.

Connect the female end of the power cord to the plug located on the rear of MicroLab, and the male end of the power cord to a properly grounded outlet which supplies the voltage specified on the serial number tag on the bottom of the instrument. Switch power on by pressing the side of the rocker arm labeled (|) on the switch located on the left rear panel of the unit.

GETTING READY TO TEST

The screen will display the message below for approximately two seconds while power-on diagnostics take place.

```
    MICRO
AUDIOMETRICS
    EM###
```

MicroLab then displays the Main Menu-1 screen. Repeated presses of **<DISP>** will cause the display to scroll through the other Main Menu screens:

```
1-MANUAL AUD      4-NEW    TEST     7-PRINT   TEST     0-SPECIAL MENU
2-AUTO.  AUD      5-RECALL TEST     8-SEND    TEST     (Special oper.
3-PATIENT  ID     6-SAVE   TEST     9-SET OPTIONS       & functions)
 <DISP>-More       <DISP>-More       <DISP>-More       <END>-EXIT
```
Main menu -1   **Main menu - 2**   **Main Menu - 3**   **Main Menu - 4**

The function performed by each of these commands will be presented briefly here, and in more detail in the subsequent sections dealing with the operation of the instrument.

<1>   **MANUAL AUD** - This command prepares the instrument for use as a manually-operated audiometer.

<2>   **AUTO AUD** - This command prepares the instrument for use as an automatic audiometer. Selection of this option begins immediate presentation of test signals, and monitoring of subject response via the response button.

<3>   **PATIENT ID** - This command will prompt the operator to enter the patient identification code (up to 9 numeric characters). Note: If "Verify ID" option was installed at the factory, the MicroLab will require that a patient ID be entered prior to entering either manual or automatic audiometric test mode and when NEW TEST is selected.

<4>   **NEW TEST** - This command clears current test data and prepares the instrument for a new test sequence. Since NEW TEST deletes the current test data, you will be prompted to verify the command by entering a yes **<Y>** to continue or no **<N>** to abort the operation. You will then be prompted to enter a patient ID before the new test begins.

<5>   **RECALL TEST** - This command allows for recollection of stored audiograms to active status for viewing, printing, or transmission to a host computer. You may select the test to load by entering **<1>** to select the first test, **<2>** to select the last test, **<3>** to enter the patient ID number of the desired test, or **<4>** or **<6>** to scroll forward or backward, respectively, through the buffer of tests.

<6>   **SAVE TEST** - This command will save the contents of current test memory to buffer memory. If the patient ID number has not been entered, the test will not be saved and the operator will be prompted to enter an ID number. If the test is saved, the total number of saved tests will be displayed. Up to 150 tests may be saved.

<7>   **PRINT TEST** - This command will output the current test to a printer. If no patient ID number has been entered, an underlined space will be printed.   If no printer is connected to the MicroLab, a **"NOT CONNECTED, Press <END>"** message will be displayed on the screen. The operator must then press **<END>** to return to the menu.

<8>   **SEND TEST** - This command will output the current test to an external computer over the serial interface. The device must be connected to the host computer's serial port. If no patient ID number has been entered, an underlined space will be sent.

<9>   SET OPTIONS - This command will display the following sub-menu:

```
┌─────────────────────────┐
│   Select Options        │
│   2 - AUD OPTS          │
│   7 - PRINT OPTS        │
│   <END>  -  EXIT         │
└─────────────────────────┘
```

These sub-menu options have the following effects:

<2>   AUD OPTS   - This option allows the operator to toggle:
    <1>   - the default audiometric test mode from "M" (manual) to "A" (automatic) testing. (Default operates when NEW TEST **<4>** is selected.)
    <2>   - the stimulus tone type from "C" (continuous) to "P" (3-tone pulsed) for manual audiometry.
    <3>   - the inclusion of the "Validity Error Test" with "Y"es or "N"o. By using the "Validity Error Test," 1 K Hz is tested twice. If both thresholds differ 10 dB or greater, a **"VALIDITY ERROR"** message will be displayed.
    <END>   - to exit from AUD OPTS menu back to the MAIN menu.

<7>   PRINT OPTS - This command allows the operator to toggle:
    <1>   - the data format for the printer from "D" (data) to "G" (graphic).
    <2>   - the form feed option from "M" (manual) to "A" (automatic).
    <END>   - to exit from PRINT OPTS menu back to the MAIN menu.
    <ENTER>   - to exit from PRINT OPTS menu back to the SELECT OPTIONS menu.

<END>   EXIT - to exit from SELECT OPTIONS menu back to the MAIN menu.

<0>   SPECIAL MENU - this command will display the following sub-menu:

```
┌─────────────────────────┐
│      -Special Menu-     │
│   1 - CAL    2 - OP ID   │
│   4 - EDIT   5 - CLEAR   │
│   7 - PRNB   8 - SENDB   │
└─────────────────────────┘
```

These sub-menu options have the following effects:

<1>   CAL - This option is for factory or qualified dealer use only.

<2>   OP ID - This option allows entry of a 2-digit operator ID number.

<4>   EDIT - This command is for factory or qualified dealer use only. It allows editing of certain default MicroLab operation constants. If modifications of default characteristics are required, contact Micro Audiometrics for information on available options and how they are selected.

<5>   CLEAR - This command will CLEAR the data storage buffer, deleting all stored tests from buffer memory! Due to the nature of this command, the

operator must respond **<Y>** (yes) twice in a row to a warning entry. If **<N>** (no) is entered to either query, the command will not be executed.

<7>   **PRNB** - This command will output the entire contents of the data buffer to the printer. If no printer is connected, the **"SERIAL TIMEOUT"** message will be displayed.

<8>   **SENDB** - This command will output the entire contents of the data buffer to the host computer (optional data acquisition software is required). If no computer is connected, the **"NOT CONNECTED, Press <END>"** message will be displayed.

CALIBRATION

MicroLab is a very stable instrument utilizing digital calibration techniques. There are no analog adjustments; all circuits are calibrated using data stored in permanent memory to assure long term stability.

Stimulus frequencies are quartz crystal-controlled and never need adjustment.

Sound pressure level of the stimulus does require annual calibration check by the factory or a service-qualified dealer due to change that can occur from transducer aging, damage, etc.

Chapter 3
AUDIOMETER

PROGRAMMING AUDIOMETER TEST PARAMETERS
(EM Series EPROMS only)

MicroLab's audiometer can be programmed to allow the user to:
      a) include only those frequencies desired in the test protocol,
      b) select the starting frequency in the test protocol, and
      c) set the minimum and maximum stimulus level to be tested.

NOTE: The frequencies programmed will be in effect for both automatic and manual audiometry. However, in the manual audiometry mode the full stimulus level range, 0 dB HL to 90 dB HL (except 250 Hz and 8K Hz to 70 dB HL), will still be in effect for all frequencies.

Accessing the Audiometer Programming Mode
NOTE: Entering the Audiometer Programming Mode automatically clears any thresholds previously tested.

The Audiometer Programming Mode can be accessed from either the Main Menu or from the Manual Audiometry mode:

From the Main Menu: Press & hold **<1>** - Manual Aud, or **<2>** - Auto Aud.

From the Manual Audiometry Mode: Press & hold **<DISP>**. An audible alert signal will sound and the LCD will respond with:

```
┌─────────────────────┐
│    AUDIOMETER       │
│  SET-UP MODE:       │
│  Press <DISP>       │
│  to scroll menu     │
└─────────────────────┘
```

There are 4 screens displayed in the programming mode. The 1st screen shows the keys used for programming:

```
┌─────────────────────┐
│  <Y> - ADD          │
│  <N> - REMOVE       │
│ <END> - EXIT        │
│ <DISP>   (more)     │
└─────────────────────┘
```

      <Y>   - Add selected frequency to test protocol.
      <N>   - Remove selected frequency from test protocol.
    <END>   - Exit programming mode.
    <DISP>   - Display next screen.
      <5>   - Set selected frequency as start frequency in test protocol.

The next 2 screens show the frequencies available and the status of each:

```
┌─────────────────────────┐
│ <←  →>-SEL FREQ         │
│  _↓                     │
│  250  1KP  500  1K      │
│   *    *    *    *      │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│ <←  →>-SEL FREQ         │
│    ↓                    │
│  2K  3K  4K  6K  8K     │
│  *   *   *   *   *      │
└─────────────────────────┘
```

Select frequency with <←> and <→> keys.
↓ - pointer to selected frequency
– - indicator for 'Start' frequency.
∗ - indicates frequencies included in test protocol

The 4th screen shows the stimulus level range for automatic audiometry:

```
┌─────────────────────────┐
│ STIMULUS RANGE          │
│                         │
│ <←>    <→>   ↑↓         │
│ M I N / M A X   20/30   │
└─────────────────────────┘
```
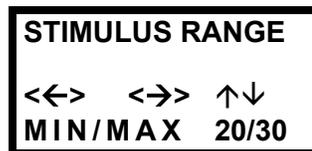
↑ ↓ - Indicator for stimulus range selected, minimum or maximum.

Press <←> to select the 'minimum stimulus range' position on the screen. Set the desired minimum dB level by pressing the <↑> and <↓> keys.

Press <→> to select the 'maximum stimulus range' position on the screen. Set the desired maximum dB level by pressing the <↑> and <↓> keys

Press **<DISP>** to cycle to the 1st screen, or press **<END>** to exit the programming mode and save parameters.

NOTE: The dB level for the 'minimum stimulus range' can not be set higher than the dB level for the 'maximum stimulus range'. Conversely, the dB level for the 'maximum stimulus range' can not be set lower than the dB level for the 'minimum stimulus range'. Example: If the dB level for the 'maximum stimulus range' is set to 50 dB HL, then the dB level for the 'minimum stimulus range' can not be set higher than 50 dB HL.

OPERATION

MicroLab performs the same functions as a conventional pure tone air-conduction audiometer, but is controlled by pressing keys instead of turning knobs. It is capable of both manual and automatic testing. A test mode is selected from the Main Menu by pressing **<1>** for manual audiometery or **<2>** for automatic audiometry. From the manual mode the operator may begin automatic testing by pressing **<END> <2>**. Automatic testing can be stopped by pressing **<END>** which causes the audiometer to enter the -AUTO AUD- menu. The operator may then press **<DISP>** to view thresholds already acquired (any key returns to -AUTO AUD- menu). You may also resume testing **<ENTER>**, exit audiometry **<END>**, or, if the optional talk-over option is installed, begin talk-over mode **<0>**. Data stored during testing will not be lost by switching back and forth between manual and automatic test modes. The audiometer will test at each of the selected frequencies from 250 to 8K Hz, with a range from 0 to 90 dB HL (except 250 and 8K to 70 dB). It will store thresholds and status codes for each frequency for both ears. Audiometric results may be examined on the instrument's display, output to a printer, or transmitted to an external computer for data base management (optional software is required; contact factory for details).

TESTING PROCEDURE

1.   For manual audiometry, instruct the patient to raise his/her hand or press the patient response button (if available) whenever a tone is heard. When the patient response button is pressed, an asterisk (*) will be displayed on the LCD. For automatic audiometry, instruct the patient to press the patient response button whenever the tone is heard.

2.   Position headphones over the patient's ears.

3.   Press **<1>** to select Manual or **<2>** to select Automatic Audiometry.

4.   Conduct the test by following the procedures described in the section on OPERATION.

5.   To view thresholds from manual audiometry, press **<DISP>**. To view thresholds from automatic audiometry, press **<END> <DISP>**. Once in display mode, further presses of **<DISP>** toggle between low frequency and high frequency thresholds. Retest any results in question.

6.   Save audiometric results by following the procedure in SAVING TESTS.

7.   Print data and/or transmit data to an external computer for database management by following the procedure in REPORTS.

CONTROL PANEL DISPLAY

The display shows the operator selections during the course of audiometric testing or a detailed review of stored data.

```
R                        M
Freq.   =      1000 Hz
Level   =        25 dB
          UNTESTED
```

The first line displays the ear and testing mode selected.

      R = Right Ear   **L** = Left Ear
      M = Manual Audiometry Mode   **A** = Automatic Audiometry Mode

The second line displays the frequency selected.

      Sequence 250, 1K, 500, 1K, 2K, 3K, 4K, 6K, and 8K Hz.
      <6>   Moves selection right in the sequence.
      <4>   Moves selection left in the sequence.

The third line displays the hearing level in decibels (dB HL) and is calibrated to comply with ANSI S3.6-1996.

      <2>   Increases level by 5 dB.
      <8>   Decreases level by 5 dB or 10 dB (see page 5, SET OPTIONS).

The fourth line displays a message indicating the status of the test. In this example the frequency has not been tested. Listed below are possible messages and their indications.

Possible message:	Indication:
UNTESTED	The frequency for the ear shown has not been tested, nor stored in current test memory.
-ON-	A tone is being presented at the specified frequency and level.
NO RESPONSE	No response was obtained at the maximum output level.
BUTTON DOWN	An automatic test has been terminated because the patient response button was held down.
FALSE RESPONSE	An automatic test has been terminated because the patient response button was randomly pressed twice outside of the response window.
NOT CONSISTENT	18 tone presentations have not detected two consistent thresholds.

MANUAL AUDIOMETRY

INITIATE TESTING - It is recommended that the operator clear previous test results before entering manual audiometry. To clear a test press **<4>** (NEW TEST) and respond to the prompts. If manual mode was chosen in "AUD OPTS" (see page 5, SET OPTIONS), the audiometer control panel display will appear and the operator may begin manual testing. If the automatic mode was chosen in "AUD OPTS" it will be necessary to exit automatic audiometry by pressing **<END>**, **<END>,** and **<1>** for manual audiometry, or change the option in "AUD OPTS" to manual audiometry (see page 5, SET OPTIONS).

FREQUENCY SELECT - The **<4>** and **<6>** keys are used to scroll through the audiometric test frequency sequence: 250, 1K, 500, 1K, 2K, 3K, 4K, 6K, and 8K Hz. The **<4>** key moves left and the **<6>** key moves right in the sequence.

Note: The sequence ...1K, 500, 1K... is part of the automatic audiometry test-retest protocol and therefore appears in the manual mode as well.

LEVEL SELECT - The **<2>** and **<8>** keys are used to increase and decrease level by +5 and -5 or -10 dB, respectively (other options are available, contact factory for information). If you attempt to increment level beyond the maximum level, **"NO RESPONSE"** will be displayed.

EAR SELECT - The test ear is selected by pressing **<Y$_R$>** for the right ear or **<N$_L$>** for the left ear.

DETERMINING THRESHOLD - The **<5>** key presents a 3-tone pulsed stimulus when it is pressed if you are using pulsed (P) mode, or presents the tone for the duration it is pressed if you have selected the continuous tone option (C) (see page 5, SET OPTIONS). It also stores the current signal level in current test memory and erases the previous entry at that frequency. Thus, threshold is taken as the last stimulus level tested before moving to a new frequency or exiting the test. If the test signal is incremented beyond the maximum level (90 dB), a **"NO RESPONSE"** message appears in the status area and **"NR"** (no response) is entered into the current test for that signal. The **<?>** key may be used to clear a threshold (the **"UNTESTED"** message will appear in the status area). This may be useful for reviewing and clearing questionable thresholds obtained in automatic test mode. The threshold may then be retested or left marked "untested."

TALK-OVER MODE - If the optional talk-over mode is installed, it may be entered at any time during testing by pressing **<0>**. Use the **<4>** or **<8>** key to decrease talk-over level or the **<2>** or **<6>** key to increase the talk-over level. Press the **<0>** or **<END>** key to exit talk-over mode and return to manual audiometry.

EXIT - Press **<END>** to exit manual audiometry mode and return to the main menu.

AUTOMATIC AUDIOMETRY

INITIATE TESTING - It is recommended that the operator clear previous test results before entering automatic audiometry. To clear a test press **<4>** (NEW TEST) and respond to the prompts. If automatic mode was chosen in "AUD OPTS" (see page 5, SET OPTIONS), an automatic audiometry test will begin. If the manual mode was chosen in

"AUD OPTS" it will be necessary to exit manual audiometry by pressing **<END>**, and **<2>** for automatic audiometry, or change the option in "AUD OPTS" to automatic audiometry (see page 5, SET OPTIONS).

INTERRUPT TEST - Press **<END>** to stop the automatic test and wait for the next tone presentation for the audiometer to display the "- AUTO AUD -" menu. You may then press **<DISP>** to view thresholds, **<0>** to enter talk-over mode (if installed), **<ENTER>** to resume test, or **<END>** to exit to the main menu. You may then re-instruct the patient, resume testing in the manual mode (**<1>**), display audiometric results (**<1> <DISP>**), or restart the automatic test sequence (**<2>**) as desired.

TALK-OVER MODE - If the optional talk-over mode is installed, press **<4>** or **<8>** to decrease talk-over level or **<2>** or **<6>** to increase the talk-over level. Press **<0>** or **<END>** to exit the talk-over mode to the "- AUTO AUD -" menu. Press **<ENTER>** to resume the test or **<END>** to exit to the Main Menu.

ABORT/RESTART - Holding the patient response button down immediately prior to a tone presentation will increment a "false response" count. If the button is still held after the "response window," the error message **"BUTTON HELD"** will take precedence. If the button is pressed, but not held, outside of the "patient response window" twice during a given signal presentation, the **"FALSE RESPONSE"** error message will be displayed. Pressing the **<END>** or **<ENTER>** key will clear error messages and leave the frequency untested. An abort also will occur when 18 tone presentations have not resulted in a threshold (automatic mode only). The test will stop, a **"NOT CONSISTENT"** message will be displayed on the screen, and an audible alert signal will sound. Press any key, and the instrument will enter the "-AUTO AUD-" menu. You may then wish to re-instruct the patient (press **<0>** to enter the optional talk-over mode, if installed). Press **<END>** to exit the current test and return to the main menu, or **<ENTER>** to continue testing. If the test is ended, you may review the current test status. Press **<1>** to enter manual audiometry mode, then press **<DISP>** to enter/toggle display mode. Manipulating the **<4>/<6>** and **<Y$_R$>/<N$_L$>** keys will cycle through each frequency and each ear. Press **<END> <2>** to restart the automatic test. The sequence will restart but will skip any frequency already tested.

RETESTING THRESHOLDS

If thresholds that have already been determined appear to be suspect, they can be easily retested. Simply select manual audiometry **<1>** from the Main Menu, scroll to the suspect frequency and ear by using the **<Y$_R$>/<N$_L$>** and **<4>/<6>** keys, and clear the old threshold value by pressing **<?>**. Repeat this procedure for each questionable threshold. You may then determine the new thresholds using either manual or automatic testing. In automatic audiometry, only those thresholds which have been cleared will be retested.

DISPLAYING AUDIOGRAMS

Press **<DISP>** when in the manual audiometry mode or in the -AUTO AUD- menu to view the first set of thresholds. Subsequent presses of **<DISP>** will toggle display between low and high frequency thresholds.

	1KP	.5	1K	2K
RT	10	05	10	15
LT	05	00	05	15

	3K	4K	6K	8K
RT	40	65	NR	NR
LT	25	50	55	65

In addition to this display you may also review both thresholds and status messages by manipulating the frequency-select keys (**<4>**/**<6>**) while in manual audiometry mode. This method is required to view the 250 Hz threshold.

SAVING TESTS

Audiometric test results are saved to buffer memory by returning to the Main Menu and pressing **<6>** (SAVE TEST). If the patient ID number has not been entered, you will be prompted to enter a number. When the test is saved, the total number of saved tests will be displayed, so you know how much room is left in the buffer.

RECALLING TESTS

Audiograms stored in the buffer may be recalled for viewing, printing, or transmission to a host computer. From the Main Menu, press **<5>** (RECALL TEST). Select the test to load by entering **<1>** to select the first test, **<2>** to select the last test, **<3>** to enter the patient ID number of the test to be found, or **<4>** or **<6>** to select the previous or next test, respectively. Once the test has been recalled, press **<DISP>** to toggle the display between low and high frequency thresholds. Press **<END>** to exit to Main Menu. The recalled test remains in current test memory.

SENDING TESTS

This feature allows a single test **<8>** or the entire data buffer **<0> <8> <Y>** to be transmitted to an external computer for display, storage, or database management. Software for these purposes is available from Micro Audiometrics for IBM-PC compatible computers. Please contact the factory for further details.

SCALE OF HEARING LOSS

Reporting the degree of hearing loss is somewhat subjective in that not all hearing tests are conducted in the same manner. Test results vary from person to person depending on ambient noise levels present while testing. If testing conditions are optimal, the following scale may be helpful in understanding or reporting results.

Lowest Level Heard Within	Indication
0 dB - 20 dB	Hearing within normal limits
25 dB - 40 dB	Slight to mild hearing loss
45 dB - 55 dB	Moderate hearing loss
60 dB - 70 dB	Moderately severe hearing loss
75 dB - 90 dB	Severe hearing loss
90 dB +	Profound hearing loss

Chapter 4
REPORTS

MicroLab is well suited for record keeping and report generation. Audiometric data for up to 150 individual tests may be stored in its buffer memory and easily recalled for review on the instrument's display screen. When a permanent record of a test is required, MicroLab can output a report to either a printer or a host computer. The printer report will contain a header (optional), MicroLab serial number, calibration date code, patient ID number, test date, operator ID number, and right and left audiometric thresholds. If raw data is sent to an external computer it may be processed by optional database management software (contact factory for availability) for detailed analysis and record comparisons.

LOADING INFORMATION

Audiometric data loaded to current test memory during testing remains there until another test is run, a NEW TEST (**<4>**) command is performed, or the power is interrupted. User-entered data is entered through the keypad and a patient ID number must be re-entered after the **NEW TEST** command. Operator ID remains in current test memory until cleared. Permanent data is entered at the factory and remains there until the instrument is recalibrated. Date and time of test is retrieved from the MicroLab's real-time clock and need not be entered by the operator.

USER-ENTERED NUMBERS - Patient ID and Operator ID numbers are entered using the keypad. Both numbers must be entered or "blanked" (by pressing **<END>** or **<ENTER>** without a number) before data can be output to a printer or external computer (see PRINT TEST, SEND TEST, PRNB, SENDB). An ID must be entered (not blanked) before the test can be saved. In addition, if the "Verify ID" option was installed at the factory, the patient ID must be entered before testing can begin. Keys **<0>** through **<9>** are used for entry of the ID numbers, followed by **<END>** or **<ENTER>**.

To ENTER a number, from the Main Menu press:
　　　　<3>　　　　for entry of patient or record identification number.
　　　　<0> <2>　　for entry of operator identification number.

Patient ID numbers are limited to 9 characters, and operator ID numbers are limited to 2 characters. The screen will display:

```
PATIENT ID:                          OPERATOR ID:
ENTER-                               ENTER-
```

Key in the desired number and press **<END>** or **<ENTER>**, or simply press **<END>** or **<ENTER>** to "blank" the entry. If a "blank" is entered, it must be cleared as if it were a number whenever an actual number is to be entered at a later time. If a number has been previously entered, it may be changed by pressing **<?>**, then the new number. To leave the current number unchanged, simply press **<END>** or **<ENTER>**.

To clear an error when entering an ID number, press **<?>** and re-enter the entire ID number. MicroLab cannot erase partial numbers. If an ID number was "blanked" by pressing **<END>** or **<ENTER>** without entering numbers, the display will appear without the "ENTER-" prompt:

```
┌──────────────────────────┐
│ PATIENT ID:              │
│                          │
│                          │
│                          │
└──────────────────────────┘
```

Indicates a "blank" was entered.

Press **<?>** to display the "ENTER-" prompt and enter the number as described above.

HARD COPY REPORTS

MicroLab can be connected to a compatible printer (contact factory for details) for printed reports. Connect the printer as shown in Chapter 2, Connections. Load the MicroLab with as much information as desired and press **<7>** (single record output) or **<0> <7> <Y>** (entire buffer output). The characteristics of each type of report are described below.

SINGLE TEST REPORT - If **<7>** is pressed, the hard copy report will contain the header (optional), MicroLab serial number, calibration date code, patient ID number, test date, operator ID number, and right and left audiometric thresholds.

GROUP REPORTS - This report repeats the single test report for each test stored in the instrument's buffer memory.

CLEARING TEST DATA BETWEEN PATIENTS

After testing is completed, the information should, if desired, be stored, printed and/or sent immediately to the host computer, prior to clearing current test memory by starting a new test. The current Operator ID number is retained for the new test. The MicroLab may also be prepared to test a new person without storing data by pressing **<4> <Y>** (NEW TEST, YES). You will be prompted to enter or "blank" the patient ID number before the new test begins. Manual or automatic audiometry will then begin depending on the mode chosen in "AUD OPTS" (see page 5, SET OPTIONS). It is not necessary to clear between each person tested when data is not saved, but it is recommended since it guarantees that no data from the previous person will appear in the new report and that you will not forget to enter a new ID number. Retesting will overwrite any old information.

ABBREVIATIONS AND DEFINITIONS

dB   **Decibel:**
The unit of measurement for intensity of pure tones.

HL   **Hearing Level:**
Refers to threshold value relative to accepted normative values for young, healthy adults (e.g., ANSI S3.6-1996).

Hz   **Hertz:**
A unit of measurement for frequency (number of cycles per second) of repetitive wave forms. For example, a 2000 Hz sine wave repeats its cycle 2000 times in each second.

LCD **Liquid Crystal Display:**
A low power graphics display which emits no light.

SERIAL INTERFACE DETAILS

Serial Interface Details

The serial interface connector on the instrument is a 5-pin DIN type with the following pin assignments:

Pin 1 - Not connected
Pin 2 - Ground
Pin 3 - Not connected
Pin 4 - Data In (Rx)
Pin 5 - Data Out (Tx)

Before the instrument will transmit data, it checks for a signal on its input line (pin 4). If this signal is not present, the message **"NOT CONNECTED"** will be displayed and no data will be sent.

Communications Protocol

Baud Rate:	9600 (Default. MicroLab can operate with any "standard" baud rate between 300 and 9600 baud. Contact factory for details.)
Data Bits:	8
Start Bit (s):	1
Stop Bit (s):	1
Parity:	None

SETTING/RESETTING DATE AND TIME

Set or Reset MicroLab date and time: from the Main Menu,

Press < **0** > for the Special Menu. Press and hold < **9** > ... an initial beep will sound. After a pause, a series of beeps will occur. Release the key after the 4th beep in this series.

The LCD will display the date presently set (day/mo/yr):

```
DATE:  11 / 07 / 93
       DD MM YY
<ENTER> -ACCEPT
 <END>  -ABORT
```

Enter a 2-digit number for the day, month, and year, respectively. Press < **?** > to clear the entry or correct errors. After pressing <**ENTER**> to accept the settings, the "Time" screen will be displayed:

```
TIME:   15 : 08 : 43
        HH MM SS
<ENTER> -ACCEPT
 <END>  -ABORT
```

The time is displayed in a 24-hour format. Enter a 2-digit number for the hours, minutes, and seconds, respectively. After pressing <**ENTER**> to accept the settings, the "Day of the Week" screen will be displayed:

```
DAY of WEEK:   05
 Su=01     Sa=07
<ENTER> -ACCEPT
 <END>  -ABORT
```

After entering the day of the week, the date and time entered above will be displayed. Press <**ENTER**> to accept the settings or <**END**> to abort the Date/Time Setting operation. If accepted, the clock will start running and display the time. Press <**END**> to exit back to the SPECIAL menu.