ULTRARAE BAR CODE READER PATTERNS AND ADJUSTMENTS

Introduction

Occasionally the UltraRAE CCD bar code reader needs adjustment to read the RAE-Sep tube ID properly. A tiered approach can be used if the tube ID is not read correctly: 1) Check tube barcode for damage, 2) override the reader manually, 3) adjust the reader in the Diagnostic Mode CCD menu, and 4) adjust the reader using the Hyperteminal from a PC. The last method is the most accurate but may require some training to perform properly.

Turning on the Bar Code Reader

Newer firmware allows the bar code reader to be turned off using sub-menu in the Monitor Setup menu. If the bar code reader does not respond or always gives the same tube name when inserting any tube, enter the program mode (MODE & N/- keys simultaneously), enter the Monitor Setup menu, and toggle to the Bar Code Reader menu to turn the reader on.

Manual Selection of Tube Type

With the unit on, remove the tube and wait for it to display "No Tube…Manual Select?". Push Y/+, and then push n/- until the correct tube type is displayed and push Y/+ again. Then insert the tube and proceed as usual.

Adjusting the CCD Reader in Diagnostic Mode

Enter Diagnostic Mode as described in Chapter 8 of the manual by holding down the Y/+ key when turning the unit on. Toggle down with the Mode key to the CCD menu. Insert a RAE-Sep tube and screw the probe cap down securely. The value should read about 43-47 with a butadiene tube, 45-49 with a benzene tube, and 59-61 with a VOC tube. If not, adjust the value using the Y/+ and N/- keys. Turn the unit off and restart in normal mode (Firmware v2.34 or lower). With Firmware v2.35 and above the user can toggle between normal and diagnostic mode by holding down the Y/+ and MODE keys simultaneously. Check the readability of a tube, and repeat with a little different CCD setting, if necessary.

HyperTerminal Adjustment Procedure

Set up Windows HyperTerminal for UltraRAE

Click on the HyperTerminal icon in the Programs\Accessories\Communications\HyperTerminal of Windows. Give any name to the connection (for example "UltraRAE"). In "connect using" dialog box choose "Direct to com1" (assuming the serial cable is connected to the com1), click on "OK". Choose "9600" for "bits per second" in "port setting", then click on "OK". Connect the UltraRAE with the serial cable to the com1 of the computer. It is ready to get into the serial diagnostic mode.

Adjust CCD Integration and Alignment in HyperTerminal

Make sure the UltraRAE is connected to the serial port and the HyperTerminal is active. Turn on unit in serial diagnostic mode by pressing and holding both the [N] and [Y] keys first and then pressing the mode key until you see a flash on the LEDs. Press "R" on the keyboard within 10 seconds. If the communication is successful, the monitor will show "UltraRAE tester" and display a menu. Select 'T' for tube test and a pattern of CCD light sensing will be displayed.

Insert the tube and observe the pattern. Remember to put the tube cap back on and screw it down, in order to get the tube into the proper position for good bar code reading (and air sealing). The integration time must be adjusted until the proper pattern is shown. After the diagnostic test, press "Esc", then choose "0", then choose "y", to turn off the power. **If the keypad does not work, then the unit is still in serial diagnostic mode**. It may be necessary to remove the battery to exit from the serial diagnostic mode if it has not been exited using the computer.

Note: The final test procedure requires that a butadiene tube is used to adjust the bar code reading. A VOC, and benzene tube are used to verify the adjustment.

Example HyperTerminal Patterns and Adjustment Procedures

Basic CCD Bar Code Reader Patterns

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All elements ON (no tube):

|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||| 129

When there is no tube in place, this pattern should be seen. Each of the 64 vertical
lines means a light sensor received the light.

All elements OFF (dark):

---------------------------------------------------------------- 128

This pattern means that no light is sensed.
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1339 Moffett Park Drive, Sunnyvale CA 94089 U.S.A.
Tel: 1.408.752.0723 | Fax: 1.408.752.0724 | E-mail: raesales@raesystems.com
www.raesystems.com | rev.5.bz/wh.11-03

Ideal patterns (the shadow of the bars are towards the left, no dark noise (dashes) on the right, & tube codes are correct)

Butadiene patterns: **Code**

010

The right side of the pattern shows the tube code "10"

VOC patterns: Code

000

The right side of the pattern shows the tube code "0"

Benzene patterns: **Code**

006 (or 12)

The right side of the pattern shows the tube code "6", the code "12" is also acceptable.

Halocarbon patterns: **Code**

009

The right side of the pattern shows the tube code "9"

Every thin bar on the bar code should give 4 dashes (and 4 less counts on the regular Diagnostic Mode CCD reader), and every thick bar, 8 dashes. In practice, the dark patterns are uneven because of the angled reader position, and the actual patterns look more like the one in the butadiene example below. Dark noise manifests itself as extra dashes on the right side.

Bar Code Reader Adjustment Using Butadiene Tube:

(1) Press the "+" or "-" key until the maximum number of the "-" are shown in the pattern and the tube code shown on the right just becomes "10"

Butadiene patterns (on the dark side):

010

(2) Press the "+" key and count on the "+" key strokes (e.g. 20 strokes) until the minimum number of the "-" are shown in the pattern and the tube code shown on the right just becomes different from "10"

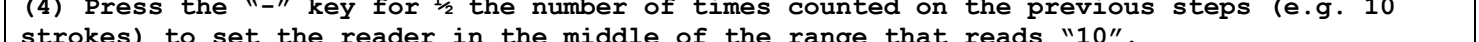
Butadiene patterns (on the bright side):

010

(3) The number of keystrokes counted that read "10" must be at least 15. If less, adjust the barcode LED or reader to maximize the number of keystrokes that read "10".

(4) Press the "-" key for ½ the number of times counted on the previous steps (e.g. 10 strokes) to set the reader in the middle of the range that reads "10".

Butadiene patterns (in the average light intensity):

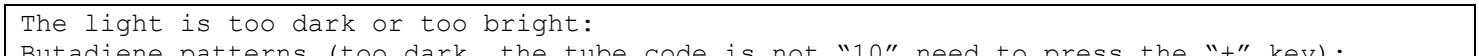


010

Problems and Fixes:

The light is too dark or too bright:

Butadiene patterns (too dark, the tube code is not "10",need to press the "+" key):



0xx

Butadiene patterns (too bright, the tube code is not "10",need to press the "-" key):

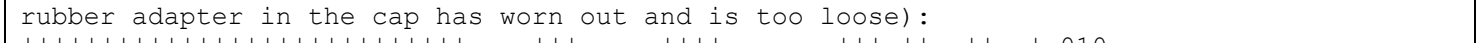
0xx

The pattern is not in the optimal position:

Butadiene pattern too far to the left (the rubber inlet adapter is worn out or the bar code on the tube is too low):

010

Butadiene pattern too far to the right (the tube cap has not screwed down tightly or the rubber adapter in the cap has worn out and is too loose):



010

If the dark patterns on the right are excessive or the tube codes are unstable, it suggests that the CCD circuit board in the instrument cap is defective.