

Read This First



Introduction

The UltraSpec 8215/8225 Laser Alignment Fixtures are the latest in a complete line of alignment equipment provided by CSI. The 8215/8225 system is used in conjunction with the UltraSpec Alignment Analyzer. Although the UltraSpec analyzer can be purchased separately, it must be used to process the data from the fixtures. The Model 8215/8225 system attaches sensor heads to shafts that are typically coupled together. Laser beams are emitted from each sensor head and targeted on the opposite sensor head. Each shaft position is measured in relation to the other shaft by rotating the two shafts. Shaft misalignment is calculated from the position of each laser beam on its respective target.

The position of each laser beam on its target is transmitted from each sensor head to the UltraSpec analyzer through radio frequency (RF) or direct cable communication. The UltraSpec analyzer processes the data and calculates the required machine moves necessary to bring the machine components into alignment.

With most alignment systems available today, the sag of the alignment fixtures must be considered to accurately calculate machine moves. With the use of laser beams, there is no fixture sag to consider! The RF communication between the sensor heads and the UltraSpec analyzer simplifies data acquisition and reduces operator error. The direct cable connect provides you with an alternate method to transfer data when the RF link is not practical.

Since each head has a self-contained angle sensor and additional memory, the data can be acquired in a variety of ways. Choices range from the traditional top, bottom, left, and right locations (minimum of three) where the fixtures interact directly with the analyzer to the patented partial sweep method (the sensor heads memorize the data and later dump it to the analyzer).

When the 8215/8225 fixtures and the UltraSpec analyzer are used with the UltraMgr PC software program, a complete alignment program can be managed from a centralized location. UltraMgr provides job tracking, control of alignment tolerances, alignment history and much more.

Some advantages of the UltraSpec 8215/8225 Laser Alignment Fixtures are:

- Easy setup
- No fixture sag
- Visible laser to assist with rough alignments
- Large diameter mounting range
- Large span range between sensor heads
- Large vertical expansion to clear larger couplings
- Large misalignment measurement range
- Partial revolutions (down to 35°)
- Dual Pass method for uncoupled alignments
- Real time machine move monitoring, vertical and horizontal
- Soft foot locator
- Radio frequency communication
- Direct cable connect, if needed
- Automatic data acquisition
- Dual beam technology
- Internal angle sensors
- Internal memory
- 15-minute charge cycle for sensor heads
- Simultaneously charging, sensor heads and analyzer
- Best ambient light protection
- Straightness measurement



How To Use This Manual

This manual is arranged in the following manner:

- The following sections of Chapter 1 provide information that should be read before attempting to use the UltraSpec analyzer or before proceeding to read the remaining chapters.
- Chapter 2 – introduces the basic features of the analyzer including descriptions of the front panel keypad and utility functions such as communications, transferring data via a modem, and system setup. Information is also provided about setting up and communicating with the UltraMgr software.
- Chapter 3 – describes options and other hardkey functions such as storing, recalling, and deleting jobs, alignment setup, using the screen/print key, and finding, creating, and storing notes.
- Chapter 4 – lists and describes the various components that make up the laser alignment system.
- Chapter 5 – provides a general system overview and information on defining and modifying a job, taking and checking data, viewing machine moves and storing data sets, and printing an alignment job.
- Chapter 6 – provides specific instructions on the various ways to acquire alignment data.
- Chapter 7– describes how to perform straightness measurements.
- Chapter 8 – contains application information.
- Chapter 9 – for your convenience, groups system maintenance and troubleshooting information into one location.

- Appendix A – provides descriptions of Foot Pre-Check types and their advantages and disadvantages.
- Appendix B – provides pin-out descriptions for the analyzer's connectors and wiring diagrams for associated cables.
- Appendix C – details the technical specifications for the UltraSpec 8117 analyzer and 8215/8225 laser alignment fixtures.
- Appendix D – describes the various accessories and optional products that are available for use with the UltraSpec analyzer.

Emphasis Paragraphs

The following types of paragraphs are used throughout this manual to call attention to the adjacent text:

Note

The note paragraph indicates special comments or instructions.

Caution!

The caution paragraph alerts you to actions that may have a major impact on the analyzer, stored data, etc.

Warning!

The warning paragraph alerts you to actions that may have extremely serious consequences for equipment and/or personnel.

Firmware and Application Version

This manual covers UltraSpec 8215/8225 compatible analyzer firmware and application versions 2.40 (and later). Version 2.40 (and later) firmware and applications require version 6.0 or later ROM to load into the UltraSpec analyzer.

Note

The 8215/8225 Laser Fixtures are only compatible with the ProAlign Plus application and not compatible with the ProAlign, Easy Align, Quick Align, Vertical Align, and Train Align applications.

UltraSpec Analyzer Serialization

The loaded analyzer firmware has been serialized and is matched to the analyzer serial number. If the firmware and analyzer serial numbers do not match, contact CSI Customer Support.

UltraMgr Software and Prerequisites

In order to use the UltraSpec 8215/8225 compatible 2.40 applications with UltraMgr compatible software, the software must be RBMware version 4.40 or later for Windows.

DOS UltraMgr software and earlier versions of Windows UltraMgr software will not work with the UltraSpec 8215/8225 compatible analyzer 2.40 or later applications.

Note

The UltraSpec Thermal Growth application will not communicate with the UltraMgr software.

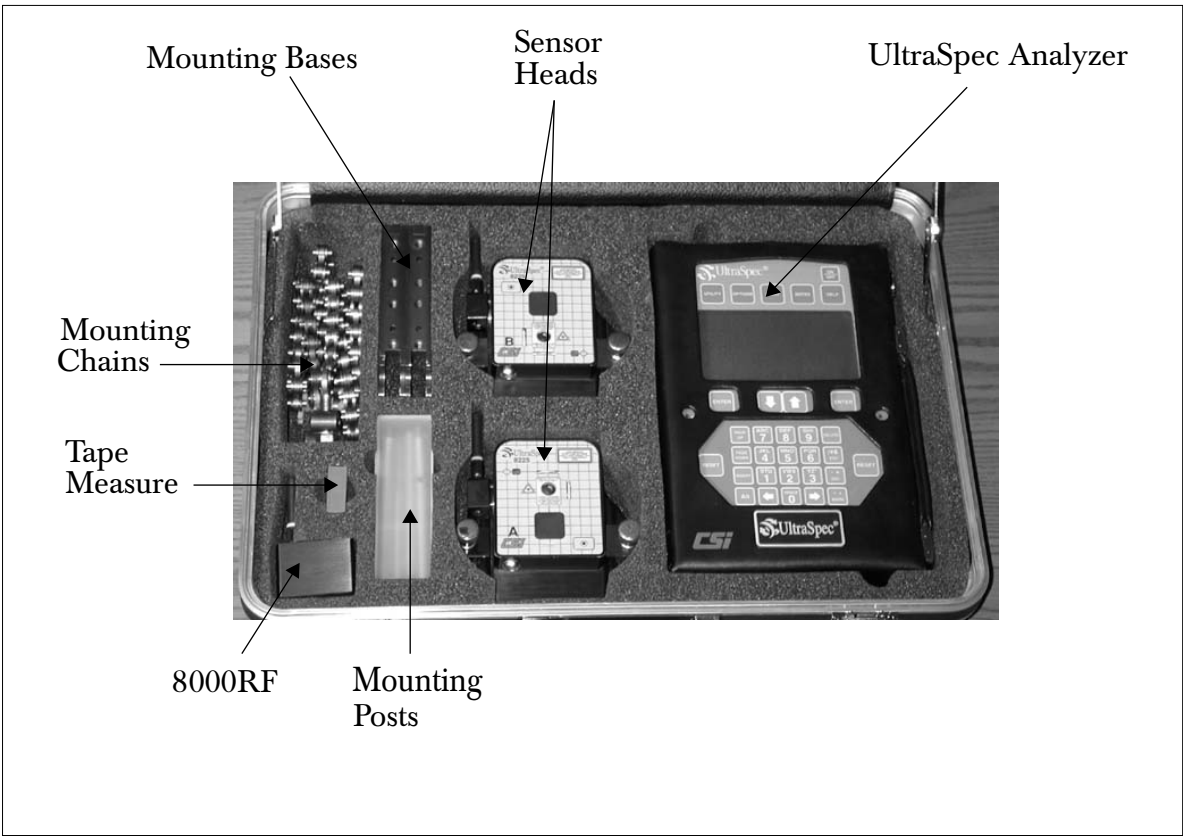
Note

UltraMgr requires some planning and set up before jobs can be downloaded into the UltraSpec analyzer. See the UltraMgr User's manual for more information.

Standard Equipment and Options

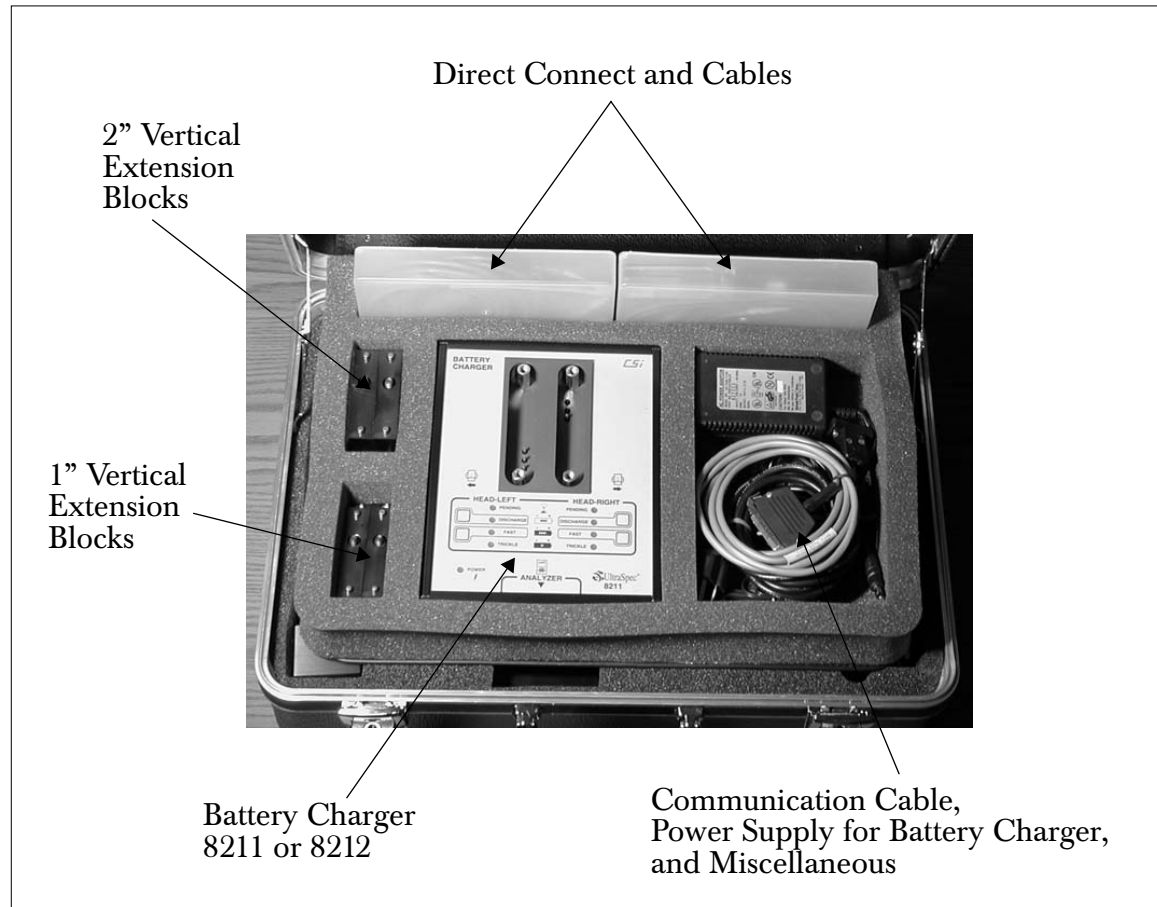
Unpack the UltraSpec Analyzer and compare the contents of the package with your shipping invoice. If you find a discrepancy, call CSI Customer Support at (865) 671-4274.

Fixtures Case Layout (bottom section)



UltraSpec 8215/8225 Laser Alignment Fixtures Case Layout (bottom)

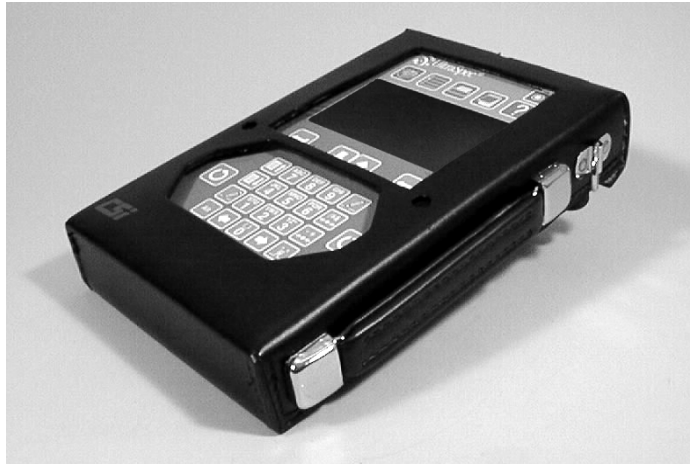
Fixtures Case Layout (top section)



UltraSpec 8215/8225 Laser Alignment Fixtures Case Layout (top)

Inserting the Analyzer into Case

Use the leather case and vinyl sheath to provide additional protection for the UltraSpec 8117 analyzer. Insert the analyzer into the leather case, making sure that the front display and keypad are visible through the cut-outs in the case. Snap the case shut, then clip on the strap and adjust for your comfort.



When the analyzer must be used in a wet or humid environment, it can be wrapped in the vinyl sheath before being inserted into the leather case.

Note

Other UltraSpec analyzer models may have a different type of leather case and vinyl sheath. These may require a different method of inserting the analyzer into the leather case and vinyl sheath.



Installing the Application

If this application package was purchased with an UltraSpec analyzer, it should be pre-loaded before shipment. However, if the program was not pre-loaded or has been purchased at a later date, these instructions will assist you in installing the application.

Should you have any problems, contact CSI Customer Support for assistance.

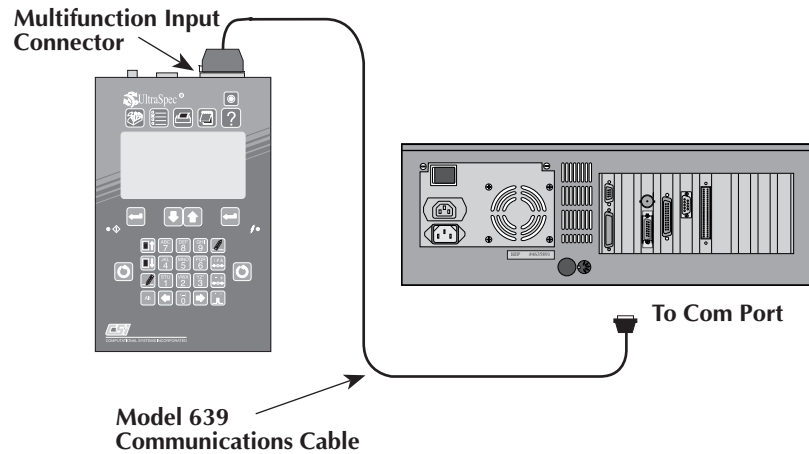
Using UltraSpec Analyzer with a PC

The following section explains how to set up communications between the UltraSpec analyzer and a PC. Communications must be established prior to completing either of these functions:

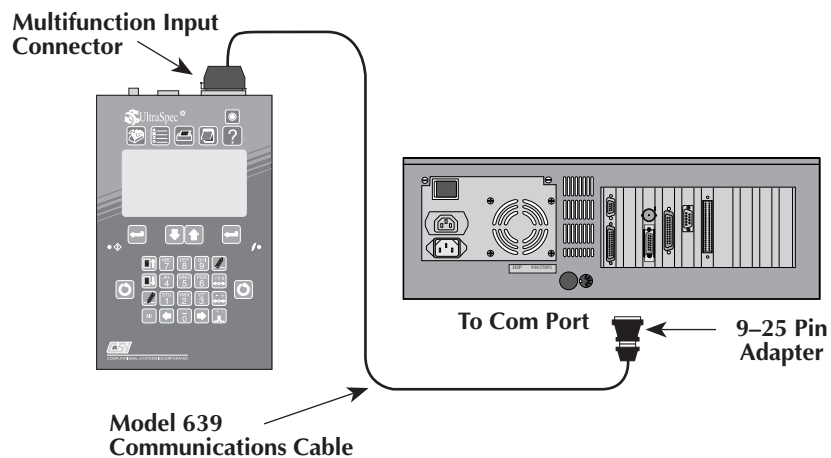
- Loading firmware and applications, or
- Moving jobs to or from the analyzer.

Communicating With the PC

A special 25- to 9-pin communications cable (Model 639) is supplied with the UltraSpec analyzer to connect the analyzer with a host computer. Connect the male end of this cable to the serial port on top of the analyzer and the female end to the COM port on the computer (normally COM1).



If the host computer uses a 25-pin COM port, you must use an optional 9-to-25 pin adapter cable between the computer and the Model 639 communications cable as shown in the following illustration.



Date and Time

When communication is attempted, the date and time settings on the UltraSpec analyzer and the host computer must be within three hours of each other or an error message will be displayed. To check and/or reset the date and time on the UltraSpec analyzer:

1. ... Press the Utility key
2. ... Select System Setup
3. ... Select Date and Time

Use the up/down arrow keys and the numeric keypad to make any required changes, and press the Enter key to accept the displayed date and time. For additional information, see “Date and Time” on page 2-28.

Note

For more information about transferring stored jobs to and from UltraMgr, see “Communications” on page 2-21.

Loading UltraSpec Analyzer Firmware and Applications

The software that controls the basic operation of the analyzer (firmware) is stored in an Erasable Programmable Read Only Memory (EPROM). The EPROM is also referred to as ROM. A floppy disk containing the firmware is supplied with each new analyzer and firmware upgrade. The most recent version of the firmware is downloaded into the analyzer before shipping. The firmware number is displayed on the analyzer’s startup screen.

This firmware can be reloaded into the analyzer at any time for firmware upgrades, or for reinstallation in the unlikely event that EPROM information has been erased. Firmware is installed into the analyzer via communications with a personal computer (PC or true compatible) and does not require disassembly of the analyzer.

The firmware and applications can be downloaded into the analyzer from either DOS or Windows. The firmware diskette contains both the DOS and Windows download programs. Refer to “Download Procedure” on page 1-13 for more information.

Caution!

Reloading firmware will erase all data stored in the analyzer. Verify that no essential data are in the analyzer before proceeding to reload firmware.

Note

Firmware and application version 2.40 require version 6.0 or later ROM to load into the UltraSpec analyzer. For more information, contact CSI Customer Support.

Note

Firmware and application versions others than 2.40 and later are not interchangeable with 2.40 and later firmware and applications and cannot be loaded into the UltraSpec analyzer together.

Note

The UltraSpec firmware and applications are serialized for the UltraSpec analyzer and can only be loaded into the UltraSpec analyzer with that serial number.

Download Procedure

The following flowchart is an abbreviated version of the download procedure. For a thorough explanation, refer to the “DOS Download Procedure” on page 1-16 or the “Windows Download Procedure” on page 1-22.

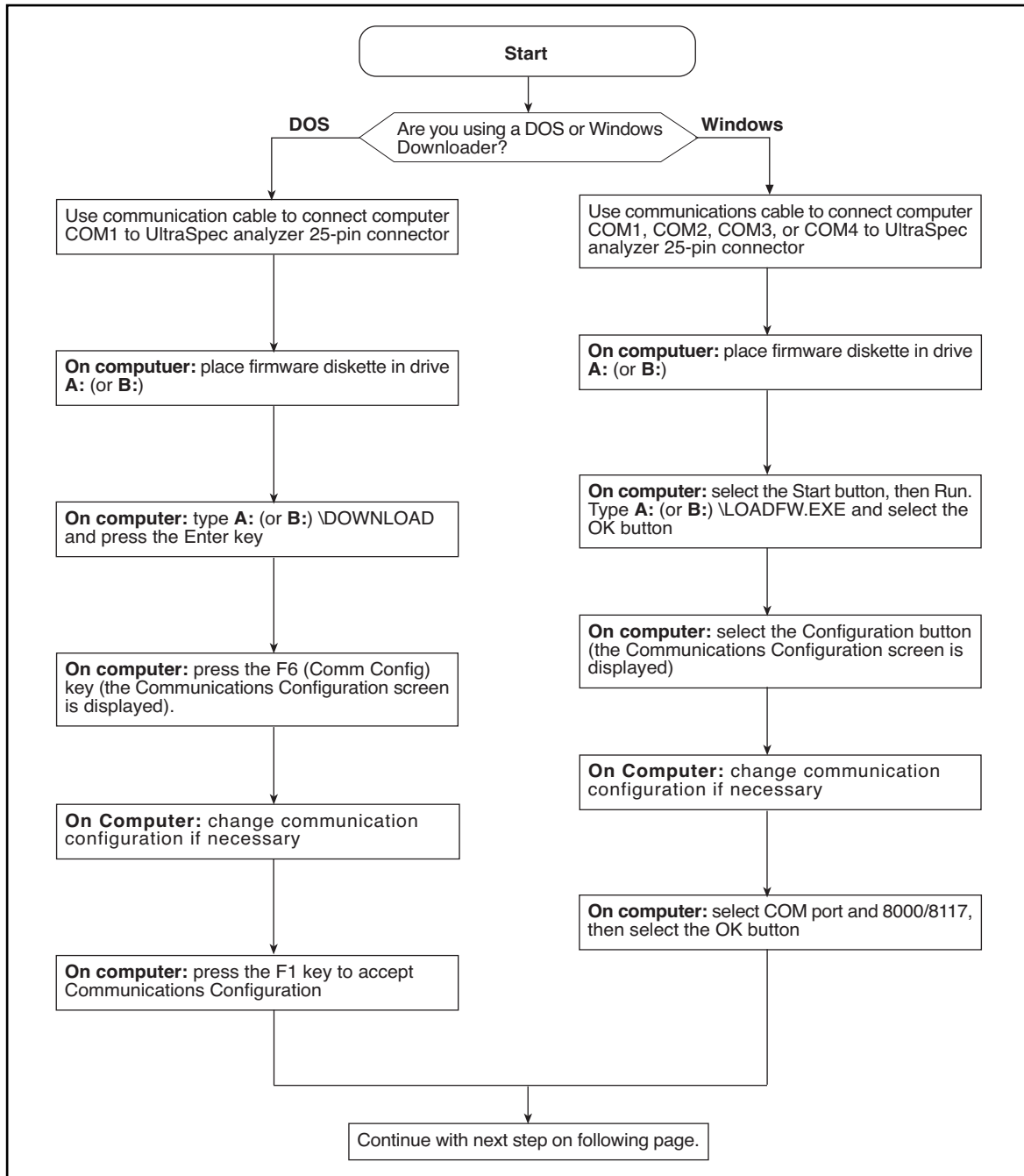


Figure 2. Download Procedure Flowchart (page 1 of 2)

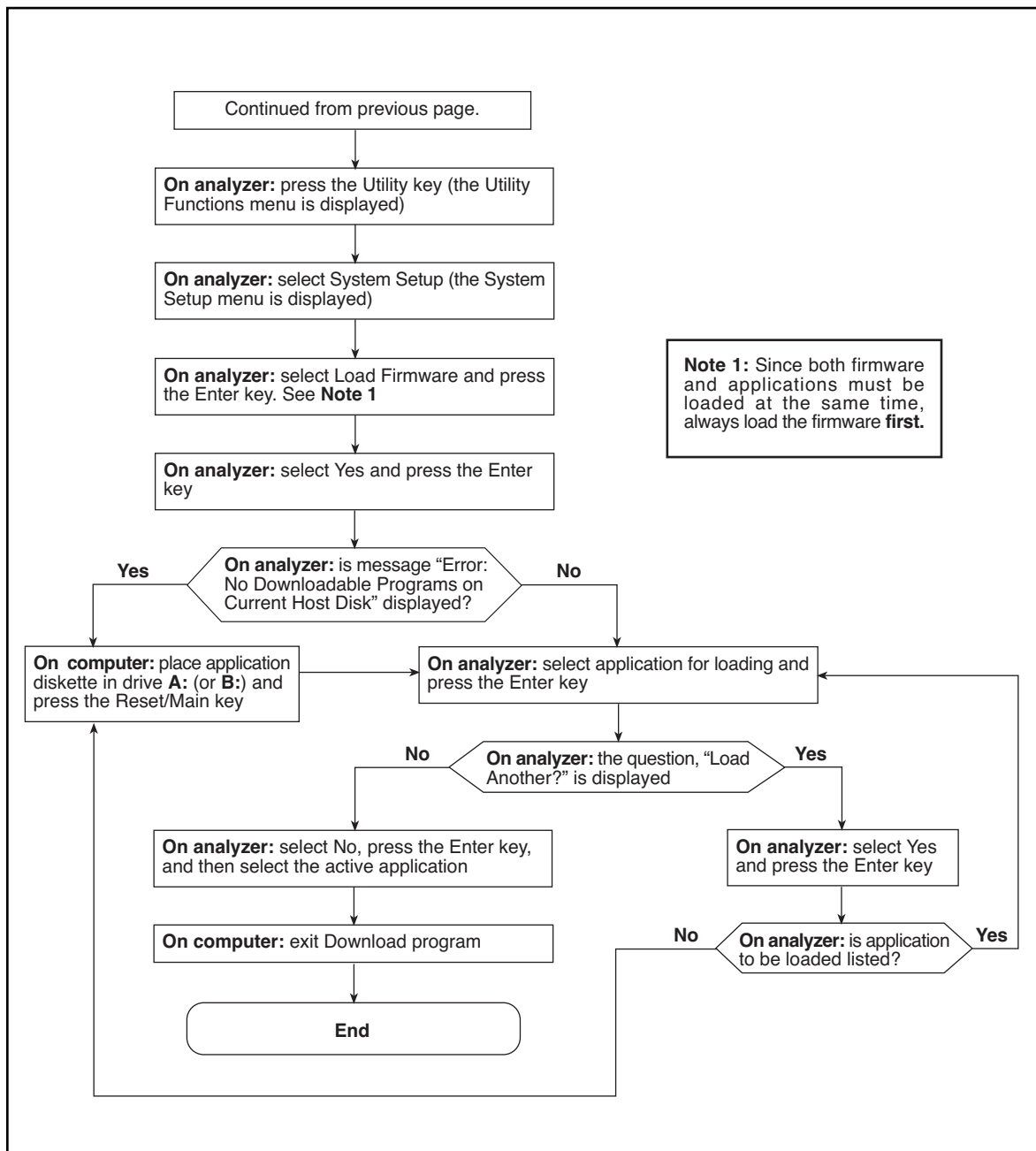


Figure 3. Download Procedure Flowchart (page 2 of 2)

Use the following *detailed* procedures to download firmware or applications into the analyzer from either a DOS- or Windows-based computer.

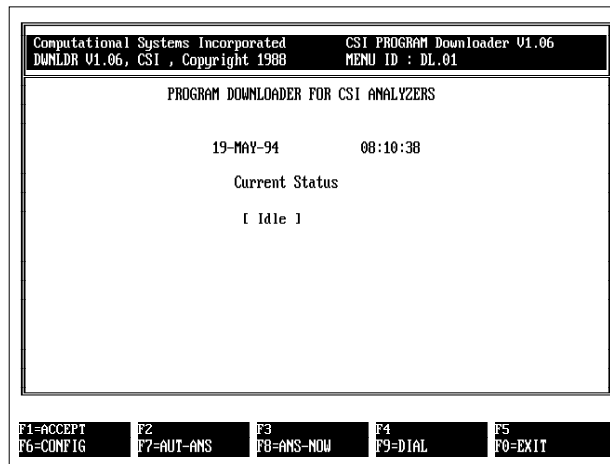
Note

When you are loading either firmware or applications, begin with the firmware diskette first.

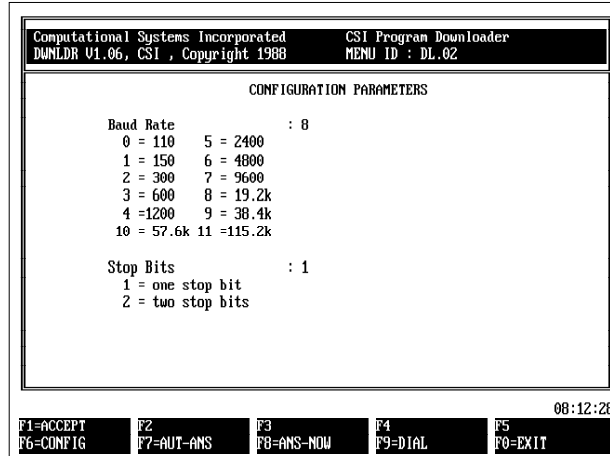
DOS Download Procedure

1. ... Connect the analyzer to the COM1 port of the computer using the supplied communications cable.
2. ... On the computer, place the floppy disk containing the firmware into drive A (or B) and at the command prompt, type:
A: (or B:) and press the Enter key (also called the Return key).
3. ... Type DOWNLOAD, then press the Enter key.

The following screen should be displayed.

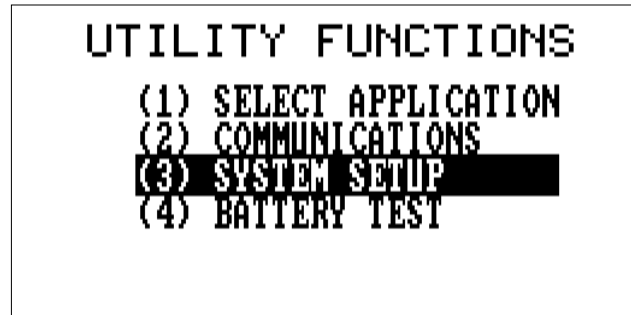


4. ...Press the F6 key to bring up the following screen which shows the communication configuration of the computer.

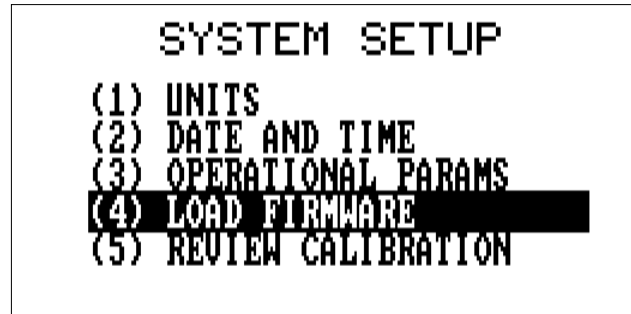


5. ... Change the computer settings if necessary. Normally, you should use one stop bit and a baud rate of 19.2k or 38.4k. After all changes have been made, press the Enter key.

6. ... On the computer, press the F1 key to accept the displayed communications configuration and return to the DOS Downloader main menu.
7. ... On the UltraSpec analyzer, press the Utility key to display the Utility Functions menu.



8. ... Select System Setup and press the Enter key.
The following screen will be displayed.

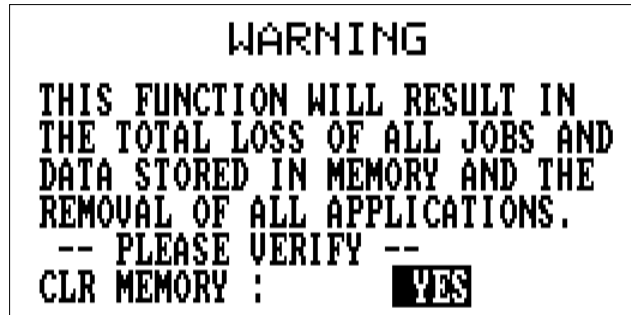


9. ... Select Load Firmware and press the Enter key.

Note

Select this option whether you are replacing the base firmware *or* loading an application or program.

The following screen will be displayed.



10. Select Yes and press the Enter key to continue.

Loading Firmware

Caution!

Reloading firmware in an UltraSpec 8000 analyzer resets the calibration factors. Always review calibration factors after loading firmware to verify the settings are the same as in the factory supplied calibration card. Refer to "Review Calibration" on page 2-32 for information about calibrating the UltraSpec analyzer.

There may be up to a 20-30 second pause before loading begins. After the firmware has been loaded, a list of application programs to be loaded will be shown (if available on the same diskette). An error message will appear if no application programs are located.

11. If the error message occurred, insert the Application Diskette into the computer drive A: (or B:); on the analyzer, press the Reset/Main key. Otherwise, go directly to Step 12.

Loading Applications

A list of programs on the diskette will be shown.

12. Select a program and press the Enter key.

As each application is loaded, you will see a prompt asking whether to continue with the next step or load another application.

13. · If additional applications were listed on the first diskette, answer Yes and press the Enter key to continue. Otherwise, insert the next application diskette at this time, answer Yes, and press the Enter key.

ATTENTION

PROGRAM DOWNLOAD IS COMPLETE

SELECT "YES" IF YOU WANT TO

LOAD ANOTHER PROGRAM

INSERT NEXT PROGRAM DISKETTE

LOAD PROGRAM?: **NO**

14. · When the last application program has been loaded, answer No and press Enter.

After the desired application(s) are loaded, you must use Select Application to designate the active application.

15. · Exit the Download program. At the computer, press the F10 key to exit the DOS Download program.

Note

Depending on the amount of memory available, no more than six applications can be loaded into the analyzer at the same time. In an analyzer with only 0.5 Mb of memory available, no more than one or two applications can be loaded at the same time, depending on the application.

Note

Although individual firmware programs are shipped on separate diskettes, all programs serialized for the same instrument can be copied to a single diskette (for downloading) if desired. To do this, copy all *.DLH and *.TSK files to the base firmware diskette.

Note

After loading firmware and application(s) in an UltraSpec analyzer, check the calibration factors (see “Review Calibration” on page 2-32).

Note

The Calibration values can be automatically loaded into the analyzer when the firmware is loaded. For more information, see the “Calibration Write Program” on page 2-39.

Windows Download Procedure

1. ... Connect the analyzer to either the COM1, COM2, COM3, or COM4 port of the computer using the supplied communications cable.
2. ... On the computer, place the floppy disk containing the firmware into drive A (or B).
3. ... From Windows, select the Start button and then choose Run. Type A: (or B:) \LOADFW.EXE and then select the OK button. Depending on whether this application has previously been run, either the Main Menu or Configuration screen will be displayed. (Note: The screens may be configured differently than what is shown).

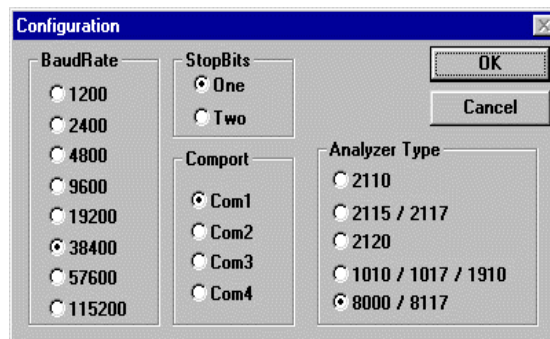


Figure 10. Windows Downloader Configuration Screen

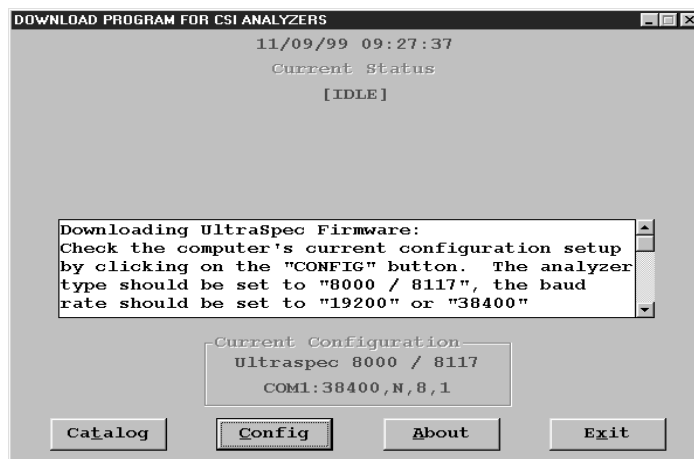
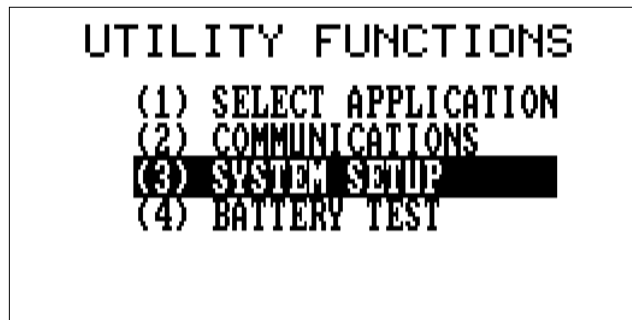
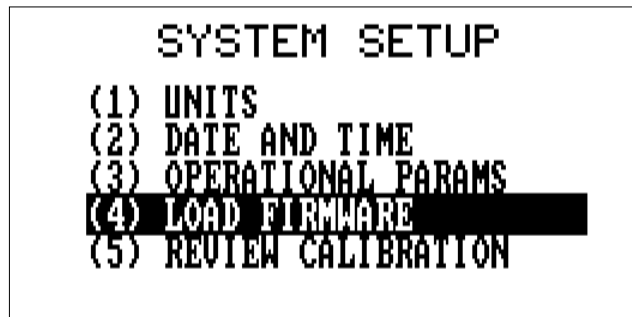


Figure 11. Windows Downloader Main Menu

4. ... If the Main Menu is displayed, select the Config button to display the Configuration screen. Otherwise, the Configuration screen is already displayed.
5. ... If necessary, change the settings on the computer. Normally, you should use a baud rate of 19.2k or 38.4k and one stop bit. Change the COM port setting to match the COM port the communications cable was connected to in step 1. Change the Analyzer Type setting to 8000 / 8117, then press the OK button to accept the communications configuration and display the Windows Downloader Main Menu.
6. ... On the UltraSpec analyzer, press the Utility key to display the Utility Functions menu.



7. Select System Setup and press Enter.
The following screen will be displayed.

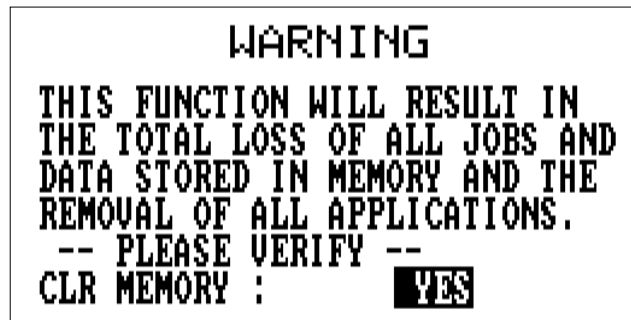


8. ... Select Load Firmware and press Enter.

Note

Select this option whether you are replacing the base firmware *or* loading an application or program.

The following screen will be displayed.



```
WARNING
THIS FUNCTION WILL RESULT IN
THE TOTAL LOSS OF ALL JOBS AND
DATA STORED IN MEMORY AND THE
REMOVAL OF ALL APPLICATIONS.
-- PLEASE VERIFY --
CLR MEMORY :  YES
```

9. ... Select Yes and press the Enter key to continue.

Loading Firmware

Caution!

Reloading firmware in an UltraSpec 8000 analyzer may reset calibration factors. Always review calibration factors after loading firmware to verify the settings are the same as in the factory supplied calibration card. Refer to "Review Calibration" for information about calibrating the UltraSpec analyzer.

There may be up to a 20-30 seconds pause before loading begins. After the firmware has been loaded, a list of application programs to be loaded will be shown (if available on the same diskette). An error message will appear if no application programs are located.

10. · If the error message occurred, insert the Application Diskette into the computer's drive A (or B). On the analyzer, press the Reset/Main key. Otherwise, go directly to Step 11.

Loading Applications

A list of programs on the diskette will be shown.

11. Select a program and press Enter.

As each application is loaded, you will see a prompt asking whether to continue with the next step or load another application.

12. If additional applications were listed on the first diskette, answer Yes and press the Enter key to continue. Otherwise, insert the next application diskette at this time, answer Yes, and press Enter.

ATTENTION
PROGRAM DOWNLOAD IS COMPLETE
SELECT "YES" IF YOU WANT TO
LOAD ANOTHER PROGRAM
INSERT NEXT PROGRAM DISKETTE
LOAD PROGRAM?: **NO**

13. When the last application program has been loaded, answer No and press Enter.

After the desired application(s) are loaded, you must use Select Application to designate the active application.

Note

When the ProAlign Plus application is first selected after loading into the analyzer a message is displayed telling you that all DLP (Downloadable Program) memory is cleared and displaying the amount of free memory (in bytes) left in the analyzer. From this screen press Enter to continue and enter the ProAlign Plus application.

14. Exit the Download program. At the computer, select the Exit button to exit the Windows Download program.

Note

Depending on the amount of memory available, no more than six applications can be loaded into the Analyzer at the same time. In an analyzer with only 0.5 MB of memory available no more than one or two applications can be loaded at the same time depending on the application.

Note

Although individual firmware programs are shipped on separate diskettes, all programs serialized for the same instrument can be copied to a single diskette (for downloading) if desired. To do this, copy all *.DLH and *.TSK files to the *base firmware* diskette.

Note

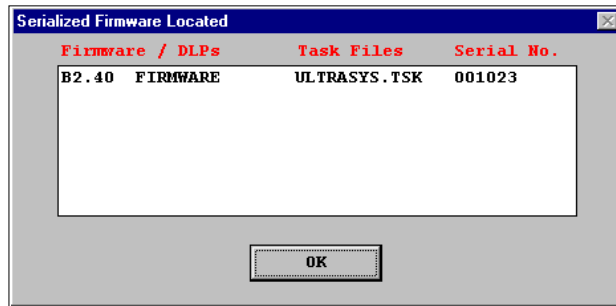
After loading firmware and application(s) in an UltraSpec 8000 analyzer, check the calibration factors (see “Review Calibration” on page 2-32).

Note

The Calibration values can be automatically loaded into the analyzer when the firmware is loaded. For more information, see the “Calibration Write Program” on page 2-39.

Catalog

Displays information (i.e. program name, version number, task file name, and serial number) about the analyzer disk placed in the drive.



Communicating with UltraMgr

Transferring jobs to and from the host computer requires 4.40 and later RBMware compatible UltraMgr's UltraCom software module and the UltraSpec 8215/8225 compatible analyzer application. A special 25-to-9 pin communications cable is supplied with the UltraSpec analyzer to connect the analyzer to the host computer. Connect the male end of this cable to the serial port on top of the analyzer and the female end to the COM port on the host computer (the port to be used is selected in the UltraMgr communication port configuration menu).

On the computer, from the RBMware main menu, select the Corrective Jobs button, select the Setup/Communications Tab, Selective Corrective Data Transfer to access the UltraMgr's UltraCom program. Select Communication Setup under Tools, and set the communication parameters. Consult the UltraMgr User's manual for more information on these parameters. Select the optional UltraMgr module for the UltraSpec analyzer application. On the analyzer, select the Utility, select Communications, select Communications Setup, and the communications parameters. See "Communications Setup" on page 2-22 for more information about these parameters.

Note

The baud rate and stop bit set in the analyzer and in the UltraMgr module must match each other.

To establish communications between the analyzer and the computer, on the analyzer select Utility, select Communications, and select Host PC Load/Dump. At this point, the analyzer is waiting on the computer to start the transfer by selecting either the "Upload Jobs to Database", "Download Jobs to Analyzer", "Download a Default Job", or "Download Tolerance Table" option in the UltraMgr Application program.

When communication is established, the number of jobs stored in the analyzer will be displayed. The jobs will then be transferred followed by a summary of the transfer process.

Note

The option in UltraMgr to “Download Jobs to Analyzer” and “Download a Default Job” is not available for the UltraSpec Analyze and UltraSpec Motor applications. The “Download Tolerance Table” option is available only in the UltraSpec Alignment applications.

Note

There is no communication between UltraMgr and the UltraSpec Thermal Growth application.

Interrupting the Job Loading Process

If an interruption should occur during the job load process, the analyzer will attempt to reestablish communications with the computer for a predetermined length of time. This time allotment, designated “Timeout,” is configurable in the Communications Setup menu accessed from the Communications Menu (see “Communications Setup” on page 2-22). CSI recommends that this be set to 10. After timeout, the analyzer will display a Communications Error screen. Press the Reset/Main key, check the following items, and repeat the job load procedure.

If problems or error messages are encountered during the communication process, recheck the following:

1. ... The baud rate and stop bit setting on both the analyzer and the computer.
2. ... The cable connection between the analyzer and the computer.
3. ... The date and time on both the analyzer and the host computer.
4. ... The communications port setup on the computer.
5. ... The number of retries and time out settings on both the analyzer and the computer.
6. ... The communications cable being used is the proper communications cable furnished with the analyzer.

Basic Analyzer Operations

Most of the feature descriptions and other information provided in this chapter are common to all UltraSpec analyzer software applications. Although the use of function keys is discussed in a very general way, detailed application-dependent operations are covered in the appropriate sections.

To provide maximum configuration flexibility and upgradeability in the field, all UltraSpec analyzer operating software is downloaded from a computer. The two types of software that are used are:

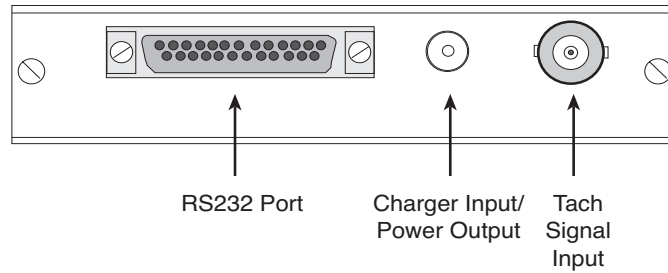
- Firmware - controls the basic function of the instrument and must be loaded first.
- Applications - provide specific functionality for alignment, balancing, operation as a single-channel FFT analyzer, or, for electric motor analysis.

Note

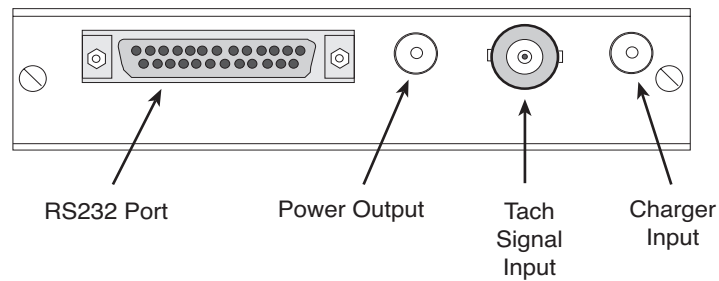
Where applicable, differences in the UltraSpec analyzer models will be discussed.

UltraSpec Analyzer Top Panel

When viewing the analyzer from the top, the features in this figure are visible. Descriptions are listed below.



UltraSpec 8000 Analyzer Top Panel



UltraSpec 8117 Analyzer Top Panel

RS232 Serial Port

- Provides for data communications between the UltraSpec analyzer and the host computer, via the Model 639 Communications cable.
- Provides for connection to an external modem via the Model 705 Modem Kit. Provides for connection to an external printer via the Model 720A Printer Interface; or to any printer supported by MicroSoft Windows operating system via CSI's Virprint program.
- Provides for connection to the Model 821510 Direct Connect Interface.
- Provides for connection to the 8000RF Interface (radio frequency interface box for laser system).
- Provides for connection to a variety of signal input devices.

Caution!

Do not connect any adapters or accessories to the RS232 serial port while the analyzer is turned on.

Charger Input

- Provides an input for the Model 8211 or Model 8212 battery chargers. In the UltraSpec 8000 analyzer, it provides an input for the Model A2115-C battery charger. In the UltraSpec 8117 analyzer, it provides an input for the Model 93140 power supply, 8211 battery charger, or 8212 battery charger.

Power Output

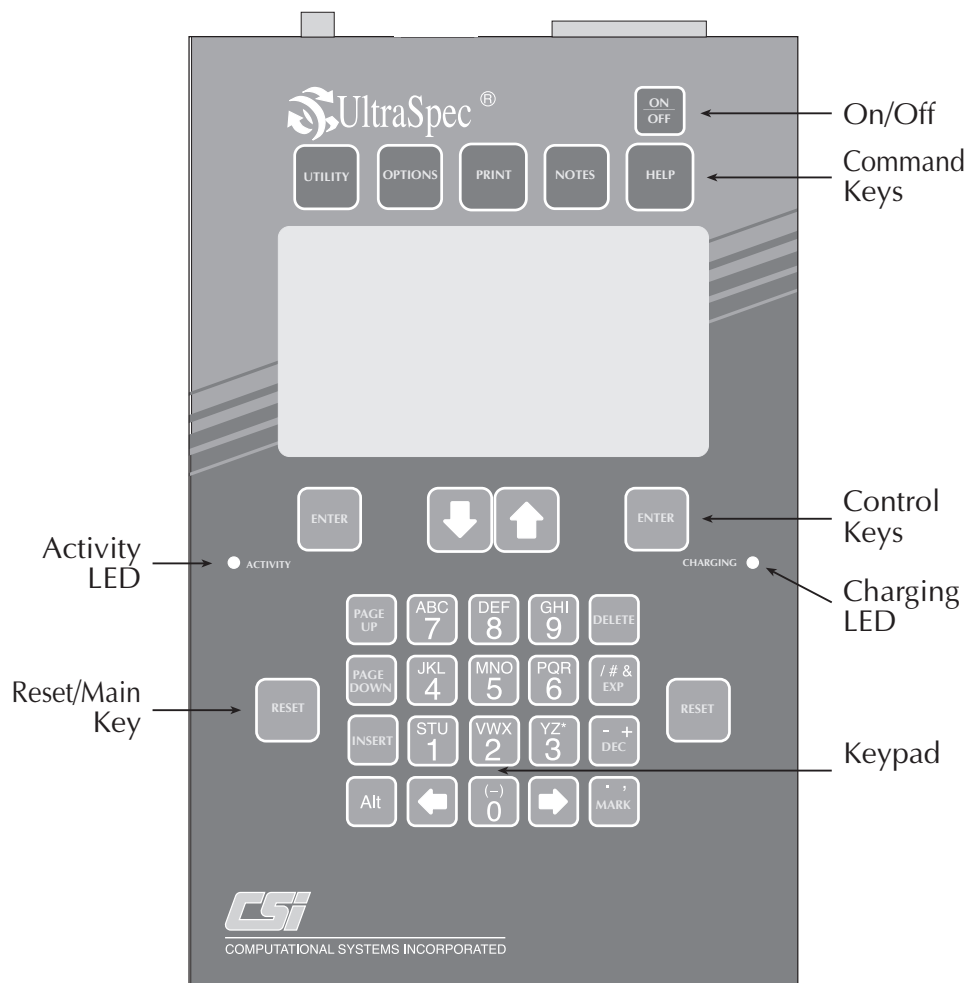
- Provides power for the Model 404 series phototach.

Tach Signal Input

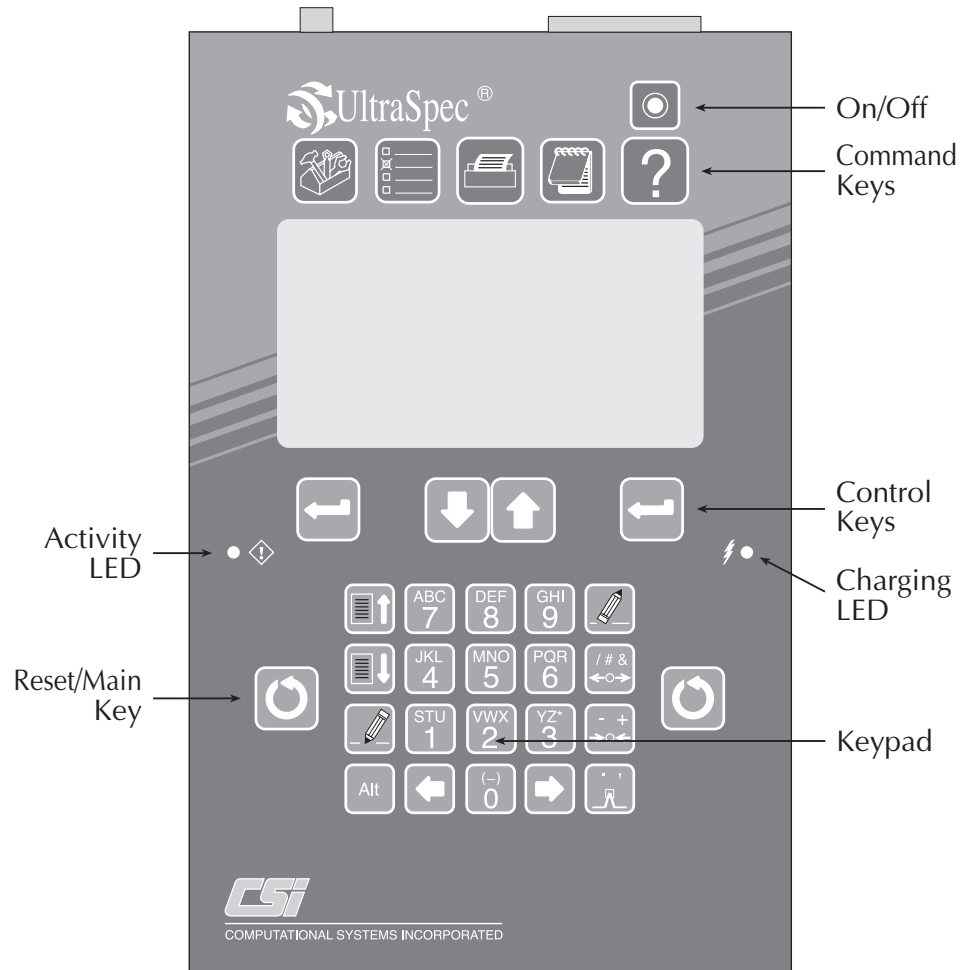
This connection is used to connect the cable from a TTL pulse generator, typically a Model 404 series or 401B tachometer.

UltraSpec Analyzer Front Panel

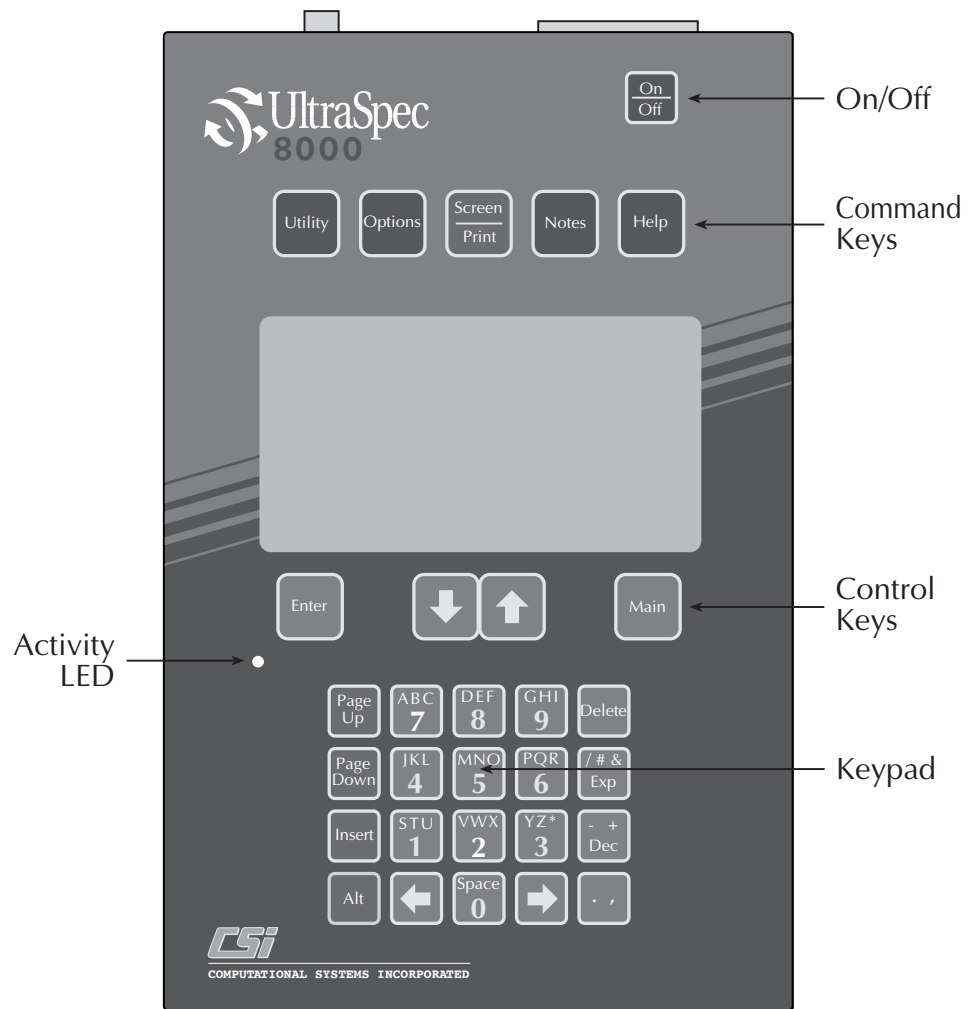
The following are brief descriptions of keys and functions located on the front panel. These functions are discussed in greater detail in other sections of the manual.



UltraSpec 8117 English Front Panel



UltraSpec 8117 Analyzer Icon Front Panel



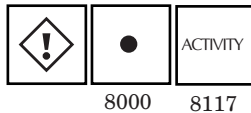
UltraSpec 8000 Analyzer after v6.0 ROM upgrade

Note

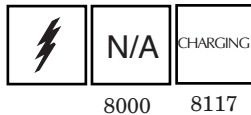
In the following discussion, keys representing the UltraSpec 8117 analyzer Icon Front Panel are shown in the left column; keys representing the UltraSpec 8117 analyzer front panel (English) and an upgraded UltraSpec 8000 analyzer are shown in the right column.

**On/Off**

Press the On/Off key once to turn on the analyzer, press it again to turn it off.

**Activity LED**

This LED, located on the left side of the front panel, flashes to provide visual confirmation of keyboard entries and certain software operations (i.e. starts and stops of data acquisitions).

**Charging LED**

This LED, located on the right side of the UltraSpec 8117 front panel, is illuminated when the battery charger is connected to the UltraSpec 8117 analyzer and the battery pack is being charged (see “UltraSpec Analyzer Battery Maintenance” on page 9-4).

**Alt Key**

The Alt Key (lower left corner) enables a second function on some keys. Keys with second functions are: Print, Notes, and Delete. Other keys with second functions may be application dependent. These keys and functions will be discussed in greater detail where applicable.

Note

Pressing the Alt key along with the Notes key allows you to enter the user defined notepad area (for adding additional notes).

Note

The Alt key is active for five seconds after being pressed. The illuminated Activity LED indicates when the Alt key is active.

Utility Function Key

**Utility**

Utility

The Utility function key is used to select the application you want to work with. Although the analyzer normally defaults to the last application that was used, you must use this key to change applications. Additional functions available from the Utility Functions menu are Communications, System Setup, and Battery Test (discussed in later sections).

Application-dependent Function Keys

Results from using these function keys will vary depending on which application you have selected.

Note

All of the functions accessed with these keys are described in detail in later sections.

**Options**

Options

The Options key enables you to store, recall, and delete jobs. Certain application-specific options and specified functions may also be accessed using the options key.

Screen/Print

The Screen/Print key is a dual purpose key. You can:

**Screen
Print****PRINT**

8000 8117

- Print a job report for the application being run, or
- When used with the Alt key, you can get a printout of the current screen.

A hardcopy can be printed directly to an external, Epson-compatible, dot matrix printer, or an HP DeskJet printer by using the Model 720A Printer Adapter. Or, it can be sent directly to any Windows compatible printer using CSI's Virprint software. (See "Screen/Print Key" on page 3-25 for more information on printing.)



Notes

Notes

The Notes key is used to access the notepad screen which provides a list of preprogrammed or user-defined observations concerning the status of the equipment. By pressing Alt/Notes, you can access the user-defined notepad area (to create a new note).



Help

Help

The Help key can be used to access help screen information at appropriate locations in the various menus. By pressing Alt/Help while in the Utility Function, you can access the help screen information for special language characters.

Control Keys



Enter

Enter

- Accepts menu selections and screen inputs.
- Returns you to the active application Main menu.

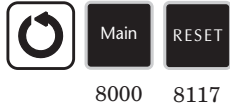


Up/Down Arrows



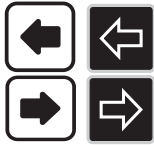
- Moves the cursor through menu selections.
- Expands and contracts the scale of graphic tolerance charts by a factor of two with each press.
- Scrolls the text screen up or down when more selections are available than will fit on the screen.
- Scrolls to the next reading (Up Arrow) or previous reading (Down Arrow) required under the Alignment Data Screen when using the 4 Point Manual method. (*Laser Alignment program only.*)
- Moves the cursor in increments of ten points or angles at a time to the next point (Up Arrow) or previous point (Down Arrow) when viewing or editing a sine curve. (*ProAlign Plus program only.*)

Reset/Main



- Returns you to the active application Main menu.

Left/Right Arrows



- Scrolls fields (Notes, Machine Description, Station Description, etc.) that extend off of the display.
- Controls cursor movement on data plots.
- Moves one space per press to the right or left in alphanumeric fields.
- Moves the cursor across the set of offset and angle points in the tolerance graphs. (*Laser Alignment program only.*)
- Steps through the alternate solutions in the Machine Move screens (*Laser Alignment program only.*)
- When viewing or editing a sine curve, pressing the Alt/Left Arrow key moves the cursor to the first point or angle. Pressing the Alt/Right Arrow key moves the cursor to the last point or angle (*Laser Alignment program only.*)
- Moves the cursor one point or angle at a time to the next point (Right Arrow) or to the previous point (Left Arrow) when viewing or editing a sine curve. (*Laser Alignment program only.*)

Page Up



- Formerly known as the Home/Back function.
- The Page Up function enables you to back up to the previous screen within a section.
- In Notes, the Page Up function moves backward six notes at a time within a section.
- In the Tolerance Charts, pressing the Alt/Page Up key shows the acceptable/excellent ranges. (*Laser Alignment program only.*)

Page Down



- Formerly known as the End/Back function.

- Advances to the next page on menus that contain more than one page.
- In Notes, the Page Down function moves forward six notes at a time within a section.
- Pressing the Alt/Page Down key in the Tolerance Charts will expand the scale to fit all readings on the graph equally. (*Laser Alignment program only.*)
- Advances to additional detailed information (e.g., sine curve, alignment data, individual tolerance plots with all readings, etc.) from the dual tolerance plot screen under View Data. (*Laser Alignment program only.*)



Insert

- Formerly known as the Insert/Delete function.
- Inserts alphanumeric characters.
- Undeletes a point or angle and refits curve when editing a sine curve. (*Laser Alignment program only.*)



Delete

- Formerly known as the Clear function.
- Deletes alphanumeric characters.
- Alt/Delete clears alphanumeric entries from text fields and the notepad.
- Pressing the Alt/Delete key while in the Main menu allows deletion of the current job or reading and notes in the current job.
- Pressing Alt/Delete while acquiring data clears magnitude and phase averages and begins a new average. (*Balance and Analyze programs only.*)
- Deletes a point or angle and refits curve when editing a sine curve. (*Laser Alignment program only.*)
- When editing a sine curve, press the Alt/Delete key undeletes all points or angles (36 maximum) and refits curve. (*Laser Alignment program only.*)



Space

- Inserts a space into alphanumeric text.
- When a strip chart is displayed, toggles amplitude zoom mode.
- Pressing the Alt/Space (Alt/0) key advances to additional Laser Fixture Status and Error code information under Laser Head Status (*ProAlign Plus program only.*)
- When the alignment data is displayed under View Data, pressing the Space key toggles the top reading between zero and the raw data. (*Laser Alignment program only.*)
- Pressing the Alt/Space (Alt/0) key under Alignment Data before initializing the laser heads resends the last set of alignment data stored in the heads.



Mark

- Provides Special Functions when displaying spectra with the cursor on screen (*required with the Analyze program*). Pressing the key the first time more precisely locates the frequency and amplitude of the peak. Pressing the key the second time places boxes at multiples of the located peak.



Expand (Exp)

- Expands the horizontal scale of a spectral or waveform plot.
- Pressing the Alt/Exp key replaces the bar graphs with numbers and visa-versa under Laser Head Status (*Laser Alignment program only.*)



Decrease (Dec)

- Decreases the horizontal scale of a spectral or waveform plot.

Selecting Menu Items

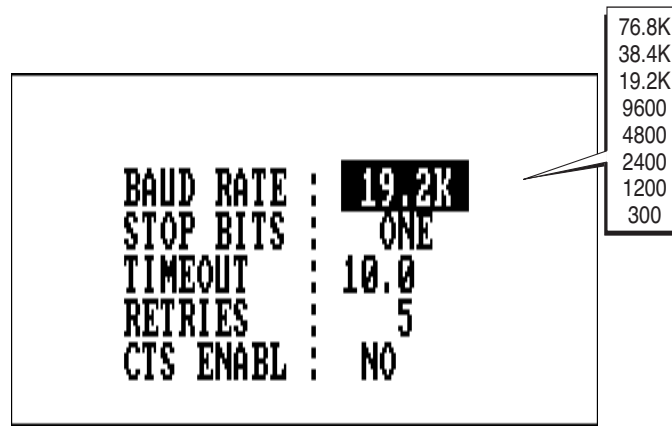
For menus that do not contain entry fields, two methods can be used to select the desired function:

- The first method is to use the analyzer's up/down arrow keys to highlight the desired function, then press the Enter key.

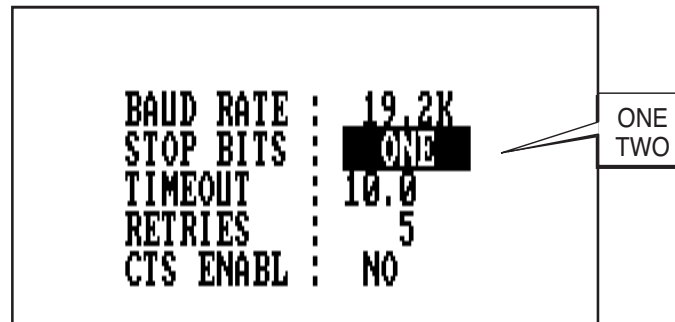
- The second method allows you to quickly select a menu item by pressing the numerical key corresponding to the menu item number. The menu item will be automatically selected and the analyzer will then advance to the next screen.

Response Fields

Many functions of the UltraSpec analyzer require that you enter data; response fields are provided for this purpose. Some response fields provide a predefined set of selections. Pressing any key on the keypad will step through these selections as shown in the following example.



Other response fields offer only two selections, for example “One” or “Two” in the following illustration, and pressing any key on the keypad will alternate between these two selections.



Another type of response field requires numerical value or alphabetical character entry and is discussed in the following section. The most common type of data entry and screen acceptance convention is: when a screen has multiple data entry fields, any key on the keypad accepts the data for the individual field and “Enter” accepts the entire screen. The Arrow keys usually move the cursor from field to field.

Alphanumeric Keys

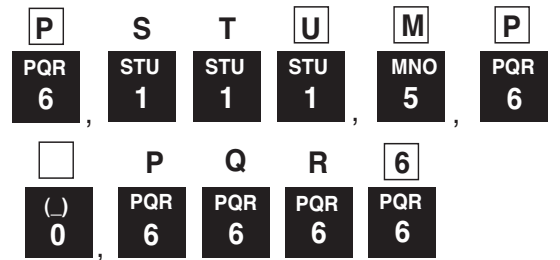
Alphanumeric keys are used to enter alphanumeric characters into response fields that do not have predefined selections. Each key is assigned up to four characters, and is designed to allow single-finger keyboard entries.

To enter a character, repeatedly press a key to step through its assigned characters, for example, D E F 8, until the desired character is displayed. The cursor will automatically advance to the next space after a one-second pause or after another key has been pressed. The left arrow key may be used to backspace the cursor to correct errors.

A blank space in the field may be entered in one of three ways:

- Press the right arrow key after the cursor has advanced one space.
- Press the right arrow key immediately after entering the last character before the space. The cursor will then advance two spaces.
- Press the Space key to advance the cursor one space and/or delete an existing character.

For example, to enter the phrase “PUMP 6” press the following keys in the order shown. Where dark keys are shown more than one time, you should press that key repeatedly until the desired alphanumeric character is displayed.



Note

The Delete key will delete an individual character as well as the space it occupies. The Alt/Delete key will clear the entire field.

Numerical Values

For fields that require numerical entry only, the alphabetic characters of the keys are disabled. Only one key press is required to enter a number. The “-” key can be used to enter a negative number and can be entered *before* or *after* the number(s).

Entering Fractions (*Alignment Applications Only*)



In the Machine Dimensions screen, these keys are used to enter fractional values. For instance, to enter $5 \frac{5}{8}$, press keys in the following order:

(1)5

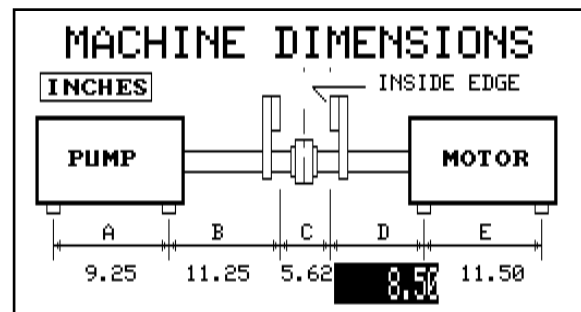
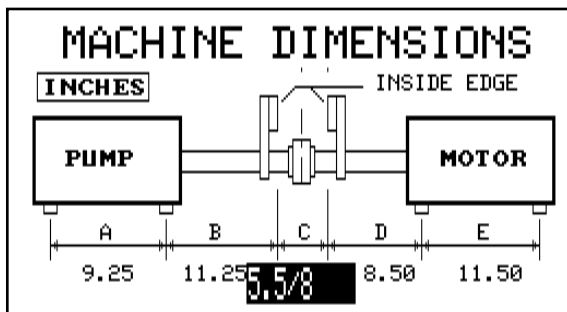
(2).

(3)5

(4)/

(5)8

When Enter is pressed, the fraction will be converted to a decimal automatically.



Special Language Characters

The following special language characters are accessible through the indicated alternate numerical key sequence.

Key Sequence	Special Character
Alt/1	Ä
Alt/2	Å
Alt/3	Ö
Alt/4	Ñ
Alt/5	Ü
Alt/6	É
Alt/7	Ç

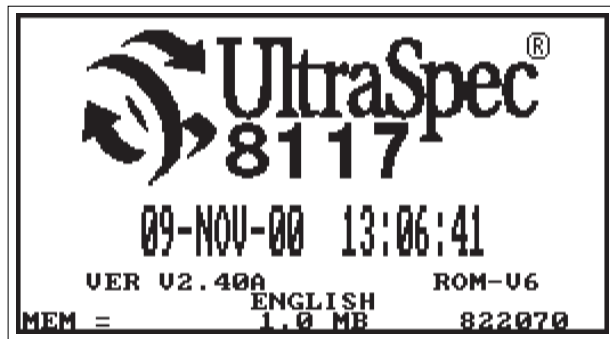
Note

To view the special language characters in UltraMgr, a special table will need to be installed. Call CSI Customer Support for more information.

UltraSpec Analyzer Utility Functions

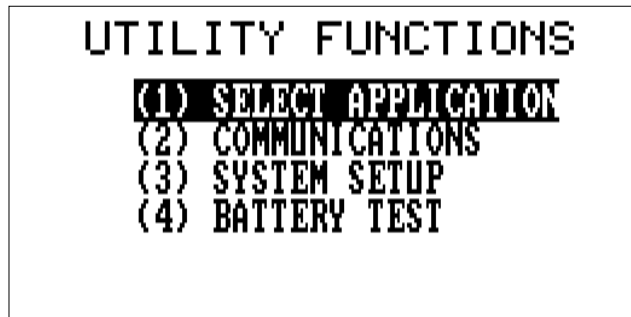
UltraSpec Analyzer Startup

When the UltraSpec analyzer is turned on, the “Power Up” screen will display first as shown below. This screen temporarily displays the current date and time, the version number of the installed firmware, the version number of the installed Erasable Programmable Read Only Memory (EPROM), the total amount of memory available in the meter, and the serial number of the meter.



UltraSpec Analyzer Startup Screen

Press the Utility key to access the Utility Functions menu shown below.



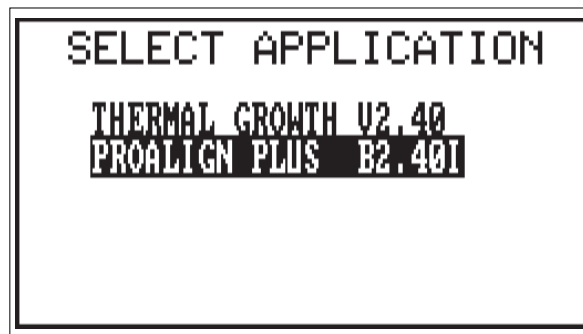
Utility Functions Screen

The Utility Functions menu contains four functions which are described in detail in the following subsections.

- Select Application
- Communications
- System Setup
- Battery Test

Select Application

Although the analyzer defaults to the last application used, you can use this menu to select another application (when multiple applications have been installed).



For additional information, refer to “Loading UltraSpec Analyzer Firmware and Applications” on page 1-12.

Note

Applications must be loaded from a computer to the UltraSpec analyzer before they can be selected.

Note

When the ProAlign Plus application is first selected after loading into the analyzer a message is displayed telling you that all DLP (Downloadable Program) memory is cleared and displaying the amount of free memory (in bytes) left in the analyzer. From this screen press Enter to continue and enter the ProAlign Plus application.

Communications

The Communications function menu is used to establish communications with the host computer and to provide utilities for controlling communication parameters of the analyzer, as well as an external modem.



Communications Function Menu

The following subsections describe the Communications menu selections in detail.

Host PC Load/Dump

The Load function is used to transfer one or more jobs from the computer database into the analyzer. The Dump function is used to transfer the modified jobs in storage to the UltraMgr database.

Note

The transfer is performed via direct computer to analyzer hook-up using a Model 639 communications cable. This cable is supplied as standard equipment with the analyzer (no modem is required). When Host PC Load/Dump is selected, the analyzer automatically awaits signals from the computer to begin transferring stored job(s) data. A screen stating that the analyzer is awaiting host commands will be displayed. This screen will be displayed until the time needed for all retries has been used up. At that point, a communications error message will be displayed.

Communications Setup

The Communications Setup menu is used to configure the communications port of the analyzer.

```
COMMUNICATIONS SETUP

BAUD RATE : 38.4K
STOP BITS : ONE
TIMEOUT    : 10.0 SEC.
RETRIES    : 5
CTS ENABL  : NO
```

Select the Baud Rate from 76.8K, 38.4K, 19.2K, 9600, 4800, 2400, 1200, or 300 baud. For rapid data transfer, select the highest baud rate possible, consistent with the capabilities of the host computer equipment.

Set the Stop Bit option at One or Two.

The Timeout option controls the amount of time (selectable from 0 through 99.9 seconds) that the analyzer will wait for the computer to respond before aborting the procedure and trying again. Entering a value of zero will disable this feature.

The Retries option specifies the number of times the analyzer will repeat attempts to establish valid communication. If communication is not established, the analyzer will display a communications error message following the last retry and timeout cycle.

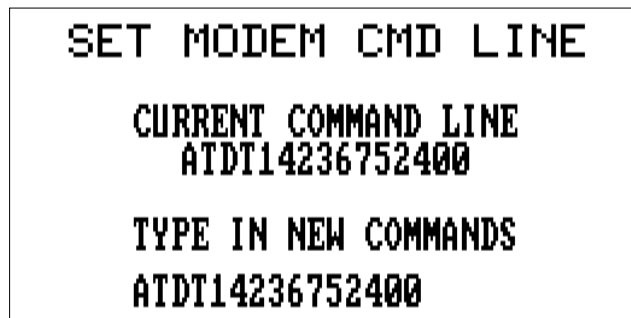
Note

CSI recommends a value of “one” for the Stop Bits setting. A suggested timeout value of 10 seconds, and five retries should allow sufficient time for the computer to process any communication errors and multiple jobs being loaded from UltraMgr.

The CTS Enable option should be set to “Yes” when using a modem that supports hardware handshake via CTS signal (this includes most 9600 baud modems).

Set Modem Commands

This menu selection is used to define the modem command string which instructs the modem to dial a telephone number.



```
SET MODEM CMD LINE

CURRENT COMMAND LINE
ATDT14236752400

TYPE IN NEW COMMANDS
ATDT14236752400
```

The example Set Modem screen above shows a modem command line for use with a Hayes-compatible modem which will:

- Use tone dialing ATDT (ATDP for pulse dialing)
- Dial 1 and the area code 423
- Then dial the number 675-2400

Underneath “Type in New Commands,” use the alphanumeric keypad to type in the desired letters/numbers. Press the Enter key to accept the new modem number.

Modem Connect

This menu selection is used to transmit the modem command string to the modem.

Transferring Data Via Modem

The CSI Model 705 Modem kit is recommended when using the UltraSpec analyzer to transfer data via telephone line. The kit includes:

- Model 705 2400-baud modem.
- Model 635 analyzer to modem cable.
- Telephone cord - connects the modem to the telephone outlet.
- Two-to-one adapter - permits the modem and an existing telephone to connect to one telephone outlet.

The host computer will require an external or internal Hayes-compatible modem that is connected to the COM port (normally COM1) of the computer. Consult the appropriate modem and/or computer manual for additional installation and operating information.

Note

You must have RBMware's CSICOM program to transfer data via modem.

To Establish Communications

1. ... On the PC, access RBMware. From the RBMware main menu, select the Portable Vibration button, select the Setup/Communications tab, select Analyzer Data Transfer, then select Setup Comm.
2. ... Specify the COM port the modem is connected to.
3. ... In the Modem Initialization String field, enter the initialization string for your modem and click OK. Refer to the manual supplied with your modem for recommended initialization strings.

If you are unable to locate the correct initialization string, CSI recommends trying one of the following generic strings.

Generic String	Result
ATA<0D>	Sends a command to the modem to make it answer the phone line immediately.
ATS0=1<0D>	Sends a command to go into Auto-Answer mode.

Note

The initialization string is the actual string that will be sent to the COM port specified in the Communication Port field.

4. ... Select Initiate to send the command string to the modem.
5. ... Connect the Model 705 modem to the analyzer's RS232 port with the supplied cable. Plug the existing telephone line and the modem telephone line into the two-to-one adapter. Plug the adapter into the telephone outlet.
6. ... Select the Modem Connect option on the UltraSpec Analyzer and press the Enter key. The analyzer will display the Modem Connect in Progress screen during the dialing process.
7. ... The telephone can be monitored during step 8 by picking up the receiver and listening to make sure that the host computer's modem has answered. Do not hang up the receiver as this will usually cause the modem to hang up also. The receiver may be carefully set aside without adversely affecting communications.
8. ... Close CSICOM to return to the RBMware main menu, then select Corrective Data Transfer.
9. ... Ensure that the baud rate and stop bits parameters in UltraMgr's UltraCom agree with the Communications Setup parameters on the UltraSpec Analyzer. Check the modem command string in the Set Modem Commands menu of the analyzer.

After communications have been established, the analyzer will display the Communications menu. Select the Host PC Load/Ump option and follow the normal operating procedures used to transfer data. *This process requires an operator at each end of the communications link.*

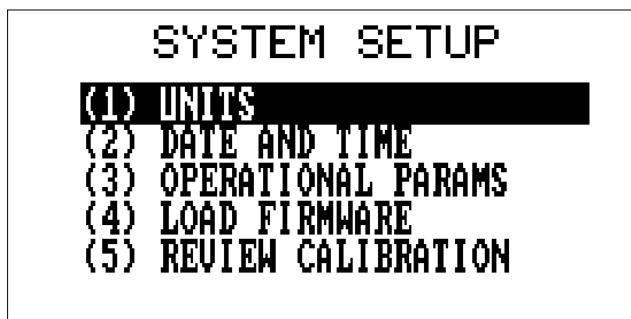
Communications Trouble (using Modem)

If communications cannot be established, verify the following:

1. ... The modem command string in the Set Modem Commands menu of the analyzer.
2. ... The baud rate, stop bits, timeout parameters, and the date and time on the analyzer and the host computer.
3. ... Secure connections on the Model 705, the analyzer, and the telephone line.
4. ... Secure connections on the host computer and modem, and the telephone line.
5. ... A dial tone is present, the modem dials the number, the destination phone rings, and the destination modem answers.

System Setup

From the Utility Functions menu, press System Setup to access the following screen. This screen shows setup parameters from which various operational control parameters of the analyzer may be specified.



Units

Data Units parameters define how the analyzer will display and collect data. The Units mode specifies whether data are to be displayed in English or Metric and Hz or CPM.

DEFINE DATA UNITS		
<DATA UNITS>	<DATA>	
ACCELERATION	:	RMS
VELOCITY	:	PEAK
DISPLACEMENT	:	PK-PK
NONSTANDARD	:	RMS
UNITS MODE	:	ENGLISH HZ

Note

The Units mode is the only parameter under Units Function used by the Alignment application.

The <Data Units> column lists the available types of converted data. The <Data> column specifies how the acquired data will be displayed for each data unit. Press any key in the lower section of the keypad to step through and select RMS, Peak, and Pk-Pk.

Date and Time

This function sets the current date and time on the UltraSpec analyzer using Greenwich Mean Time (GMT) format. Greenwich Mean Time is equivalent to Universal Time Coordinates (UTC) and Zulu (Z) time. It is measured from the Prime Meridian originating at Greenwich, England.

To change the month, press any key on the keypad to step through the months. Use the keypad to enter the correct values for the remaining items. Enter the current date, time, and GMT offset for your time zone. There are 25 GMT World Time Zones from -12 through +12 (i.e. the GMT Offset for the Eastern Standard Time Zone would be -5). Toggle Daylight Savings Time (D.S.T.) on or off depending on whether Daylight Savings Time is in effect or not. Press the Enter key to accept the values as displayed and return to the System Setup menu.

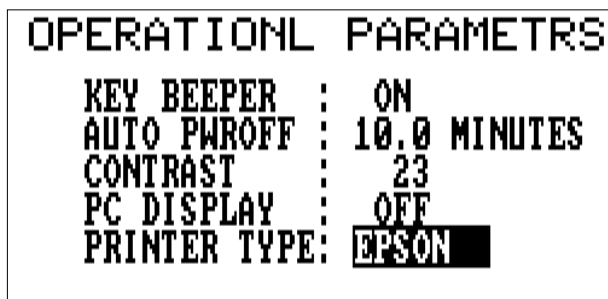
```
SET TIME AND DATE
DAY   : 06      HOUR   : 15
MONTH : AUG     MIN    : 49
YEAR  : 98      SEC    : 51
      GMT OFFSET: -5.0
      D.S.T.   : ON
CURRENT GMT = 06-AUG-98 19:49:51
```

Note

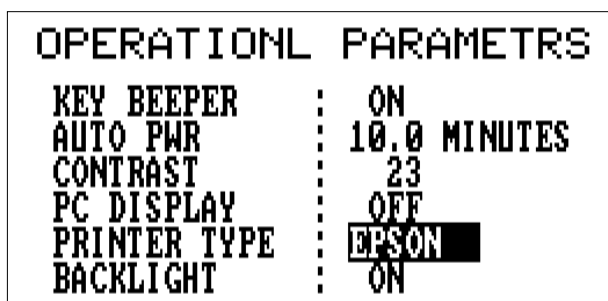
If the analyzer displays the “Warning - Check GMT & DST Setting” screen, it will continue to do so with power-up and reset until you have entered, made the necessary changes, and accepted the date and time. In the UltraSpec 8000 analyzer, you will be required to set the date and time every time you reload the base firmware. In the UltraSpec 8117 analyzer, the date and time with GMT offset and D.S.T. are automatically saved in non-volatile memory when the date and time are accepted; therefore, you will not be required to set the date and time when the base firmware is reloaded.

Operational Params

The Operational Parameters menu is used to set up certain operating characteristics of the analyzer.



UltraSpec 8000



UltraSpec 8117

Key Beeper: - This field is used to toggle the audible indicator (beep) function between On and Off. When on, a single beep indicates that a key has been pressed.

Automatic Poweroff: - The Automatic Poweroff feature will turn the analyzer off if there is no user activity within a specified time period. This time period is defined in minutes from 0 to 10. Entering 0 will disable the Automatic Poweroff feature.

Contrast: - alters the viewing angle of the analyzer display screen. Any key on the keypad will advance the contrast values from 1 (maximum contrast) through 41 (minimum contrast), and then the sequence repeats.

Note

Changing contrast in normal light often appears to change only the tint. In certain situations, however, changing the viewing angle of the screen can make a significant difference in clarity.

PC Display: - This function enables a computer, loaded with appropriate software, to display the analyzer's screen on the computer monitor using the 639 communication cable. This feature is intended for demonstration and training purposes and is not used during normal operation of the analyzer and should be set to Off.

Note

To display and acquire data simultaneously a splitter adapter (e.g., model 8003) is required.

Printer Type – Epson, Deskjet, Epson-2, or Virprint.

- Epson – use any Epson-compatible dot matrix printer
- Deskjet – use when printing to HP Deskjet printer
- Epson-2 – same as Epson but with compressed line spacing in graphics mode. This is useful for some printers that leave graphics in the graphics mode.
- Virprint – A printer emulation program from CSI. Used to print data from the analyzer via the Virprint (Virtual Printer) program to any printer supported by the Windows operating system. See “Screen/Print Key” on page 3-25 for more information on printing.

Note

Switching printer types with the 720A attached might require letting the 720A printer interface sit unconnected for about five minutes. If you are using a printer interface with a reset button, *it should be pressed after changing the printer selection.*

Backlight – This field is only available in the UltraSpec 8117 analyzer. It is used to turn the analyzer’s backlight on and off. When on, the backlight turns off automatically after one minute of key inactivity and back on automatically when any key is pressed.

Load Firmware

This feature is used to load firmware and applications from the PC into the analyzer. See “Installing the Application” on page 1-10 for complete instructions on this procedure.

Review Calibration

To ensure maximum measurement accuracy, each UltraSpec analyzer is thoroughly calibrated by CSI before shipping, and the results of the calibration are recorded on the calibration tag that is shipped with the analyzer. The values entered into the analyzer’s calibration routine allow the firmware to compensate for any minor errors in measurement that may be caused by component tolerances within the analyzer.

Normally, these values do not have to be modified. However, the analyzer calibration values should be checked against the calibration tag under the following conditions:

- The analyzer produces invalid or unreasonable readings.
- The battery has been allowed to discharge to the point where analyzer memory has been lost. (This typically would require several months of inactivity.)
- New firmware has been loaded into the analyzer (UltraSpec 8000 analyzer only).
- The analyzer displays the “Warning – Check Calibration Factors” screen.

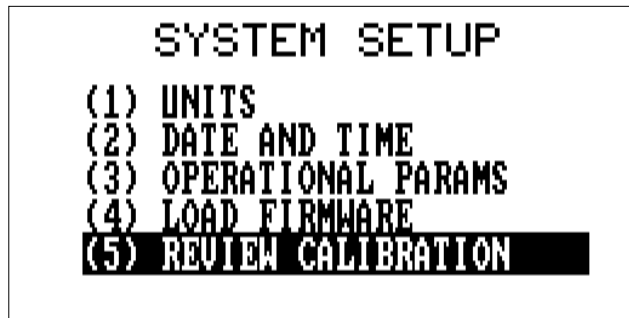
Normally, the calibration values can simply be entered into the analyzer using the values recorded on the calibration tag. It is recommended, however, that the analyzer be returned to CSI once a year for re-calibration in order to maintain the instrument’s accuracy.

Note

The calibration values can be automatically loaded into the analyzer when the firmware is loaded. For additional information see “Calibration Write Program” on page 2-39.

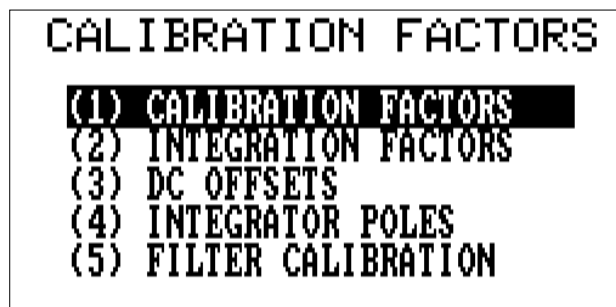
Note

In the UltraSpec 8117 analyzer, the calibration values can be saved into non-volatile memory. For more information, see “Save Calibrations” on page 2-37.

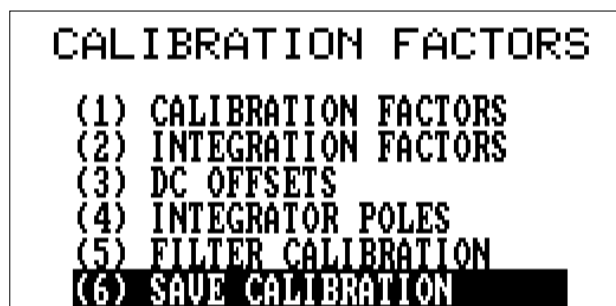


To check and/or modify the calibration values, press the Utility key, highlight System Setup from the menu and press the Enter key. Then highlight Review Calibration and press the Enter key. At the "Access #:" prompt, enter the access code (CSI is the default) and press the Enter key.

The following are brief descriptions of the functions of each selection.



UltraSpec 8000



UltraSpec 8117

Calibration Factors

Adjusts the overall signal amplitude compensation.

```
CALIBRATION FACTOR

CURRENT CALIBRATION
FACTOR = 1.016
DESIRED CALIBRATION
FACTOR = 1.016
```

Integration Factors

These four parameters apply to the gain corrections used for the analog integrators which convert sensor units to display units.

```
INTEGRATION FACTORS

ACCEL INTEGRATOR 1 : 3.386
ACCEL INTEGRATOR 2 : 7.626
VOLTS INTEGRATOR 1 : 1.129
VOLTS INTEGRATOR 2 : 2.592
```

DC Offsets

These parameters are associated with the DC measurement offset, the analog RMS to DC converter offset, and the battery test offset.

DC OFFSETS	
DC OFFSET	: 0.01335
RMS/DC OFFSET	:-.01300
+ BATTERY OFFSET	: 0.2300
- BATTERY OFFSET	: 0.2400

UltraSpec 8000

DC OFFSETS	
DC OFFSET	: .002000
RMS/DC OFFSET	:-.00700
+ BATTERY OFFSET	:-0.2000

UltraSpec 8117

Note

Battery Offsets is the only factor used in the Alignment application.

Integrator Poles

These six parameters apply to low frequency roll-off correction of the analog integration circuits. This correction is normally disabled unless special low-frequency measurements are being performed.

INTEGRATOR POLES		
APPLY POLES	:	NO
ACCELERATION POLE1	:	2.50
ACCELERATION POLE2	:	3.40
VOLTS POLE1	:	2.50
VOLTS POLE2	:	3.40
LOW FREQUENCY (HZ)	:	3.00

If pole corrections are enabled (Apply Poles field set to “Yes”), the specified lower frequency for correction will be used not only for analog integration but also for digital integration. Do *not* enable pole corrections for normal use unless there are special requirements for measurements.

Filter Calibration

These two parameters define the break frequency intervals of the internal pre- and post-filter stages of the anti-aliasing filter section.

FILTER CALIBRATION		
PRE-FILTER	:	117.
POST-FILTER	:	133.

Save Calibrations

This feature is only available in the UltraSpec 8117 analyzer. It is used to store the calibration values into non-volatile memory. This must be done to save new calibration values. Otherwise, the values will be lost once power to the analyzer is turned off.

If the displayed values do not agree with the values on the tag, re-enter the calibration values.

Note

If the analyzer displays the “Warning – Check Calibration Factors” screen, it will continue to do so with each power-up and reset until you have entered the Set Calibration function. This procedure is intended to ensure that the calibration factors are at least checked for accuracy after downloading firmware or inadvertently losing analyzer memory data.

Calibration Write Program

The calibration factors for the analyzer can be automatically entered into the analyzer when the firmware is downloaded using the Windows Calibration Write program (formerly known as the Calwrite program). The calibration factors must be entered or modified using the Calibration Write program before downloading the firmware into the analyzer. To run the Calibration Write program and enter the calibration factors, place the floppy disk containing the firmware into the A (or B) drive of your computer. From Windows, select the Start button and then choose Run. Type A: (or B:) \CWRITEFW.EXE and then select the Ok button. The following screen will be displayed.

Description	Default	Actual
ADC Calibration Factor	1.000	1.000
Acceleration Integrator #1	3.504	3.504
Acceleration Integrator #2	7.712	7.712
Volts Integrator #1	1.168	1.168
Volts Integrator #2	2.571	2.571
DC Offset	0.000	0.000
RMS/DC Offset	0.000	0.000
+ Battery Offset	0.000	0.000
- Battery Offset	0.000	0.000
Acceleration Pole #1	2.500	2.500
Acceleration Pole #2	3.400	3.400
Volts Pole #1	2.500	2.500
Volts Pole #2	3.400	3.400
Low Cutoff Frequency	3.000	3.000
Pre-Filter	120.00	120.00
Post-Filter	120.00	120.00

Buttons: Exit, About, Accept, Reset, Previous, Next, Reload Defaults, Help

Source/Destination: Current Drive: A:

Ready

The factors are displayed in two columns. The first column contains the Default calibration factors. The second column contains the editable (Actual) calibration values.

The Current Drive defaults to the first drive found to exist starting with Drive A. When the program is first run, it automatically attempts to read the factors from the file containing the firmware on the selected drive. To change drives, click on the Previous or Next button. The program will automatically attempt to read the factors from the file containing the firmware on the newly selected drive.

Initially, the Actual factors are set to the Default factors. If all the factors are zero (0.0), the Current Drive does not contain the file containing the firmware. To enter new calibration factors, click on the desired box and type in the new factor. Either use the Tab key to advance to the next box or click on the next box.

To reset the Actual factors to the Default factors, click on the Reset button. To write new factors into the firmware file, click on the Accept button. After the factors have been successfully written into the firmware file, the Default column will be reloaded with the new factors. When finished, click on the Exit button to exit and close the Calibration Write program.

To reload Default factors, if you switch firmware diskettes without exiting the program, click on the Reload Default button. The program will automatically read the factors from the file containing the firmware on the new firmware diskette.

Note

The Calibration Write program is a Windows program. Therefore, the calibration factors can only be entered or modified from within Windows. Once the calibration factors have been successfully written into the firmware file, the firmware can be downloaded in the analyzer either using the DOS Downloader or Windows Downloader program. Refer to the pages under “Download Procedure” on page 1-13 for more information.

Note

Even after loading firmware with the modified calibration factors into the UltraSpec 8000 analyzer, you are prompted to check them to make sure they are correct. This prompt message will continue appearing until you look at the calibration factors.

Battery Test

The Battery Test function will give an approximate indication (in percent) of the battery's condition and the battery pack voltage. To access this function, select Battery Test from the Utility key menu.

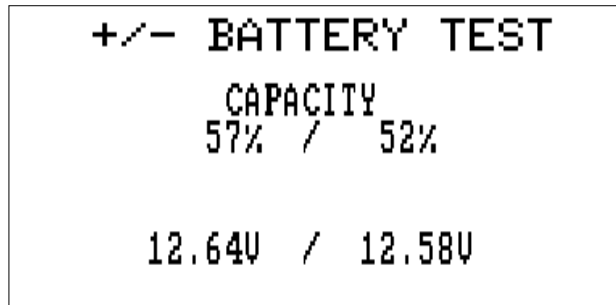


Figure 18. UltraSpec 8000

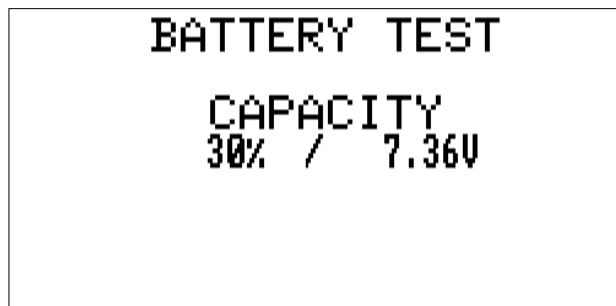


Figure 19. UltraSpec 8117

This display presents *approximate* values and should only be used as a guideline in determining the amount of battery charge remaining. When the percent value first reaches zero, a built-in safety margin allows approximately ten minutes of additional use before the analyzer turns itself off in order to protect the memory.

Options and Hardkey Functions

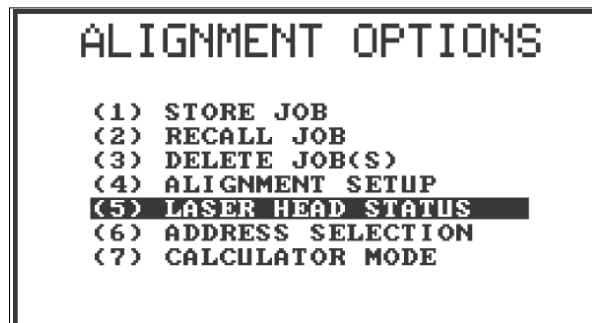


Utility Key

The Utility key provides functions that are generic to all applications. Refer to “UltraSpec Analyzer Utility Functions” on page 2-19 for an explanation of these functions.

Options Key

The Options key provides access to those functions that are specific to this application (see the following screen).



Alignment Options Screen

Store Job

All data are stored to a user specified job number. This selection stores the current job in the stored job area. If the job is stored successfully, a screen will appear stating that it was a success. Also displayed on this screen is the amount of “Free memory” (in bytes) available in the analyzer. Press Enter to continue and return to the program’s main menu. If you attempt to store a job that has the same job number as one already stored, you will see a “Warning Duplicate Job # Found” message giving you the chance to change the job number if the job in storage should be kept. If you want to overwrite the stored job. Press Enter to continue.

Jobs can reside in two areas in the analyzer, the

- current (active) job area, or
- stored job area.

The current job is the active job in the analyzer and can be totally modified to suit your needs. You can only have one job at a time in the current job area.

Before being transferred to the computer for storage via UltraMgr, jobs must be stored in the stored job area. The number of jobs which can be placed in the stored job area will vary depending on what other applications are loaded in the UltraSpec analyzer, as well as what data the other applications have stored.

There are two ways to place a job in the stored job area:

- Define it on the analyzer and use the Store option, or
- Load it from the host computer using UltraMgr.

Note

Depending on the amount of memory available in the analyzer and the type of alignment data (e.g., 4 point or Auto Sweep) being stored in the alignment job it is possible to store up to a maximum of 100 alignment jobs in the analyzer.

Recall Job

Recall Job is used to select a job in the stored job area. Select Recall Job from the Alignment Options menu to access the screen shown below. Using the Up and Down Arrow keys highlight any desired job *stored in the UltraSpec memory* and then press the Enter key.

When recalling a job into the current job area where a job is already located, you will receive a prompt asking if you want to overwrite the current job. Pressing Enter allows the current job to be overwritten. If the job is recalled successfully, a screen appears stating that it was a success. Press Enter to continue. If you want to save the current job, press the Reset/Main key to abort, then store the job using the process described under “Store Job” on page 3-3.

Note

Follow these steps carefully to ensure that you do not overwrite data that you really want to keep

RECALL JOB			
JOB NUMBER	MACH ID	DATE	TIME
WO 2333-A	PUMP #4	24-FEB-94	14:30:48
WO 2356-D	PUMP #5	17-JUN-94	08:53:32
WO 2509-R	PUMP #2	15-FEB-94	16:09:53
WO 2490-Q	BLOWER #3	04-MAR-94	14:27:30

Note

If there are more jobs than can be displayed on the analyzer screen, use the Page Down key to page to the remaining selections on the list.

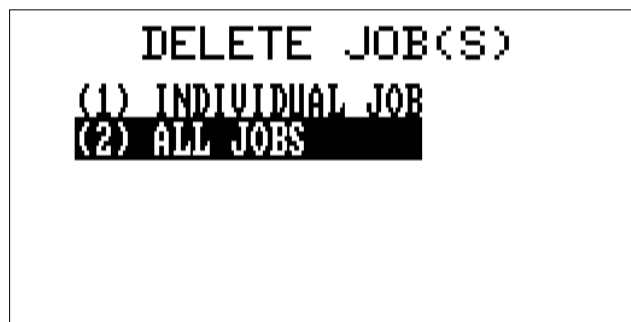
After selecting the job, the analyzer returns to the program’s Main menu.

Delete Job(s)

Delete Job(s) is used to erase individual jobs or all data in the analyzer's stored memory. When Individual Job is selected, a list of jobs in storage will be displayed. Using the Up and Down Arrow keys, you can then select the job to be erased by pressing the Enter key.

When deleting an individual job, you will receive a Warning prompt asking if you want to delete the selected job and displays a screen stating that it was deleted successfully. Also displayed on this screen is the amount of "Free Memory" (in bytes) available in the analyzer. Press Enter to continue and return to the Delete Job menu.

If you wish to cancel and not delete the selected job, pressing the Page Up key will abort the operation and return you to the Delete Job menu.



If All Jobs is selected, the following warning screen will be displayed. Press any key to toggle Yes or No. Press Enter to continue. Answering Yes deletes all jobs stored (including the active job) in the analyzer and displays a screen stating that they were deleted successfully.

Also displayed on the screen is the amount of “Free Memory” (in bytes) available in the analyzer. Press Enter to continue and return to the program’s Main menu. Answering No aborts the operation and returns you to the program’s Main menu.

```
WARNING
THIS FUNCTION WILL RESULT IN
THE TOTAL LOSS OF ALL JOBS AND
DATA STORED IN MEMORY FOR THE
CURRENT OPERATING APPLICATION.
-- PLEASE VERIFY --
CLR MEMORY : NO
```

Caution!

Use extreme caution when using the Delete Job(s) function if the analyzer contains job data. After accepting or answering Yes to the warning screen, the data cannot be retrieved unless the data have been dumped to UltraMgr.

Alignment Setup

Selecting Alignment Setup displays the following screen.

```
ALIGNMENT SETUP
METHOD          : AUTO SWEEP
ACQ MODE        : STANDARD
TOLERANCES      : ANGLE/OFFSET
THERMAL GROWTH  : NO
FOOT PRE-CHECK  : SOFT FOOT
QUICK SPEC      : NO
```

Alignment Setup Screen

Method: Allows you to select the method used to acquire alignment data. The available methods are 4 Point Auto, 4 Point Manual, Auto Sweep, Manual Sweep, Dual Pass, and Straightness. Additional information is available under “Alignment Data” on page 5-25 and “Data Collection Methods - Overview” on page 6-1.

ACQ Mode/Sample Rate/Target Window: Allows you to select how the chosen method acquires alignment data. Refer to “Alignment Data” on page 5-25 and “Data Collection Methods - Overview” on page 6-1 for more details.

Tolerances: Determines how tolerance are displayed:

Angle/Offset (formally Standard) = Offset vs Angle

Jackshaft = Left Angle vs Right Angle (recommended for span
(C dimension) > 20 inches)

Refer to “Tolerances” on page 5-30 for more information.

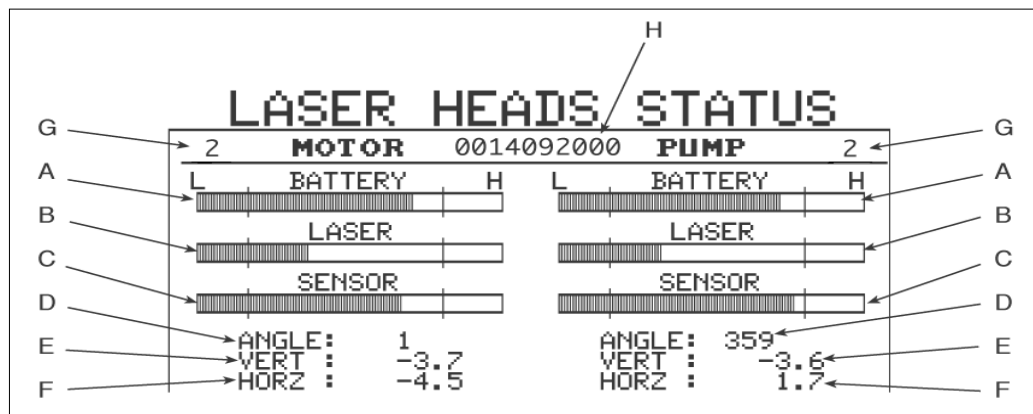
Thermal Growth: (Yes/No) Turns on additional screens in Job Definition for the input of Thermal Growth data. Refer to “Thermal Growth, Vertical” on page 5-20 and “Thermal Growth, Horizontal” on page 5-21 for more information.

Foot Pre-Check: Allows you to check whether or not there is movement at the coupling when a bolt or other fastener (at the foot of the machine) is loosened. Choose between Soft Foot or FDI (Frame Distortion Index). *See “Foot Pre-Check” on page 5-22 and Appendix A for more information.*

Quick Spec: (Yes/No) Allows you to make a quick inspection of the alignment condition of a machine with minimal setup and effort. If a machine is found to have unacceptable alignment, the procedure can be readily converted to a full alignment procedure and machine moves calculated. See “Quick Spec” on page 6-33 for additional information.

Laser Head Status Screen

Laser Head Status provides a continuous update on laser head parameters. It also monitors for other laser errors and reports any errors using pop-up messages. This screen assumes that the laser configuration screen is set up as configured under “Laser Configuration” on page 5-17. If so, the left half of the screen contains information on the Left sensor head and the right half of the screen contains information on the Right sensor head. If “***” appears, you do not have proper communication. Press <Alt> <Exp> to replace the bar graphs with numbers.



In all bar graphs, the bar should be between the lines. Definitions are:

- A.**... A bar graph of the present battery condition of each sensor head.
- B.**... Bar graph of the laser diode current in each head. This is for system troubleshooting.
- C.**... Bar graph of the laser intensity on each target. This is for system troubleshooting.
- D.**... The present rotational angle of each sensor head.
- E & F.** The position of each laser beam on each target. This position is located on the vertical and horizontal axes (read in mm or mils).
- G.**... The number of averages taken before each target data value is sent to the analyzer. Pressing the Up or Down Arrow key increases or decreases the number of averages by one. A minimum of one and a maximum of 25 averages can be set.
- H.**... The version number of the sensor heads.

Note

Whenever a communication problem exists, the following message will be displayed: “Attempting Laser Head Communication.” If this occurs, make sure:

- 1.... (If applicable), you are using the proper direct connect cable (Model 821510) and it has been properly connected to the analyzer.
- 2.... If applicable, you are using the proper wireless adapter (Model 8000RF) and it has been properly connected to the analyzer
- 3.... Both laser heads are turned on.
- 4.... The RF communication addresses for both the laser heads and analyzer are set up properly.
- 5.... You are in the proper alignment application (ProAlign Plus) for the laser heads (Models 8215 and 8225).

Pressing the Alt/0 (Alt/Space) key displays a screen with a complete status and error code report from laser heads. If a “W” or an “X” appears under a laser head column for a condition, as shown in the following figure, then that condition exists for that laser head.

	LEFT HEAD	RIGHT HEAD
** STATUS **		
MODE:	STANDARD	STANDARD
AUTO PWR OFF:		
** ERRORS **		
LOW BATTERY:		
LSR INTENSITY:		
LASER CURRENT:		
BM OFF TARGET:	X	X
INVALID CAL:		
NON-LINEAR:		
OUT-OF-SYNC:		
PROC SELFTEST:		

Status Report

Auto Power Off: When an “X” appears in the column, the auto shut down (power off) mode is disabled. Refer to “Battery Usage - Laser Heads” on page 4-16 for more information.

Error Report

Low Battery: A “W” in this column indicates the 1st of two low battery warnings. From the time a “W” appears in the column the laser head will have approximately thirty minutes of power left before it powers off. Any data acquired when the head is in this state is considered good and can be used, but you need to find a stopping point. An “X” in this column indicates the 2nd and final low battery warning before the laser head powers off. From the time an “X” appears in the column the laser head will power off in approximately five minutes. Any data acquired when the head is in this state is questionable and is not used. With both indications the laser head needs to be recharged. Refer to “Battery Charging” on page 4-9 and “Battery Usage - Laser Heads” on page 4-16 for more information.

Note

The amount of time (life) left in the battery is only an approximation. As battery age and usage increases, battery life can decrease; therefore, the amount of time left in the battery decreases.

Laser Intensity: An “X” in this column indicates that the laser signal received on the laser head PSD (Position Sensor Detector) is out of its factory specified limit (either too high or low). This could be due to a beam adjusted in such a manner that the beam isn't hitting the target, a blocked laser beam, an internal error in the laser head, or a laser power transmitted from the other laser head which is too low. When the head is in this state, no data is being acquired. First make sure that the laser beam from the opposite laser head is properly adjusted so it hits the PSD of the laser head. Refer to “Center the Laser Beams” on page 4-42 for more information. If the adjustment isn't the problem, make sure the laser beam isn't being blocked by an obstacle (e.g. cable, dirt or grease on the laser and PSD lenses, dust particulate in the air, etc.). Also, make sure the laser head is being operated within its specified temperature limits (i.e. temperatures greater than the specified limit can result in a reduced laser power output). Refer to Appendix C for operating limits. Contact CSI Customer Support if you are unable to resolve the problem.

Laser Current: An “X” in this column indicates that the circuit driving input current for the laser signal being transmitted from the laser head is out of its limit (either too high or low). This should only occur if there was an internal error in the laser head. When the head is in this state, no data is being acquired. Contact CSI Customer Support if you experience this problem.

Note

The circuit driving input current for the laser signal being transmitted and the laser power for the laser signal being transmitted are not the same. It is possible for the laser signal power being transmitted to be low and still have the circuit driving input current for the laser signal being transmitted be within factory specified limits.

Beam (BM) Off Target: An “X” in this column indicates that the laser beam from the other head is not being detected on the PSD of the laser head. This could be due to a beam adjusted in such a manner that the beam isn't hitting the target, a blocked laser beam, or an internal error in the laser head. When the laser head is in this state no data is being acquired. First make sure that the laser beam is properly adjusted so it hits the PSD of the opposite head. Refer to “Center the Laser Beams” on page 4-42 for more information. If the adjustment isn't the problem, make sure the laser beam isn't being blocked by an obstacle (e.g. cable, dirt or grease on the laser and PSD lenses, dust particulate in the air, etc.). Contact CSI Customer Support if you are unable to resolve the problem.

Invalid Calibration (Not currently used): An “X” in this column indicates that the factory set calibration values have become corrupted. Contact CSI Customer Support if you experience this problem.

Non-Linear Region: An “X” in this column indicates that laser beam is hitting the PSD outside an imaginary limit (boundary) specified at the factory. This could mean that some of the laser beam is hitting the PSD and some of the beam is partially off the PSD. It could also mean that the entire laser beam is hitting on the PSD, but that some of the beam is hitting the PSD beyond the imaginary limit. When the laser head is in this state, data is still being acquired and accepted since the laser heads can not tell which situation is occurring. Make sure that the laser beam is properly readjusted so it hits the PSD of the opposite head. Refer to “Center the Laser Beams” on page 4-42 for more information. Contact CSI Customer Support if you are unable to resolve the problem.

Out-Of-Sync: An “X” in this column indicates that both laser heads are not synchronized with each other. This could result when the laser beam is off the target, momentarily as the beam first comes onto the PSD, or it could be due to an internal error inside the laser head. When the head is in this state, no data is being acquired. Make sure that the laser beam is properly readjusted so it hits the PSD of the opposite head. Refer to “Center the Laser Beams” on page 4-42 for more information. Contact CSI Customer Support if you are unable

to resolve the problem.

Processor Selftest (Not currently used): An “X” in this column indicates that a test of all the internal memory addresses show that they are not working properly. Contact CSI Customer Support if you experience this problem.

Note

Contact CSI Customer Support if you are unable to resolve any problem or have any questions about any of the parameters under Laser Head Status.

Address Selection

Address Selection allows the user to read and set the laser head addresses, to read and set the analyzer address, or to review the laser head and the analyzer addresses the analyzer is set up to use. This is necessary when using either direct connect or RF communications. If one laser system (a system consists of a pair of laser heads and an analyzer) using RF communication is operating in close proximity to another laser system using RF communication to prevent the two from interfering with each other. In this situation either one, more, or all of the laser systems could use direct connect cables to communicate instead of RF communication or the addresses of each laser system can be changed so that each laser system has a different address than the other. For example, one laser system can have the address of its A-head set to 1, B-head to 2, and analyzer to 11 while the other laser system can have the address of its A-head set to 3, B-head to 4, and analyzer to 12. A maximum of five (5) laser systems communicating RF can be configured to operate using different addresses. The definition of “operating in close proximity” will vary from one environment to another. For example, in one plant any laser system operating within 50 feet of each other could have RF interference due to the other laser system while in another plant any laser system operating within 200 feet of each other could have RF interference due to the other laser system. Refer to “Communication Between the Fixtures and Analyzer” on page 4-35 for more information.

Select Address Selection from under the Options menu and the following menu will be displayed:



Read/Set 82X5 Addressing

This option allows the user to read and set the address in the laser heads. The user will be asked to turn off and on the laser heads one at a time while the analyzer reads the addresses in the laser heads. Then the user will be given the opportunity to change the laser head addresses. The laser head addresses can be set from 1 to 10 with no two laser heads having the same address. The default addresses have the A-head set to 1 and the B-head set to 2.

To read and set the laser head addresses the direct connect cable must be attached to each of the laser heads and the analyzer first.

Caution!

When connecting any device to the RS232 serial port located on the top panel of the analyzer, the analyzer must be turned off.

With the direct connect cable connect, select Read/Set 82X5 Addressing from under the Addressing Selection menu and the following menu will be displayed with step-by-step instructions:

SET LASER HEAD
ADDRESSES

TURN ON "A" LASER HEAD
TURN OFF "B" LASER HEAD

PRESS <ENTER> TO CONTINUE

From the first screen, turn the A-head on and B-head off, then press Enter to continue to the next screen.

```
SET LASER HEAD
ADDRESSES

TURN ON "A" LASER HEAD
TURN OFF "B" LASER HEAD

THE RECEIVED ADDRESS = 1
PRESS <ENTER> TO ACCEPT THIS
ADDRESS OR TYPE IN NEW ADDRESS
IN THE RANGE 1 TO 10.
NEW LASER HEAD ADDRESS =       
```

The second screen will display the address received from the A-head. If the address is not correct or you wish to change the address type in the new address from 1 to 10 using the number keys on the keypad and press Enter to continue to the next screen. If the address is correct then press Enter to continue to the next screen.

```
SET LASER HEAD
ADDRESSES

TURN OFF "A" LASER HEAD
TURN ON "B" LASER HEAD

PRESS <ENTER> TO CONTINUE
```

From the third screen, turn the A-head off and B-head on, then press Enter to continue to the next screen.

```
SET LASER HEAD
ADDRESSES

TURN OFF "A" LASER HEAD
TURN ON "B" LASER HEAD

THE RECEIVED ADDRESS = 2
PRESS <ENTER> TO ACCEPT THIS
ADDRESS OR TYPE IN NEW ADDRESS
IN THE RANGE 1 TO 10.
NEW LASER HEAD ADDRESS =       
```

The forth screen will display the address received from the B-head. If the address is not correct or you wish to change the address type in the new address (different then the A-head address) from 1 to 10 using the number keys on the keypad and press Enter to continue to the Alignment Options menu. If the address is correct then press Enter to continue back to the Alignment Options menu.

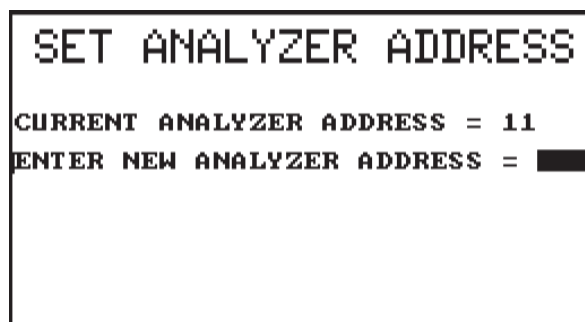
Note

If you enter a number outside the range of 1 to 10 or try to enter two addresses which are the same you will get a warning telling you of the error and to repeat the procedure.

Set Analyzer Address

This option allows the user to read and set the address in the analyzer. The analyzer address can be set from 11 to 15 with the default address set to 11.

To read and set the analyzer address select Set Analyzer Address from under the Addressing Selection menu and press Enter. The following menu will be displayed:



```
SET ANALYZER ADDRESS
CURRENT ANALYZER ADDRESS = 11
ENTER NEW ANALYZER ADDRESS =
```

This screen will display the address set in the analyzer. If the address is not correct or you wish to change the address type in the new address from 11 to 15 using the number keys on the keypad and press Enter to continue to the Alignment Options menu. If the address is correct then press Enter to continue back to the Alignment Options menu.

Note

If you enter a number outside the range of 11 to 15 you will get a warning telling you of the error. If this occurs, press any key to continue and repeat the procedure.

Review Current Addresses

This option allows the user to review the laser head and analyzer addresses setup in the analyzer. To review the settings setup in the analyzer, select Review Current Addresses from under the Addressing Selection menu and press Enter.

Note

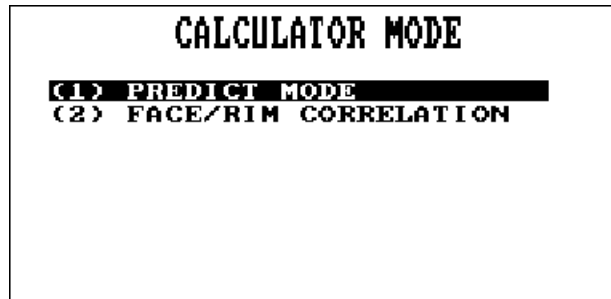
This option only displays the addresses setup in the analyzer and not the addresses setup in the laser heads themselves.

CURRENT ADDRESSES		
LEFT LASER HEAD ADDRESS	=	1
RIGHT LASER HEAD ADDRESS	=	2
ANALYZER ADDRESS	=	11

Calculator Mode

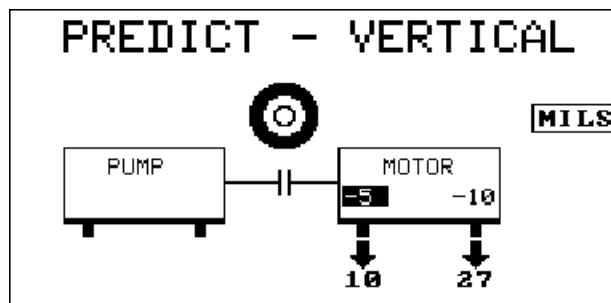
Calculator mode serves as an aid in performing calculations on collected alignment data. The Predict Mode allows you to estimate the resulting misalignment based on the current values needed to align the machine (required move) and operator specified values that the machine can be moved. This is very useful if the machine cannot be dropped any further in the vertical direction or if the machine is bolt bound horizontally. The Face/Rim Correlation converts current misalignment laser position readings to corresponding face/rim readings. This is useful to users familiar with the face/rim alignment method who want to correlate the alignment condition, as measured by the lasers, to indicator values.

Select Calculator Mode from the Options Menu and the following screen appears:



Predict Mode

Press the Enter key to view the Predict-Vertical screen.

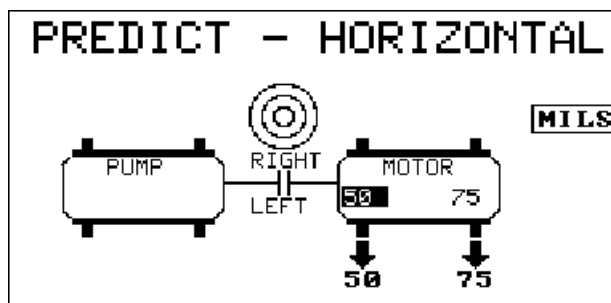


This screen displays the movement currently required to align the machine vertically. The target indicates how close the machine vertical position is to being in tolerance. The center (bullseye) indicates that the alignment condition is in the excellent range. The middle ring represents an acceptable range. The outer ring represents >1 times and <2 times the acceptable range. No ring highlighted indicates >2 times acceptable range.

Similar to the "Machine Moves" section, one of six screens showing an alternate solution to bring the equipment into alignment may be selected. If no foot is selected (no value is highlighted), the Left/Right Arrow can select alternate solutions.

Use the Up/Down Arrow to highlight which foot the specified value is to be applied. Enter a number corresponding to the possible move that can be made. For vertical moves, up is positive. If a machine cannot be moved the required distance, such as when a foot needs to be lowered more than the amount of shims already under the foot, try using different move values in order to find the optimum alignment for the given conditions. The idea is to find a movement solution that may cause the alignment condition to be in the acceptable or even the excellent range.

Press the Enter key to proceed to the Predict-Horizontal screen.

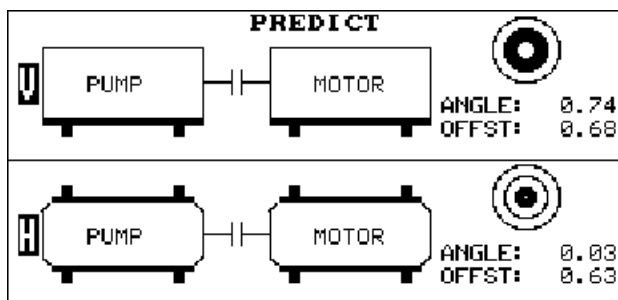


Similar to the Predict-Vertical screen, the Predict-Horizontal screen displays both the movement currently required to align the machine horizontally and a target displaying the alignment condition with respect to the corresponding tolerances.

If no foot is selected (no value is highlighted), the Left/Right Arrow can select alternate solutions.

Use the Up/Down Arrow to highlight which foot the specified value is to be applied. Enter a number corresponding to the possible move that can be made. For horizontal moves, left is positive. If a machine cannot be moved the required distance, such as if the machine is bolt bound, try using different move values in order to find the optimum alignment for the given conditions. The idea is to find a movement solution that may cause the alignment condition to be in the acceptable or even the excellent range.

Press the Enter key to proceed to the Prediction screen.



This screen displays the estimated alignment condition if the specified moves were to be performed. The upper graph shows vertical misalignment, both offset and angular. The lower graph shows horizontal misalignment, both offset and angular.

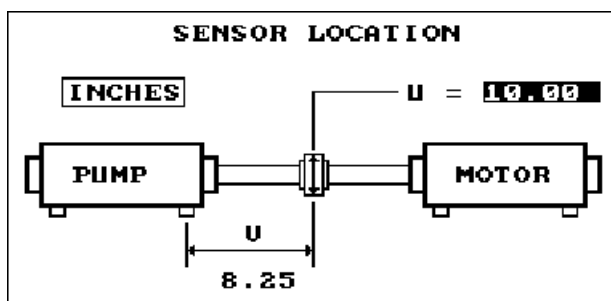
The targets indicate how close the machine vertical and horizontal positions are to being in tolerance. The center (bullseye) indicates an excellent range. The middle ring represents an acceptable range. The outer ring represents >1 times and <2 times the acceptable range. No ring highlighted indicates >2 times acceptable range.

This process may need to be repeated before a suitable solution is found to bring the alignment condition within tolerance.

The example above was shown using offset and angle tolerances. The Predict Mode can also be used with Jackshaft tolerances.

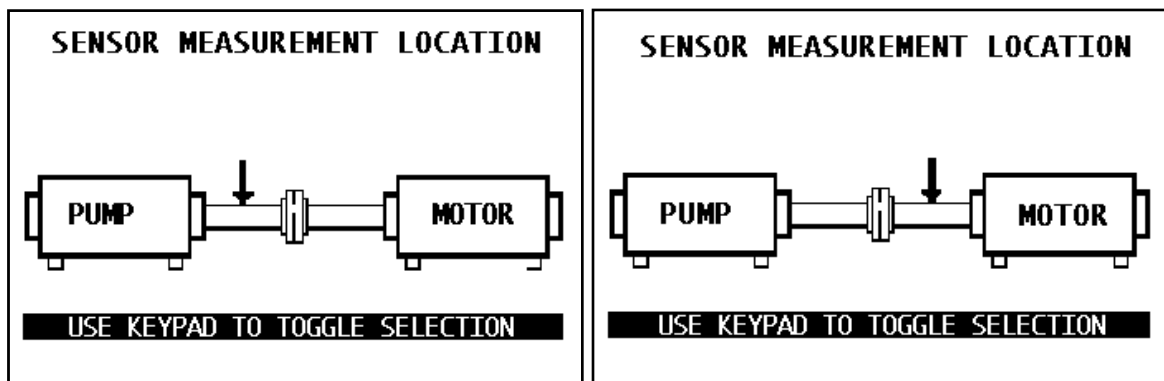
Face/Rim Correlation

Press the Enter key to view the Sensor Location screen.



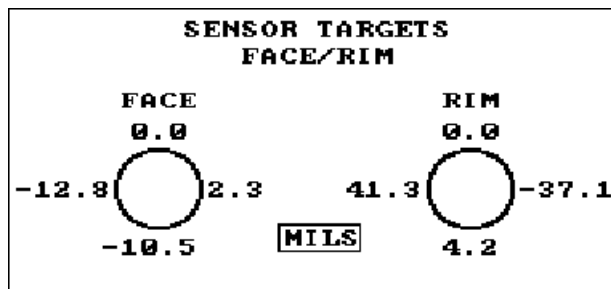
Use the Up/Down Arrow to highlight a parameter in order to enter a value. For dimension “U”, measure the diameter of the coupling (the diameter that would be swept by the face reading) and enter the corresponding value. For dimension “V”, measure from the center of the inboard foot of the left machine to the point at which the rim sensor (dial indicator) would take readings as shown in the figure above. This is usually the center (or close to the center) of the coupling. For both measurements, measure to the nearest 1/8” (3mm).

After both values are entered, press the Enter key to proceed to the Sensor Measurement Location screen.



Use the Up/Down Arrow or any alphanumeric key to select which side of the coupling the sensor is located. Actual face/rim measurements are to be taken on the coupling half pointed to by the arrow. The sensor measurement location determines the direction (sign) of the “rim” total indicator runout (TIR).

Press the Enter key again to view the Sensor Targets screen.



This screen represents the face/rim readings which are equivalent to the current alignment condition of the equipment. Thermal growth values are included in the computation.



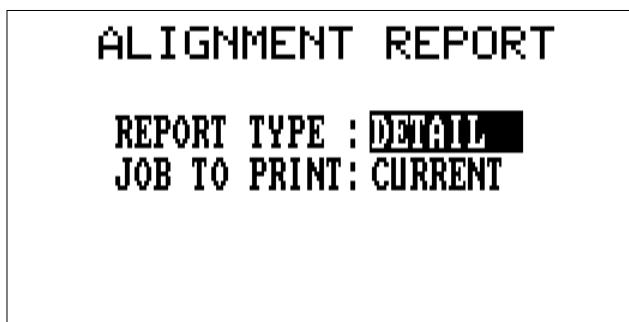
Screen/Print Key

The Screen/Print key is a double function key. To activate the Print function, press the key itself. To activate the Screen function, press the Alt key, then the Screen/Print key.

The Print key activates the Alignment Report menu. From that screen, you can print out an Alignment Report about any job in the analyzer.

The Screen Print option does exactly what the name implies – it prints the information that is on your screen display at the time it is activated.

Print Report



Alignment Report Menu

Report Type: – Select one of two entries (use any number key on the keypad to toggle the choices).

- Detail – allows every set of alignment readings and machine moves (maximum 20) for the job(s) selected to be printed.
- Summary – allows only the first and the last set of alignment readings and machine moves for the job(s) selected to be printed.

Job To Print: – Select one of three entries by pressing any numbered key on the keypad.

- All – allows alignment data on *all* stored jobs to be printed.

- Current – allows the alignment data for the job currently in the analyzer to be printed (the current job can be printed even though it is not in the stored area).
- Select One – allows the screen listing all stored jobs to appear. Highlight any job by pressing the Up Arrow or Down Arrow and press Enter to print it. After the job has finished printing, the stored jobs list will reappear. You can then select another job for printing, if desired.

After selecting either a Current or Stored entry, press the Enter key to print the job(s). *During the printing, a note stating that the job is currently being printed will appear. To stop printing, press the Reset/Main key and the Main menu will be displayed.*

Printing can be done either directly to a compatible external printer via the Model 720A Printer Interface or to any printer supported by Microsoft Windows operating system via the Virtual Printer program.

Caution!

DO NOT connect the printer directly into the RS232 port located on the top panel of the analyzer. Read the steps on pages 3-27 to 3-29 before printing directly from the analyzer.

Printing Directly to an External Printer

The following steps must be done to get a hard copy print out on an external, Epson-compatible dot matrix printer or an HP Deskjet printer using the Model 720A Printer Interface:

1. ... In the UltraSpec analyzer, select the proper printer type (i.e. Epson, Deskjet, or Epson-2). See “Printer Type” for more information.
2. .. Turn the analyzer and printer off.
3. .. Plug one end of the Model 720A Printer Interface directly into the RS232 Port located on the top panel of the analyzer.
4. .. Connect the other end of the Model 720A Printer interface to the printer via a standard parallel printer cable.
5. .. Turn the printer on first.
6. .. Turn the analyzer on second.
7. ... Either press the Print key to print a pre-defined report or select the desired screen and press the Alt/Print key to get a screen print of that specific screen.

Note

When printing via the Model 720A Printer Interface, the analyzer is not compatible with printers that use a serial interface.

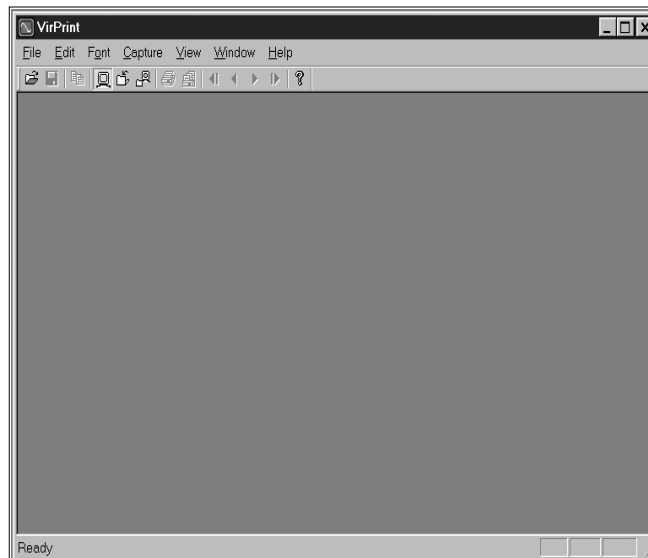
Printing to Virtual Printer Program

Virtual Printer (Virprint) is a Windows program that emulates the physical connection to a printer. Previously, the Model 720A printer interface was required to print from an UltraSpec analyzer. Virprint allows printing on any printer supported by Microsoft Windows operating system.

Note

Printing to Virprint uses the same communications cable used to load firmware and load/dump UltraSpec jobs to and from the PC. It does NOT use the Model 720A Printer Interface.

1. .. Connect the 25-pin male end of the Model 639 Communications cable directly into the RS232 Port located on the top panel of the analyzer.
2. .. Connect the 9-pin female end of the Model 639 Communications cable directly into your PC's serial port.
3. .. In the UltraSpec analyzer, select the proper printer type (i.e. VRPRNT). See "Printer Type" for more information.
4. .. Run the Virtual Printer program on your PC.



5. .. From the Capture menu select a capture mode: Screen, File, or File and Screen.

If you select Screen, the information from the analyzer is sent directly to the computer screen.

If you select File, the information from the analyzer is sent directly to a Virprint file.

If you select File and Screen, the information from the analyzer is sent directly to both the computer screen and a Virprint file.

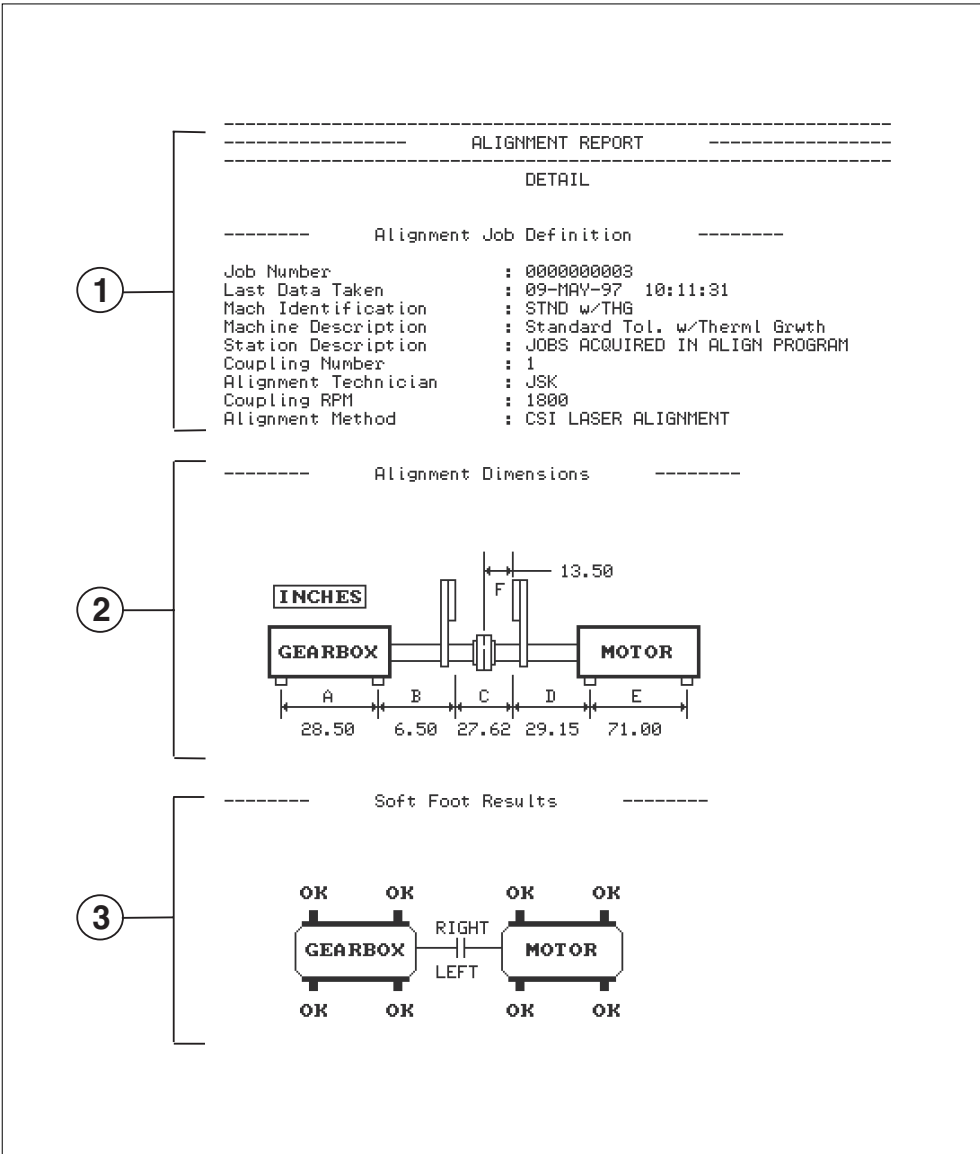
6. ..Select the serial port you connected the Model 639 Communications cable to. COM 1 is the default setting.
7. ...In the analyzer, either press the Print key to print a pre-defined report or select the desired screen and press the Alt/Print key to get a screen print of that specific screen. Once the printing operation is started the Virtual Printer program will display the message "Capturing Data."
8. ..Once the information is captured, the Virtual Printer program has control of the information from the analyzer. The information can be printed by selecting "Print" under File (use "Printer Setup" under File to select the printer) or saved to a Virprint file by selecting "Save" under File.

If additional information is to be printed from the analyzer, repeat the steps starting from step 6. For more detailed information on the Virtual Printer program, consult the Virtual Printer User's Manual.

Select Job for Report

The following figures are a facsimile of the alignment report; descriptions are provided after the final figure.

Alignment Report



Alignment Report (Part 1)

----- Thermal Growth Data -----

4

8.0 8.0 7.0 7.0 MILS

GEARBOX MOTOR

0.0 0.0 0.0 0.0 MILS

GEARBOX MOTOR

9.0 9.0 0.0 0.0

5

----- Readings (mils) -----

Total : 6

Set	GEARBOX				MOTOR				
	Top	Left	Bot.	Right	Top	Left	Bot.	Right	
1	9.38	-2.69	6.31	18.39	-56.40	-45.25	-12.80	-23.96	
2	3.39	-9.14	1.64	14.18	-12.78	0.13	-1.99	-14.89	
3	17.37	5.02	15.72	28.07	-54.35	-42.34	-44.63	-56.64	
4	16.60	4.66	15.43	27.36	-46.79	-34.47	-42.83	-55.16	
5	17.89	5.68	16.67	28.88	-45.43	-33.66	-42.18	-53.94	
6	18.12	6.08	16.89	28.93	-44.94	-32.49	-42.04	-54.50	

6

----- Machine Moves (mils) Offset (mils) & Angle (mils/inch) -----

Machine Moves: Vertical, Up is positive; Horizontal, Left is positive

Set	VERTICAL MOVE			
	GEARBOX		MOTOR	
	OB	IB	IB	OB
1	----	----	43	93
2	----	----	11	22
3	----	----	10	20
4	----	----	4	8
5	----	----	4	6
6	----	----	3	5

HORIZONTAL MOVE			
GEARBOX		MOTOR	
OB	IB	IB	OB
----	----	40	92
----	----	5	15
----	----	6	16
----	----	-1	2
----	----	0	3
----	----	-2	-1

7

----- Notes -----

Total : 2

1.AFTER OVERHAUL
2.REPLACED OLD SHIMS

Alignment Report (Part 2)

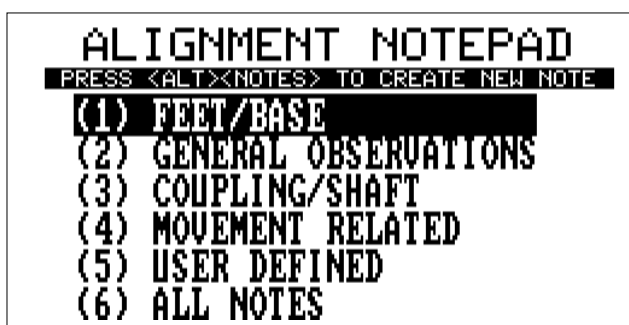
[illegible]

Alignment Report (Part 3)

- (1) – documentation details as established in the “Job Definition” section of the alignment process.
- (2) – alignment dimensions as established in the “Job Definition” section. Also illustrates how the machine is viewed during the alignment job and the dimension units. *This section is not shown in a summary report.*
- (3) – Foot Pre-Check graphic. This illustrates the last checked foot conditions as saved in the alignment job. FDI or Soft Foot is displayed depending on the type of Foot Pre-Check method used. See “Foot Pre-Check” on page 5-22 for an explanation of the results.
- (4) – Thermal growth allowance graphic in the vertical and horizontal directions. These are the growths as measured or calculated at the machine feet; a negative number signifies a shrinkage. *This section is not shown in a summary report.*
- (5) – sensor readings taken during the alignment job; up to 20 sets are shown in a detailed report. *Only the first and last are shown in a summary report.*
- (6) – machine moves that are calculated and saved during the alignment job; up to 20 sets are shown in a detailed report. Since six solutions are available, the solution on screen when it is left is saved. The “----” signifies a foot was held stationary during that move. The alignment condition is also shown in offset and angle. *Only the first and last are shown in a summary report.*
- (7) – notes documented during the alignment job; up to 40 can be shown.
- (8) – Alignment Condition graphics that show how the alignment condition compares with the tolerances. The top two graphics are the vertical direction and the bottom two are the horizontal direction. The first graphic in each direction displays all the machines moves or reading sets; the second graphic in each direction displays the tolerance curves. Text of the alignment condition for each move is listed to the right of the diagram.

Notes Key

The Notes key is used to access the Alignment Notepad screen, which provides a list of 70 predefined notes. Up to 29 user-defined notes can also be entered for a total of 99. These notes can be used to record observations concerning the machinery being monitored and of the alignment job itself. Up to 40 notes can be stored with each alignment job, and along with the remaining information, dumped into the UltraMgr database.



Notepad Screen

Note

The Notes key always returns you to the Alignment Notepad screen. Press <Alt> <Note> to access the new user-defined notes area (see “Creating Notes” on page 3-42 for more information.)

Predefined Notes

The 70 predefined notes are separated into four categories:

- Feet/Base
- General Observations
- Coupling/Shaft
- Movement Related

These notes *cannot* be modified and are listed on the following pages, grouped by category. Each type is shown in its own table to save time in locating a particular note.

Note

In the following tables, “fixed” will be replaced by the name of the machine on the left and “move” will be replaced by the name of the machine on the right.

Feet/Base

Note #	Description
01	Soft foot, fixed IB Right
02	Soft foot, fixed IB Left
03	Soft foot, fixed OB Right
04	Soft foot, fixed OB Left
05	Soft foot, move IB Right
06	Soft foot, move IB Left
07	Soft foot, move OB Right
08	Soft foot, move OB Left
09	Cracked foot, fixed IB Right
10	Cracked foot, fixed IB Left
11	Cracked foot, fixed OB Right
12	Cracked foot, fixed OB Left
13	Cracked foot, move IB Right
14	Cracked foot, move IB Left
15	Cracked foot, move OB Right
16	Cracked foot, move OB Left
17	Dowel pins used
18	Dowel pins removed
19	Horz jackscrews installed
20	Horz jackscrews damaged
21	Shims corroded
22	Replaced old shims
23	Loose foundation bolt(s)
24	Base cracked
25	Base corroded
26	Broken hold down bolt(s)

General Observations

Note #	Description
27	Lube leak from bearings
28	Loose piping flange bolts
29	Product leaking
30	Broken bolt(s) on machine
31	Rubbing noted during rotation
32	Low oil level(s)
33	After overhaul
34	Dirty oil filter
35	Dirty air filter

Coupling/Shaft

Note #	Description
36	Torsional play in coupling
37	Worn hub, fixed
38	Worn hub, move
39	Worn coupling insert
40	Loose fit, coupling to shaft
41	Lub leakage from coupling
42	Bad coupling lub condition
43	Axial coupling gap reset
44	Worn set screw, fixed
45	Worn set screw, move
46	Eccentric coupling, fixed
47	Eccentric coupling, move
48	Cocked coupling, fixed
49	Cocked coupling, move
50	Excessive end float
51	Bent shaft, fixed
52	Bent shaft, move
53	Difficult to turn
54	Difficult to stop
55	Worn key or keyway

Movement Related

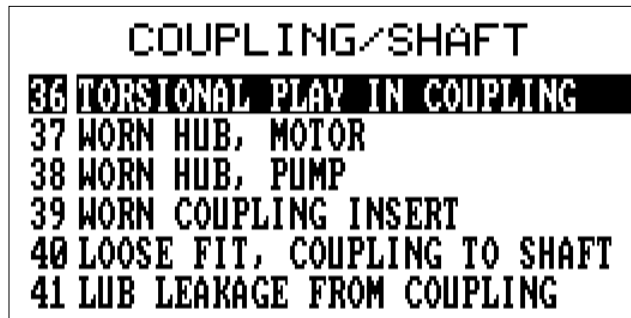
Note #	Description
56	Equipment problem
57	Both machines moved
58	Bolt bound horz, fixed IB
59	Bolt bound horz, fixed OB
60	Bolt bound horz, move IB
61	Bolt bound horz, move OB
62	Vert move limited, fixed IB
63	Vert move limited, fixed OB
64	Vert move limited, move IB
65	Vert move limited, move OB
66	Smaller hold down bolt used
67	Thermal growth inconsistent
68	Thermal growth unknown
69	Piping strain present, inlet
70	Piping strain present, outlet

Storing Notes

To store a note or notes for a machine, press the Notes key, then select the category where the note exists. If you do not know the category or just want to review existing job notes, select the (6) All Notes section. Using the up/down arrow keys to scroll through the list, highlight the desired note number and press the Enter key. The note text will then highlight automatically, indicating that the note is stored.

Note

The Page Down and Page Up keys can be used to scroll an entire page (six lines) at a time. Press the Page Down key to scroll down, or press the Page Up key to scroll up. All scrolling will remain in the same section.

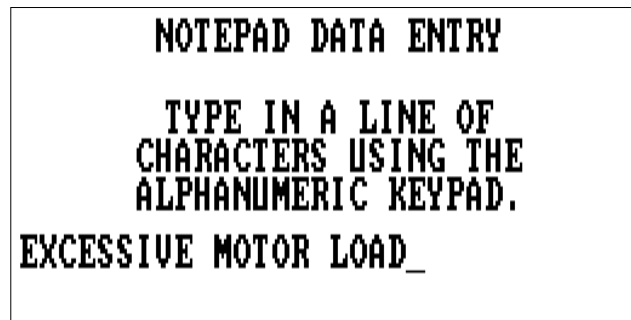


Typical Notes Screen

Additional notes can then be selected, or the Reset/Main key can be pressed to return to the Main menu. To remove a selected note observation, repeat the highlighting process. The number of notes stored is displayed in the lower left of the Main menu.

Creating Notes

Although 70 predefined notes already exist, there may be times when you need to create a new one. To do this, select (5) User Defined under the Alignment Notepad. Any user defined notes previously created will be shown. If none of the notes shown match your needs, press the Alt key, then the Notes key to display the Notepad Data Entry screen shown below. Follow the prompts shown on the screen.

A rectangular screen with a black border. The text is in a monospaced, all-caps font. It reads: "NOTEPAD DATA ENTRY" at the top, followed by "TYPE IN A LINE OF CHARACTERS USING THE ALPHANUMERIC KEYPAD." in the center, and "EXCESSIVE MOTOR LOAD_" at the bottom, where the underscore indicates a cursor position.

NOTEPAD DATA ENTRY

TYPE IN A LINE OF
CHARACTERS USING THE
ALPHANUMERIC KEYPAD.

EXCESSIVE MOTOR LOAD_

Notepad Data Entry Screen

Note

If no User Defined notes are present in memory, the Notepad Data Entry screen will automatically be displayed after the User Defined section is selected.

Note

Pressing the Alt key, then pressing the Notes key at any time allows you to immediately create a User Defined note.

Enter the note text using the alphanumeric keypad (32 characters maximum) and then press the Enter key to log the note into the User Defined section. The note will be placed at the end of the section and automatically highlighted.

Forty notes can be defined for each alignment job. If you try to define a 41st note, an error message will be displayed. To enter a new note, one of the old ones must be removed.

Help Key

Most screens in the analyzer have an associated help message. You can access the help message *for the field which is highlighted* by pressing this key. Messages can refer to a single screen or to a single highlighted field on a screen. If further help is required, refer to the appropriate section in this manual.

Note

By pressing Alt/Help while in the Utility Functions, you can access the help screen information for the special language characters (see “Special Language Characters” on page 2-18 for more information).