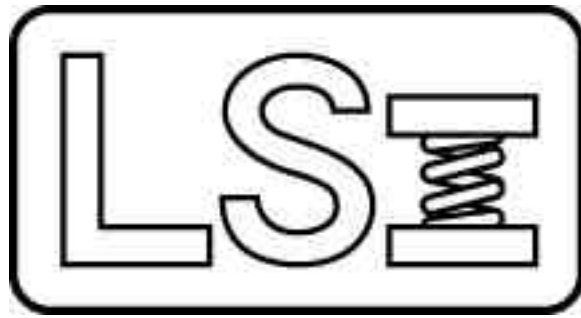# Larson Systems Inc.

SUL & DSUL
User Manual

About This Manual
This manual could contain technical inaccuracies or typographical errors. Changes are periodically made to the information contained herein. These changes will be incorporated in new editions of the manual.

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1   INTRODUCTION

Larson Systems Inc. has created a solution for measuring the squareness of a spring, with ground ends, while in the loaded condition. The Squareness Under Load system allows the user to measure the composite angle of a compressed spring in degrees.

2   DESCRIPTION

The DSUL and SUL are intended for usage on up to 2.5" OD (Outside Diameter) springs with a load of less than 1,500 lbs. It measures the composite angle in degrees with graduation of 0.1 degrees with a maximum of 15 degrees.

3   INSTALLING THE SUL AND DSUL

3.1   Precision Alignment "For Best Results"

3.1.1   Verify parallelism between the lower platform and the Ø 2.5" adapter

3.1.1.1   Mount the supplied adapter to the upper platform on the SDHT & Super 2000.

Screw the Upper Platform Adapter so that it is mounted flush to the upper platform of the hand tester.

3.1.1.2   Replace the upper platform on the FLASH & UT, to the one supplied with the SUL or DSUL.

3.1.1.2.1   Remove the upper platform of the FLASH or UT by simply remove the three 10-32 SHCS (socket head cap screw) with a 5/32 allen wrench.

3.1.1.2.2   Using the three 10-32 SHCS screw the supplied platform to the 3.5 dia. main platform.

Hold the platform concentric to the main platform while tightening

3.1.1.3 Place an indicator and stand on the lower platform and bring the upper platform down to the indicator.

3.1.1.4 Rotate the indicator around the lower platform at 90° intervals (a mirror may be helpful).

NOTE: The indicator readings must be within 0.001" TIR.

3.1.1.5 Shim under upper platform as needed

3.2 Mounting a SUL on a Hand Tester

3.2.1 Mounting a SUL to the lower platform requires a 5/16-18 threaded hole, if your tester does not have the proper hole contact Larson Systems.

3.2.1.1 Simply place the SUL on the lower platform of tester with the front of the unit facing a direction that allows it to be easily read by the operator and does not interfere with the operation of the tester.

3.2.1.2 Using a 3/16" allen wrench, tighten the center screw into the lower platform of tester.

3.3 Centering a SUL on a Hand Tester

Centering the SUL is very important to ensure proper test results.

3.3.1 Mount the centering gage and pin

3.3.1.1 Screw the centering pin into the upper platform adapter.

3.3.1.2 Place the 3/8 dia. dowel pin into the SUL Platform.

3.3.1.3 Side the centering gage onto the 3/8 dia. dowel pin.

3.3.2 Align the SUL with the centering pin in the upper platform.

3.3.2.1 Lower the upper platform carefully to ensure it is flush with the centering gage, than load it to 5 lb of force.

3.3.2.2 Loosen the 10 SHCS on the upper platform slightly with a 3/16" allen wrench.

3.3.2.3 Place the indicator in one of the counter-bored holes in the centering gage, than set the indicator to zero.

3.3.2.4 Place the indicator in the opposite counter-bored hole.

NOTE: The indicator readings must be within 0.002" TIR.

3.3.2.5 Place the indicator in the other two counter-bored hole.

3.3.2.6 If the indicator reading is not within 0.002" TIR, move the upper platform until it is.

3.3.2.7 **Tighten the 10 SHCS on the upper platform. Recheck the alignment**

3.4 Mounting a DSUL on a Hand Tester

3.4.1 *Mount the DSUL base plate onto the lower platform with either a 5/16-18 or 5/8-18 SHCS (socket head cap screw), using a ¼" or ½ allen wrench.*

3.4.2 *Mount the DSUL onto the base plate using two 5/16 hex bolts and washers. Tighten lightly.*

with the indicator.

Centering the DSUL is very important to ensure proper test results.

3.4.3 *Mount the centering gage and pin*

3.4.3.1 **Screw the centering pin into the upper platform adapter.**

3.4.3.2 **Place the 3/8" dia. dowel pin into the DSUL Platform.**

3.4.3.3 **Side the centering gage onto the 3/8" dia. dowel pin.**

3.4.4   Align the DSUL.

3.4.4.1   Lower the upper platform carefully to ensure it is flush with the centering gage, and then load it to 5-10 lb of force.

3.4.4.2   Loosen the 5/16" hex bolts slightly with a 1/2" wrench.

3.4.4.3   Place the indicator in one of the counter-bored holes in the centering gage then set the indicator to zero.

3.4.4.4   Place the indicator in the opposite counter-bored hole.

NOTE: The indicator readings must be within 0.002" TIR.

3.4.4.5   Place the indicator in the other two counter-bored hole.

3.4.4.6   If the indicator reading is not within 0.002" TIR, move the DSUL until it is.

3.4.4.7   Tighten the 5/16 hex bolts. Recheck the alignment with the indicator.

3.5 Mounting a DSUL to the STAR

3.5.1 *Mounting DSUL base plate onto the lower platform with either a 5/16-18 SHCS (socket head cap screw), using a ¼" allen wrench.*

3.5.2 *Mount the DSUL onto the base plate using two 5/16 hex bolts and washers. Tighten lightly.*

3.5.3 *Add a 2.50 Dia. Adapter to the Upper Platform*
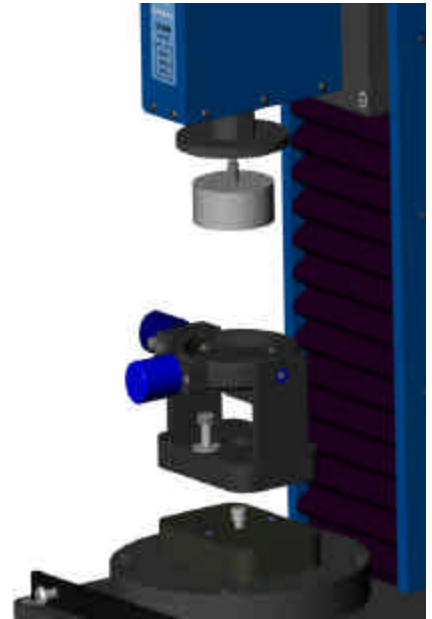
3.5.4 *Mount the centering gage and pin*

    3.5.4.1 **As described I para.3.4.3.**

3.5.5 *Align the DSUL.*

    3.5.5.1 **As described I para.3.4.4**
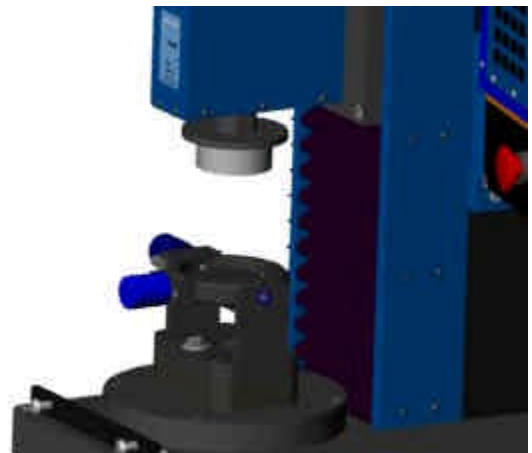
3.6 Centering Pilot Design for the SUL and DSUL
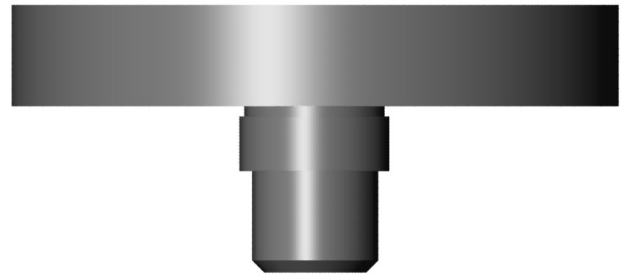
3.6.1 Make a custom set of Centering Pilot to each spring size.

3.6.1.1 The OD (Outside Diameter) of the centering pilot should be 0.002" less then the minimum spring ID (Inside Diameter).

3.6.1.2 The height of the pilot should be 70% of the spring wire diameter.

3.6.2   On a Lathe, use the Machining Adapter to turn the Centering Pilot blank down to 0.002 less then the minimum spring ID and 70% of the spring wire diameter (the height must be less then the minimum wire diameter)

There must be one set of Centering Pilots for every spring size.

***If you do not have a machine lathe capable to turn down the centering pilots Contact Larson Systems.

3.6.3   Allowing for spring burr

3.6.3.1   **If deburring of the spring is not a part of the process, then grind a small relief in the side of the centering pilot.**
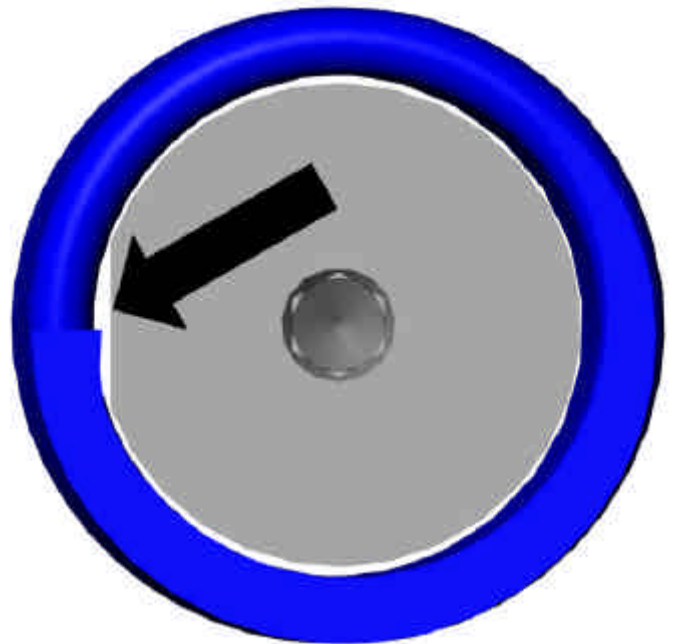
4   READING THE SUL

The SUL features an indicating dial that is graduated in .1 degrees and is numbered for full degrees; the .5 degree mark is slightly longer than the .1 degree marks for visibility. The SUL also features an LED Light. When you turn the Indicating Ring and the center makes contact the light will turn on. The reading is taken at the indicating blade, when the light turns on. It is important that the operator is directly in front of the unit, this will ensure the best possible readings.
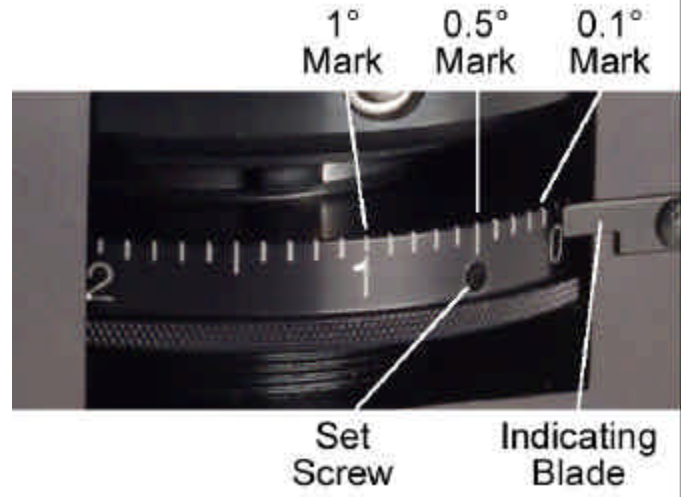
5   USING THE SUL ON A HAND TESTER

After installation and aligning the SUL, you will have to prepare for the testing. You will need to zero the length and the force of the tester. You will have to screw the proper centering pilot that goes with the spring to be tested. LSI recommends that a set of Centering Pilot be made for each spring size (0.002 less then the minimum spring ID and 70% of the spring wire diameter). If no centering pilot will work for your application, contact Larson Systems for a solution.

5.1   Zeroing the length

With the force zeroed lower the upper platform so it makes contact with the SUL platform. Apply a load equal to (or approximately) 20% of full scale. Once you have the load applied zero the length.

5.2 Centering of the spring

The centering of the spring is very important to ensure good test results. Screw the proper centering pilot that goes with the spring to be tested.

5.3 Zeroing the SUL

The Indicating dial may need to be adjusted. Bring the upper platform down and apply a load the SUL. Rotate the Indicating Dial so it is tight. If the dial is not reading zero with a .050 Allen Wrench loosen the set screw and rotate the dial to the zero reading, tighten the set screw

Indicating
Dial

5.4 Testing with the SUL

You will perform tests in the same way that you would on a standard tester. Turn the LED Light on, and turn the Indicating dial down all of the way. Bring your spring down to the required height and lock the upper platform in place. Turn the Indicating Dial until the LED light turns on; when the light turns on, take the reading.

LED
Light

6 REPLACING THE BATTERIES IN YOUR SUL

Your SUL is powered with two AAA 1.5 volt batteries. To replace the batteries remove the four cap screws with a 3/32" Allen Wrench this will open the side cover. Carefully remove the batteries and reinstall new ones.
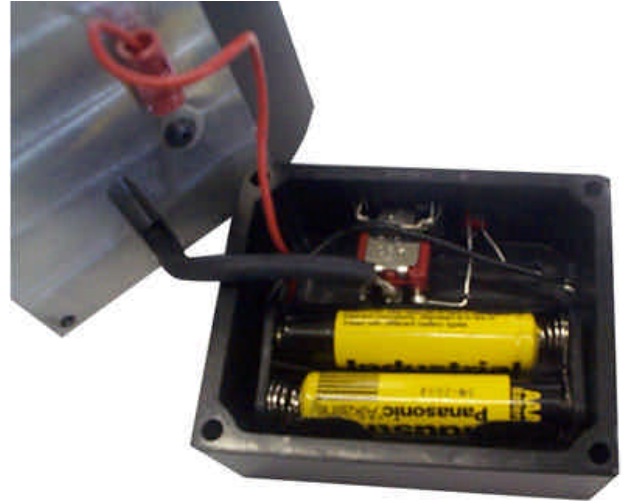
7 BASIC OPERATION OF THE DSUL

The DSUL is very easy to use. To turn the power on, press the On / Clear button. Pressing the Zero Angle will zero all of the angle readings. Pressing Units will change the way the units are displayed. Pressing Store will send the test data to the memory. Pressing Send will send the test data to a printer if one is hooked up. To turn power off press the Option button until you see power displayed then press F2 button.

8 USING A DSUL ON A HAND TESTER

After installation and aligning the DSUL, you will have to prepare for the testing. You will need to zero the length and the force of the tester. You will have to screw the proper centering pilot that goes with the spring to be tested. LSI recommends that a set of Centering Pilot be made for each spring size (0.002 less then the minimum spring ID and 70% of the spring wire diameter). If no centering pilot will work for your application, contact Larson Systems for a solution.
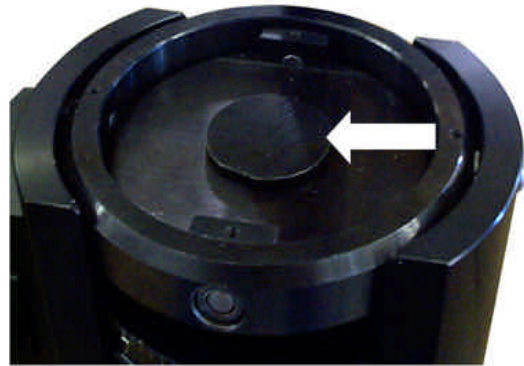
8.1 Zeroing the DSUL

With the force zeroed lower the upper platform so it makes contact with the DSUL platform. Apply a load equal to or approximately to 20% of full scale. Once you have the load applied press the Zero Angle button on the DSUL. Also with the load applied, press the zero length button on the hand tester.

8.2 Centering Pilots

Centering of the spring is very important to ensure good test results. Screw the proper centering pilot that goes with the spring to be tested.

8.3 Testing with the DSUL

You will perform tests in the same way that you would on a hand tester. When you bring the spring down to the required height and lock the platform in place. Once the platform is locked in place you may take down the Z angle reading or, if a printer is hooked up to your DSUL, you can press the Send button to print.

9 USING THE DSUL ON A STAR TESTER

After installation, you will have to prepare for the testing. You will need to zero the length and the force of the tester. You will have to screw the proper centering pilot that goes with the spring to be tested. LSI recommends that a set of Centering Pilots be made for each spring size (0.002 less then the minimum spring ID and 70% of the spring wire diameter). If no centering pilot will work for your application, contact Larson Systems for a solution.

9.1 Initializing the STAR Tester

With the DSUL installed on the STAR you can initialize the tester. Press the Gray" Home Tester button on the STAR, this will bring the upper platform down and zero the length and force.

9.2 Zeroing the DSUL

To zero the DSUL lower the upper platform of the tester and apply a load of about 20% of full scale. Once the load is applied press the Zero Angle button on the DSUL.

9.3 Centering Pilots

Centering of the spring is very important to ensure good test results. Select a centering pilot that will work for your spring and install on both the upper and lower platforms

9.4 Testing with the DSUL on a STAR Tester

You will perform tests in the same way that you would on a hand tester except the pause feature on the STAR is required. When you program your test you will need to add a pause after the test point. Load the spring and press the Start Test Button. When the tester is paused you can take your Z angle reading or, if a printer is hooked up to your DSUL, you can press the Send button to print.

10 USING THE OPTION MENU

The Option Menu is used to access commonly used tester functions, limit option menu (if ordered), power off, user setup menu, and diagnostic menus. Press the *Option* key to advance through the displays. Press *F1* or *F2* to choose selections. Press any key to exit Option Menu.

Once a specific menu is entered other keys become active. The Mode key will back up to the previous menu (just as the Option key advance to the next menu). The Send key will back out of a sub menu entirely. For example, if you are in the RS232 sub menu pressing the Send key will back out to the main User Setup menu.

10.1 User Options

The Option Menu gives rapid access to tester functions and other menus.

10.1.1 EndPrint

The EndPrint option allows you to print the summary data such as the mean, standard deviation, maximum, minimum, and range at the end of testing. Press *F2* to select EndPrint.

```
        Option
Store     EndPrint
```

If there was not printout started the display will show:

```
    Print-out Not
    in Progress
```

If a printout has been started the printer will print the statistical summary and the display will show:

```
    Print-out Done
    Please Wait..
```

10.1.2 Store

The *Store* option lets you see how many points are saved; clear the last point entered, or clear all the points. Press *F1* to select the Store menu.

```
        Option
Store     EndPrint
```

If no tests are stored the display will show:

Press *On/Clear* to exit the menu.

```
    No Information
        Stored
```

If data is stored in the tester the display will show:

```
-X 0.00 Y 0.00 +
#  1 Z  0.00 deg
```

Press *F1* or *F2* to view other stored results.

Press *Option* to advance to the next menu, clearing a single result. Press *F1* to clear the single result.

```
Clear Mem     1
Now
```

Press Option to advance to the next menu, clearing all results. Press *F1* to clear all result.

```
Clear All memory
Now
```

Press *On/Clear* to exit the menu.

10.1.3 Angle Limits

The Limit Option allows you to turn on or off the Angle Limits option. The option is enabled for the current mode selection (Manual mode or Peak mode), this allow for different limits to be set between the manual and peak mode. Limit can be applied to the X, Y, or Z angles. Only one angle limit can be used at a time.

```
   Limits Option
On            Off
```

Pressing *F2* turns off the limits.

Pressing *F1* turns on the limits.
Press *F1* to set up the X angle limits, *F2* to set up the Y angle limits, or *Option* to advance to the next menu.

```
   Limit Option
X                Y
```

Press *F1* to set up the Z deflection limits.

```
   Limit Option
Z
```

Once an angle has been selected to set up use the *F1* key to advance the cursor to another digit, use the *F2* key to advance the digit, and the *Option* key to switch between the Lower and Upper limit.

```
Man. Low X deg
Nxt   000.00      +
```

Press the *On/Clear* button to exit the menu.

Once a limit is selected an set up the asterisk character (*) will appear to the right of the angle to indicate that number has limits applied to it. The three LEDs above the display will be active also. The Low LED indicates the angle is below the lower

```
X   0.00*Y   0.00
Z     0.00    deg
```

limit, the High LED indicates the angle is above the upper limit, and the Good LED indicates the angle is between the lower and upper limits.

10.1.4 Power Off

```
        Option
               Power
```

The Power menu allows the user to shut off the tester immediately.

Press F1 to keep the tester running and back out of the Power menu. Press F2 to power down the tester immediately. When the tester is powered off using this method, any printout information is stored so the printout can continue where it left off. This includes statistical summary information.

```
Turn Off Power?
Stay On        Off
```

10.2 User Setup

The User Setup menu access setup information such as Company and City name for printouts, Backlight and Power time of times, date and time, and RS232 configuration.

```
        Option
User Setup
```

The User Setup menu is password protected. Hitting certain keys in a sequence enters the password. The sequence is Units-Send-F1.

10.2.1 RS232

```
    User Setup
RS232       Power
```

The RS232 menu is used to set up the format of the data that is send out the RS232 port.

The output can be in either Report or Data format. Report format is designed to go to a printer for a hardcopy report. The Data format is designed to go to a computer or data collector. The data format can have up to 4 carriage return delimitated lines. The line that contains the actual angle data have multiple comma delimitated fields.

Press the *F1* key to enter the RS232 setup.

Press the *F1* or *F2* key to switch between the Report and Data format. Press the *Option* key to go to the next menu. There are different configurations for Report and Data formats.

```
Output Format
-     Report    +
```

```
Output Format
-      Data     +
```

10.2.1.1 Data Format

The data output contains multiple fields of data, each field is comma delineated. If a field is turned off the associated comma is also removed.

Press *F1* or *F2* to switch between the Yes and No option. This enables the output of the data. Press the *Option* key to advance to the next menu.

```
┌─────────────────────┐
│ Send Results:       │
│     Yes         +   │
└─────────────────────┘
```

Press *F1* or *F2* to changed between 'Send Heading' and 'No Heading'. This enables the Data heading. Data heading includes device type (DVSUL), testing mode (SCM for manual mode and SCK for peak mode), and angle units (MUD for degrees and MUR for revolutions). Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Data Transfer:      │
│ - Send Heading +    │
└─────────────────────┘
```

Press *F1* or *F2* to switch between 'Send Count' and 'No Count'. The count is the first field in the data line. For a output of the current displayed data the count is zero. For an output from stored data the count contains the test number. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Data Transfer:      │
│ -   Send Count  +   │
└─────────────────────┘
```

Press *F1* or *F2* to switch between 'Send Date' and 'No Date'. This is the second field in the data line. It contains the current date for a send of the displayed data or the date when the data was stored. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Data Transfer:      │
│ -   Send Date   +   │
└─────────────────────┘
```

Press *F1* or *F2* to switch between 'Send Time' and 'No Time'. This is the third field in the data line. It contains the current time for a send of the displayed data or the time when the data was stored. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Data Transfer:      │
│ -   Send Time   +   │
└─────────────────────┘
```

Press *F1* or *F2* to switch between 'Send Tab Char' and 'No Tab Char'. A tab character can be inserted between the time data and its comma delineation. This tab character can be used by some data collectors to signal the end of text data and the beginning of measured data. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Data Transfer:      │
│ -Send Tab Char +    │
└─────────────────────┘
```

Press *F1* or *F2* to switch between 'Send X/Y Angle' and 'No X/Y Angle'. This is the fourth and fifth field in the data line. They contain the actual measured angle about X and Y axes. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│  Data Transfer:         │
│ -Send X/Y Angle+        │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between 'Send Z Deflection' and 'No Z Deflection'. This is the sixth field in the data line. This contains the calculated deflection from the Z axis. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│  Data Transfer:         │
│ -Send Z Deflect+        │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between the available communication protocols. They are Delay 0.01s between characters, Delay 0.025 sec, Delay 0.05 sec, Hardware (RTS/CTS Handshaking), or None. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│  Comm. Protocol         │
│ -    Hardware    +      │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between the available Baud rates. They are 1200, 2400, 4800, 9600, and 19200. Press the *Option* key to scroll back to the Send Result menu. Press *On/Clear* to exit the menu.

```
┌─────────────────────────┐
│ Comm. Baud Rate         │
│ -      9600      +      │
└─────────────────────────┘
```

10.2.1.2 Report Format

Press *F1* or *F2* to switch between 'Yes' and 'No'. This enabled the report printout. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│   Print Report:         │
│ -      Yes       +      │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between 'Print Heading' and 'No Heading'. The heading include the Company Name, City name, and device information. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│ Printer Format:         │
│ -Print Heading +        │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between 'Print Summary' and 'No Summary'. The summary is the statistical summary at the end of testing. Statistical summary includes Mean, Range, and Standard Deviation. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│ Print Format:           │
│ -Print Summary +        │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between the printout width and the heading height. The selecting include '80, Double', '80, Single', and '24, Single'. The 80 and 24 refer to the number of characters across a page. 'Double' give the company and city name in a double height format and 'Single' gives the company and city name in single height like the rest of the printout. Press *Option* to advance to the next menu.

```
┌─────────────────────────┐
│ Printer ch,Width        │
│ -   80, Double +        │
└─────────────────────────┘
```

Press *F1* or *F2* to switch between the Printer Protocols. They include Delay 0.01 sec between characters, Delay 0.025, Delay 0.05, Hardware (CTS/RTS handshaking), and none. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Printer Protocol    │
│ -    Hardware     + │
└─────────────────────┘
```

Press *F1* or *F2* to switch between the available Baud rates. They are 1200, 2400, 4800, 9600, and 19200. Press Option to advance to the next menu.

```
┌─────────────────────┐
│ Printer BaudRate    │
│ -     9600        + │
└─────────────────────┘
```

Press *F2* or *F2* to switch between 'Plain Paper' and 'Roll Feed'. Plain paper is used for single sheet paper or track feed paper. Form feed will be generated between pages. Roll Feed is used for continuous paper without page perforation. No page breaks are generated between pages, 2 carriage returns are used between pages. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│    Paper Type       │
│ - Plain Paper     + │
└─────────────────────┘
```

Press the *F1* key to advance the cursor and the *F2* key to advance the number under the cursor. Set the number of lines available on a page before a page break and form feed are generated. This is not used for Roll Feed paper type. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│  Lines per Page     │
│ next 066          + │
└─────────────────────┘
```

Press the *F1* or *F2* to switch between 'Oki', 'Epson', or 'Other'. If 'Other' is selected another menu will be available to set the output string to generate the Double Width character on a printer. Press *Option* to advance to the next menu. If 'Oki' or 'Epson' is selected the next menu will scroll back to 'Send Results'. If 'Other' is selected the next menu will be Double Width string setup. Look in your printer user manual or consult the printer manufacture's web site for these types of command strings.

```
┌─────────────────────┐
│ Dbl Wdth On/Off     │
│ -    Oki- 1F/1E +   │
└─────────────────────┘
```

Press *F1* to set up the Double Width On string, press *F2* to set up the Double Width Off string. Both On and Off string are set up similarly.

```
┌─────────────────────┐
│ Define Dbl Wdth     │
│ On Str    Off Str   │
└─────────────────────┘
```

Press *F1* to advance the cursor. Press *F2* to advance the character under the cursor. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│ Command Len On      │
│ Next     01       + │
└─────────────────────┘
```

Press *F1* or *F2* to switch between 'Hex' and 'Decimal'. Each character in the command string can be defined in either decimal notation or Hexadecimal notation. Press *Option* to advance to the next menu.

```
┌─────────────────────┐
│    Define in        │
│ -     Hex         + │
└─────────────────────┘
```

Press *F1* to advance the cursor. Press *F2* to advance the character under the cursor. Press *Option* to advance to the next menu. Set up all characters in the command string. Press *Send* to back up to the On/Off selection menu.

```
┌────────────────────────┐
│ Dbl Width On #01       │
│ Nxt       00        +  │
└────────────────────────┘
```

10.2.2 *Power*

The Power menu sets the power time off timer. The number is expressed in Hours and Minutes. Press *F1* to advance the cursor to the next character. Press *F2* to advance the character under the cursor. Press On*/Clear* to exit the menu. When the tester is left idle for the defined amount of time it will turn itself off. An idle state is when no buttons are being pushed and neither of the encoders are moving.

```
┌────────────────────────┐
│     User Setup         │
│ RS232         Power    │
└────────────────────────┘
```

```
┌────────────────────────┐
│  Power Time-Out        │
│ next     00:20      +  │
└────────────────────────┘
```

10.2.3 *Date*

The date menu sets the current date and time for the tester.

```
┌────────────────────────┐
│     User Setup         │
│               Date     │
└────────────────────────┘
```

Press *F1* or *F2* to switch between the available date displays. They are 'MM/DD/YY', 'YY/MM/DD', and 'DD/MM/YY'. Press *Option* to advance to the next menu.

```
┌────────────────────────┐
│   Date Format          │
│ -    MM/DD/YY      +   │
└────────────────────────┘
```

Press *F1* to advance the cursor. Press *F2* to advance the character under the cursor. Press *Option* to advance to the next menu.

```
┌────────────────────────┐
│    MM:DD:YY            │
│ next 01 01 00      +   │
└────────────────────────┘
```

Press *F1* or *F2* to switch between 12 and 24 hour format. Press *Option* to advance to the next menu.

```
┌────────────────────────┐
│   Time Format          │
│ - 12 hour a/pm         │
└────────────────────────┘
```

Press *F1* to advance the cursor. Press *F2* to advance then character under the cursor. Press *Option* to advance to the next menu. Press *On/Clear* to exit the menu.

10.2.4 Company/City

The Company and City name are entered in a similar manner and are discussed as one. The names can contain up to 32 characters. The names are broken into 4 menus because all 40 characters cannot be displayed at once.

```
   User Setup
Company       City
```

The characters available for the names are the upper case and lower case alphabet, numbers, and the characters &, ', (,), *, +, -, /, comma, decimal point, and space.

Press F1 to enter the Company name. Press F2 to enter the City name.

```
Company Name 1/4
Next Your Com  +
```

Press F1 to advance the cursor to the next character. Press F2 to advance the character under the cursor. Press Option to advance to the next menu.

```
  City Name  1/4
next Anytown,  +
```

Press On/Clear to exit the menu.

10.2.5 Backlight

The backlight timer is used to turn off the backlight of the display. This is done to conserve battery power. After a defined period of time the backlight shuts off and the display shows a sleeping message. Either press a key or move an encoder to wake up the tester.

```
   User Setup
Backlight
```

Press *F1* to advance the cursor to the next character. Press *F2* to advance the character under the cursor. Press *On/Clear* to exit the menu.

```
  Light Time-out
next    00:05   +
```

10.3 Diagnostics

The Diagnostics menu is used to access a variety of tester performance functions that may help in troubleshooting problems. Press F1 to enter the Diagnostics menus.

```
    Option
Diagnostic
```

10.3.1 Battery Voltage.

Press F1 or F2 to switch between the 'Yes' and 'No' settings. When 'Yes' is selected and the Option Menu is exited the display will show the current battery voltage. The normal voltage should be between 6.8 and 7.2 volts. A battery connected to a charger should read 7.8 volts or higher.

Press the On/Clear button to stop showing the battery voltage and return to normal display.

```
View Batt Volts
-      Yes      +
```

10.3.2 Keypad Check.

Press *F1* to enter the keypad check. In the keypad check, when a button is pressed the display will beep and show what button was pressed. If the actual button pressed and the displayed button pressed does not match, service will be needed at LSI. Press *On/Clear* to exit the Keypad Check then *Option* to advance to the next menu.

```
Perf Keypad Chck
Now
```

10.3.3 Screen Check

Press *F1* to enter the screen check. When in the screen check a cursor will slowly advance along the cursor, beeping as it changes position. When the cursor loops back to the beginning of the display, the display will be inverted (all pixels turned on) and a blank cursor will rotate through the display. These two loop will continue until the *On/Clear* button is pressed. Press the *Option* key to advance to the next menu.

```
Perf Screen Chck
Now
```

10.3.4 RS232 Protocols

This screen will display the current RS232 baud rate and communication protocol (Hardware, Delay, None, etc). Press the *Option* key to advance to the next menu.

```
RS232 Protocols
9600, hardware
```

10.3.5 RS232 Setup

This screen will display the current RS232 output format and what sections of the output are turned on. Press *F1* or *F2* to see more sections turned on. Press *Option* to advance to the next menu.

```
RS232-Report On
 Heading Summary
```

10.3.6 RS232 Check

Press *F1* to perform an RS232 check. The tester will send out a line of text out the RS232 port. If a printer or terminal is connected the line "Greetings user. The RS232 port is working OK. Have a nice day." will appear. If an RS232 loopback connector is attached to the tester, it will receive the output and display the text "Greetings User." A loopback device connects the testers transmit pin to its receive pin and its CTS line to its RTS line.

```
Perf RS232 Check
Now
```

If neither of these situations happen then the tester may need to be looked at by LSI personal.

Press *Option* to advance to the next menu.

10.3.7 Processor Speed and Ram

This display shows the current processor speed and amount of RAM installed. Press *Option* to advance to the next menu.

```
16 MHz processor
with 64 Kb RAM
```

10.3.8 Print All E2 Memory

If a printer or terminal is connected then this menu can be used to print out information about the tester for LSI personal to look at if the tester is experiencing problems. Press *F1* to start the printout. Press *Option* to advance to the next menu.

```
Print All E2 Mem
Now
```

10.4 Factory Setup

This option does not contain any user selectable options and should only be used by authorized LSI personnel**. Any factory setup modifications done by non-authorized personnel will void the warranty.**