Analyst ILS In-Line Test System
INSTRUCTION MANUAL

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Specifications and operational characteristics of the System are subject to change. CheckSum LLC cannot take responsibility for any direct or consequential damages arising from use of this manual or the related product.
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CheckSum Analyst ILS In-Line Test System

Features

- Fully automated handling for test
- SMEMA interface compatibility
- Low-cost, high reliability
- Re-probe for contaminant break-through
- Re-test for failed UUTs
- Sample-testing of UUTs

The CheckSum Analyst ILS is designed for in-line testing of electronic assemblies on automated production lines. The Analyst ILS can be configured with CheckSum’s sophisticated in-circuit, TestJet™ Technology, functional test and in-system programming with the MultiWriter on-board, gang programming option,
CHECKSUM electronics/software to provide very high test coverage. The Analyst ILS is complete and ready to install and use once the test electronics and controller are installed, and a custom test fixture is built for the assembly to be manufactured. By incorporating a coreset of SMEMA-compatible specifications, integration with other equipment is simplified. Providing features such as periodic sampling of UUTs passing down the line and automated recompression of probes and/or automatic retesting on failures, the Analyst ILS meets sophisticated testing needs. Using standard SMEMA interface connections, the Analyst ILS coordinates loading the UUT from the previous machine, testing it, and then passing it on to the next machine in the line. The mechanical core of the CheckSum Analyst ILS provides precise, yet robust and reliable operation. The Analyst ILS has a proven track record on a number of high-volume production lines. Like other CheckSum products, the Analyst ILS is low-cost and high quality, providing a very high benefit to cost ratio when compared to alternatives.


Note: There are two versions of the Analyst ILS handler; standard and -43. The standard model accommodates boards up to 340mm by 254mm (13.4 inches wide and 10 inches deep). The -43 model is designed to accommodate boards up to 400mm by 300mm (15.7 inches wide and 11.8 inches deep).
### Conveyor

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveyor Height</td>
<td>Adjustable 93.98cm to 96.5cm (37” to 38”) from floor</td>
</tr>
<tr>
<td>Conveyor Z-Travel</td>
<td>5cm (1.968”)</td>
</tr>
<tr>
<td>Conveyor X-Travel</td>
<td>Left to right (available right to left on special order)</td>
</tr>
<tr>
<td>Conveyor Width</td>
<td>Front rail fixed; rear rail adjustable:</td>
</tr>
<tr>
<td>Standard</td>
<td>from 101mm to 254mm (4” to 10”)</td>
</tr>
<tr>
<td>-43 option</td>
<td>from 101mm to 300mm (4” to 11.8”)</td>
</tr>
<tr>
<td>Conveyor X-Speed Option, See pg. 32</td>
<td>76cm to 793cm per minute (30 to 312 inches/minute)</td>
</tr>
<tr>
<td>Rail Width</td>
<td>3.05mm (0.120”) width of UUT edges inaccessible</td>
</tr>
</tbody>
</table>

### UUT Press

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press stroke</td>
<td>14.99cm (5.9”)</td>
</tr>
<tr>
<td>Conveyor Z-Travel Force</td>
<td>400kg (880 lbs.)</td>
</tr>
</tbody>
</table>

### Size and Weight

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Weight</td>
<td>275kg or 605 lbs. (±~36kg or 80lbs. for typical test controller/electronics)</td>
</tr>
<tr>
<td>Operating Size</td>
<td>Including light pole</td>
</tr>
<tr>
<td>Standard</td>
<td>90cm W x 77 cm D x 210 cm H 35.4” W x 30.3” D x 82.7” H</td>
</tr>
<tr>
<td>-43 Option</td>
<td>100 cm W x 85 cm D x 210 cm H 38.75” W x 32.75” D x 82.7” H</td>
</tr>
</tbody>
</table>

### Facility Requirements

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic Requirements</td>
<td>550 to 620kPa (80 to 90 PSI) air pressure</td>
</tr>
<tr>
<td>AC Lines Input</td>
<td>Operates on 115V or 208V, 60 Hz, 15A circuit. Voltage must be selected at time of order.</td>
</tr>
<tr>
<td>Earth Ground</td>
<td>6.35mm (0.250”) diameter earth ground lugs provided each end</td>
</tr>
<tr>
<td>Clearance</td>
<td>Recommended front/rear clearance: 92cm (36”)</td>
</tr>
<tr>
<td>Environmental</td>
<td>4.4°C to 32°C (40°F to 90°F), 0-80% relative humidity, non-condensing</td>
</tr>
</tbody>
</table>
Unit Under Test (UUT)

<table>
<thead>
<tr>
<th>Maximum Size</th>
<th>Direction of Board Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>340mm W x 254mm D</td>
</tr>
<tr>
<td></td>
<td>13.4” W x 10” D</td>
</tr>
<tr>
<td><strong>-43 Option</strong></td>
<td>400mm W x 300mm D</td>
</tr>
<tr>
<td></td>
<td>15.7” W x 11.8” D</td>
</tr>
<tr>
<td>Maximum Probes</td>
<td>2000</td>
</tr>
<tr>
<td>Component Height</td>
<td>Pressure rods are top-side 19mm (0.75”) long to accommodate most UUTs without top plate routing. Components topside up to 50mm (2”) can be accommodated with top-plate routing. Components bottom-side can be accommodated up to 31.75mm (1.25”) in height with probe-plate routing.</td>
</tr>
<tr>
<td>Tooling Holes</td>
<td>Edge of tooling holes in UUT must be minimally 6.35mm (0.250”) from conveyor-driven edges of UUT. Recommended hole size is 3.175mm (0.125”), 3.48mm (0.137”) or 3.962mm (0.156”) diameter.</td>
</tr>
<tr>
<td>Probing</td>
<td>Top and bottom compatible</td>
</tr>
</tbody>
</table>

KIT2000-ILS-QC Test Fixture Kit
### KIT2000-ILS-QC

Includes:

- (1) 9.525mm (0.375”) thick G-10 probe plate
- (1) 9.525mm (0.375”) thick polycarbonate top pressure plate
- (1) top installation plate
- (1) bottom installation plate
- (10) pressure rods 19mm (0.750”) long
- (2) fixture kit alignment pins and bushings
- (1) bottom connector interface plate (unpopulated) with provisions for 2000 test points
- (1) 50-pin system control block
- (1) fixture storage kit

### KIT2000-ILS-43

Same as above, except:

- (1) 10mm (0.394”) thick G-10 probe plate
- (1) 9mm (0.36”) thick polycarbonate top pressure plate and with larger plates to accommodate larger UUTs

### Test Fixture Kit Options

<table>
<thead>
<tr>
<th>FIX-250P-WB</th>
<th>250 test point fixture wiring block</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIX-50P-WB</td>
<td>50 test point fixture wiring block</td>
</tr>
<tr>
<td>IL-ROD-0750</td>
<td>Blunt Pressure Rod</td>
</tr>
<tr>
<td>IL-ROD-0750-T</td>
<td>Tapered Pressure Rod</td>
</tr>
<tr>
<td>1900-428</td>
<td>Fixture Kit Top Spacer 45mm (1.768”) long</td>
</tr>
<tr>
<td>1900-431</td>
<td>Fixture Kit Bottom Spacer 81mm (3.217”) long</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Designed for spring-probe socket set-height of 5.08mm (0.200”) for standard 1.575mm (0.062”) thick UUT circuit board</td>
</tr>
</tbody>
</table>

### Software Test Halt Control

The System can be configured, with use of the “/maxflts” parameter, to halt after a specified number of UUT failures (number of UUTs that have failed in succession). When this event occurs, the handler stops and the pole lamp light will be blinking. Once the problem has been analyzed, testing is resumed by pressing the RESET ALL button.

### Shipping

<table>
<thead>
<tr>
<th>Shipping Weight</th>
<th>350kg or 770lbs. + ~ 36kg or 80lbs. for typical test electronics when installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Size</td>
<td>122cm x 102cm x 191cm (48” x 40” x 75”)</td>
</tr>
</tbody>
</table>
Facility Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIX-250P-WB</td>
<td>250 test point fixture wiring block</td>
</tr>
<tr>
<td>FIX-50P-WB</td>
<td>50 test point fixture wiring block</td>
</tr>
<tr>
<td>IL-ROD-0750</td>
<td>Blunt Pressure Rod</td>
</tr>
<tr>
<td>IL-ROD-0750-T</td>
<td>Tapered Pressure Rod</td>
</tr>
<tr>
<td>1900-428</td>
<td>Fixture Kit Top Spacer 45mm (1.768”) long</td>
</tr>
</tbody>
</table>

Limited Warranty

Electronic elements one-year, mechanical portions 90-days parts and labor limited warranty when returned to factory for repair. Consequential damages are excluded. See the full text of the CheckSum limited warranty for details.
Installation

Unpacking

The CheckSum Analyst ILS is shipped boxed and on a pallet. To uncrate:

1. Remove the attachments holding the sides to the pallet.
2. Lift the sides up and off of the handler.
3. Remove any cross-bars at each end of the pallet, on the top.
4. Using the four eye-bolt rings at the top of the handler, lift it free of the pallet.
5. Once the pallet is removed, the handler can be rolled into position via casters installed on the bottom.

Once the handler is located in its operating position:

1. Remove additional packing materials from the handler.
2. Cables for power and signals to the keyboard, mouse, and monitor are available in the center space in the front.
3. Install the swing-arm assembly. The swing-arm assembly threads into the eye-bolt hole location at the top, back left-side of the handler. Install the monitor on the swing-arm.
4. Install the keyboard and mouse on the tray at the top center of the handler.
5. Install the printer (if included) on the shelf to the left of the monitor.
6. Install the light-pole at the right rear of the handler. The light-pole cable is available in the mounting hole.
7. With the handler conveyor in the up position, set the height of the handler to match the conveyors of adjacent machines using the legs of the handler. Ensure it is level.

Finally, open the front doors, and turn on the main power breaker mounted inside the system on the right-hand side. Note: The breaker on & off positions are labeled.

Connection to Facilities

The handler may be connected to a standard 115V or 208V, 60Hz, 15A circuit. Note that the voltage to be used has to be selected at the time of order. There are two ¼-20 tapped holes in the lower rear of the machine, one towards each end. Hardware is provided to connect earth ground, or ground to adjacent machines. To install the hardware, thread in the ¼-20 set screw, install a lock washer then hex nut and tighten. Then install the two flat washers and wing nut. The wing nut can be loosened to connect the ground connection between the two flat washers.

Compressed air is provided via a 3/8” O.D. hard-plastic hose. This hose may be connected directly, or you may connect via a 1/8” NPT female connector. The inlet air should be 80-120 PSI. The internal regulator of the handler should be set to 500 kPa (72.5 PSI). Note: If the air pressure is reduced below 300 kPa (43.5 PSI), the machine will sense this, and not operate. This pressure is indicated by an arrow on the regulator. NPT female connector. The inlet air should be 80-120 PSI. The internal regulator of the handler should be set to 500 kPa (72.5 PSI).
Connection to Adjacent In-Line Machines

The Analyst ILS uses typical SMEMA interfaces for connection to adjacent machines. It is configured with cables approximately 4 feet long for these connections. The appendix of this manual includes interface wiring diagrams as described in the following tables.

<table>
<thead>
<tr>
<th>Connection to Previous Machine:</th>
<th>Pins 1 and 2 provide a contact closure to the previous machine. Contacts are closed when the Analyst ILS is ready to accept a UUT. Pin 1 of the previous machine should provide 24 VDC with output impedance that will not allow more than 10mA when it is shorted to ground (e.g., &gt;2.4Kohm).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via 14-pin, size 17 round receptacle (e.g. AMP 206043-1 housing) mounted on the Analyst ILS. Mates to cable with 14-pin, size 17 plug, such as AMP 206044-1 housing.</td>
<td>Pins 3 and 4 are used by the previous machine to indicate when a UUT is available. The previous machine should provide contact closure to these pins when a UUT is available. Pin 3 provides 24VDC (10 mA max). The contact closure should provide a signal level less than 0.8V at pin 3.</td>
</tr>
<tr>
<td></td>
<td>When contact closures are present at both pins 1 and 2 and pins 3 and 4, a UUT should pass from the previous machine to the CheckSum Analyst ILS.</td>
</tr>
</tbody>
</table>
SMEMA Specifications (Version 1.2)

The mechanical specifications that follow are for single board transfer systems with conveyor transports. These systems can be assembled next to each other without any interface hardware. The printed circuit board is assumed to move from left to right however, the same standard applies for systems when the board moves from right to left. An equipment manufacturer must clearly state the direction of board movement.

1.) **Conveyor height** Each machine must have the transport conveyor height adjustable from 37" to 38" from the floor to the bottom of the PC board.
2.) **Conveyor width** For equipment with an adjustable conveyor width, the front rail is fixed and the rear rail is adjustable. The range of adjustment will vary with the equipment manufacturer.
3.) **Edge clearance** The conveyor should require no more than 0.187" of clear board space at the side edges.
4.) **Tooling pins** Tooling pins should be on the front edge of the board (next to the fixed transport rail). A recommended hole diameter is 0.156" (+.003, -.000). Distance from the edge is 0.300" + .010".
5.) **Maximum gap** The maximum gap between the in-line machine track ends is 0.375".
6.) **Lead-in** The minimum lead-in on the track ends of the conveyor is 0.125".

---

### Connection to Next Machine In-Line:

<table>
<thead>
<tr>
<th>Connection to Next Machine</th>
<th>Detailed Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via 14-pin, size 17 round receptacle (e.g. AMP 206043-1 housing) mounted on the Analyst ILS. Mates to cable with 14-pin, size 17 plug, such as AMP 206044-1 housing.</td>
<td>Pin 1 provides 24 VDC source (10 mA max), with pin 2 as the reference low. The next machine should provide a contact closure to pins 1 and 2 when it is available to accept a UUT. The contact closure should provide a signal level less than 0.8Vdc.</td>
</tr>
<tr>
<td></td>
<td>Pins 3 and 4 provide a contact closure to the next machine when the Analyst ILS is ready to pass a UUT to the next machine. Pin 3 of the next machine should provide 24 VDC with output impedance that will not allow more than 10mA when it is shorted to ground (e.g., &gt;2.4Kohm).</td>
</tr>
<tr>
<td></td>
<td>When contact closures are present at both pins 1 and 2 and pins 3 and 4, a UUT is passed from the CheckSum Analyst ILS to the next machine in the line</td>
</tr>
<tr>
<td></td>
<td>Pins 9 and 10 are used to provide a contact closure to the next machine in the event that the UUT passes its tests. Pin 9 of the next machine should provide 24 VDC, with output impedance that will not allow more than 10mA when it is shorted to ground (e.g., &gt;2.4Kohm).</td>
</tr>
<tr>
<td></td>
<td>Pins 11 and 12 are used to provide a contact closure to the next machine in the event that the UUT fails its tests. Pin 11 of the next machine should provide 24 VDC, with output</td>
</tr>
</tbody>
</table>
Test Station Software Configuration

The Analyst ILS software must be configured to accommodate use within the Analyst ILS test environment. This is performed by use of command line parameters passed to the VisILS12.exe file when it is invoked.

Note: Analyst ILS software may be invoked from a power-up environment, a desk-top icon, or manually. Each of these ways of starting the software has separate command line setups. Ensure that you have configured the command line parameters from each place that you may eventually start the system software.

The command line parameters (lower and/or uppercase) that are typically used with the Analyst ILS are:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/maxflts &lt;count&gt; /MAXFLTS &lt;count&gt;</td>
<td>Maximum consecutive faults. If more than &lt;count&gt; number of UUTs fail in a row, sets the system module’s digital IO MSB low. This causes the Analyst ILS to set an error condition with the red light-pole lamp lit and the buzzer on.</td>
</tr>
<tr>
<td>/kpfort &lt;msec&gt; /KPFORT &lt;msec&gt;</td>
<td>Keypad failures only retests. Enables the system to accept the [F5] key (kepad input) to specify failure-only retests. This does not retest steps that pass, only those which have failed. The Analyst ILS uses this input if one or more Retest Cycles are set on the Power Panel. The delay &lt;msec&gt; is typically specified as 0 (zero).</td>
</tr>
<tr>
<td>/rptlrst /RPTLRST</td>
<td>Enables the system to use the F7 signal (system generated) to print a test results report if the UUT has failed. This key is used by the Analyst ILS after an assembly has failed. Output of the report goes to the automatic reporting device specified in the Configuration setup of the system software.</td>
</tr>
<tr>
<td>/-skip_q /-SKIP_Q</td>
<td>Causes the system to not ask to skip individual PCBs on panelized assemblies. Use the Test window menu item Panel &gt; Select Skips to select any boards to be skipped.</td>
</tr>
<tr>
<td>/lt &lt;test name&gt; /LT &lt;test name&gt;</td>
<td>Causes the system to load the specified test program and go to the test screen. This enables the system to be immediately ready for testing with the Analyst ILS after power-up and the Auto Start button is pressed.</td>
</tr>
<tr>
<td>/f7debounce /F7DEBOUNCE</td>
<td>Ignores any F7 requests for a test results report following the first F7 received after doing a test.</td>
</tr>
</tbody>
</table>

Note that there are many other parameters available. Refer to the system electronics/software documentation available in on-line help and a separate instruction manual.

In addition to the command line parameter setup, the test software should be configured with:

\textit{Halt on Fail: Off} \hspace{1cm} \textit{Max Failure Only ReTests: 1}
Standard Analyst ILS Setup

Summary

1. The command line setup for any method used to start the Analyst ILS test system software should include:
   \texttt{C:}\textbackslash\texttt{CheckSum}\textbackslash\texttt{wisILS12.exe /MAXFLTS 10 /KP Fort 0 /RPTLRTST /-SKIP_Q /F7DEBOUNCE /LT TEMPLATE.SPEC}

2. The System Configuration for \textit{Automatic Test Results Report} should be:

   ![Configure Reporting Window]

3. Test Step \textit{RPRTS}
   The program step \textit{RPRTS} should not be used in a test program to print to the same device specified by the \textit{Configuration for Automatic Test Results} otherwise two copies will be made.

Setup Details

There are several methods that can be used to start the CheckSum test system software. The description for each command line option is shown on pages 13. Check the command line option setup for each method.

Windows Start-up icon

The normal setup includes the \textbf{Analyst ILS} in the windows Startup set:
This ensures the system startup includes the correct program and the command line for this program should be verified. Right-click on the Startup > Analyst ILS and select the Properties:

The Analyst ILS Properties window will populate. Enter the following into the “Target”

VisILS12.exe /MAXFLTS 10 /KPFORT 0 /RPTLRTST /-SKIP_Q /F7DEBOUNCE /LT TEMPLATE.SPEC

Notes for /LT TEMPLATE.SPEC

The option /LT TEMPLATE.SPEC loads the test program named TEMPLATE.SPEC and opens the Test window. The test program must be installed in the test program directory, typically c:\checksum\specfile, otherwise an error message will pop-up. This option ensures the system opens the Test Screen window, now use the menu item File > Open to load the appropriate UUT test program before the first assembly arrives at the system handler. The TEMPLATE.SPEC program is normally automatically installed with the system software. A listing of the program is shown on page Error! Bookmark not defined.

Desktop icons
CHECKSUM
Check the properties of the Windows Desktop icon for the Analyst ILS and ensure the Target line shows:
C:\CheckSum\visILS12.exe /MAXFLTS 10 /KPFLRTST /RPTLRTST /-SKIP_Q /F7DEBOUCE /LT TEMPLATE.SPEC

Windows Start > Run
If the software is started with the Windows Start > Run method, ensure the Target line shows:

![Screenshot of the Run dialog box]

Printing Reports
The Automatic, Test Results Report setup is accessed from the main system window Configure System selection. The Configure System, Environment top tab provides the button selection Configure Reporting. The Configure Reporting window top tab, Automatic, shows the standard setup:

![Screenshot of the Configure Reporting window]

When the handler determines the test is complete, a signal is generated to the test system software. This signal is an F7 key press.

The /RPTLRTST option uses the setup for automatic reporting. This option changes the selection of the Automatic reporting to include an F7 key press. The standard setup is to enable the "Automatic Test Results Report" check box as shown above. The RPTLRTST option will generate a test results report according to the selection for the Automatic report Type ("Type" choice Fail Results above) when an F7 key press occurs. The output is sent to the Automatic report destination ("Send To" choice LPT1 above). The one selection that RPTLRTST doesn't use in the Automatic report setup is when to report ("Report On" choice above) as this is determined by when an F7 key press occurs. If Automatic reporting is disabled (no check box at the front of “Automatic Test Results Report”) then so is the RPTLRTST output.
Test Program Listing

Testing Facility: CheckSum

Assembly Name: Analyst ILS Template

File Name: TEMPLATE.SPEC

File Date: 22 Jan 2008

Time: 16:06

Test System: CheckSum Analyst ILS

---From--- ----To---- -----------Test----------- --Limits-- --Nom--
Point Name Point Name Type Range Title Low High

Rem TEMPLATE.SPEC
Rem Rem
Rem Check sample
JmpDI 0 End of File 254 1
Rem Rem
Rem Start ICT
Disp 1 ICT
Rem Rem
Rem Start Functional
Disp 2 Functional
Rem Rem
Rem Power Down
Label SHUT DOWN
Rem Rem
DispE 0
Label End of File

Displays:

No Col Row Display

1, 28, 1, ICT in Progress
2, 28, 1, Power-on Test in Progress

End of Data

Fixturing

The Analyst ILS uses the CheckSum test fixture KIT2000-ILS-QC-ESD (ILS-43 uses KIT20000ILS-43-ESD). This fixture kit includes the common parts necessary in order to customize the Analyst ILS for a particular UUT that you want to test. This work (including programming for your test program) can be performed by CheckSum’s internal fixturing division, a local fixture vendor, or by yourself if you have the necessary drilling, machining, wiring and programming facilities.
Note: The Analyst ILS uses metric fasteners, however the test fixture kit uses standard 10-24 NCT hardware and fasteners.

**Fixture Kit Stack-up**

![Diagram of fixture kit stack-up]

**Figure 1 KIT2000-ILS-QC-ESD Fixture kit stack-up**
Figure 2 KIT2000-ILS-43-ESD Fixture kit

Figure 3 KIT2000-ILS-QC-ESD Probe Plate Dimensions
Figure 4  KIT2000-ILS-43-ESD Probe Plate

Figure 5  KIT2000-ILS-43-ESD Fixture Top
Figure 6  KIT2000-ILS-43-ESD  Fixture Bottom Dimensions

Figure 7  KIT2000-ILS-43-ESD  Fixture Interface Dimensions
Probe Plate Layout

The UUT moves from left to right, and must have a minimum of 3.05mm (0.120”) of bare PCB space on both the bottom and top edges for the conveyer. The UUT is positioned by the use of tooling pins that fit into tooling holes on opposite corners of the UUT. Normally, pointed spring-loaded guide pins are used that hold the UUT above the probes until the top of the press comes down. It is important that the edge of any tooling pins must be at least 6.35mm (0.250”) from the top and bottom edges of the UUT. The probes must be at least 4.318mm (0.170”) from the top and bottom edges of the UUT, although they may be closer on the leading and trailing edges.

The fixture kit is designed to be used with sockets set height at 5.08mm (0.200”) above the probe plate. With a standard 1.575mm (0.062”) thick UUT PCB, this will give the proper probe compression.

If there is a strong concentration of spring-probe loading, it may be necessary to add additional top and bottom spacers to prevent flexing of the fixture kit plates. The top spacer is 45mm (1.768”) long and can be ordered as CheckSum PN 1900-428. The bottom spacer is 81mm (3.217”) long and can be ordered as CheckSum PN 1900-431. To install these, drill 4.9mm (0.193”) diameter holes in the plates where they are to be installed.

-43 Model Probe Plate Details

There are two alignment holes on each of the four main fixture kit plates. These are positioned 440.5mm (17.34”) apart on center, and are present to both allow the plates to be accurately positioned during the drilling and machining process and also to install guide pins that cause the fixture kit to come into proper alignment prior to UUT engagement. All of the plates have 6mm (0.236”) diameter holes, except the probe plate, which has 10mm (0.394”) diameter holes. If the Delrin bushings are pressed into the probe plate, this reduces the diameter of the 10mm (0.394”) holes to 8mm (0.315”).

There is also a 15mm (0.591”) diameter hole through each plate. This hole allows a light beam to detect when the UUT is present. When the UUT moves into place, the front edge of the UUT moves 1.27mm (0.050”) past the center of this hole. As a result, there is a semi-circular area that will not accept probes in the leading edge of the UUT. The radius is 7.95mm (0.313”), with the center 50.04mm (1.97”) from the leading lower corner of the UUT.

The lower right corner of the UUT should be located 445mm (17.52”) inches to the right and 343.97mm (13.542”) below the top, left corner of the probe plate.

Standard Model Probe Plate Details

There are two alignment holes on each of the four main fixture kit plates. These are positioned 361.95mm (14.25”) apart on center, and are present to both allow the plates to be accurately positioned during the drilling and machining process and also to install guide pins that cause the fixture kit to come into proper alignment prior to UUT engagement. All of the plates have 6.35mm (0.250”) diameter holes, except the probe plate, which has 12.7mm (0.500”) diameter holes. If the Delrin bushings are pressed into the probe plate, this reduces the diameter of the 12.7mm (0.500”) holes to 6.35mm (0.250”).

There is also a 15.875mm (0.625”) diameter hole through each plate. This hole allows a light beam to detect when the UUT is present. When the UUT moves into place, the front edge of the UUT moves 1.27mm (0.050”) past the center of this hole. As a result, there is a semi-circular area that will not accept probes in the leading edge of the UUT. The radius is 7.95mm (0.313”), with the center 50.04mm (1.97”) from the leading lower corner of the UUT.
CHECKSUM

The lower right corner of the UUT should be located 349.25mm (13.750”) inches to the right and 30.99mm (1.220”) below the left plate alignment hole.

Pressure Plate Layout

The pressure plate should have 3.15mm (0.124”) diameter holes drilled for each pressure rod used on the top of the UUT. The fixture kit contains 10 pressure rods which are 19mm (0.750”) long. If more are needed, they can be ordered from CheckSum as the IL-ROD-0750 (blunt tip) or the IL-ROD-0750-T (tapered tip). If any components on the UUT are more than 19mm (0.750”) tall, the pressure plate must be milled out to accommodate them.

Kit Wiring

Once the plates are drilled, the probe receptacles are installed and then the receptacles can be wired. The fixture kit includes a connector interface plate for the bottom of the fixture kit. The bottom plate can accommodate up to 2000 test points. The points are wired in groups of 250 pins using the CheckSum FIX-250P-WB connectors. These provide wire-wrap posts inside the test fixture. Top probes can be connected to the bottom plate using transfer probes.

<table>
<thead>
<tr>
<th>Connector</th>
<th>FIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>J37 1801 – 1850</td>
<td>J27 1301 – 1350</td>
</tr>
<tr>
<td>J36 1751 – 1800</td>
<td>J26 1251 – 1300</td>
</tr>
<tr>
<td>J32 1551 – 1600</td>
<td>J22 1051 – 1100</td>
</tr>
</tbody>
</table>

Back, outside view of the fixture kit connector interface panel, same as the back view of the test system

The standard wiring locations for optional modules are:

J40 FUNC-2
J39 SMT-2 #2/HP-1
J38 PWR-2
J37 SMT-2 #1
J36 DIG-1 #2
J35 DIG-1 #1
J34 CR-2 #1

*Note: Optional power supplies and other signals may be wired to connectors J31 & J32 or to the “FIX” System connector (see page 24) depending on the installed system options. See the section Fixture Interface Optional Power Supply and USB Wiring on J31 and J32 on page 42 for the fixture interface optional power supply and USB connections.
| Probe Plate | 451 | 453 | 455 | 452 | 454 | 456 | 401 | 403 | 405 | 402 | 404 | 406 | 351 | 353 | 355 | 352 | 354 | 356 | 301 | 303 | 305 | 302 | 304 | 306 | 251 | 253 | 255 | 252 | 254 | 256 | 201 | 203 | 205 | 202 | 204 | 206 | 151 | 153 | 155 | 152 | 154 | 156 | 101 | 103 | 105 | 102 | 104 | 106 | 51 | 53 | 55 | 52 | 54 | 56 | 1 | 3 | 5 | 2 | 4 | 6 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|             | 495 | 497 | 499 | 496 | 498 | 500 | 445 | 447 | 449 | 446 | 448 | 450 | 395 | 397 | 399 | 396 | 398 | 400 | 345 | 347 | 349 | 346 | 348 | 350 | 295 | 297 | 299 | 296 | 298 | 300 | 245 | 247 | 249 | 246 | 248 | 250 | 195 | 197 | 199 | 196 | 198 | 200 | 145 | 147 | 149 | 146 | 148 | 150 | 95 | 97 | 99 | 96 | 98 | 100 | 45 | 47 | 49 | 46 | 48 | 50 |

*Front view of receiver spring-probes 1-500, same as the wire-wrap view from inside the test fixture*
The Analyst ILS system includes a 50-pin connector labeled “FIX” with access to signals that can be used to provide additional UUT/fixture protection and to optional equipment signals. The 50-pin system connector has the following signals (use FIX-50P-WB on the fixture kit to access):

<table>
<thead>
<tr>
<th>Signal Description</th>
<th>Pin Number</th>
<th>Function Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24VDC #2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>N/C</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>GND #2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>+24VDC #2 Time Delay Relay Enable/</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Optional Powered HUB (+5V)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 1 DCD</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 6 DSR</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 2 RD</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 7 RTS</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 3 TD</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 8 CTS</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 4 DTR</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 9 RI</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 5 GND</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>N/C</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #1 +V</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #1 -V</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #1 -Sense</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #2 +V</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #2 -V</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #2 -Sense</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 1 DCD</td>
<td>11</td>
<td>USB Port 1 Shield</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 6 DSR</td>
<td>13</td>
<td>USB Port 1 GND</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 2 RD</td>
<td>15</td>
<td>USB Port 1 D+</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 7 RTS</td>
<td>17</td>
<td>USB Port 1 D-</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 3 TD</td>
<td>19</td>
<td>USB Port 1 VBUS</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 8 CTS</td>
<td>21</td>
<td>PS-UUT-L1 #1 IF_COM</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 4 DTR</td>
<td>23</td>
<td>PS-UUT-L1 #1 ENA_IN</td>
</tr>
<tr>
<td>Opt. Serial Conn. Pin 5 GND</td>
<td>27</td>
<td>PS-UUT-L1 #2 ENA_IN</td>
</tr>
<tr>
<td>N/C</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #1 +V</td>
<td>31</td>
<td>PS-UUT-L1 #1 +V</td>
</tr>
<tr>
<td>PS-UUT-L1 #1 -V</td>
<td>35</td>
<td>PS-UUT-L1 #1 -V</td>
</tr>
<tr>
<td>PS-UUT-L1 #1 -Sense</td>
<td>39</td>
<td>PS-UUT-L1 #1 +Sense</td>
</tr>
<tr>
<td>PS-UUT-L1 #2 +V</td>
<td>41</td>
<td>PS-UUT-L1 #2 +V</td>
</tr>
<tr>
<td>PS-UUT-L1 #2 -V</td>
<td>45</td>
<td>PS-UUT-L1 #2 -V</td>
</tr>
<tr>
<td>PS-UUT-L1 #2 -Sense</td>
<td>49</td>
<td>PS-UUT-L1 #2 +Sense</td>
</tr>
</tbody>
</table>

**Table 1 - FIX pin-out with optional equipment connections (inside fixture)**
Notes: Optional power supplies and other signals may be wired to the “FIX” System connector or to connectors J31 & J32 depending on the installed system options. See the section Fixture Interface Optional Power Supply and USB Wiring on J31 and J32 on page 42 for the fixture interface optional power supply and USB connections. The power supply +24VDC #2 is optional and may not be installed in all systems (contact CheckSum for assistance). The +24VDC #2 Enable/ signal must be connected to GND #2 in the fixture to enable the time delay (range 1 to 10 seconds, typically 1.5 second delay) relay to connect +24VDC #2 output to pin 2.

See the PS-UUT Notes on page Error! Bookmark not defined. for detallLS on the optional power supply output enable signals (PS-UUT-L1 #1 ENA_IN and PS-UUT-L1 #2 ENA_IN).

The reversed board sensor can be used to test to see if the UUT arrived into the Analyst ILS backwards. An optical sensor such as an OMROM E3S-LS5C4S or equivalent can be used and wired into this connector. The status of this signal is checked prior to the fixture press being actuated. If the signal is “OK”, the press engages and the test starts. If the signal is “Error,” the Analyst ILS will stop and the buzzer will sound. If you do not design the fixture to accommodate the reversed board feature, connect a jumper between pins 3 and 5 to override the feature. This can be done with the mating connector in the test fixture kit, or a jumper directly to the “FIX” System connector.

The system includes an optical sensor that detects the Board “Arrived”, or a fixture-mounted sensor can be added to detect the Board “Arrived”. “Arrived” means the board is ready to be pushed down on the spring probes. To use the system sensor, set the two-position switch labeled Sensor Changeover, mounted on the special control panel, to “HANDLER”, see page Error! Bookmark not defined.. To use a fixture-mounted sensor, set the switch to “FIXTURE”. A fixture-mounted sensor is necessary in some situations where the board edge does not properly align with the system sensor. The Board Arrived signal should only be true at the time when a board has arrived. It must be false at other times since this signal is checked to insure the board has properly moved on to the next position.
Fixture Kit Assembly

Once the fixture is fabricated and wired, it can be assembled. The two top plates are connected together with the short spacers, and the bottom two plates are connected together with the long spacers.

Install the 6.35mm (0.25”) diameter alignment pins in the pressure plate (with the pressure rods). Install the 12.7mm (0.50”) OD Delrin bushings in the probe plate below the alignment pins. When the plates are properly assembled, the UUT-in-place sensor 15.875mm (0.625”) diameter hole will align on all four plates.

Test Program Considerations

The Analyst ILS is configured to allow test programs to be written without regard to whether they will be used in a standard or in-line system, however, test steps that require operator intervention, such as PotR and SwchR test commands, should be avoided. If the fixture control, FixCt command is used, be sure to set the delay time to zero since the program will not start until the press is in the down-position and the fixture probes are compressed.

The ability to use the sample frequency front-panel switch setup requires some test program steps at the beginning of every test program (bolded lines below). The handler sets a digital bit high to indicate that the test should not be executed for an assembly (see the Front Panel Control Sample Frequency on page 32). The test program needs to test this digital bit and jump accordingly. The test program named TEMPLATE, has these steps:

```
Rem Check sample bit
JmpDI 0 End of File 254 1
Rem
Rem Start ICT
Disp 1 ICT
Rem
Rem Start Functional
Disp 2 Functional
Rem
Rem Power Down
Label SHUT DOWN
Rem
DispE 0
Label End of File
```

Test program execution settings:

```
Halt on Fail Off
Max Failure Only ReTests: 1
```
Installing Optional Power Supplies

This section describes the process to install the power supplies. Skip this section if the power supplies were ordered from CheckSum as part of a complete test system, since the power supplies are installed and verified prior to shipment.

Caution: Always disconnect compressed air from the tester before any panels are removed from the test system. Mechanical parts internal to the test system can be dangerous when in operation.

Here are the steps to install the power supplies.

1) Turn-off the system AC power and disconnect the VAC input line and the compressed air supply line to the rack. Verify AC switch on front of power supplies are in the “O” (OFF) position. Disconnect AC line cord from back of power supply if connected.
2) Remove the front and side panels for access.
3) Install the rack mount kit(s) on the power supply and the system.
4) Connect the power supply wiring to the supply and the fixture interface.
5) Route the wires between the power supply and the fixture interface.
6) Reinstall the panels, power and air supply.

The power supply is normally installed at the bottom of the system rack. One part of the rack slides attach to each side of the power supply. The other parts of the rack slides attach to the system rack. After installing the rack slides, install the power supply in the rack.
Part of the power supply kit includes the wiring harness to connect the power supply to the fixture interface. The wire harness includes the 200-pin block since several of the wires are soldered to a special power supply pin block.

The wires to the power supply are labeled. In addition to the ± voltage output wires, there are ± sense wires, power supply enable output wires, communication cable, and the VAC power cable. The communication cable with the RJ45 connector and a DB-9 connector must be connected from the system PC COM1 port to the #1 power supply Remote In. A communication cable, with RJ45 connectors on each end, connects from Remote Out to Remote In on each subsequent power supply.

On the back of the power supply, remove plastic cover from J2 and SW1 on back panel; retain the cover and screw.

---

**Error! Reference source not found. notes:**

1. Remote/Local output voltage sense connections (J2)
2. DIP switch SW1.
3. DB25 for analog program and monitor plus other functions (J1).
4. RS-485 OUT to other power supplies (OUT)
5. RS-232/RS-485 IN remote serial programming port (IN).
6. AC power input 85 to 265VAC, 47 to 63Hz with active power factor correction (0.99 typical).
7. Exit air slots.
8. Voltage output bus bars.

Set the SW1 switches:

1) On supply #1, SW1-9 switch (Enable/Disable control Active) should be UP, all other SW1 switches should be DOWN.
2) On all other supplies (if installed) SW1-6 (RS485 interface) and SW1-9 should be UP, all other SW1 switches should be DOWN.

Connect power supply to Source and Sense wires from interface block:

1) Install the lugs onto the bus bars as shown in the following figure, using the indicated torque.
2) The power supply Remote Sense wires in the (+) Sense and (-) Sense positions of the J2 connector should be connected to the +Sense and -Sense wires from the Power Supply Interface board. Do not make connections to the Local Sense positions on the J2 connector.

3) Reinstall the cover over J2 and SW1.
4) Install the metal cover over the bus bar source outputs of the power supply.

Connect power supply J1 (safety Enable output feature) to interface block:

1) Use the provided DB25 IDC style connector to make these connections. The connector must be shrouded when completed.
2) On each supply, connect the wires to each of the J1 connectors.

Verify or change the address of each supply:

NOTE: The default address setting from the power supply manufacturer is 6.
The front panel controls can be locked to protect from accidental power supply parameter changes. Press and hold the front panel PREV button to toggle between “Locked Front Panel” LFP and “Unlocked Front Panel” UFP. The front panel display will cycle between LFP and UFP while the PREV button is held down. Release the button when the display shows the desired setting.

Press the REM/LOC button until an address is displayed in the left LED field for voltage setting (e.g. A 06). Rotate the VOLTAGE knob to change the address numeric value. If, when you rotate the VOLTAGE knob you see LFP displayed then the front panel is locked out from updating the address until you hold the PREV button and see UFP displayed and the panel is unlocked. Once unlocked then you can set an address.

1) If the REM/LOC LED is lit, press the REM/LOC button momentarily.
2) Press and hold the REM/LOC button until the display indicates the address and baud rate. The address is shown on the left display as “A 06” and the baud rate is shown on the right display.
3) Adjust the address of each supply using the VOLTAGE knob. Set the address of the first supply to “A 06”, the second supply to “A 07”, etc. The default PS-UUT-L1 address in the system configuration for the first supply is 6. Any system with more than one power supply will require the addresses of the additional supplies be set on installation. Each power supply requires a unique address that matches the displayed address in the CheckSum System Configuration window.
4) Verify the baud rate of 9600. Adjust with the CURRENT knob if necessary.
5) Switch the supply/supplies OFF.

Connect serial cables:
1) Connect the DB-9 to RJ-45 cable from the PC to the “IN” connector at the back panel of supply #1.
2) Using the provided RJ-45 to RJ-45 cable, connect the “OUT” connector of supply #1 to the “IN” connector of supply #2 (if applicable).
3) Connect any additional supplies “IN” to the “OUT” connector of the previous supply.
CHECKSUM

Power-up the supplies:

1) One each power supply, connect the AC line cord. Use only the AC line cord supplied with the Lambda supply. The supply accepts universal AC input (85-265VAC).
2) Operate the switch on the front panel to the “I” (ON) position.
3) In the CheckSum test system software, Configure System F4, add the PS-UUT-L1 supplies (Add Module… > Functional Modules), verify the address, interface location, and baud rate.
4) Self-Test each power supply added to the system configuration.
The cables from the power supply to the PC and the fixture interface must be routed such that they never touch any moving part of the pneumatic press. If the cables are kept to the side and back of the rack they should be safe. Be certain to tie down all of the cables to a stationary part of the rack away from the moving items.

PS-UUT Notes

The power supplies are setup from CheckSum with the ENA_IN (enable) inputs configured to require a positive voltage input to enable the power supply output. The PS-UUT-L1 back panel SW1-9 switch needs to be in the UP position for use of ENA_IN to be enabled. An output from the PWR module can be programmed to +5V referenced to IF_COM. A 250-400 ohm resistor should be connected in series with the PWR output voltage to the ENA_IN input. This enable is normally used to provide a safety mechanism with a switch mounted on the test fixture. If an operator opens a safety lid or cover, the fixture switch opens and disconnects the ENA_IN input, which will disable the power supply output.

Optional power supplies and other signals may be wired to connectors J31 & J32 or to the “FIX” System connector (see page 24) depending on the installed system options. See the section Fixture Interface Optional Power Supply and USB Wiring on J31 and J32 on page 42 for the fixture interface optional power supply and USB connections.
Power Panel Controls

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reprobe Cycles</td>
<td>Sets the number of times (0-7) to re-engage the probes prior to testing. Can be used to break through flux or contaminants on the UUT.</td>
</tr>
<tr>
<td>Retest Cycles</td>
<td>Sets the number of times (0-15) that the system will try a retest in the event of a failure. The entire test of the UUT is first run, and then if retests are specified, the steps that failed are tested again. The Analyst ILS pass/fail signal at the SMEMA interface is set based on the final test or retest of the UUT.</td>
</tr>
<tr>
<td>Sample Frequency</td>
<td>Sets a sampling rate (0-15) for the UUT. If zero, all UUTs are tested. If non-zero, specifies how many UUTs are skipped between tests.</td>
</tr>
<tr>
<td>Auto/Manual</td>
<td>Sets the machine to manual or automated operation. Normal testing mode is Auto. For manual control, set to Manual which activates the conveyer, press and stop controls.</td>
</tr>
<tr>
<td>Control</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Press Down</td>
<td>Toggles between engaging and disengaging the UUT probes (only active in Manual Mode). To make the press go down, the Press Down button on the Conveyor/Press Panel must be pressed simultaneously. The press will not go down unless the conveyor is already in the down position.</td>
</tr>
<tr>
<td>Auto Start</td>
<td>Used after power up, an error condition, or after changing from manual to automatic control to start automatic operation.</td>
</tr>
<tr>
<td>UUT Stop</td>
<td>Engages or disengages the mechanism which stops the UUT on the conveyer when it is in the test position. On enables the stop, Off disables the stop.</td>
</tr>
<tr>
<td>Reset All</td>
<td>Commands the system to go to the initial power-on state. After Reset All, set the Auto/Man control to Man and use Press Up and Conveyor Up controls to release the UUT that was being tested at the time Reset All was selected.</td>
</tr>
<tr>
<td>Power</td>
<td>Turns power on and off to the system. The main system breaker in the lower right of the system must first be turned on for this switch to be active. The Power switch has a clear safety cover that needs to be lifted prior to using the switch. The switch illuminates when power is turned on.</td>
</tr>
</tbody>
</table>

**Conveyor / Press Panel Controls**

<table>
<thead>
<tr>
<th>Control</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Optional) Speed Control</td>
<td>Allows continually variable conveyer speed from 10% to 100% speed. Not all units have this option.</td>
</tr>
<tr>
<td>Emergency</td>
<td>Shuts off power to system. Turn-to-release control. The system halts when this is pressed. Once it is released, it is necessary to manually reset the system by pressing Buzzer Reset on this panel, then Reset All on the Power panel.</td>
</tr>
<tr>
<td>Conveyor Start</td>
<td>Commands the conveyer to start if it is halted, and to stop if it is active. This control is only active when the Auto/Man control is in Man.</td>
</tr>
<tr>
<td>Conveyor Up</td>
<td>Commands the conveyer to go up to the normal load/unload position. This control is only active when the Auto/Man control is in Man.</td>
</tr>
<tr>
<td>Conveyor Down</td>
<td>Commands the conveyer to go down to the test position, allowing the press to go down when requested. This control is only active when the Auto/Man control is in Man.</td>
</tr>
<tr>
<td>Press Up</td>
<td>Commands the press to go up, disengaging the probes. This button must be held until the conveyer is fully up.</td>
</tr>
<tr>
<td>Press Down</td>
<td>Commands the press to go down, engaging the probes. Press Down does not operate unless the Conveyor is down and the Press Down button on the Power panel is also simultaneously held.</td>
</tr>
<tr>
<td>Reset Buzzer</td>
<td>Turns off the buzzer located in the light pole. If the Emergency switch has been pressed, this button also releases the emergency stop state.</td>
</tr>
</tbody>
</table>
Indicator Panel

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass/Fail</td>
<td>Show status of last test performed, or when testing, current status of UUT</td>
</tr>
<tr>
<td>Test</td>
<td>Test in progress, system busy</td>
</tr>
<tr>
<td>Manual/Auto</td>
<td>Mode that system is in, manual or automated control</td>
</tr>
<tr>
<td>Press Down</td>
<td>Indicates that the probes are engaged</td>
</tr>
</tbody>
</table>

Special Control Panel*

* Inside the front right door.

<table>
<thead>
<tr>
<th>Control Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Converyer Speed</td>
<td>The two conveyer speed controls should not be adjusted except in the event that a conveyer motor or controller is changed. These controls adjust the speed of each conveyer, and must be carefully adjusted to balance one another. If the conveyer speed is to be adjusted, use the Speed Control of the Converyer/Press Panel which affects both conveyers simultaneously.</td>
</tr>
<tr>
<td>Through-Mode</td>
<td>This switch can be set to the ON position to allow UUTs to cycle through the Analyst ILS without halting for testing. UUTs are directly shuttled to the next machine. This can be used if the assemblies being run down the line are not to be tested. The normal OFF position (down) is used when the Analyst ILS is used for testing. Press the “Reset All” button after the switch is changed to start through-mode and to stop through-mode.</td>
</tr>
<tr>
<td>Sensor Changeover</td>
<td>The normal position for this switch is in the Handler position (down). In this position, the system uses a light beam built into the handler to detect when the UUT is in position to test. Alternatively, the fixture can contain its own switching mechanism to signal the handler that a UUT is in place (for example, if the UUT is not square at the leading edge). In this case the switch can be placed in the Fixture position and the fixture switch wired into the handler.</td>
</tr>
</tbody>
</table>

Operation

Power Up/Down
To power up the system, ensure the Emergency switch is released then press the Power switch on the power panel. Allow a few moments for the computer to power up as indicated by the controller monitor showing the system menu.

To power down the system, first “shut down” the Windows software. Once this process is completed, turn off the Power switch on the power panel.

Installing the Fixture Kit
To install the fixture kit (none installed at the time):
1. Open the Analyst ILS front top and bottom doors. Be sure the 4 back doors are closed.
2. Set the Fixture control switch to the “Release” setting. The Fixture control switch is located on the system frame just below and to the left of the fixture kit. The switch is accessible behind the top of left front door even when the doors are closed.
3. Slide the fixture kit bottom into place until the guide pins fit into the alignment holes on the bottom plate of the fixture kit.
4. Set the Fixture release switch to the “Engage” setting
5. If the top latches are in the latched position, press the button in their center to unlatch them.
6. Slide the fixture kit top assembly into the top guides
7. Engage the top latches by pressing them in from the sides
8. If the UUT is different in depth from the previous UUT, the back rail track position must be adjusted. If the system includes the optional Rail control switch, set the switch to Release (see page Error! Reference source not found. on page Error! Bookmark not defined.), otherwise adjust the rear track by loosening the two thumb-screws facing outward under the rear rail near the entry and exit of the conveyer, then slide it to the proper width for the UUT (the adjustment width should be the UUT width +0.02 inches), and set the Rail control switch to Lock otherwise tighten the screws.
9. Close the front and back doors of the machine.

Note: You may wish to manually run a UUT through the machine to ensure proper operation prior to automated operation. See the “Manual Operation” section of this manual for instructions about how to do so.

Automated Operation

To use the Analyst ILS for normal operations, perform the following steps:
Note: First ensure that the clear front and rear panel doors are closed, the press top and conveyer are up (if not, manually move them to this position as per the instructions in the following section), and the Auto/Man switch of the Power Panel is set to the Auto position.

1. Power up the Analyst ILS with the Power Switch of the Power Panel. Wait for the system to power up.
2. Use the keyboard and mouse to load the desired test program using the Open selection from the File menu. **
3. Use the keyboard and mouse to select Test Screen from the Test Menu. **
4. Press the Auto Start button on the Power Panel. The green lamp of the light pole should then illuminate.

** Note: The system can be configured to automatically load and run a test program from the power up sequence. To do this, use the /lt command line parameter when starting the Analyst ILS software. If this is done, steps 2 and 3 are not necessary.

The system is now ready to begin automated testing.

In the event that the system has encountered an error condition, use the following sequence:

1. If the buzzer is on, press the Buzzer Reset button of the Converyer/Press Panel.
2. If the press and conveyer are not in the up position, perform the following steps 3-6, otherwise go to step 7:
3. Set the Auto/Man switch of the Power Panel to Man
4. Hold the Press Up switch of the Convoyer/Press Panel until the top of the press is fully up.
5. Press the Convoyer Up switch of the Convoyer/Press Panel until the convoyer moves to the up position.
6. Set the Auto/Man switch of the Power Panel to Auto.
7. Press the Auto Start switch of the Power Panel. Depending on the reason for the halt, the Auto Start switch may require pressing a second time. The Green lamp of the pole lamp will be lit when the Analyst ILS is ready to resume.

Note: In the event of a problem, press the EMERGENCY button on the Convoyer/Press Panel. This stops all activity. To release the EMERGENCY button, turn it clockwise.

Manual Operation

To control the test system manually, use the following sequence:

1. Place the Auto/Man switch of the Power Panel to Man.
2. Place the UUT Stop switch of the Power Panel to ON.
3. Press the Convoyer Start button of the Convoyer/Press Panel to start the convoyer. The Convoyer Start button toggles between convoyer on and off.
4. Place the UUT on the convoyer.
5. Once the UUT has moved to the stops, press the Convoyer Start button of the Convoyer/Press Panel to stop the convoyer.
6. Rotate the UUT Stop switch of the Power Panel to OFF to disengage the stops. This is optional as when you press the convoyer down button the stops will retract and then extend when the railLS return to the up position.
7. Press the Convoyer Down button on the Convoyer/Press Panel to move the convoyer to the down position.
8. Press and hold, simultaneously, the Press Down button of the Convoyer/Press Panel and the Press Down button of the Power Panel until the top of the press is fully down.
9. The keyboard and mouse can now be used to manually control testing of the UUT.
10. Press the Press UP button of the Convoyer/Press Panel until the fixture top is in the fully up position.
11. Press the Convoyer UP button of the Convoyer/Press Panel until the convoyer moves to the up position.
12. Press the Convoyer Start button of the Convoyer/Press Panel until the UUT travels out of the Analyst ILS.
13. Press the Convoyer Start button of the Convoyer/Press Panel to stop the convoyer.

This completes a cycle of manual testing. To resume automated testing, press the Auto Start button on the Power Panel. If the green light of the pole lamp is not illuminated, press it a second time.

Fixture and Rail Adjust Optional Controls*

* The optional fixture and rail adjust control switches are located inside the front left door.
Rail Adjust

The back rail track position must be changed for UUTs with different depth. Set the switch to Release and position the back rail. Set the switch to Lock at all other times (normal setting).

Fixture

The fixture base is locked into position with pneumatics. The fixture must be released to be changed. Set the switch to Release, remove the fixture, install the new fixture, and set the switch to Lock (normal setting).

Light Pole

Yellow light

Steady: passing boards through without testing
Blinking: handler error condition

Red light

Steady: “Emergency Stop” condition
Blinking: Have had successive UUT failures, and machine has halted as a result: waiting for operator input to continue.

Green light

Operation is in progress, handler busy. Normal state of machine.

Buzzer

Becomes active when yellow light is blinking, or if red light is blinking or steady. The volume of the buzzer can be adjusted with a control at the base of the light pole.

Optional Touch Panel Display

The optional touch panel display provides diagnostic information. The PLC (Programmable Logic Controller) LEDs on the back of the system indicate the complete system status. The touch panel display makes this information readily available at the front of the system.

The bottom of the display shows three touch keys; MAIN, ALARM, and I/O Monitor. Press any key to activate the function.

MAIN displays “Waiting for Loader” on the left and “Waiting for Unloader” on the right (Round circular displays), the two conditions are highlighted when true.
ALARM displays three boxes, top to bottom that show; “Error message”, “Cause” and Troubleshooting.

I/O Monitor displays a grid with 0-15 left to right and 0-7 vertically that indicates the state (On/Off) for the PLC channels.

**Maintenance**

In most environments* the Analyst *ILS requires little routine maintenance, however the following steps are recommended:

1. Clean the cabinet with a damp cloth, do not use solvent-based cleaning fluids.
2. Each two weeks, check and clean if necessary, the filter on the front of the industrial controller used to house the system electronics. This filter can be removed and blown out with compressed air (wear eye protection).
3. Check the input air pressure gauge at the rear of the Analyst *ILS to ensure that the regulator is operating at 0.5 mPA, if not ensure that adequate input pressure is present (minimum 72.5 PSI).
4. Each six months, execute the self-test/self-calibration software for the system test electronics. A description of this process is included with the system software. Select “Help” from the top navigation menu. Select “topic search” and enter “Self-Test” into keyword search bar.
5. Check the condition of the conveyer belts. If they are showing excessive wear, replace with CheckSum 1900-474-43 or equivalent 9.5mm x 2000mm belts (e.g., PN FSB-2UF9.5x2000 3G). Replace as pairs. ESD versions also available(-ESD suffix)
6. Clean the shaft. Remove dust, dirt from the shaft and check it. (If shaft has scratch/dent, replacement is needed.) Apply Shell Alvania Grease S2 or same type.
7. Clean the rail of conveyor-depth-adjustment.
8. Clean the inside of press unit.
*Environmental factors like dust will determine the frequency / necessity of cleaning required for optimal performance and life of the machine.

If improper operation is suspected, run self-test of the system electronics. If you need technical help, call CheckSum (UTC-08:00 Pacific time zone) at 1-877-Checksum (US only) or +1.360.435.5510 or e-mail support@checksum.com for assistance.
Appendix

Wiring Previous Machines to Analyst ILS

Note: Signals are low true
Wiring Analyst ILS to Next Machine

1. Ready to Accept UUT
2. GND
3. UUT Available
4. GND
5. SHIELD
6. UUT Passed Test
7. GND
8. UUT Failed Test
9. GND
10. GND
11. GND
12. GND

SMEMA Connector (Plug)  SMEMA Connector (Receptacle)

BOARD
Travel Direction

Note: Signals are low true
## Fixture Interface Optional Power Supply and USB Wiring on J31 and J32

<table>
<thead>
<tr>
<th>PS-UUT-L1 #1 +V</th>
<th>J31-1</th>
<th>J31-2</th>
<th>J31-3</th>
<th>J31-4</th>
<th>PS-UUT-L1 #1 +V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #1 -V</td>
<td>J31-5</td>
<td>J31-6</td>
<td>J31-7</td>
<td>J31-8</td>
<td>PS-UUT-L1 #1 -V</td>
</tr>
<tr>
<td>N/A</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 #1 +Sense</td>
<td>J31-9</td>
<td>J31-10</td>
<td>J31-11</td>
<td>J31-12</td>
<td>PS-UUT-L1 #1 +Sense</td>
</tr>
<tr>
<td>PS-UUT-L1 #2 +V</td>
<td>J31-13</td>
<td>J31-14</td>
<td>J31-15</td>
<td>J31-16</td>
<td>PS-UUT-L1 #2 +V</td>
</tr>
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<td></td>
<td>J31-19</td>
<td>J31-20</td>
<td>J31-21</td>
<td>J31-22</td>
<td>PS-UUT-L1 #2 +Sense</td>
</tr>
<tr>
<td></td>
<td>J31-23</td>
<td>J31-24</td>
<td>J31-25</td>
<td>J31-26</td>
<td>PS-UUT-L1 #2 +V</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>J31-27</td>
<td>J31-28</td>
<td>J31-29</td>
<td>J31-30</td>
<td>PS-UUT-L1 #3 +Sense</td>
</tr>
<tr>
<td></td>
<td>J31-31</td>
<td>J31-32</td>
<td>J31-33</td>
<td>J31-34</td>
<td>PS-UUT-L1 #4 +V</td>
</tr>
<tr>
<td></td>
<td>J31-35</td>
<td>J31-36</td>
<td>J31-37</td>
<td>J31-38</td>
<td>PS-UUT-L1 #4 -V</td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>PS-UUT-L1 IF_COM</td>
<td>J31-43</td>
<td>J31-44</td>
<td>J31-45</td>
<td>J31-46</td>
<td>N/A</td>
</tr>
<tr>
<td>PS-UUT-L1 #3 ENA_IN</td>
<td>J31-47</td>
<td>J31-48</td>
<td>J31-49</td>
<td>J31-50</td>
<td>PS-UUT-L1 #4 ENA_IN</td>
</tr>
</tbody>
</table>

Opt. Serial Conn. #1 Pin 1 DCD  J32-1 \( \rightarrow \) J32-2 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 6 DSR  J32-3 \( \rightarrow \) J32-4 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 2 RD  J32-5 \( \rightarrow \) J32-6 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 7 RTS  J32-7 \( \rightarrow \) J32-8 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 3 TD  J32-9 \( \rightarrow \) J32-10 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 8 CTS  J32-11 \( \rightarrow \) J32-12 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 4 DTR  J32-13 \( \rightarrow \) J32-14 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 9 RI  J32-15 \( \rightarrow \) J32-16 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Pin 5 GND  J32-17 \( \rightarrow \) J32-18 \( \rightarrow \) N/A
Opt. Serial Conn. #1 Shield  J32-19 \( \rightarrow \) J32-20 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 1 DCD  J32-21 \( \rightarrow \) J32-22 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 6 DSR  J32-23 \( \rightarrow \) J32-24 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 2 RD  J32-25 \( \rightarrow \) J32-26 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 7 RTS  J32-27 \( \rightarrow \) J32-28 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 3 TD  J32-29 \( \rightarrow \) J32-30 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 8 CTS  J32-31 \( \rightarrow \) J32-32 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 4 DTR  J32-33 \( \rightarrow \) J32-34 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 9 RI  J32-35 \( \rightarrow \) J32-36 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Pin 5 GND  J32-37 \( \rightarrow \) J32-38 \( \rightarrow \) N/A
Opt. Serial Conn. #2 Shield  J32-39 \( \rightarrow \) J32-40 \( \rightarrow \) N/A

USB Port 1

### Pins for PS-UUT-L1 #1 – #4, optional serial port and USB

(N/A: J31 Pins 7, 17, 27, 37 and even numbered pins J32-2 to J32-40 are not installed in the block)
Handler Input/Output Block Diagram and PLC Connections

SMEMA Interconnects