



The Diablo LS InstruCare Support Solution for the Atomic Emission Detector

*Remote Diagnostics, Monitoring, Reporting and Troubleshooting Tools
For the Atomic Emission Detector*

Diablo Analytical has been providing application support and training for the G2350 AED since it was first released in 1996. In addition, we have also acted as the call center for all AED service and support requests for both Agilent Technologies and Joint Analytical Systems (JAS) since 2003. As a result of our close involvement with the AED as users, application and training specialists, and as the call center, we have gained a great deal of experience and insight into the problems AED users experience with the instrumentation. These experiences have also led us to search for better, more efficient ways to provide remote support to AED customers. We have experimented with a number of “remote access” approaches, but none have provided us with an adequate solution. However, we believe that the LS InstruCare system from Jopasana, combined with our intimate knowledge of the AED, provide a remote diagnostic and support solution that will greatly improve our ability to support the AED.

Jopasana LS InstruCare

Jopasana LS InstruCare is a web-based application for remote diagnostics and management of analytical instruments. Diablo Analytical has teamed with Jopasana to develop a remote support and diagnostics solution specifically for the Atomic Emission Detector. LS InstruCare for the GC-AED will help you establish the baseline performance of your AED, evaluate the instrument’s on-going performance, and then provide proactive notification when problems arise. It also provides support personnel with easy access to the performance history of your AED to help in diagnosing problems.

Benefits of LS InstruCare

- Proactive performance monitoring results in reduced downtime and improved instrument availability.
- Extend instrument life by identifying and addressing problems before they require major repairs.
- Reduce cost of maintenance by reducing the need for on-site service calls.
- Better management of spares and consumables.

Advantages of LS InstruCare over other Remote Access Solutions

- Security – only the key AED instrument performance parameters are uploaded to an external server. There is no need to grant access to the corporate network or computers.
- Automatic notification when performance parameter values exceed control limits.
- Allows Diablo to evaluate your AED performance and help with instrument troubleshooting without accessing your AED ChemStation directly.

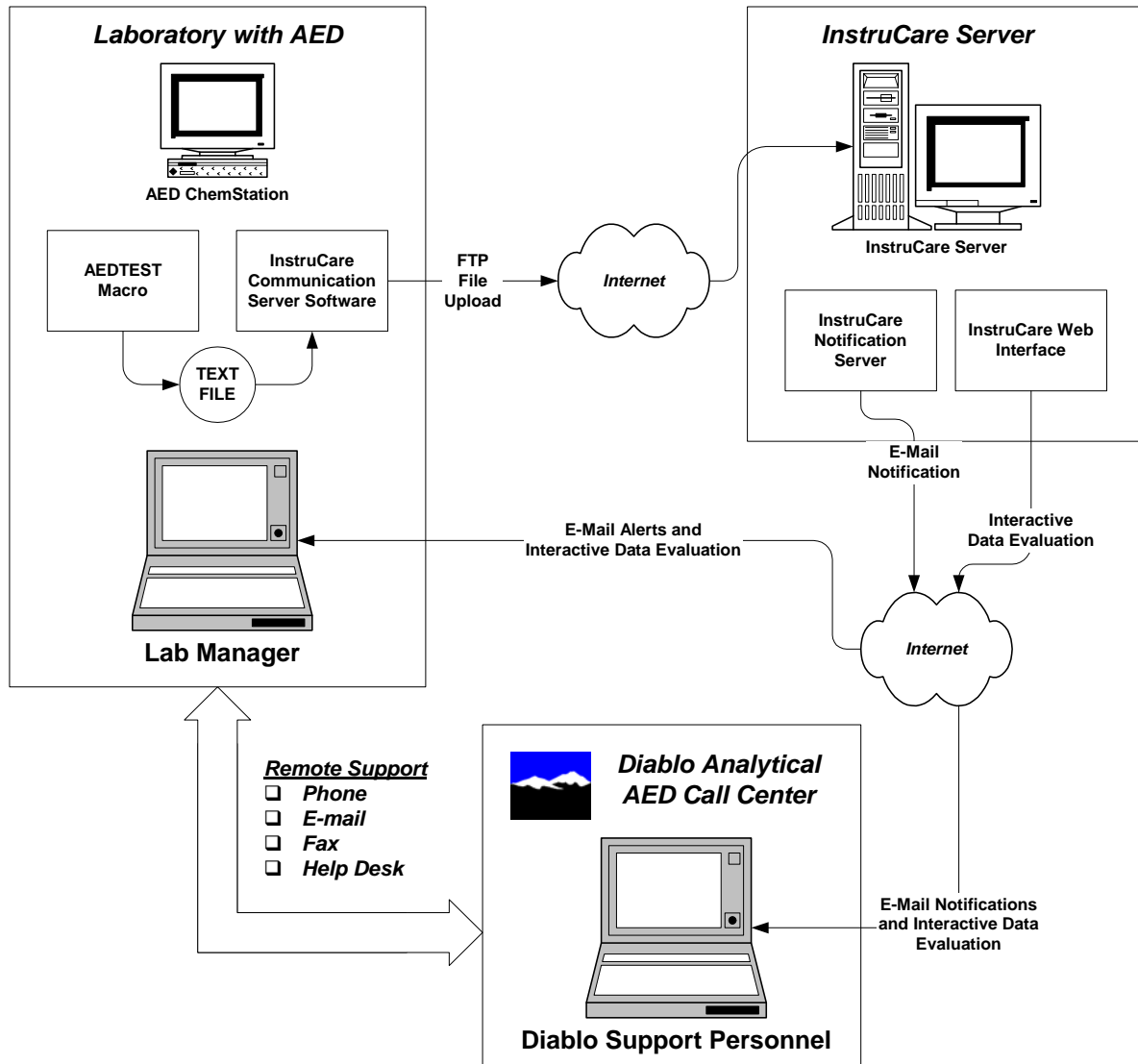
Additional Benefits of the Diablo AED LS InstruCare Support Solution

- Diablo’s AED Troubleshooting Guide for the GC-AED.
- 8 hours of remote phone, e-mail, and web support from Diablo’s AED support personnel included with annual support contract.

AED LS InstruCare Support Solution Licensing

- One time payment for the LS InstruCare Server software license
- Annual service contract, which includes Client license, Communication Server and LS InstruCare Server software maintenance and updates, AEDTEST macro updates, and annual Diablo remote support.
- LS InstruCare Server software hosting costs.

InstruCare for the Atomic Emission Detector



How it Works

Diablo has written an AED instrument monitoring macro called 'AEDTEST'. This macro can either be run manually as desired from the ChemStation menus, or it can be setup to run automatically at a particular time of the day using the ChemStation Scheduler. The macro performs a suite of performance tests to identify leaks and problems with UV throughput, plasma energy, and reagent gas settings.

After completing the full AED Test Suite, key parameter values are written to a text file. The LS InstruCare Communication Server software, which runs on the AED ChemStation computer, automatically uploads the results from the text file to a remote LS InstruCare Server. The file upload is made by an outgoing connection using the common FTP data transfer protocol.

When a new set of performance data is received by the LS InstruCare Server, the results are automatically added to the asset monitoring database on the server. If any of the performance results exceed control limits, an e-mail notification is automatically sent to support personnel. The historical data for each instrument can then be monitored and evaluated through a simple web-based interface that is accessible to authorized personnel from any web browser.

Diablo's AED Test Macro

Diablo wrote the AEDTEST macro based on our experience troubleshooting AED systems. Each test that is automatically performed by the macro is a test that we typically ask users to run manually when troubleshooting AED problems. The macro collects 22 AED performance parameters, prints a report to the local printer, and logs key data to a text file for upload to the LS InstruCare server. The macro can either be run manually as desired from the AED ChemStation menu, or it can be scheduled to run at a specific time each day using the ChemStation Scheduler. The AEDTEST macro collects the following AED performance parameters:

AED Leak and Basic Status Test

- C193 Peak Height*
- N174 Peak Height*
- O2 Band Height*
- C193 / O2 Ratio*
- N174 / O2 Ratio*

AED UV Throughput Test

- C193 Peak Area
- C165 Peak Area
- C193 / C165 Ratio*

AED Flow Rates (Optional, User Entered)

- Cavity Vent Flow Rate
- Purge Vent Flow Rate

AED Helium Plasma Intensity Test

- He501 Peak Area with No Reagent Gases*
- He501 Peak Area with H2 Reagent
- He501 Peak Area with O2 Reagent
- He501 Peak Area with H2 and O2 Reagent

Hydrogen Reagent Gas Test

- Hydrogen Pressure
- H486 Peak Area
- He492 Peak Area
- H486 / He492 Ratio*

Oxygen Reagent Gas Test

- Oxygen Pressure
- O725 Peak Area
- He728 Peak Area
- O725 / He728 Ratio*

*Parameters that are logged to the text file

Diablo's Troubleshooting Guide for the GC-AED

It is usually more efficient and less costly when an AED user is able to identify and correct problems with their instrumentation without requiring an on-site service call. Unfortunately, the AED is a complex instrument that can be difficult and sometimes intimidating to troubleshoot. Recognizing this, we wrote Diablo's *Troubleshooting Guide for the GC-AED*. It supplements the AED hardware service manual, and draws on our many years of experience supporting AEDs. The Troubleshooting Guide is intended to help AED users troubleshoot and diagnose problems with their systems. A copy of the Guide is included as part of Diablo's LS *InstruCare Solution for the GC-AED*.

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 Check the Peak Width / Data Rate Setting

 Look for Leaks and Plugs

 Check the GC Inlet and Autosampler

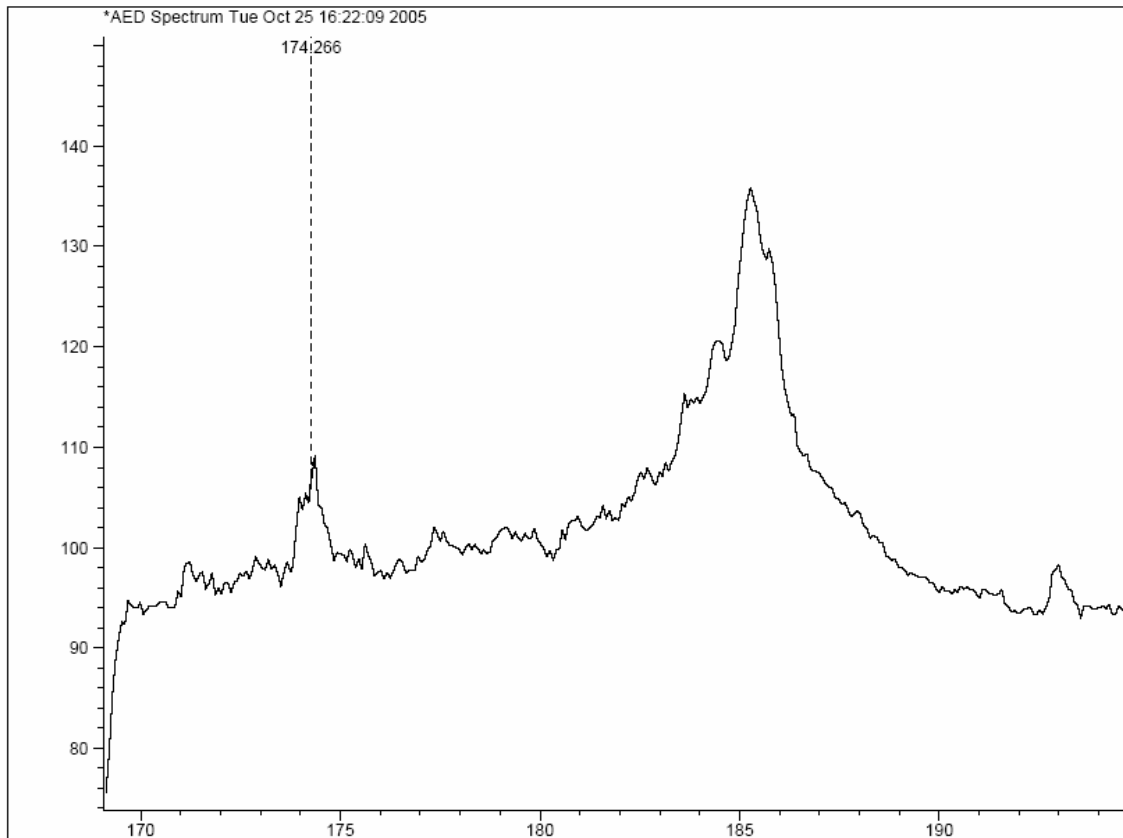
 Run the AED Checkout Sample and Methods

Common Error Messages

 Spectr/No Water

 Water Zn Overheat

Example AED System Test Report



Report Date: Tue Oct 25 16:28:12 2005
Instrument: Instrument 1

AED Flow Rates (User Entered)

Cavity Vent Flow Rate (mL/min): 53.3
Purge Vent Flow Rate (mL/min): 30.9

AED Leak and Basic Status Test

C193 Peak Height: 4
N174 Peak Height: 8
O2 Band Peak Height: 38
C193/O2 Band Ratio: 0.105263
N174/O2 Band Ratio: 0.210526

AED UV Throughput Test

C193 Peak Area: 9135
C165 Peak Area: 5639
C193/C165 Ratio: 1.619968

AED Helium Plasma Intensity Test

He501 Peak Area (No Rgt): 53123
He501 Peak Area (H2 Rgt): 20454
He501 Peak Area (O2 Rgt): 27936
He501 Peak Area (H2+O2 Rgt): 8810

Hydrogen Reagent Gas Test

Hydrogen Pressure (psi): 9.400708
H486 Peak Area: 113418
He492 Peak Area: 5792
H486/He492 Ratio: 19.581837

Oxygen Reagent Gas Test

Oxygen Pressure (psi): 22.999362
O725 Peak Area: 952
He728 Peak Area: 7923
O725/He728 Ratio: 0.120157