



*Integrated Rig Instrumentation System*  
**iRIS DRILLER'S INTERFACE**  
*User's Manual for JOIDES RESOLUTION*

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**READ IN CONJUNCTION WITH THE FOLLOWING MANUALS:**

- iRIS General Users Quick Start Guide
- iRIS Driller's Quick Start Guide
- iRIS Operations Superintendent Quick Start Guide

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## Overview

The Integrated Rig Instrumentation System (iRIS) is a replacement rig instrumentation system (RIS), used by the International Ocean Discovery Program – *JOIDES Resolution* Science Operator (IODP-JRSO) to measure, collect, and archive ship operations, including drilling, coring, navigational, and science-related systems in the collection and recovery of deep earth samples. This system is a direct replacement of the long-used RigWatch™ RIS that was in use on the *JOIDES Resolution* (JR) from approximately 2009 until iRIS' scheduled deployment in 2023. The new iRIS system is based on National Instruments LabVIEW™ programming language and utilizes existing sensor and control infrastructure to accomplish its objectives.

The purpose of this manual is to provide instructions to execute, configure, and produce custom datalogging files for offline calculations and visualization of drilling/coring procedures using the iRIS Driller's Interface Software package, available on the *JOIDES Resolution* network shares. Please see the on-board Marine Computer Specialists or Application Development Group for assistance in installation. You can find summarized instructions for other actions in the iRIS Driller's Quick Start Guide (QSG) found in the *JOIDES Resolution* documentation repository, Confluence.

### 1. Computer / Software Requirements

The following minimum requirements are required to use the iRIS GUI,

#### A) Computer Requirements:

- Microsoft™ Windows™-based computer (tested on Windows™ 10)
- 10MB of hard disk space (for program only and associated program files)
- Adequate space for datalogging files (varies)

**NOTE: YOU MUST BE CONNECTED TO THE JR's ON-BOARD NETWORK TO CONNECT AND LOG FROM iRIS. PLEASE SEE THE JRSO MARINE COMPUTER SPECIALIST STAFF IF YOU REQUIRE ASSISTANCE.**

#### B) Software Requirements:

- IODP iRIS Driller's Interface Software package
- NI™ LabVIEW™ Runtime Software

### 2. Installing the iRIS GUI Package

1. Download and unpack/unzip the iRIS installation package
2. Double click on the installer
3. The installer will create a folder named, *C:\IRIS\<USERNAME>*. See [Figure 1](#)
4. The installer will create the following subfolders: See [Figure 2](#):

\EXPORT\_ASCII

\EXPORT\_DATALOGS

\EXPORT\_DEFS

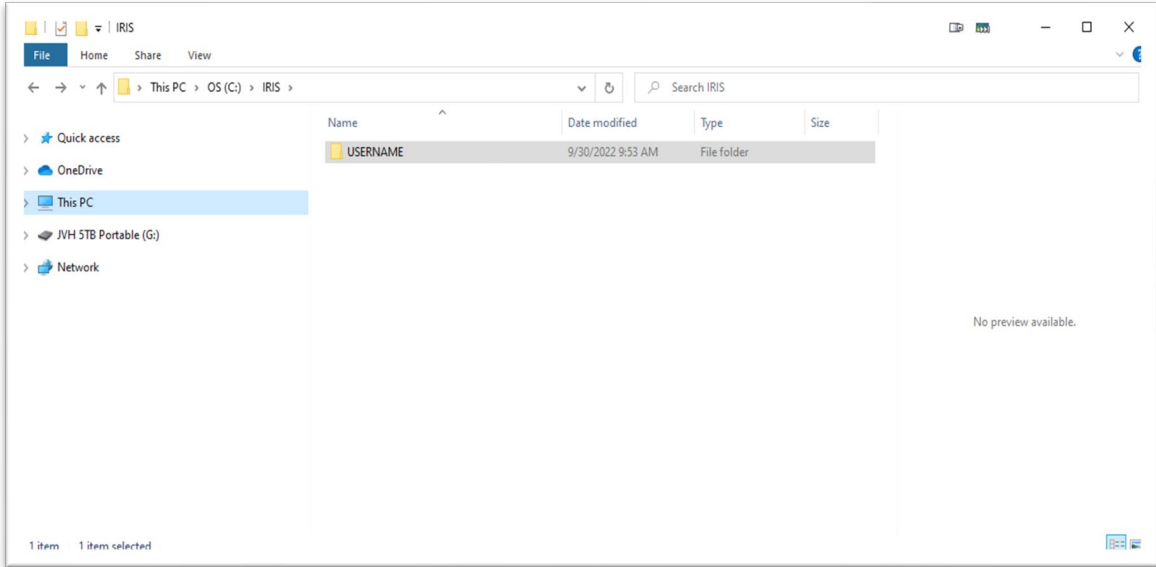


Figure 1. iRIS Installer Folder Creation

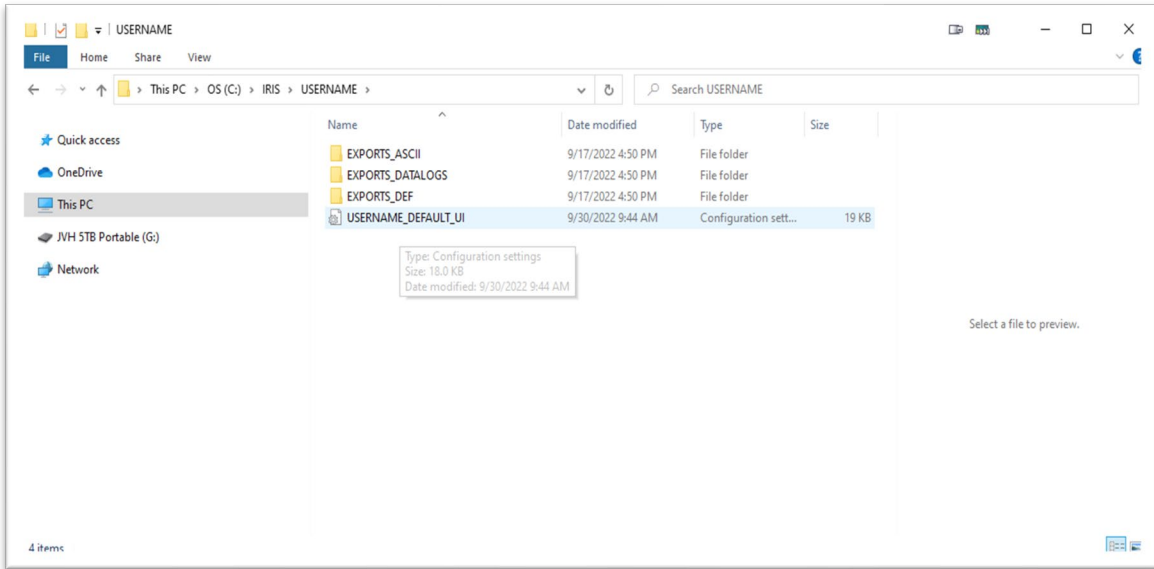


Figure 2. iRIS subfolder creation

Once the installer completes, the program is ready to run. Double click on the iRIS Driller’s Interface icon to start the program:



Figure 3. iRIS Program Icon

The iRIS Driller's interface will start and present the User with the following display:

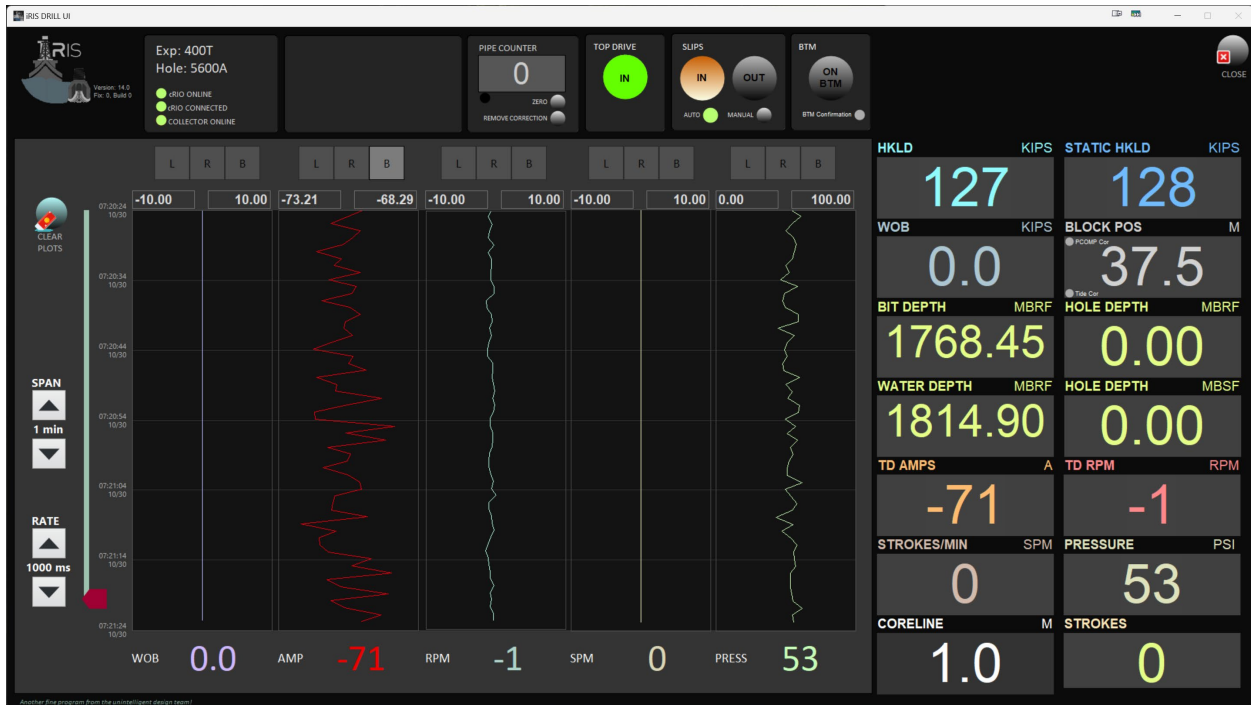


Figure 4. iRIS Driller's Interface

### 3. iRIS SETUP



**CAUTION: DUE TO THE POTENTIAL IMPACT ON OPERATIONS, MANUAL NUMERICAL ENTRY IN THE DRILLER'S USER INTERFACE (UI) WILL BE DESCRIBED FIRST. THE VALUES DISPLAYED IN THE DRILLER'S USER INTERFACE ARE USED FOR A VARIETY OF CALCULATIONS IN SEVERAL AREAS OF iRIS. IT IS IMPORTANT TO ENTER MANUAL CORRECTIONS WITH CAUTION OR INCORRECT READINGS, AND THEREFORE INCORRECT DRILLSTRING HANDLING, MAY RESULT.**

#### A) Modifying Numerical Inputs into the Driller's User Interface



**NOTE: THERE ARE SEVERAL METHODS THE USER CAN ADJUST THE NUMERICAL VALUES THROUGHOUT THE IRIS INTERFACE,**

- (1) the user can click the up/down arrows to increase or decrease the numerical value, or

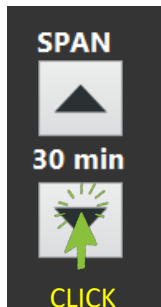


Figure 5. Adjusting Values by Up/Down Arrows

(2) the user can click and drag the cursor to highlight the number and type the desired value



Figure 6. Adjusting Numerical Values by Direct Typing

#### 4. iRIS Driller's Interface Layout

The iRIS Driller's Interface is divided into several functional areas detailed below.



Figure 7. iRIS Driller's Interface Functional Areas

The functional areas are as follows:

##### A) Drilling/Coring Activities Panel

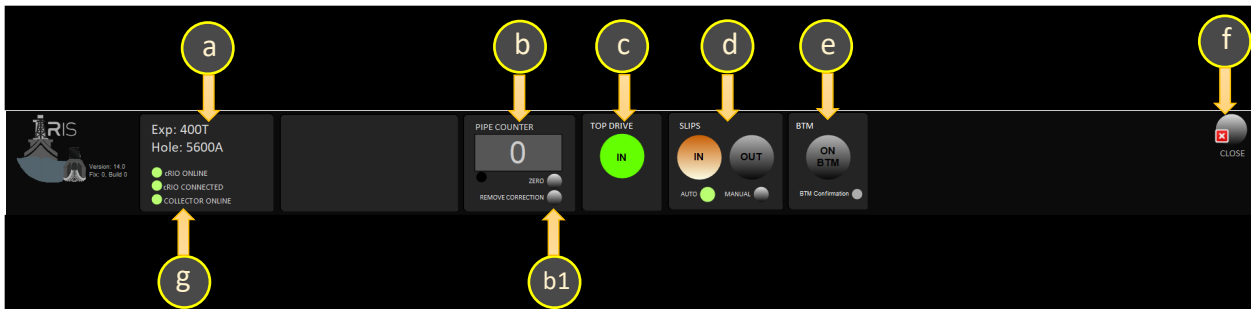


Figure 8. Expedition Information Summary Functional Area

The Expedition Information Summary contains information related to:

- a. Expedition / Current Hole Number (entered by the IODP Operations Superintendent)

- b. PIPE COUNTER Indicates the current pipe count currently deployed
  - o b1 “Zero” and “Remove Correction” buttons will zero out and cancel any manual corrections to the pipe count



**CAUTION: DUE TO THE POTENTIAL IMPACT ON OPERATIONS AND DATA COLLECTION, MANUAL NUMERICAL CORRECTION AND ZERO OF THE PIPE COUNT SHOULD BE USED WITH AN ABUNDANCE OF CAUTION!**

- c. TOP DRIVE indicator will change color from green to grey depending on the state of the top drive
- d. SLIP MODE - Toggle button to set Slip mode and indicates the slip position. This can be set to “Manual” or “Auto” by checking the “Mode” toggle box. The “Auto” mode changes state based on the weight of the drillstring as measured at the crown sheaves
- e. Coring “On BTM” indicator. When toggled, these buttons will generate event flags and sent to the data collection database to flag the start and stop of the coring process
- f. This indicator will illuminate green when the interface is connected to the cRIO controller. The cRIO controller is the central processor for the iRIS system
- g. Indicators will alert the Driller when the cRIO controller is offline and connected, as well as if the data collection database is on- or offline. When online, the indicators are green, and turn red when they are offline or not connected to the Drillers Interface

B) Plot Control / Program Status

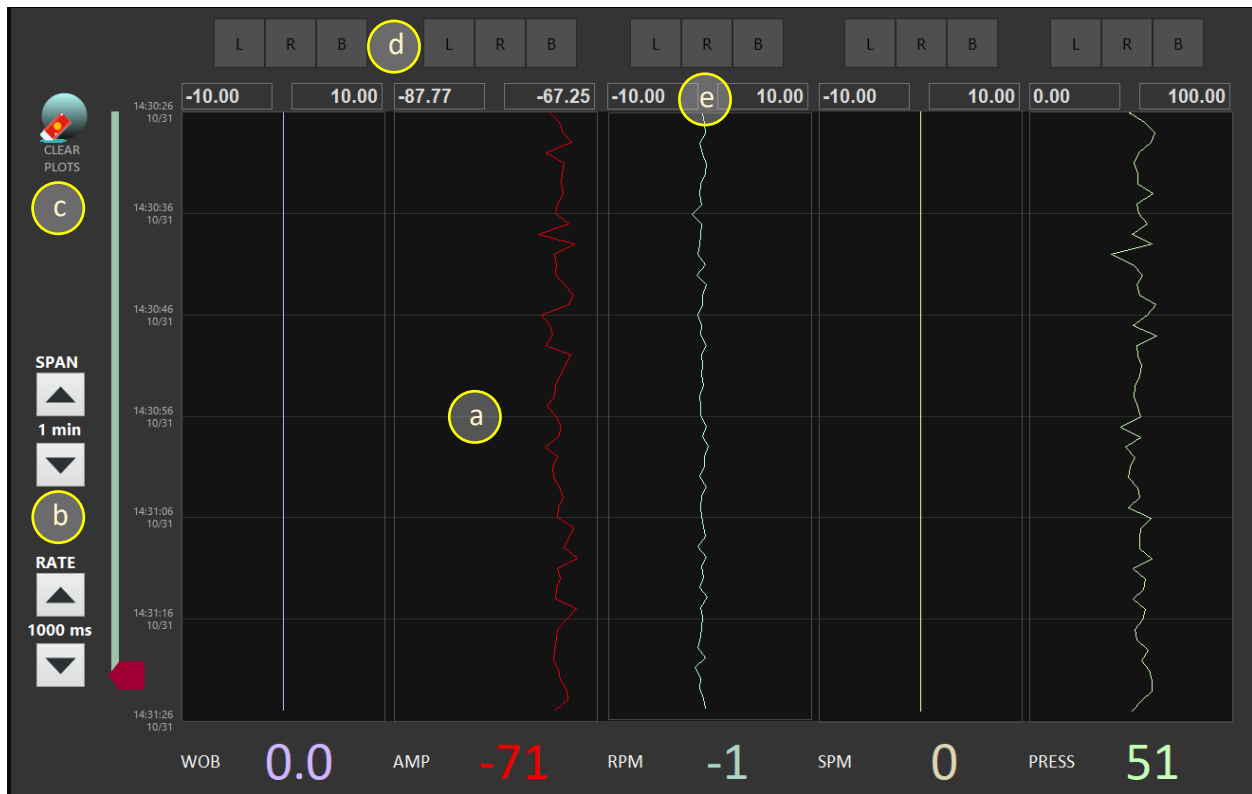


Figure 9. Plot Control / Program Status Functional Area



The Plot Control / Program Status functional area displays a variety of waterfall plots and gives the Driller control over the graphing display area.

- a. Waterfall plot display showing
  - Current Weight on Bit (WOB)
  - Top Drive Amp Draw (AMP)
  - Top Drive RPM (RPM)
  - Pump Strokes (SPM)
  - Standpipe Pressure (PRESS)
  
- b. The SPAN and RATE selectors give the Driller control over how much or little data is displayed on the waterfall plots.
  - “SPAN” is a user-selectable time span to increase or decrease the total data history displayed on the waterfall plots. The user can select from the following time periods:  
Select these time periods by clicking on the up/down arrows to move to the next step, or by clicking on the time unit in the middle and selecting from the list of available time periods.

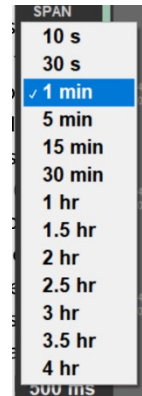


Figure 10. SPAN display adjustment menu

- “RATE” controls the rate at which data is updated in the plot area. Increasing the data collection rate improves the resolution of collected data, but is slightly slower to display, and if combined with an extended SPAN rate, will result in a “fuzzy looking” plot. If the user selects a longer collection rate, the data will have less resolution.

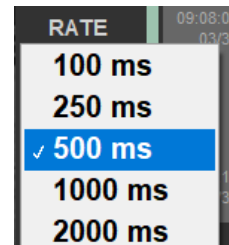


Figure 11. RATE selection menu for display controls

- c. Use the CLEAR button to clear the plot area of data.



**CAUTION! CLICKING THE CLEAR BUTTON WILL CLEAR ALL PLOTTED DATA, BUT NOT THE DATA THAT IS COLLECTED AND STORED!**

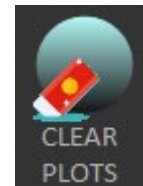


Figure 12. CLEAR PLOTS button

- d. Use the three buttons labeled “L”, “R”, and “B” to autoscale the collected data into (L)eft, (R)ight, and (B)oth to control which side of the display lane will be scaled to fit data.

C) X-Axis range scaling.

There 4 options:

1. Auto scale (B)oth the left and right click on the B control.
2. Auto scale only the (R)ight and the user sets the left value, select R control.
3. Auto scale only the (L)eft and the user sets the right value, select L control.

4. Users sets both right and left values, deselect all.

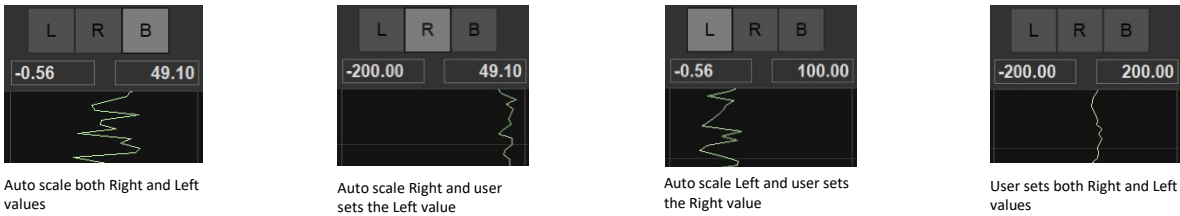


Figure 13. Scaling Options for Waterfall Plot Displays

NOTES:

- Don't see data in plot? Select **B** first.
- Auto scaling is based on all the data in the buffer.
- To change a value just select the number and type in the new value.
- To export plot, right click plot and select either:
  - Export to clipboard
  - Export to Excel
  - Export to Image

D) Downhole Operations Display

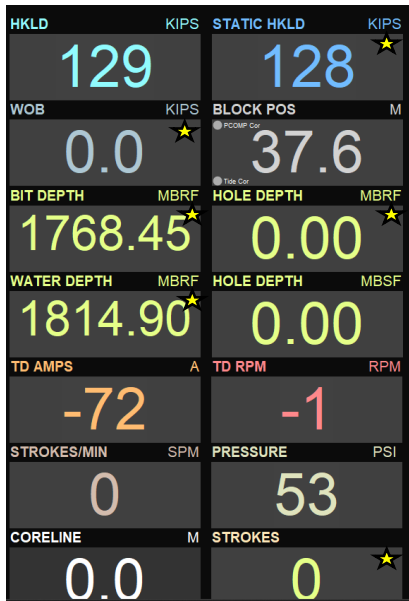


Figure 15. Downhole Operations Display

The design of the right side of the main display gives the Driller a quick glance at important parameters used during drilling and coring operations. The parameters in this display are fixed, and only give the current measured values (i.e., no historical or trend data is available). You can find detailed readings and historical trends for each of these parameters in other areas in the Driller's interface software. (See Figure 15)

Several of the numerical displays in the Downhole Operations Display can be manually corrected by the Driller. Make these manual corrections by clicking the text box and entering a new value. As seen in Figure 16, iRIS will remind the user that pressing the "Enter" button, the change is committed to the data collection database. Note that the values in Figure 15 that are starred are available for manual value correction.

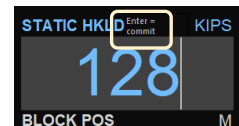


Figure 16. Manual Value Correction

5. Adjusting Plot Layout and Displays

Once the User has configured the desired graphs, iRIS GUI allows the User to change the time scale, sampling frequency, and view historical graphs to view trends.

### A) Adjusting Plot Time Scale

iRIS GUI Allows the User to increase or decrease the time scale of the plot area. To adjust the time scale, click on the appropriate arrow on the Display functional area. *See Figure 17 below*

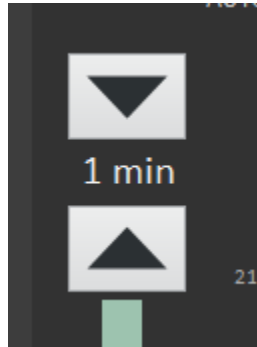


Figure 17. Time Scale Adjustment

The User has the following available time scales

Seconds	10	30					
Minutes	1	5	15	30			
Hours	1	1.5	2	2.5	3	3.5	4

Table 1. Available Time Scale Adjustments

### B) Customize Sampling Frequency

The User can also adjust the sampling frequency that the plot area polls the central datalogger. By adjusting the sampling frequency, events that occur quickly (e.g., firing of the Advanced Piston Core barrel) can be more readily visualized. *See Figure 18.*

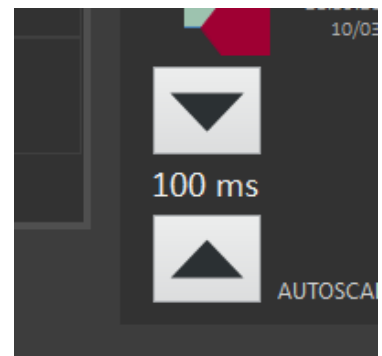


Figure 18. Sample Frequency Adjustment

The available sampling frequencies are (in milliseconds per sample):

100 ms	250 ms	500 ms	1000 ms	2000ms
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Table 2. Sample Frequency Timing

**NOTE: 1000 ms = 1 sec**

### C) Reviewing Historical Data in Plot Area

The iRIS GUI gives the User the ability to review up to four (4) previous hours of data. *See Figure 19.*

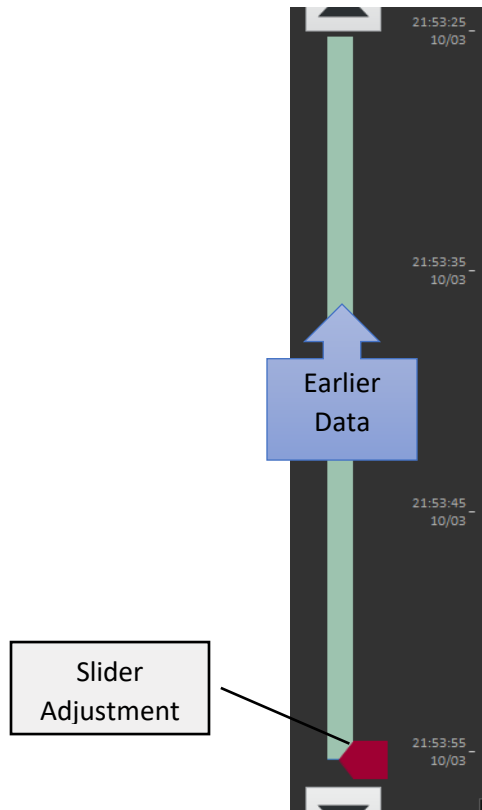


Figure 19. Historical Data Slider

Click and drag the slider bar up to review historical data, and then back down to get more recent data.

**NOTE: THE SLIDER BAR MUST BE RETURNED TO THE BOTTOM OF THE SLIDER TRACK IN ORDER FOR THE PLOTTING OF DATA TO CONTINUE**

#### D) Clearing the Plot Area

To clear the plot area, click the “Clear Plot” button. *See Figure 20*

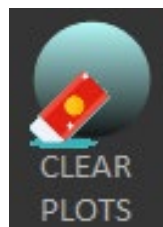


Figure 20. Clear Plot Button

Once selected, all plots will clear of current data and refresh the plot area, and then resume plotting from the bottom of the plot area.

#### E) Adjusting the Autoscale Values

iRIS allows the User to modify the scale at which the data is graphed, according to the Autoscale settings (*See Figure 21*). Based on the autoscale setting selected for the plot lane, the User can set upper limits to fit the graph within the boundaries of the plot lane. The User can adjust the values

- a. If the graph is anchored to the LEFT, only the RIGHT value can be adjusted
- b. If the graph is anchored to the RIGHT, only the LEFT value can be adjusted
- c. If the graph is both LEFT/RIGHT autoscaled, both sides can be adjusted

To adjust the scaled value, simply click in the area where the lower or upper limit is being displayed (*Figure 21*) and drag the cursor over the value and enter the desired value and hit Enter.



Figure 21. Manually Adjusting Graph Scaling

## Troubleshooting

### 1. If the display does not update:

Due to the way that the LabVIEW runtime engine operates, the graphing or other displays may not automatically update when the User changes a plot display setting. If this occurs, use the following actions to refresh the display:

- a. Click the “Clear Plots” button on the front panel. The display should refresh and begin plotting data once again
- b. Click the “Edit” button above the plot lane. Once the Plot Editor is displayed, click the “Apply Changes” or “Cancel” button, and the display should refresh using current data

### 2. If the desired edge of the plot lane is not centered or not anchored:

Some data being collected and graphed can have large swings depending on sea states, ship position, or other factors. Because of this, the initial data may be plotted incorrectly on an extreme edge of the plot lane. To correct this, use one of the following actions to better visualize the historical data:

- a. Select a different autoscale edge. Use the (L)eft, (R)ight, or (B)oth Centered selections above the plot lane.
- b. Separate plots that have a wide variation or range of values from overlaying each other

# Revision Log

REVISION NUMBER	DESCRIPTION	REVISION DATE
<b>0</b>	Initial release	22-10-08
<b>1</b>	Updated to reflect simplification of DUI (Removal of tabs, Drillers Worksheet)	23-11-01