# 1. Introduction to IRIS Utilities

The IRIS operator and/or system manager must make sure all the hardware and software in the IRIS system work together properly from the time of installation through the day-to-day operation. This job includes:

- Configuration — Setting up the hardware and software after it is installed or after a software update.
- Calibration — Fine-tuning the system so that it generates the most accurate data possible.
- Monitoring — Overseeing the day-to-day operation of the system to make sure that it continues to function properly.
- Testing — Locating the cause of problems when they arise.

The IRIS utilities are designed to help with these job functions. Table 1–1 lists all the utilities, showing how they are used together to configure, calibrate, monitor and test the radar/antenna, signal processor, and IRIS. Each column of the table is independent of the others; that is, you can configure, monitor, and test the radar/antenna using the utilities listed in the radar/antenna column without regard for the signal processor or IRIS. Similarly, you can configure, calibrate, monitor and test the signal processor separately. IRIS can also be configured independently, though monitoring it is meaningless without the antenna and signal processor.

**Table 1–1: IRIS Utilities by Function**

| Function | Radar/Antenna | Signal Processor |
|---|---|---|
| Configuration | Setup | Setup<br>Dspx |
| Calibration | —— | Ascope<br>Zauto or Zcal |
| Monitoring/Testing | Antenna<br>Bitex | Ascope<br>Dspx |

In general, configuration utilities are run only after installation or after a software or hardware update. Calibration utilities are run periodically or if there is a change to the system hardware. Monitoring and testing are on-going procedures. You run those utilities regularly, or whenever problems arise.

While some of the utilities can be run while IRIS is running, this is not recommended and usually not necessary. Table 1–2 lists the IRIS utilities, with a short description and a checkmark indicating the utilities that can be run while IRIS is running.

In some cases the signal processor utilities for the SIGMET model RVP6 signal processor are not required for the SIGMET model RVP7 Digital Receiver and Signal Processor, i.e., because of the wide dynamic range of the RVP7, utilities relating to receiver gain control are only required by the RVP6.

**NOTE to IRIS Users: Utilities that use the signal processor can be accessed without quitting the IRIS program (qiris). To do this, simply set the Radar Process button to the off position in the IRIS Radar Status Menu. This will free the SCSI bus to the signal processor so that it can be accessed by the utilities. Another way to run a utility while IRIS is running is to use the –demo option which is available for many utilities. This allows values to be changed and stored. However, these will not take effect unless IRIS is restarted (qiris and siris).**

**Table 1–2: Summary of IRIS Utilities**

| Utility | Run with IRIS | Description |
|---|---|---|
| Antenna | ✓ | Provides monitoring and control for the RCP antenna controller. This allows keyboard/mouse control of the antenna and radar transmitter/receiver/servo system for test and verification purposes. |
| Ascope | | A general purpose data plotting and radar control program. Users can display up to four plots from the available parameters:<br>• Reflectivity vs. Range<br>• Velocity vs. Range<br>• Spectrum Width vs. Range<br>• Log, I and Q Raw A/D Samples vs. Range<br>• Log, I and Q Time Series at Selectable Range<br>• Doppler Spectrum at a Selectable Range<br>In addition, Ascope provides an alternative radar control program for changing pulse width, PRF, clutter filters and data thresholding. Ascope is used to align the LOG and LINEAR channel A/D converters and for overall system verification. The Doppler spectrum display is particularly useful for diagnosing problems in the Doppler receiver. |

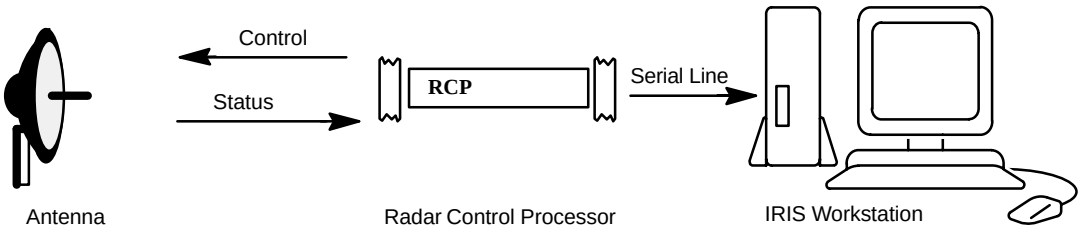
**Table 1–2: Summary of IRIS Utilities (cont.)**

| Utility | Run with IRIS | Description |
|---|---|---|
| Bitex | ✓ | Provides detailed configuration and observation of the information reported by the Built-In Test Equipment (BITE). |
| Dspx | | Helps to debug interface hardware to the signal processor, or debug new software you are developing using the signal processor. |
| Overlay | ✓ | Graphical editor to edit and display overlay maps that you develop, so that you can see how they will appear when displayed on the real-time display or other products. |
| Setup | ✓ | Configures the radar software for the characteristics of the radar, such as the number of pulse widths, the duty cycle limits, the radar wavelength, antenna gain, transmit power, etc. This utility should be run first. |
| Zauto7 | | Calibrates the slope and offset of a test signal within a linear range. This information is stored in a file and used during programmed radar collection. |
| Zcal | ✓ | Allows the user to manually modify the calibration file. |

## 1.1 Radar/Antenna

Figure 1–1 shows the connection between the radar system and IRIS via the RCP (radar control processor). The radar is connected to the RCP via a number of status and control lines. The RCP is connected to the IRIS workstation via a serial line.

**Figure 1–1: Typical Antenna Installation**




The relationship between the radar/antenna, RCP, and IRIS must be configured during installation, then it must be monitored and tested to make sure it continues to function properly.

### 1.1.1 Configuring the Antenna

IRIS utilities and menus let you control the antenna's position and velocity from a remote workstation. For these utilities and menus to work, you must first configure the antenna using **setup** described in Chapter 9.

Some of the information you supply in the **setup** utility comes from the manufacturer's specifications, such as:

- Minimum and maximum elevation that the antenna can reach.
- Maximum azimuth and elevation velocities.
- Warm-up and settle times.
- RCP serial line format.

The **setup** utility also needs to know information about the antenna's location, such as:

- Height of the ground in meters.
- Height of the antenna in meters.
- Latitude and longitude of the antenna site.

To save time during configuration, gather this information before running **setup**.

After the antenna is configured, run the Antenna utility to test the connection between the antenna and IRIS.

You should also use Antenna to test the antenna's built-in safeguards. These safeguards ensure that the antenna does not exceed its elevation limits. The procedure for testing the antenna safeguards is described in Chapter 2. It may require two people — one to run the utility, and one to watch the antenna.

### 1.1.2 Monitoring the Antenna

The Antenna utility gives you access to all of the radar control features through a menu interface, including:

- Setting the azimuth and elevation position and velocity.
- Turning on the transmitter radiate, servo power, and transmitter cabinet.

In addition, it displays antenna status information, including:

- Airflow
- Waveguide pressure
- Magnetron current
- Transmitter radiate on, off, and warning status

After installation or routine maintenance, use Antenna to test the interface between the antenna and IRIS. However, do not run Antenna when IRIS is running because it may interfere with commands that IRIS sends to the radar control processor. Use the Radar Status menu, which gives you access to the same antenna status information without interfering with IRIS commands. See the *IRIS User's Manual* for information on the Radar Status menu.

### 1.1.3 Testing the Antenna

The Antenna utility's RCP I/O Summary menu is a good place to start when analyzing antenna problems. It can help diagnose problems on the serial line. For example:

- If the output count is frozen, the computer is not transmitting data.
- If the input count is frozen, there is no I/O coming from the RCP.
- If the error count is incrementing rapidly, you may be using the wrong antenna format or baud rate.

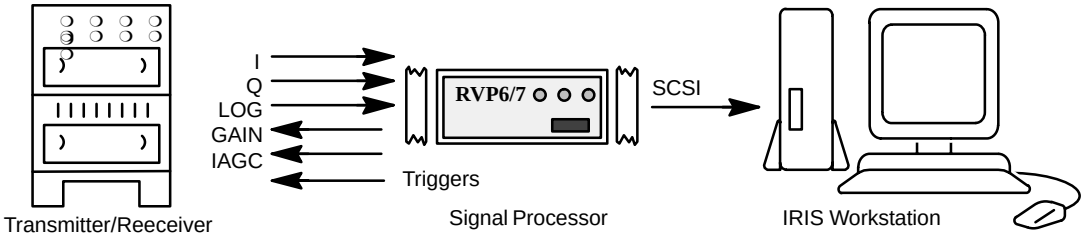
If the I/O and error counts appear normal, the problem is not with the serial line. You should then look at the Antenna status panel, which may show an error or fault for one or more antenna controls.

You can also run the **bitex** utility to see if the BITE packets are coming across the line. Information in the BITE packets can further pinpoint the cause of the problem. The **bitex** is described in Chapter 4.

## 1.2 Signal Processor

Figure 1–2 shows a typical signal processor installation. The signal processor receives input from the transmitter/receiver through the I, Q, and LOG signals. It controls the gain through the GAIN signal for analog sensitivity time control (STC) or automatic gain control (AGC), or through the instantaneous automatic gain control signal (IAGC) for digital fast AGC. The signal processor is connected to the IRIS workstation via a SCSI interface.

**Figure 1–2: Typical Signal Processor Installation**




The relationship between the transmitter/receiver, signal processor, and IRIS must be configured after installation. Each of the gain and offset pots must be adjusted and calibrated. This calibration information is stored on disk so that it can be used during radar data collection. The signal processor must then be monitored and tested to make sure it continues to function properly.

### 1.2.1 Configuring the Signal Processor

After you install the IRIS hardware and software and before you run the signal processor, you must run the Setup utility. This utility provides commands with which you define the parameters of the radar transmitter, so that the signal processor can process the radar information that it receives.

In the RCP Section 9.3, you define the parameters of the radar transmitter/receiver, including:

- Wavelength
- Pulse width
- Minimum, maximum, and default PRF
- Transmitter, receiver and test signal losses

This information can be found in the manufacturer’s specification for the radar device.

After the radar and signal processor have been cabled up and configured with Setup, there is only a 50/50 chance that the Doppler velocity sign is set correctly. To check this, run the Ascope utility as described in Chapter 3. If the sign is not correct, swap the I and Q input cables to the signal processor.

## 1.2.2 Calibrating the RVP7 or RVP8 Signal Processor

When the signal processor is configured, each of the connections between the transmitter/ receiver, signal processor, and IRIS must be adjusted and calibrated to ensure the most accurate results. The RVP7 Digital Receiver alignment does not require the radar utilities for installation, except for the **zauto** (or manual **zcal**) utilities which are used for calibration. However, the alignment can be done using the **dspx** utility.

## 1.2.3 Monitoring the Signal Processor

The **ascope** utility is a convenient way to monitor the signal processor. It lets you control the antenna position and velocity, sample data either once or continuously, and plot from one to four output parameters in a graphical display. For example:

- Plot the reflectivity and Doppler spectrum to determine how much dynamic range is available in the linear channel for clutter correction.
- Plot the mean velocity vs. range to make sure the velocity sign is correct.
- Plot the linear channel A/D's vs. range and the LOG channel A/D vs. range to make sure the analog-to-digital converters are aligned correctly.
- Plot the Doppler power spectrum at a selected range to examine interesting weather targets in detail.

## 1.2.4 Testing the Signal Processor

The RVP7 signal processor performs a series of self-tests when it is powered up. If an error occurs during the power-up cycle, one of the LEDs is turned off. Refer to the *RVP7 (or RVP6) Signal Processor User's Manual* for more information.

The **dspx** utility can help track down a problem with the signal processor. It is especially useful as a debugging tool when developing new hardware or software interfaces to the signal processor. A brief description of the **dspx** utility and an example of its use are given in Chapter 6. More detailed information about the **dspx** commands can be found in the *RV7 Signal Processor User's Manual*.

## 1.3 Running the IRIS Utilities

Utilities can be run locally or over the network for remote operation and maintenance. The utilities may be started from either a terminal or a graphical user interface called Utils. These cases are described below.

**Important: You must be an operator to run the IRIS Utilities. Observers are not allowed to run any utilities that would effect the system configuration or operation.**

**Note: Utilities that use the signal processor can be accessed without quitting the IRIS program (qiris). To do this, simply set the Radar Process button to the off position in the IRIS Radar Status Menu. This will free the SCSI bus to the signal processor so that it can be accessed by the utilities. Another way to run a utility while IRIS is running is to use the –demo option which is available for many utilities. This allows values to be changed and stored. However, these will not take effect unless IRIS is restarted (qiris and siris).**

### 1.3.1 Running the Utilities Locally from a Terminal Window

This is the case for the following:

- The workstation is connected directly to the signal processor via the SCSI–2 bus and the RCP via an RS232 serial line.

The steps for running the utilities are:

1. Start a terminal on the local workstation. On HP and IBM workstations, double click the terminal icon to do this. On SGI workstations, use the system manager menu to start a “Unix Shell”. On Linux, right click on desktop and select New “window”.
2. Optional– to get a nicer terminal you can immediately type **sigterm.** This will start a terminal that has nice scroll bars, size, background, etc. Note that your user ID (operator or observer) and node name will appear at the top. This is useful if you have several terminals open in a networked environment since for each terminal you will know who you are and where you are.
3. Type the name of the utility followed by any options (e.g., –demo). It is often nice to type “&” after the utility name. This will free–up the terminal after the utility is started. An example is:

**$ ascope –demo &**

Note that utility names are typed all lower case. If you are unsure what options are available, type the name of the utility and the option –help. In most cases this will give you a list of options:, for example:

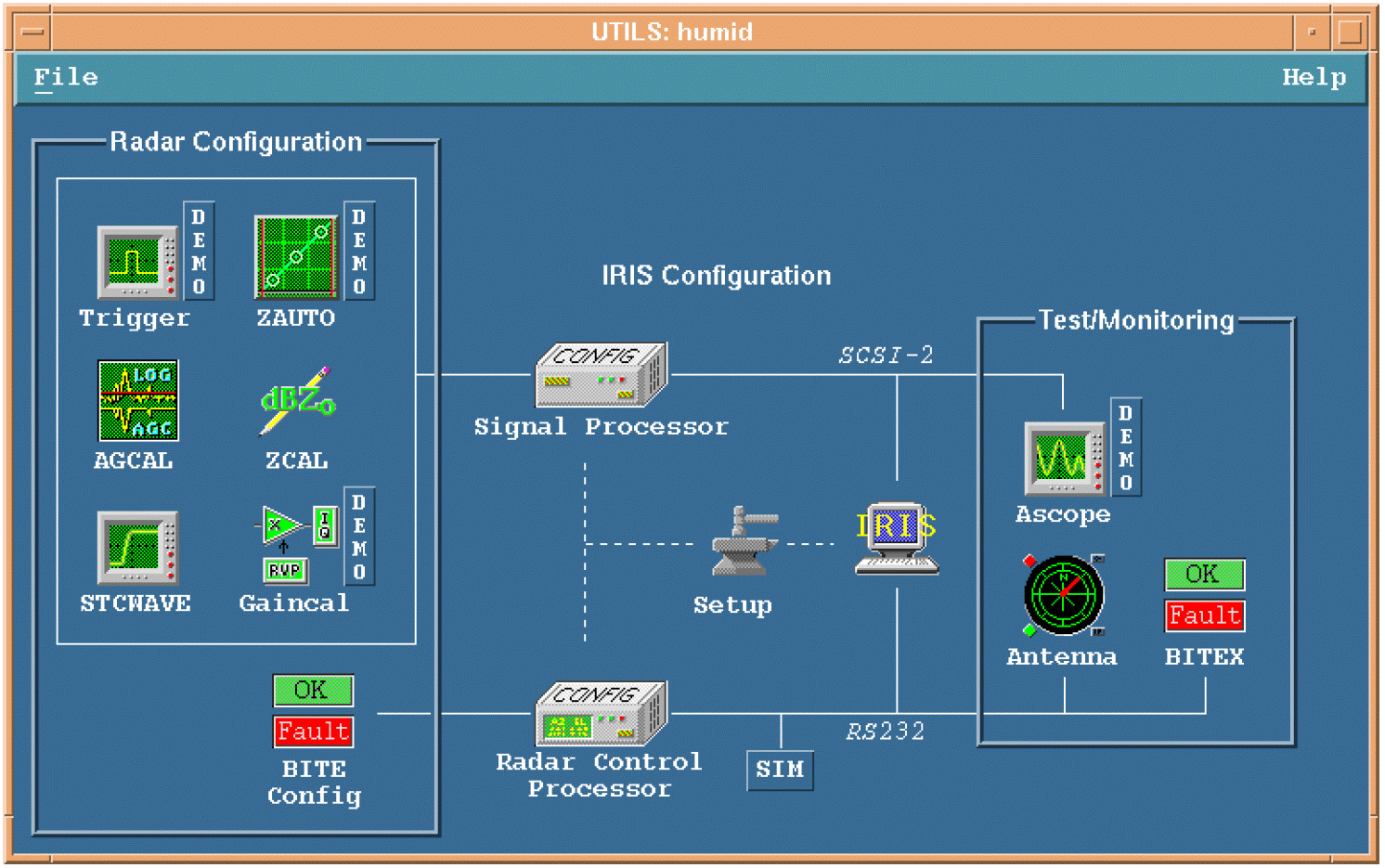
**$ ascope –help**

## 1.3.2 Running the Utilities Locally Using the utils menu

Utils is a convenient graphical user interface to access the IRIS utilities. You can start it from IRISnet Utils icon. Or, start a terminal of “sigterm” and then type:

**$ utils &**

The utils menu will appear as shown below (use zoom to see details):



The menu shows an idealized block diagram of a radar system and the interfaces and how the utilities can be used to configure, monitor and test various parts. The node name of the workstation is shown at the top of the menu. This is useful in multi–radar networks for keeping track of where you are.

Any utility can be invoked by double–clicking on an icon. If you only want to start the demo version of a utility (for example for training), double click the demo button.

A special feature of this menu is that the EEROM configuration (terminal setups) for the signal processor and SIGMET's RCP02 Radar Control Processor can be accessed by double clicking on their respective icons (labelled config).

It is very convenient if you are doing installation or configuration work to leave this menu running, but iconified (the . button at the upper right), so that it is ready for fast access.

## 1.3.3 Running Utilities or the utils Menu from a Remote Workstation

In this case you would be sitting at a workstation on the network and want to run the utilities on another workstation. For example, perhaps you are at a central maintenance facility and want to do remote calibration or configuration of a system.

The first consideration is whether your communications bandwidth is adequate for this. SIGMET recommends a minimum bandwidth of 64 kBits/sec for this type of application, although it depends on the utility that you are running. the Ascope utility is the most demanding in terms of bandwidth.

There are several ways to do this. However each method is using the feature of exporting a display over the network to your workstation.

### Running remote utilities from a generic terminal window

- Start a Unix terminal as described in Section 1.3.4.
- rlogin or telnet to the workstation where you want to run utilities, e.g.,

  **$ rlogin nodename**

  where nodename is the host name of the network node you want to go to.

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**Important: Note that you may be prompted for a password, or denied access depending on your network security features. See you system manager if you have questions about Unix security.**

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- Now that you are logged onto the remote system, you must assign the display to come out on your system by typing:

**$ export DISPLAY= mynodename:0.0**

where mynodename is the host name of the workstation that you are on.

- You can now type the name of the utility and the utility display will appear on your screen. Alternatively you can type “utils&” to get the utilities graphical user interface.

## Running remote utilities from a sigterm terminal window

Using a sigterm–style terminal is more convenient because you don’t have to do the export display step– sigterm does it automatically.

- Start a sigterm terminal as described in Section 1.3.5. by typing:

**$ sigterm nodename**

where nodename is the host name of the network node you want to go to. The terminal will pop–up with the node name in the title.

- You can now type the name of the utility and the utility display will appear on your screen. Alternatively you can type “utils&” to get the utilities graphical user interface.

## 1.4 Getting Online Help

SIGMET documentation is saved as .pdf files, which can be read using Adobe Acrobat Reader. Adobe Acrobat Reader is shipped and installed with IRIS, and it is also installed with most internet browsers. You can access the documentation at any time while running IRIS or the utilities. The Help pull-down menu takes you directly to the relevant chapter of the manual, to the Table of Contents, or Index. Once you are viewing the online documentation, you can access any of the other SIGMET online books as well.

When you start Adobe Acrobat Reader for the first time, it will give you a list of conditions to read and agree.

You can also access Manuals from IRISNet by clicking the Manuals icon. That gives you a Manuals menu, where you can select different manuals for parts of SIGMET software.

**Note: You can copy the .pdf files from IRIS CD or from Sigmet website to any computer, and use them to study the properties of the software. Adobe Acrobat Reader is available for most operations systems including MS Windows.**

### 1.4.1 Moving Around in the Document

Commands to go to **First Page**, **Previous Page**, **Next Page** and **Last Page** can be used from **Document** menu, arrow icons in the toolbar, or by keyboard commands listed in the Document menu.

Embedded within the text are hypertext links, which display as small blue icons. When you click on a hypertext link, it takes you to some other location within the book. Hypertext links let you go immediately to a section of the book from the Table of Contents or Index, or from another chapter.

As you hop around a book looking for information, you can always go back to your previous location by choosing **Document–> Go Back** from the menu bar. You can also see the previous files you have accessed, in the end of **File** menu. Note that Table of Contents is abbreviated as T.o.C.

### 1.4.2 Searching for Information

If you know what information you are looking for but don’t know where to find it, you can use Acrobat Readers **Edit –> Find...** commands to look for a string within a chapter. To search through other chapters you have to go to the table of contents (TOC) level.

## 1.4.3 Printing Online Documentation

Online documentation can be printed from Adobe Acrobat Reader if a postscript printer has been configured, as described in the *IRIS Installation Manual.*

### To print a document:

1. Display the chapter that you want to print, then choose **File–>Print** from the menu bar.
2. Adobe Acrobat Reader pops up a window containing the name or names of print queues that are configured with the system. Choose a printer and the range of pages you want to print, then click on the Print button.

## 1.4.4 Accessing Other SIGMET Online Books

You can access any of SIGMET's online books. The easiest way is to click the appropriate icon in the Manuals menu (from Irisnet, or by typing Manuals to a terminal window).

Or, you can choose **File–>Open...** from the menu bar.