

C. Passive IRIS Features

C.1 Overview

For most installations, IRIS is in “active” control of the radar and antenna via the serial line connection to the radar control processor. However, for some installations, the radar and antenna are controlled by an external RCP and IRIS is merely connected to the radar by the signal processor. In this case, the external control system performs the scanning and IRIS simply “listens” to the signal processor in “passive” mode. In passive mode, the radar TASKS in IRIS are configured to match the scanning that is performed by the external control system and IRIS synchronizes to the external scanning, i.e., IRIS deduces which TASK should be running, starts the TASK and acquires the TASK data from the signal processor.

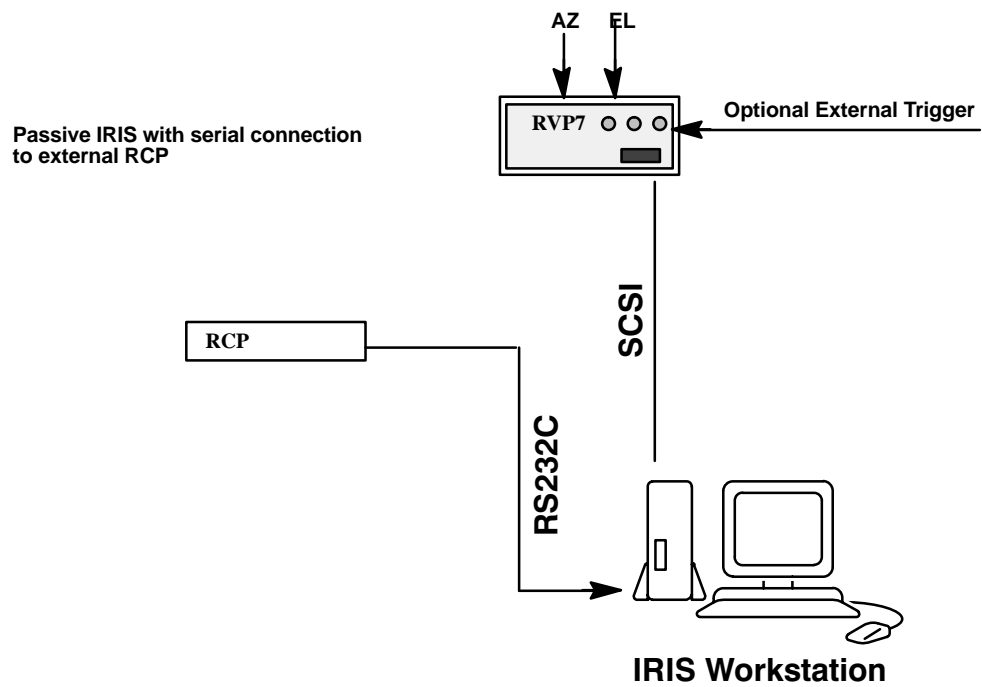
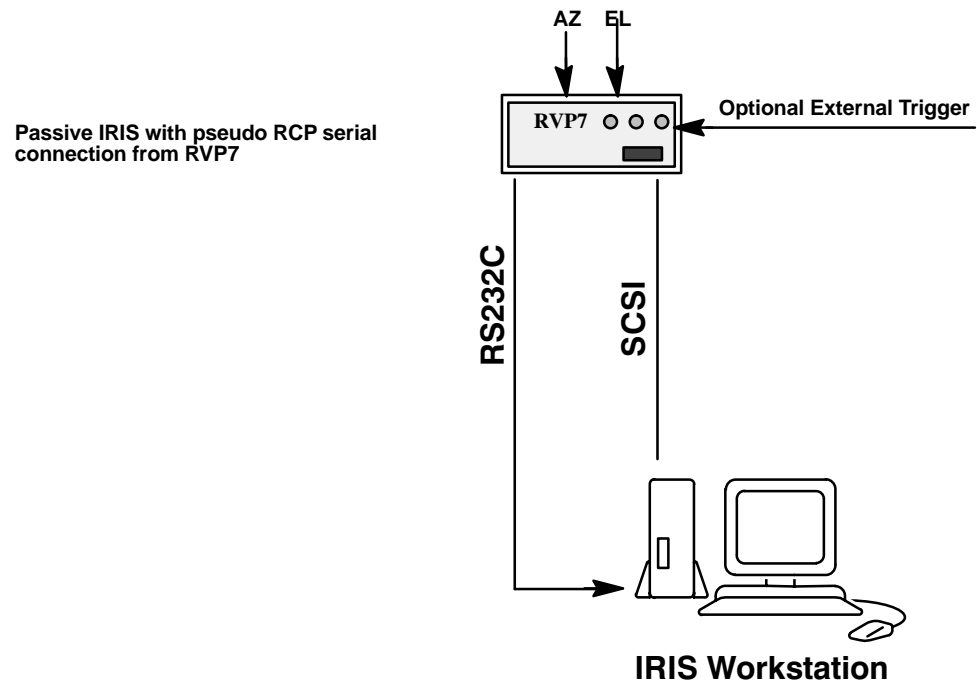
Passive IRIS is ideal when IRIS must be installed in parallel with an existing data acquisition system. The existing system can then “do its own thing” and IRIS will simply follow along. Another application is when two radars at different frequencies (and correspondingly two IRIS's) share the same antenna. In this case, one of the IRIS systems can operate in active mode and the other operate in passive mode to allow simultaneous data collection from both radars.

C.2 Passive IRIS Hardware Configurations

Figure C–1 shows the hardware configurations that are typically used for passive IRIS. There are two ways to connect to the radar. In either case, the signal processor can be configured to receive an external trigger, or it can generate the radar triggers. In either case, there is a serial line RCP input that tells IRIS the antenna angles and rotation speed. This RCP information is used to synchronize the data acquisition. For more information on configuring passive IRIS, refer to the *IRIS Utilities Manual* chapter on the **setup** utility (Ingest section).

- **Pseudo RCP Connection from the RVP7 Signal Processor**
This is the most typical way to connect a passive IRIS in parallel with an existing system. In this case, the RVP7 signal processor must have both azimuth and elevation input lines connected. The RVP7 makes a serial output to the IRIS host computer which looks like an RCP output (in RCV02 format, see **Appendix C** of the *RCP02 User's Manual*). Of course, the RVP7 does not know all of the customary RCP information such as radiate ON/OFF, etc., but it does know the antenna angles and makes an estimate of the antenna rotation speed by differencing the angles. This information is passed to IRIS on the serial line. Refer to the *RVP7 User's Manual* for information on how to setup this serial line output. Note that the RVP7 ignores any characters that it receives on the serial line.

Figure C-1: Passive IRIS Examples



- **External RCP Connection-** This would be the way to connect two IRIS systems, each operating a different radar through the same antenna (one active and one passive). In this case, there is an external RCP that connects to IRIS via a serial line. This has the advantage that there can be more radar status monitoring parameters passed to IRIS. It is still required to connect the azimuth and elevation input lines to the signal processor, because passive IRIS requires the tag data.

C.3 Passive IRIS Configuration in setup

Passive IRIS is enabled in the IRIS **setup** utility (Ingest/Scanning Options). Please refer to the *IRIS Utilities Manual* for details. In summary, the **setup** utility allows the following to be configured:

TASK Scheduling Control (select one of)

- **Active Only-** the normal IRIS active control.
- **Passive Only-** for a system that can function only in passive mode. This is the most common type of passive IRIS.
- **Active/Passive-** for systems that can assume either role. In this case, the selection of active versus passive is done in the TASK Scheduler menu.

Use External Trigger (Yes/No)

The type of radar trigger to the RVP7 processor must be specified to be either an external trigger (input to the RVP7) or an internal trigger generated by the RVP7. For a passive system that is running along side another system, it is likely that the trigger will be an external trigger supplied by the other system.

Status Product TASK Synchronization

Passive IRIS can “synchronize” to the active control system by means of a Status product that is sent from the active system. This is discussed in detail in the next section. In the **setup** utility respond “Yes” if the active system can send a status product to synchronize the TASK scanning. Note that this approach would be used if the active control system is another IRIS, for example in a system that is running two radars (and correspondingly two IRIS's) through the same antenna.

C.4 TASK Configuration, Scheduling and Synchronization

Passive IRIS must determine what the active system is doing and then follow along acquiring data. The TASK Configuration and TASK Scheduler menus must be properly configured for this to work. In addition there are two ways that the TASK's that are run on the passive system are synchronized to the active system.

TASK Configuration

For each "TASK" that is run by the active system, you must configure a corresponding TASK to be run on the passive system. For example, if the active system is running a volume scan, then you would configure a corresponding volume scan in the passive system with exactly the same elevation angles.

Aside from the angles, the only other critical element of the TASK Configuration is the radar trigger. If the trigger is generated externally (rather than by the RVP7), then you must configure the correct PRF. Note that dual PRF is not supported by passive IRIS when an external trigger is used. If the RVP7 is generating the trigger then you can configure any allowed trigger including dual PRF.

TASK Scheduler

With regard to the other signal processing and scan parameters you have complete flexibility to configure any processing options. Thus while passive IRIS must scan the same as the active system it can be doing very different processing.

The TASK Scheduler should be configured with the same TASK's as are run by the active system. It is required that the TASK's be in the same order as are run on the active system unless you are using Status Product configuration (see below). Also if your system can run in Active or Passive mode, then the Active/Passive menu selection at the top of the TASK Scheduler should be set to "Passive". This state is saved when you save the TASK Scheduler configuration.

TASK Scheduler Synchronization

There are two ways that passive IRIS synchronizes the TASK that it is running to the the active control system. In either case, the TASK Scheduler in the passive system must be configured to contain the TASK's that are being run by the active system and all TASKS must be set to "Scheduled". The methods are:

- **TASK Order Synchronization**

In this case, Passive IRIS tries to run the first TASK in the schedule. It waits until the PRF and the starting angle match the TASK configuration and then starts acquiring data for the TASK. Passive IRIS then waits for the PRF and angle for the 2nd TASK in the Scheduler and so on.

It may be necessary to adjust the angle tolerances in **Setup/ingest** to tune the TASK so that it runs properly. For example, if the angles of the TASK are very

close together, then the angle tolerance should be set smaller than the angle spacing. Also, the antenna may not actually achieve the desired elevation angle, in which case it is better to modify the TASK in passive IRIS to match the actual rather than the nominal elevation angles.

- **Status Product Synchronization**

This case requires that a Status product be sent to the passive system. In the case when the active system is another IRIS, the Status product on the active system is generated automatically whenever a TASK is started and contains the name of the TASK that is currently running. When the passive system receives this, it starts (or continues running) the same TASK. The Status product must be configured to be output automatically over the network to the passive system.

C.5 Testing Passive IRIS

To verify the proper functioning of passive IRIS, use the following:

- Watch the TASK Scheduler and verify that the TASK's are being sequenced properly ("Running" means a TASK is acquiring data).
- Observe the Ingest Summary menu to verify that all sweeps of each TASK are being collected.
- Use the Rays utility to verify that there are no missing rays. Note that depending on the nature and accuracy of the antenna control system, it may not be possible to eliminate missing rays at the end of individual sweeps.
- Make individual PPI products for each sweep of a volume scan. An easy way to do this is to specify "*" (wild card) in the elevation angle field of the PPI Product Configuration. The PPI products will show any missing rays that are >2 degrees. Single missing rays will not be apparent.