

## 8.3 Radar Control Processor

### 8.3.1 Process Control and Serial I/O

| <i>Process Control and Serial I/O</i> |   | <i>Help</i> |
|---------------------------------------|---|-------------|
| System has an antenna                 | <input checked="" type="checkbox"/> Yes   |             |
| Interface to RCP                      | Serial <input type="checkbox"/>           |             |
| Antenna angle insertion source        | Normal RCP <input type="checkbox"/>       |             |
| Transmit format to RCP                | XMT02 (Enhanced) <input type="checkbox"/> |             |
| Receive format from RCP               | RCV02 (Enhanced) <input type="checkbox"/> |             |
| Main channel device name              | <b>i</b> <input type="text"/>             |             |
| Auxiliary transmit format             | No Transmission <input type="checkbox"/>  |             |
| Start RCP Simulator                   | <input checked="" type="checkbox"/> Yes   |             |
| Simulator device name                 | <input type="text"/>                      |             |
| Transmit subprocess priority          | <b>i</b> <input type="text" value="-15"/> |             |
| Receive subprocess priority           | <b>i</b> <input type="text" value="-15"/> |             |
| Timezone of time packets              | <input checked="" type="checkbox"/> UTC   |             |
| Trust timestamps in RCVxx             | <input type="checkbox"/> No               |             |

- *System has an antenna* — In most environments only the radar host systems will have an antenna. Select “No” for all analysis and display systems.

- The following table describes how questions 2–4 in the above setup menu should be answered depending on your equipment configuration.

| Equipment Configuration |               |             |            |             |
|-------------------------|---------------|-------------|------------|-------------|
|                         | RVP8/hardware | RVP8/serial | RCP8       | IRIS        |
| Interface               | None          | Serial      | Serial     | Serial      |
| Angle source            | Native RVP8   | Normal RCP  | Normal RCP | Normal RCP  |
| Channel                 |               |             | ant_fifo-x | Serial Port |

- *Interface to RCP* – If the RCP is in close proximity and connected via a serial connection choose serial. Otherwise, choose socket for a connection via the network. If you choose socket, then you must enter the hostname or IP address and the socket number for the antenna host system. Additionally all of the other set-up questions will be removed because these are all pertinent for the system that is physically connected to the antenna (i.e. antenna host system). On an RVP8 system which has a hardware interface for angle input (either parallel tags or synchro inputs) enter “None” for the interface, and “Native RVP8” for the angle source. For RVP8 systems using a serial tag interface to the RCP, enter “Serial” for the interface and “Normal RCP” for the angle source. Note that in neither of these cases can you control the antenna from the RVP8.
- *Antenna angle insertion source* – This tells which angle source we are using to determine the current antenna position. Other information, such as the status and control bits always comes from the “Normal RCP” interface.
- *Transmit format to RCP* — Enter one of the following antenna reception formats for both the main and auxiliary:
  - o No Transmission
  - o xmt01 (Original RCP)
  - o xmt02 (Enhanced RCP)
  - o xmt05 (Dual System)
  - o Scientific Atlanta 3860

The details of the various formats are in the *IRIS Programmer’s Manual*.

- *Receive format for RCP* — Enter one of the following antenna reception formats for both the main and auxiliary:
  - o No Reception
  - o rcv01 (Original RCP)
  - o rcv02 (Enhanced RCP)
  - o rcv03 (Shipboard Format)

- o rcv05 (Dual System)
- o Scientific Atlanta 3860

The details of the various formats are in the *IRIS Programmer's Manual*.

- *Main channel device name* — Enter the pathname of the device file for the serial port wired to the RCP. For internal simulation, set this to blank as well as the *Simulator device name*.

You can freely substitute FIFOs for serial device files. What to do is based on the device name: If the device pathname ends in “-x” or “-y”, then IRIS assumes that we are opening a FIFO pair that will be used in some sort of loopback mode.

Here is an example, first create your FIFOs:

```
$ cd /usr/sigmet/config
$ mkfifo ant_fifo-x ant_fifo-y
```

Then choose “/usr/sigmet/config/ant\_fifo-x” as the device name. IRIS will write to the specified FIFO, and read from the other. If the RCP is a SIGMET RCP8, then choose “/usr/sigmet/config/ant\_fifo-y” as the RCP8/SiteHost serial port.

- *Running at and with parity* — Specify the baud rate and parity of the serial port.
- *Auxiliary channel device name* — Some systems have two serial lines transmitting RCP control information. Only the primary line is used to receive information. If your system uses two lines, configure the second line as the auxiliary.
- *Automatically Start Simulator* — This is a convenience feature for simulated systems to automatically start up the antenna simulator when the antenna driver is started.
- *Simulator device name* — The device file for the simulator, normally blank.
- *Receive/Transmit Subprocess Priority* — On UNIX systems, set the priority to -15.
- *Timezone of time packets* — Some RCP's are configured to send the current time to IRIS over the serial link. This is used to set the time of the radar computer at the safest times. This specifies the timezone of that data stream.
- *Trust timestamps in RCVxx* — Some RCP serial formats include a timestamp used to accurately time sequence the received data. Set this to “No” on systems attached to RCPs which do not fill in those numbers.

### 8.3.2 Radar Site and Antenna Placement

| <i>Radar Site and Antenna Placement</i> |              | <i>Help</i> |
|---|--------------|-------------|
| Ground height above sea level           | 865.0 meters |             |
| Antenna height above the ground         | 3.0 meters   |             |
| Latitude (North) of the antenna         | 40.00000 deg |             |
| Longitude (East) of the antenna         | 32.00000 deg |             |
| Antenna position forward of INU         | 0.0 meters   |             |
| Antenna position to port of INU         | 0.0 meters   |             |
| Antenna position above INU              | 0.0 meters   |             |
| INU Height Offset                       | 0.0 meters   |             |

- *Ground height above sea level* — Enter the height above sea level (in meters) of the ground at the radar site. All product heights are referenced to this value. If you wish to make products relative to sea level, enter zero and put the ground height and tower height into the next question. If the radar is on a ship, then a value of 0 is appropriate. For compositing several radars together, chose a common reference ground, and enter the same value here for all sites.
- *Antenna height above the ground* — Enter the height of the radar antenna above the ground height chosen above. If you are using RCV03 format, this number (set in meters) is overridden by the altitude reported from the antenna controller.
- *Latitude (North) / Longitude (East) of antenna* — Enter these values in decimal degrees with as many places of accuracy as desired (N and E are positive). If you are using RCV03 format, these numbers are overridden by the antenna controller.
- *Antenna position ...* — For moving platform systems only, enter the distance in meters from the Inertial Navigation Unit location to the antenna location. This is recorded with the data and used for platform motion velocity corrections. For example, if the INU is located in the middle of a ship at sea level, and the antenna is 10 meters above the sea, 15 meters to the stern and centered, enter the values “-15,” “0,” and “10.”



- *INU height offset*— For moving platform systems that do not correctly measure the height of the INU, this number is added to what is reported by the antenna controller.

### 8.3.3 Antenna Characteristics

| <b>Antenna Characteristics</b>  |  | <b>Help</b> |
|---------------------------------|--|-------------|
| Minimum elevation angle         | <input type="text" value="-1.00 deg"/>     |             |
| Maximum elevation angle         | <input type="text" value="50.00 deg"/>     |             |
| Maximum azimuth velocity        | <input type="text" value="24.00 deg/sec"/> |             |
| Maximum elevation velocity      | <input type="text" value="12.00 deg/sec"/> |             |
| Initial mode for Azimuth axis   | <input type="text" value="Stopped"/>       |             |
| Initial mode for Elevation axis | <input type="text" value="Stopped"/>       |             |

- *Minimum/Maximum elevation* — The minimum and maximum elevation position in degrees that the antenna can safely reach.
- *Maximum azimuth/elevation velocity* — The maximum velocity in degrees per second that the antenna can safely rotate on each axis. This limit applies to both clockwise/counterclockwise and up/down motion. The antenna should be able to achieve the velocity limits set here.
- *Initial mode for Azimuth/Elevation axis* — This parameter sets the mode of the antenna when IRIS is first started. Enter one of the following values:
  - o Stop — The antenna is not moving when IRIS is started. This should be the antenna's initial mode at sites where there is a possible hazard to personnel.
  - o Position — The antenna is moved to its initial position when IRIS is started.
  - o Velocity — The antenna is rotated at its initial velocity when IRIS is started.If the Initial mode for Azimuth/Elevation axis is not set to "Stopped," the following text boxes appear:
- *Initial Azimuth/Elevation position* — Enter the position in degrees that the antenna should take when IRIS is started; used when the initial mode is set to "position."

- *Initial Azimuth/Elevation velocity* — Enter the degrees/second that the antenna should rotate when IRIS is started; used when the initial mode is set to “velocity.”

### 8.3.4 Control and Support Features

| <i>Control and Support Features</i> |   | <i>Help</i> |
|-------------------------------------|---|-------------|
| Radiate toggle period               | <input type="text" value="1.00 sec"/>       |             |
| Stop radiate toggle after           | <input type="text" value="5 min"/>          |             |
| Noise toggle period                 | <input type="text" value="0.00 sec"/>       |             |
| Signal generator minimum value      | <input type="text" value="-110 dBm"/>       |             |
| Signal generator maximum value      | <input type="text" value="10 dBm"/>         |             |
| Signal generator warmup time        | <input type="text" value="1.0 sec"/>        |             |
| Signal generator settle time        | <input type="text" value="1.0 sec"/>        |             |
| Initial signal generator level      | <input type="text" value="-50 dBm"/>        |             |
| Pulse Width Control                 | <input checked="" type="checkbox"/> Enabled |             |
| Pulse Width Status                  | <input checked="" type="checkbox"/> Enabled |             |
| Polarization Control                | <input checked="" type="checkbox"/> Enabled |             |
| Polarization Status                 | <input checked="" type="checkbox"/> Enabled |             |

- *Radiate toggle period* — IRIS automatically toggles the radiate control off for this time, then on again, once per task if the following conditions are met:
  1. IRIS can control the radiation.
  2. IRIS can sense the radiation state.
  3. IRIS is requesting the radiation to be on, but it is actually off.

4. Less than the *Stop radiate toggle after* time has passed since the transmitter was not following the request.

Setting either parameter to 0 disables toggling. The recommended values are 1 second and 5 minutes.

- *Noise toggle period* — Whenever the INGEST process or the **Ascope** utility take noise samples, the signal generator bit in the antenna controller is set for this amount of time after IRIS is through with its noise tasks. This value is used by Gematronik radars for calibration purposes. Set this parameter to 0 if you do not need this feature.
- *Signal generator minimum /maximum value* — The lowest and highest power output of the signal generator in dBm.
- *Signal generator warmup time* — Time allowed after the signal generator is turned on before the signal level is assumed to be correct.
- *Signal generator settle time* — Time allowed after the signal level is set before the received power is measured. A value of 1 second is recommended.
- *Initial signal generator value* — Enter the signal generator level to use when IRIS is started.
- *Pulsewidth Control* — Select either “disabled” or “enabled.” On driver powerup, the pulse width will not be set until it is also set in the signal processor.
- *Pulsewidth Status* — Select “enabled” or “disabled” to indicate whether the antenna controller can detect the pulsewidth.
- *Polarization Control* — Select either “disabled” or “enabled.” On driver powerup, the polarization will not be set until it is also set in the signal processor.
- *Polarization Status* — Select “enabled” or “disabled” to indicate whether the antenna controller can detect the polarization.

### 8.3.5 Control Bit Definitions

| <b>Control Bit Definitions</b> |  | <b>Help</b> |
|--------------------------------|--|-------------|
| Servo Power Control            | <input checked="" type="checkbox"/> Enabled      |             |
|                                | <input checked="" type="checkbox"/> Active HIGH  |             |
|                                | <input checked="" type="checkbox"/> Initially On |             |
| Transmit Radiate Control       | <input checked="" type="checkbox"/> Enabled      |             |
|                                | <input checked="" type="checkbox"/> Active HIGH  |             |
|                                | <input type="checkbox"/> Initially Off           |             |
| T/R Power Control              | <input checked="" type="checkbox"/> Enabled      |             |
|                                | <input checked="" type="checkbox"/> Active HIGH  |             |
|                                | <input checked="" type="checkbox"/> Initially On |             |
| Signal Generator Control       | <input checked="" type="checkbox"/> Enabled      |             |
|                                | <input checked="" type="checkbox"/> Active HIGH  |             |
|                                | <input type="checkbox"/> Initially Off           |             |

- *Servo Power Control* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can control the servo power. If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”
- *Transmit Radiate Control* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can control the transmitter radiation. If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”
- *T/R Power Control* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can control the power to the transmitter and receiver rack.



If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”

- *Signal Generator Control* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can control a signal generator for calibration purposes. If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”

|                          |   |
|--------------------------|---|
| Siggen Cont.Wave Control | <input checked="" type="checkbox"/> Enabled     |
|                          | <input checked="" type="checkbox"/> Active HIGH |
|                          | <input type="checkbox"/> Initially Off          |
| Master Reset Control     | <input checked="" type="checkbox"/> Enabled     |
|                          | <input checked="" type="checkbox"/> Active HIGH |
|                          | <input type="checkbox"/> Initially Off          |
| Noise Generator Control  | <input checked="" type="checkbox"/> Enabled     |
|                          | <input checked="" type="checkbox"/> Active HIGH |
|                          | <input type="checkbox"/> Initially Off          |

- *Siggen Cont. Wave Control* — Choose either “disabled” or “enabled” to indicate whether the signal generator can be switched between Continuous Wave (CW) and pulse mode. If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”
- *Master Reset Control* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can be reset. If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”
- *Noise Generator Control* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can control a noise source for receiver testing and calibration purposes. If enabled is selected, an option for “Active HIGH” or “Active LOW” appears as well as an option for “Initially Off” or “Initially On.”

### 8.3.6 Status Bit Definitions

| <b>Status Bit Definitions</b> |   | <b>Help</b> |
|-------------------------------|---|-------------|
| Servo Power Status            | <input type="checkbox"/> Disabled               |             |
| Transmit Radiate Status       | <input checked="" type="checkbox"/> Enabled     |             |
|                               | <input checked="" type="checkbox"/> ON: HIGH    |             |
| T/R Power Status              | <input type="checkbox"/> Disabled               |             |
| Signal Generator Status       | <input type="checkbox"/> Disabled               |             |
| Siggen Cont.Wave Status       | <input type="checkbox"/> Disabled               |             |
| Siggen Fault Status           | <input type="checkbox"/> Disabled               |             |
| RCP Shutdown Status           | <input checked="" type="checkbox"/> Enabled     |             |
|                               | <input checked="" type="checkbox"/> Fault: HIGH |             |
|                               | <input type="checkbox"/> Type: Normal           |             |

- *Servo Power Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect that the servo power is turned on. If enabled is selected, an option for “ON: HIGH” or “ON: LOW” appears.
- *Transmit Radiate Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect that the transmitter is trying to radiate. If enabled is selected, an option for “ON: HIGH” or “ON: LOW” appears.
- *T/R Power Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect that the power is turned on to the transmitter/receiver rack. If enabled is selected, an option for “ON: HIGH” or “ON: LOW” appears.
- *Signal Generator Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect whether the signal generator is turned on. If enabled is selected, an option for “ON: HIGH” or “ON: LOW” appears.
- *Siggen Cont. Wave Status* — Choose either “disabled” or “enabled” to indicate whether the antenna control can detect when the signal generator is in continuous



wave or pulse mode. If enabled is selected, an option for “Fault: HIGH” or “Fault: LOW” appears.

- *RCP Shutdown Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if the RCP is turned on. If enabled is selected, an option for “Fault: HIGH” or “Fault: LOW” appears.
- *Low Airflow Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if the airflow is low. If enabled is selected, an option for “Fault: HIGH” or “Fault: LOW” appears. You also can select whether the fault is treated as a normal or critical fault. Normal faults are marked with yellow, while critical faults are marked with red, and can cause mode switching and window alerts.

|                               |  |
|-------------------------------|--|
| Low Airflow Status            | <input checked="" type="checkbox"/> Enabled        |
|                               | <input type="checkbox"/> Fault: LOW                |
|                               | <input type="checkbox"/> Type: Normal              |
| Low Waveguide Pressure Status | <input type="checkbox"/> Disabled                  |
| Antenna Local Mode Status     | <input type="checkbox"/> Disabled                  |
| T/R Local Mode Status         | <input type="checkbox"/> Disabled                  |
| Safety Interlock Status       | <input checked="" type="checkbox"/> Enabled        |
|                               | <input checked="" type="checkbox"/> Fault: HIGH    |
|                               | <input checked="" type="checkbox"/> Type: Critical |
| Standby Status                | <input checked="" type="checkbox"/> Enabled        |
|                               | <input checked="" type="checkbox"/> Standby: HIGH  |
| Magnetron Current Status      | <input type="checkbox"/> Disabled                  |

- *Low Waveguide Pressure Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if the waveguide pressure is low. If

enabled is selected, an option for “Fault: HIGH” or “Fault: LOW” appears. The fault type is also specified.

- *Antenna Local Mode Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if it is in local mode. If enabled is selected, an option for “Local: HIGH” or “Local: LOW” appears.
- *T/R Local Mode Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if the transmitter/receiver is in local mode. If enabled is selected, an option for “Local: HIGH” or “Local: LOW” appears.
- *Safety Interlock Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if the safety interlock is open. If enabled is selected, an option for “Fault: HIGH” or “Fault: LOW” appears. The fault type is also specified.
- *Standby Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if the transmitter is in the standby mode. If enabled is selected, an option for “Standby: HIGH” or “Standby: LOW” appears.
- *Magnetron Current Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect that the magnetron current is not correct. If enabled is selected, an option for “Fault: HIGH” or “Fault: LOW” appears. The fault type is also specified.

### 8.3.7 Network Status Reports

| <i>Network Status Reports to the RCP</i> |   | <a href="#">Help</a> |
|--|---|----------------------|
| Reporting                                | <input checked="" type="checkbox"/> Enabled     |                      |
| Status fault polarity                    | <input type="checkbox"/> Active LOW             |                      |
| Initial state of sites                   | <input checked="" type="checkbox"/> All Faulted |                      |
| Radar Workstation 'A' site code          | NMA   |                      |
| Radar Workstation 'B' site code          | CYB   |                      |
| Data Processor 'A' site code             |   |                      |
| Data Processor 'B' site code             |   |                      |



- *Reporting* — Select either “disabled” or “enabled.” If enabled is selected the following options appears:
  - o *Status Fault polarity* — Select either “Active HIGH” or “Active LOW.” Since the site status bits in the XMT02/04/05 formats are set to “1” when a site is okay, the recommended fault polarity is “Active LOW”.
  - o *Initial state of sites* — Select the initial fault status of all four sites as either “All Okay” or “All Faulted.”
  - o *Radar Workstation 'A' site code, ...* — Enter the site codes whose fault status is to be reported to the RCP for each of the two possible Radar Workstation sites and Data Processor sites.

### 8.3.8 RST Mode Requests

| <i>RST Mode to Number Mapping</i> |  | <a href="#">Help</a>                 |
|-----------------------------------|--|--------------------------------------|
| Radar Status name for MODE #1     | <input type="text" value="MAINTENANCE"/> |                                      |
| Radar Status name for MODE #2     | <input type="text" value="STANDBY"/>     |                                      |
| Radar Status name for MODE #3     | <input type="text" value="AIRPORT"/>     |                                      |
| Radar Status name for MODE #4     | <input type="text" value="AERIAL"/>      |                                      |
| Radar Status name for MODE #5     | <input type="text" value=""/>            |                                      |
| Radar Status name for MODE #6     | <input type="text" value=""/>            |                                      |
| Radar Status name for MODE #7     | <input type="text" value=""/>            |                                      |
| Mode to use when RCP is dead      | <input type="text" value="1"/>           |                                      |
| Mode reporting delay              | <input type="text" value="1"/>           | <input type="text" value="1.0 sec"/> |

These questions let you define up to seven modes. Each mode has a number and a name, corresponding to a Radar Status menu configuration. Whenever the configuration is changed in the Radar Status menu, the mode is reported back to the RCP. Unrecognized configurations are reported as mode 0. The RCP can also send



this mode to the Radar Status menu to change the configuration. A request for mode 0 denotes automatic switch mode, which automatically switches configurations based on warning products.

- *Radar Status name for MODE (1 – 7)* — For each 3-bit nonzero mode value, enter the name of an IRIS configuration that is to be activated whenever that mode is requested.
- *Mode to use when RCP is dead* — This mode will automatically be requested by the IRIS antenna driver whenever it detects that the RCP is dead, i.e., that the genuine desired mode can not be determined. This is valuable in dual/redundant systems that must switch to a known state when certain errors occur. Setting the mode to zero will cause no mode change to occur for a dead RCP.
- *Mode reporting delay* — To make sure that the RCP mode is never ahead or behind the IRIS task scheduler mode, IRIS will first stop the old task, wait the set delay time, report the new mode to the RCP, wait again for the delay, then load the new task schedule, and run it. If your system does not use the RCP mode report, then the default setting is zero. Note that if the RST menu switches modes, both modes have the same task schedule, the tasks are not stopped and no delay is applied. The same is true for the product schedule.