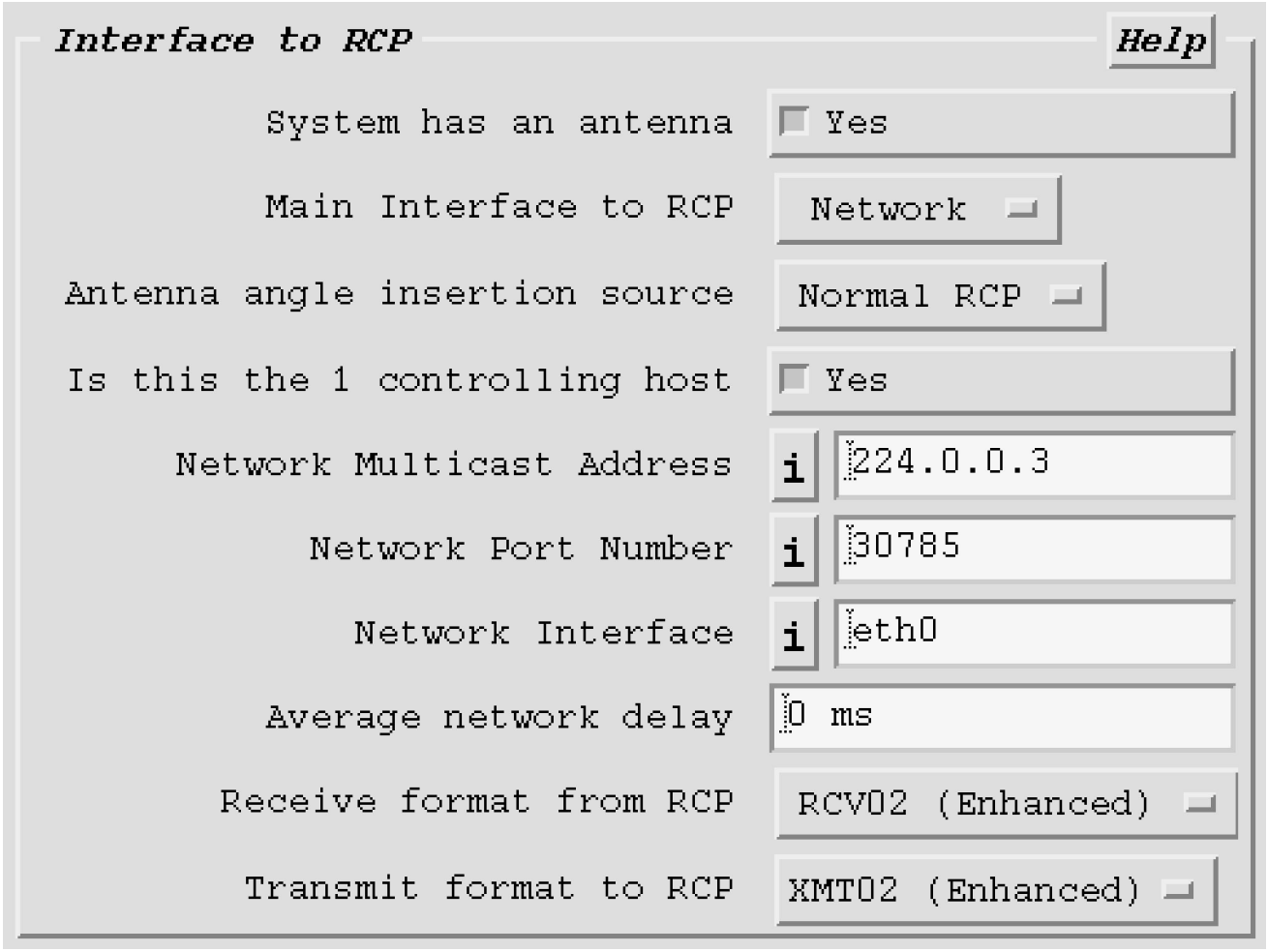
8.3 Radar Control Processor

8.3.1 Interface to RCP



- *System has an antenna* — In most environments only the radar host systems will have an antenna. Select "No" for all analysis and display systems.
- *Main Interface to RCP* — See Chapter 9 for detailed configuration examples of how to configure the RCP and RVP interfaces. Choices here are:
  - Network — This is the most frequently used interface on modern RVP8 and RCP8 systems. It uses a multicast network socket to send and receive information from the RCP. For network interfaces you must enter the Multicast Address, Port Number, Interface, and network delay.
  - Serial — This is the legacy serial cable interface. You will need to also enter the serial device file name. For RVP8 systems using a serial tag interface to

the RCP, enter “Serial” for the interface and “Normal RCP” for the angle source.

- AntExport — Not recommended for general use. Allows a low-bandwidth remote host to get antenna control and status. All of the other setup questions will be removed because that information is automatically exported from the main RCP system.
- None — 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.

- *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. Choices are:
  - Normal RCP — This means that the antenna angles arrive in the normal network packets from the RCP.
  - Native RVP8 — This means you are on an RVP8 which gets angles from a hardware source.
  - Native RCP8 — This means you are on an RCP8 which inherently knows the antenna position.
- *Is this the 1 controlling host* — You must select only one of your computers to be the controlling host. This will be the only computer to send transmit packets to the RCP. These are the packets which control antenna position and other switches. If you configure more than one host as a controller, you will not be in full control.

For network interfaces expect the following questions:

- *Network Multicast Address* — We suggest using the default address of 224.0.0.3. This is a “link-local” address which by default will not be passed through routers, but it will go through switches and hubs. If you need to go through a router, consider using the “site-local” address 239.255.0.1.

  The strength of the multicast addressing scheme is that the antenna position information can go to several recipients simultaneously, so both the RVP8 and the IRIS host can receive antenna information. A drawback is that the packets may travel to other machines on the local network and cause network administrators to complain. Be sure to set the same address and port number on the RCP8 and RVP8 as needed. The multicast addresses have many reserved values, so if you have more than one RCP8 system at a site, we recommend using different port numbers, rather than different addresses.
- *Network Port Number* — Suggested default of 30785. Increment from there if needed.

- *Network Interface* — Specify here which eithernet interface to use for the RCP communication. If the antenna information does not need to leave the local computer, then use the loopback interface of "lo".
- *Average Network delay* — SIGMET recommends that you start with the default value of 0 ms here. This is the packet transmission delay from the RCP8 to the local system. For slow networks measure this by pinging the RCP8 and enter half the average ping time.

For serial interfaces expect the following questions:

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

  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.

For AntExport interfaces expect the following questions:

- *AntExport hostname/IP–Address* — Enter the host of the exporting system.
- *AntExport Port Number* — Suggested default of 30745.

Questions resume for all interfaces:

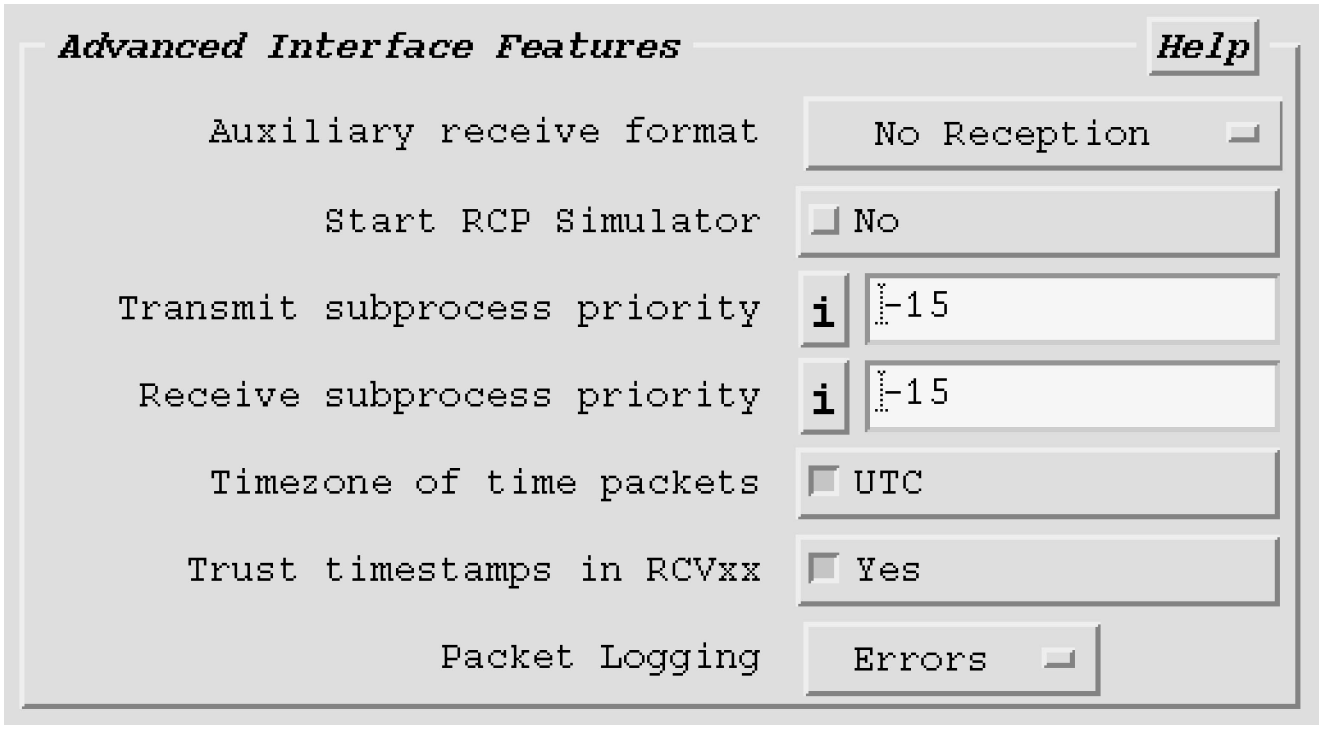
- *Receive format from RCP* — Enter one of the following antenna reception formats for both the main and auxiliary:
  - No Reception
  - rcv01 (Original RCP)
  - rcv02 (Enhanced RCP)
  - rcv03 (Shipboard Format)
  - rcv05 (Dual System)
  - Scientific Atlanta 3860

  The details of the various formats are in the *IRIS Programmer's Manual*.
- *Transmit format to RCP* — Enter one of the following antenna reception formats for both the main and auxiliary:

- No Transmission
- xmt01 (Original RCP)
- xmt02 (Enhanced RCP)
- xmt05 (Dual System)
- Scientific Atlanta 3860

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

8.3.2 Advanced Interface Features

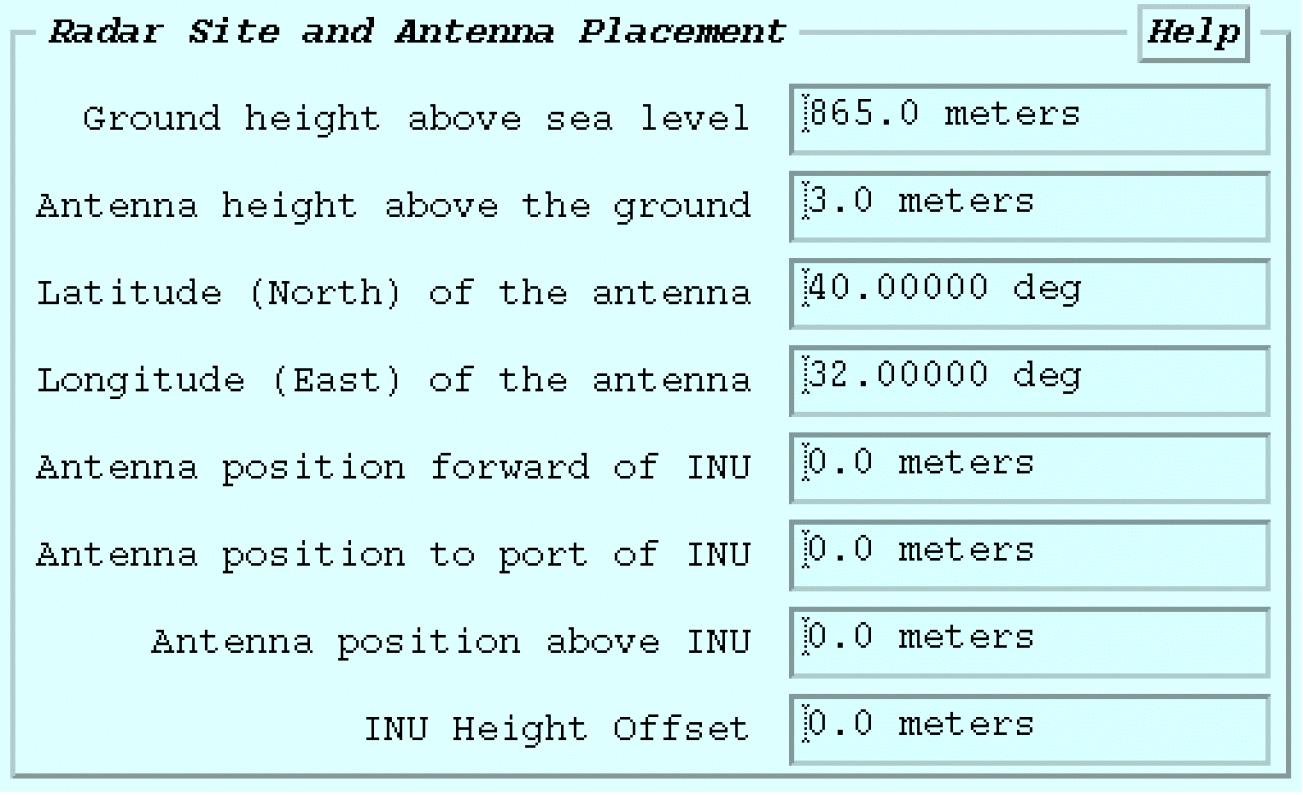


- *Auxiliary receive format* — Some systems have two serial lines transmitting RCP control information. Only the primary line is used to receive information. If your system uses two lines, configure the second line as the auxiliary.
- *Auxiliary serial device name* — Enter the auxiliary serial device file when used.
- *Start RCP Simulator* — This is a convenience feature for simulated systems to automatically start up the antenna simulator when the antenna driver is started.
- *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.
- *Packet Logging* — This is used to debug errors in the antenna position and INU packet reports. When turned on, a log file is created with an entry for each position packet including the time of arrival at ms resolution. This log will also include any bad antenna position reports received. You can set the logging to "Position" for pedestal angles, or "INU" for roll, pitch, and heading, or "Pos and INU" for both, or to "Errors" for just logging the bad angles. Sigmet recommends that you leave this set to "Errors".

  The location of the log file is dependent on the antenna angle insertion source. If set to "Normal RCP", then the ant_rcv process will create a log file in the {IRIS_LOG} directory. If set to "Native RCP8", and the angles are coming from the WSR88D DCU, it will log on the error output of the RCP8. You should redirect that to a file in your /etc/init.d/rcp8 file. We cannot log high speed "Native RCP8" and "Native RVP8" sources.

8.3.3 Radar Site and Antenna Placement

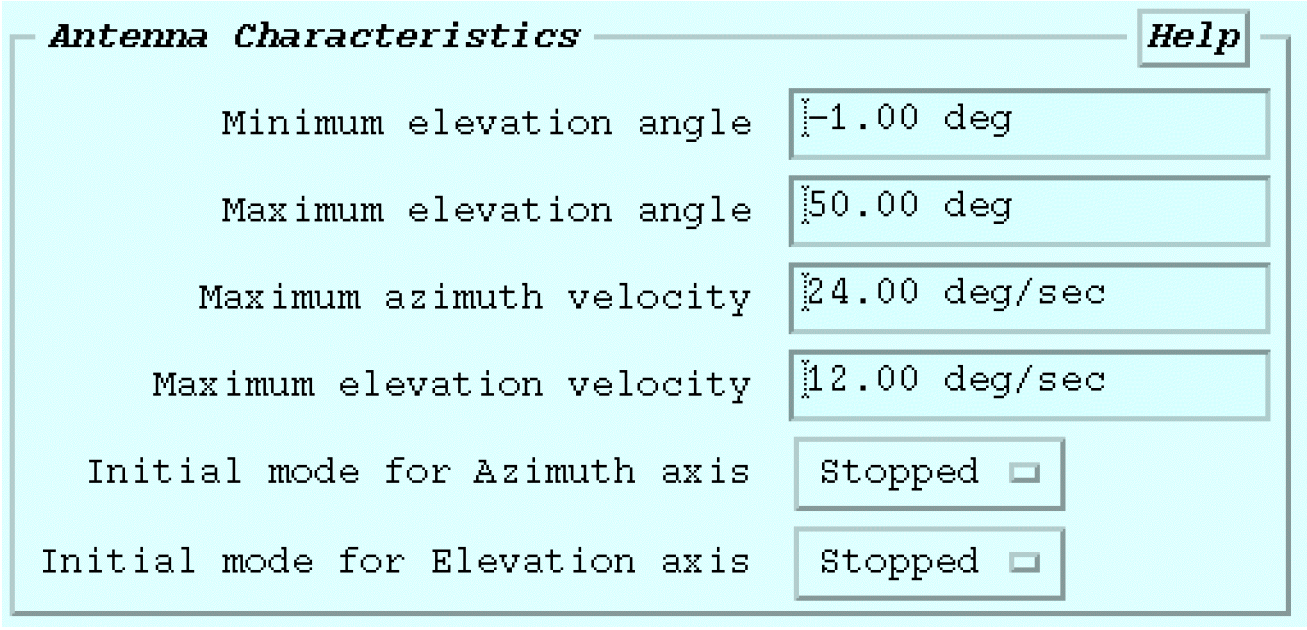


- *Ground height above sea level* — Enter the height above sea level (in meters) of the ground at the radar site. All product heights are referenced to this value. If

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.

8.3.4 Antenna Characteristics

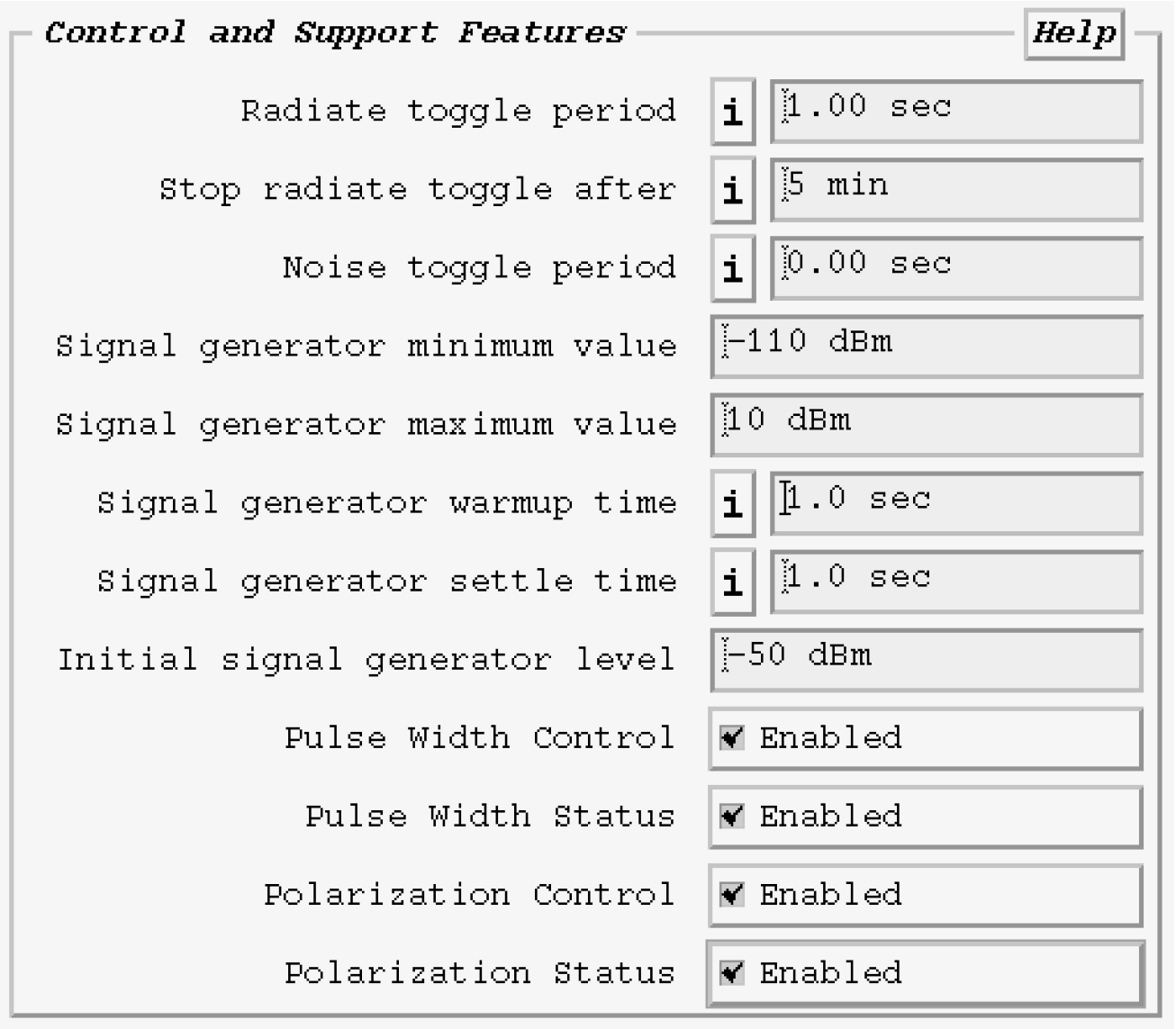


- *Minimum/Maximum elevation* — The minimum and maximum elevation position in degrees that the antenna can safely reach.

- *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:
  - 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.
  - Position — The antenna is moved to its initial position when IRIS is started.
  - 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."

8.3.5 Control and Support Features

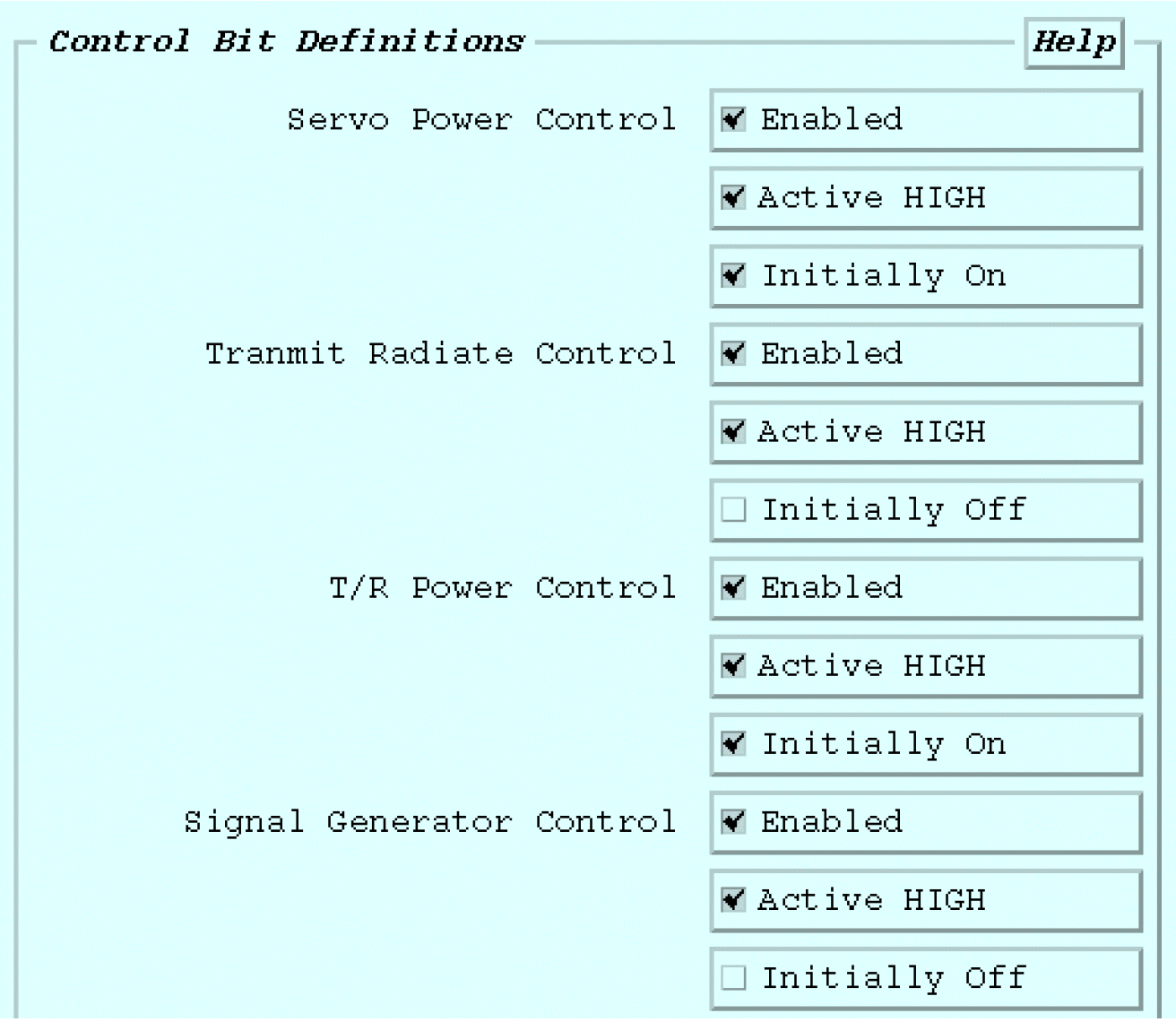


- *Radiate toggle period* — IRIS automatically toggles the radiate control off for this time, then on again, once per task if the following conditions are met:
  1. IRIS can control the radiation.
  2. IRIS can sense the radiation state.
  3. IRIS is requesting the radiation to be on, but it is actually off.
  4. Radiate has been requested on more that the “Warmup time for transmitter” set in the ingest setups.
  5 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.

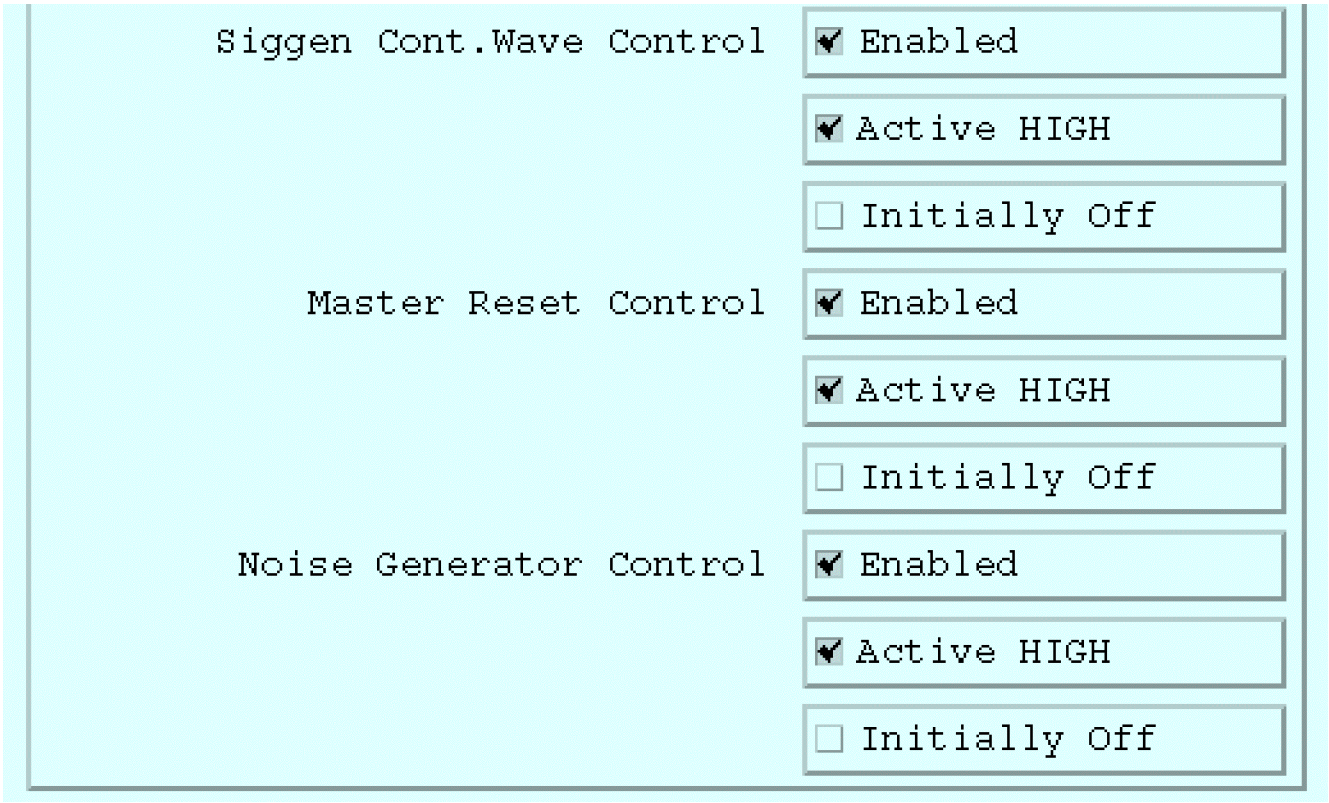
8.3.6 Control Bit Definitions



- *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.

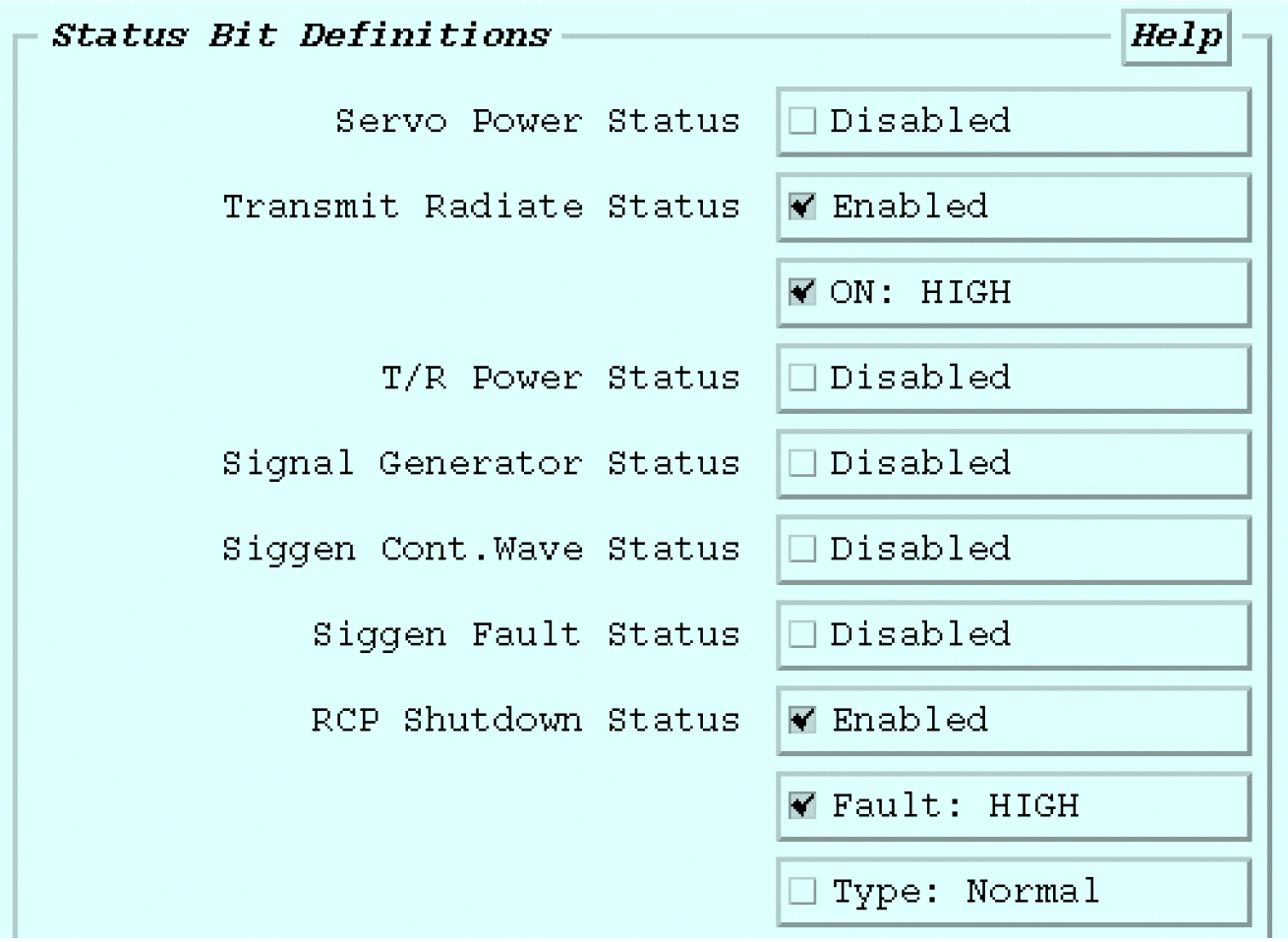
If enabled is selected, an option for "Active HIGH" or "Active LOW" appears as well as an option for "Initially Off" or "Initially On."

- *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* — 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."

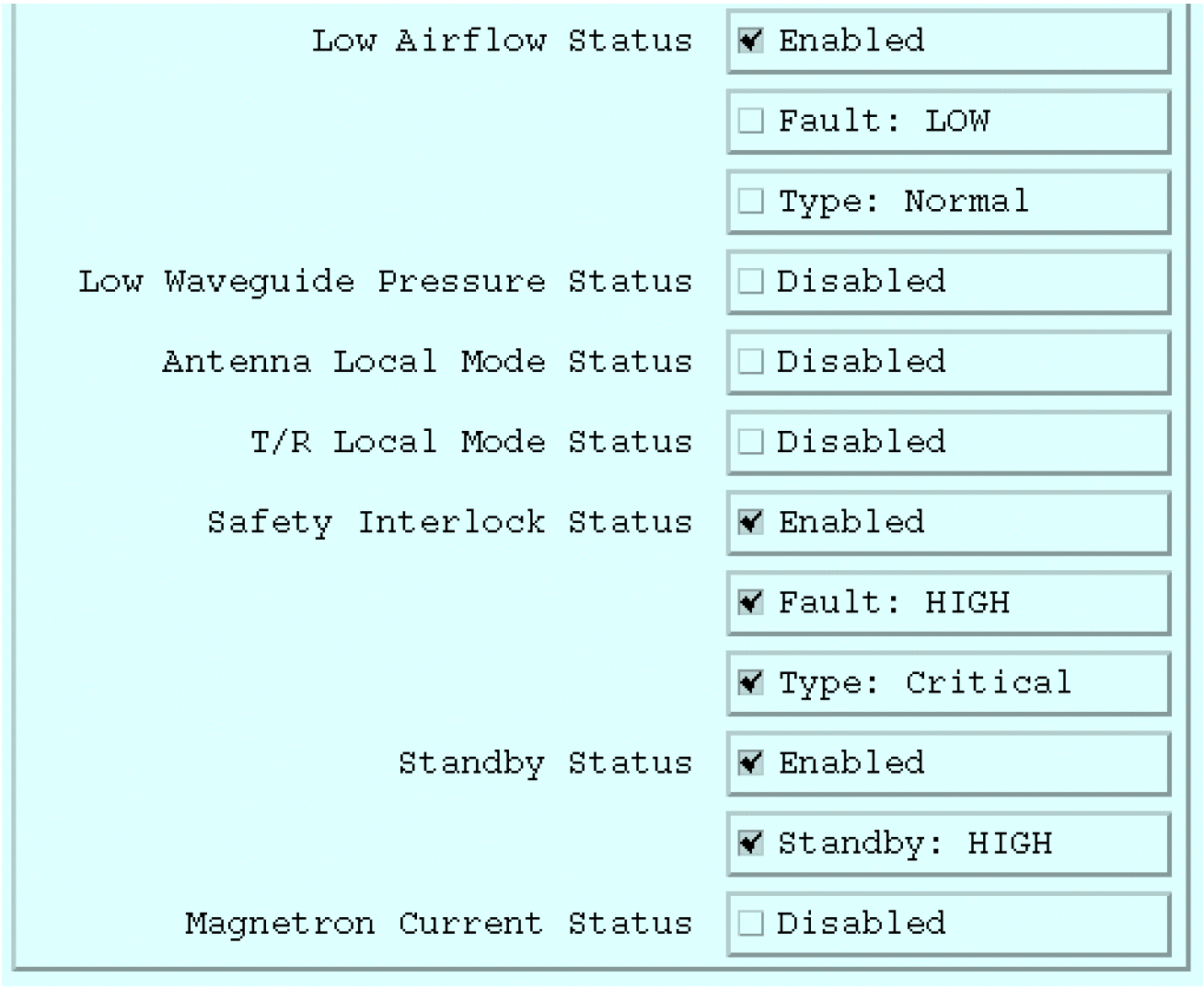
8.3.7 Status Bit Definitions



- *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.

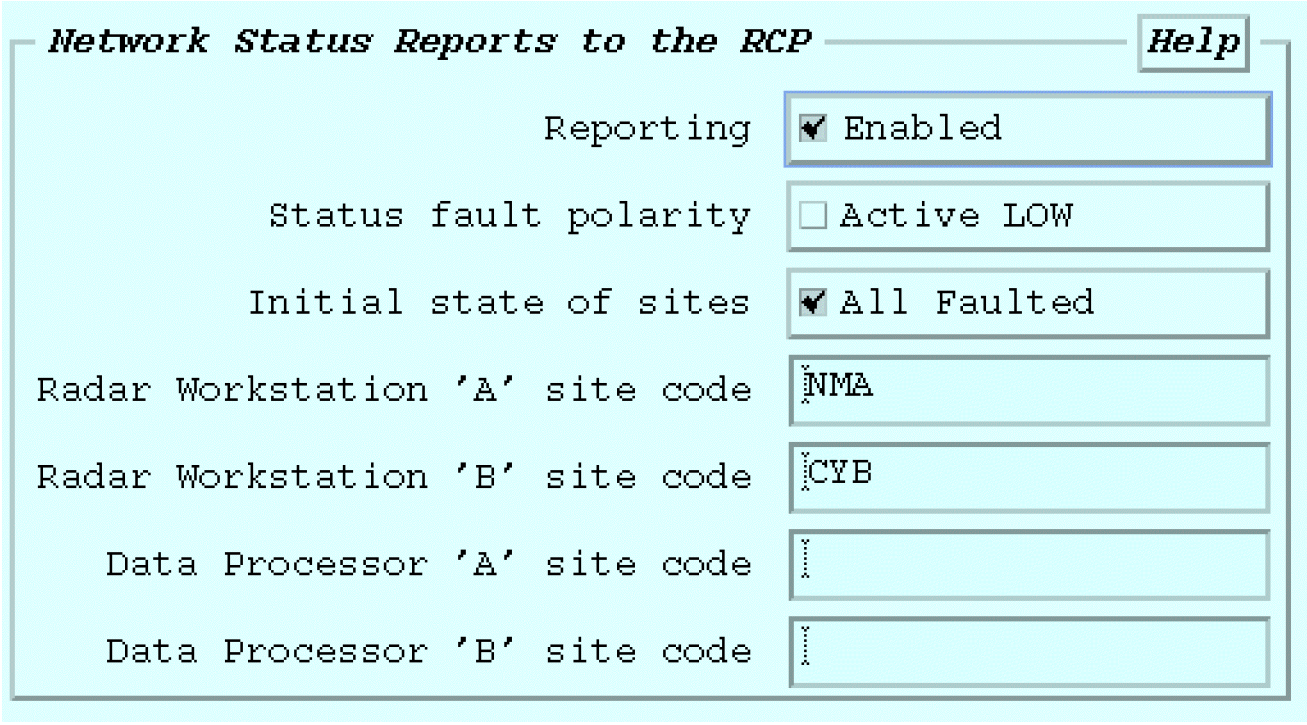


- *Low Waveguide Pressure Status* — Choose either "disabled" or "enabled" to indicate whether the antenna controller can detect if the waveguide pressure is low. If

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

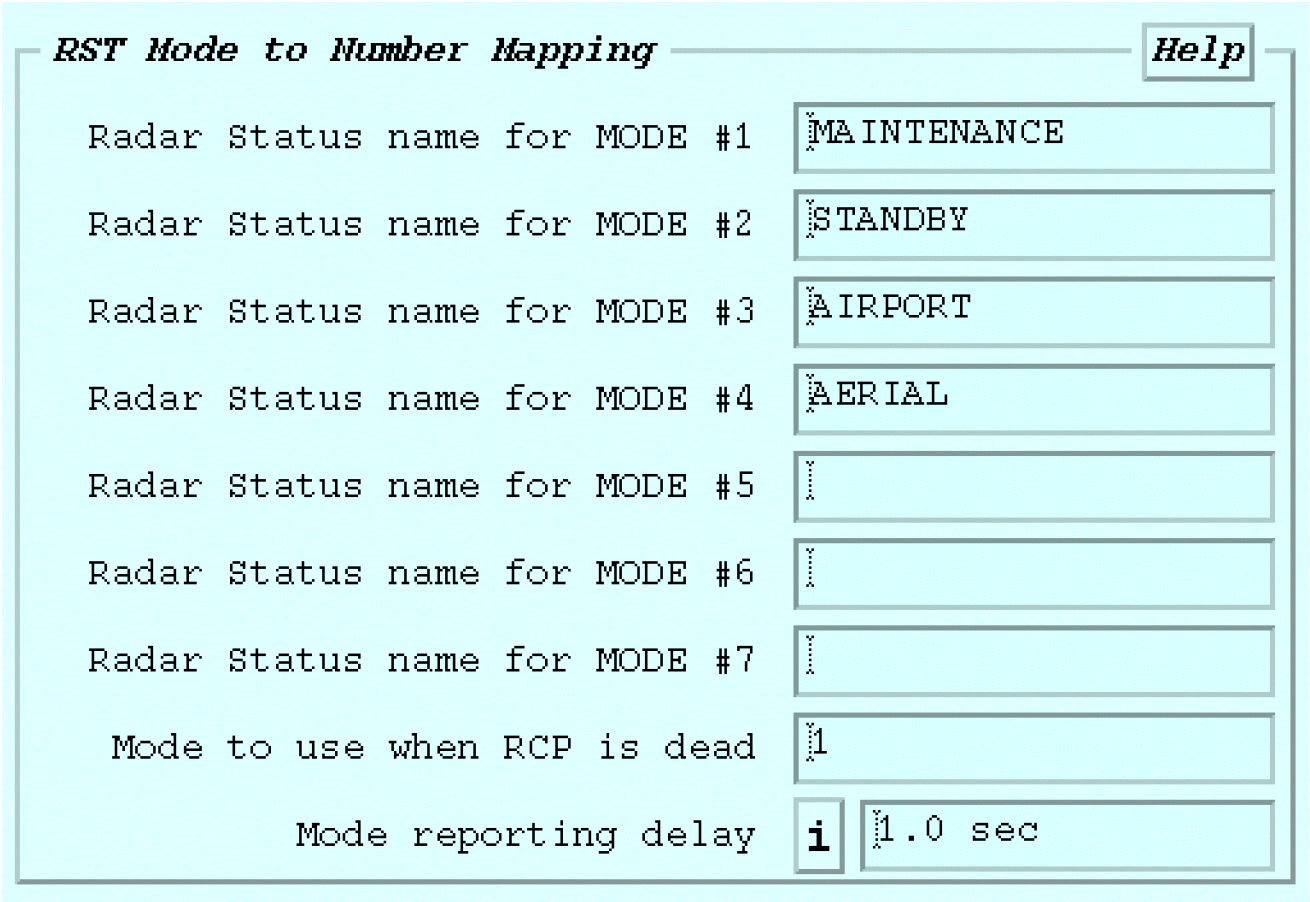
- *Antenna Local Mode Status* — Choose either “disabled” or “enabled” to indicate whether the antenna controller can detect if it is in local mode. If enabled is selected, an option for “Local: HIGH” or “Local: LOW” appears.
- *T/R Local Mode Status* — Choose either “disabled” or “enabled” to indicate 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.

8.3.8 Network Status Reports



- *Reporting* — Select either “disabled” or “enabled.” If enabled is selected the following options appears:
  - *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”.
  - *Initial state of sites* — Select the initial fault status of all four sites as either “All Okay” or “All Faulted.”
  - *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.

8.3.9 RST Mode Requests



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 theat 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.