WX/ASR Basic Operation and Baseline Configuration

Annex C: RCP8 and BITE Configuration

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1. Document Scope

This document describes the hardware and software configurations for the two RCP8 radar/antenna control processor systems installed on the WX/ASR system. The RCP8 provides the hardware interface to the radar transmitter and antenna/pedestal system. It also runs the IRIS/Radar software. This document describes the software configuration of the two RCP8 systems. The hardware connections are described in Annex D.

The sections of this annex are:

2. Delivered Hardware and Spares

3. RCP8 TTY Setups

    3.1 Radar A- RCP8 TTY Setups (from antx)

    3.2 Radar B- RCP8 TTY Setups (from antx)

    3.3 Discussion of Control Logics

4. RCP8 softplane.conf file (identical for rcp–a and rcp–b)

5. RCP8 BITE Packet Format (identical for rcp–a and rcp–b)

    5.1 BITE Displays
    5.2 BITE Packet Format

The ***RCP8 User's Manual*** serves as the primary reference for this annex. This is available in hardcopy and on-line under the "manuals" interface or as part of the Help in IRIS.

2. Delivered Hardware and Spares

The RCP8 is a rack mount PC equipped as follows:

- Dual Intel Pentium mother board (3.06 GHz each, 6.12 GHz total.
- 80 GB hard disk drive
- 1 GB memory
- DVD+RW/CDRW
- Keyboard mouse and monitor on a KVM switch shared with the RCP8
- SIGMET IO62 Rev B PCI Card

In addition, a SIGMET RCP8 IO62 Connector Panel Rev A is supplied to provide the physical connections to the various radar subsystems. The panel connects to the IO62 PCI card by a dedicated 62–position cable.

The following spares were provided:

- Rack mount PC power supply module (qty 2)
- RVP8/Rx Card Rev B
- IFD Rev D
- Computer mother board
- DAFC

Note that some of the spares are shared with the RVP8.

3. RCP8 TTY Setups (from antx)

3.1 rcp-a TTY Setups

Note: the antx TTY setup files were documented on a system at SIGMET so the "Board configuration and status" does not correspond to the WX/ASR system.

```
Script started on Sun 27 Mar 2005 12:29:00 PM EST

$ antx

-------- RCP Setup TTY 'Chat' Mode (^C to exit) --------

RCP> help listall
(Help View) – Board Configuration and Status
-----------------------------------------
RCP8 Radar Control Processor V7.3 IRIS–8.07.4
  Settings were last saved using V7.3
  RCP8 started at: 15:50:09 24 MAR 2005
  Current time is: 12:29:11 27 MAR 2005

Physical hardware inventory:
  Found PCI Card I/O–62  – Rev.B  Serial:1755  Code:25 (/dev/rda/io62–0)
   \––> IO62CP Backpanel – Rev.B  Serial:2190  Code:3
       ( Supply Currents – Panel: 461 mA,  Relays: 0 mA )

Parallel execution threads:
          CS–Tick – PID:17215   Priority:12  Policy:RealTimeRR
           Servos – PID:17215   Priority:12  Policy:RealTimeRR
         Watchdog – PID:17215   Priority:11  Policy:RealTimeRR
         Host–RCV – PID:17215   Priority:11  Policy:RealTimeRR
         Host–XMT – PID:17215   Priority:11  Policy:RealTimeRR
         Host–NET – PID:17215   Priority:11  Policy:RealTimeRR
      Seapath/INU – PID:17215   Priority:11  Policy:RealTimeRR
  Seapath/INU–SIM – PID:17215   Priority:11  Policy:RealTimeRR

Shared library build dates:
  RCP8/Core: Fri Dec  3 11:50:48 EST 2004
  RCP8/Open: Fri Dec  3 11:50:58 EST 2004
  RCP8/Site: Fri Dec  3 11:50:49 EST 2004

AZ Axis – Pos:   11.13    Off:–135.00    Vel:   2.2    Synchro Ref: 0% Syn: 0%
(FAULT)
EL Axis – Pos:   11.13    Off:   –0.00    Vel:   2.2    Synchro Ref: 0% Syn: 0%
(FAULT)

(Site Host) – Host Computer Setups
----------------------------------
Connection type for host computer I/O: Network
  Multicast address : 239.255.0.2
  Port number: 30785
  Network interface : eth0
Data format transmitted by host computer: XMT02
  Dead–Host–Computer detection time: 5.0 sec
Data format received by host computer: RCV03
  RCP8 transmission rate: 20.00 records/sec
```

```
Process incoming servo control packets: YES
RCP8 transmits Time–of–Day records: YES
  Time between Time–of–Day records :  60 sec
RCP8 transmits internal BITE packets: YES
  ID of internal BITE packets: 0x01
RCP8 transmits AUX status BITE packets: YES
  Xmt ID of status  BITE packets: 0x02
RCP8 receives AUX control BITE packets: YES
  Rcv ID of control BITE packets: 0x03
RCP8 transmits analog voltage Q–BITE packets: YES
  ID of analog voltage Q–BITE packets: 0x04
Maximum signal generator power level:    0 dBm
Default user interface: Local–TTY

(Site Misc) – Miscellaneous Setups
----------------------------------
External reset 'unsafe' duration: 1.0 sec
Lower EL limit switch causes shutdown: YES
Upper EL limit switch causes shutdown: YES
Primary   I/O–62 PCI card (–1:None) :  0
Secondary I/O–62 PCI card (–1:None) : –1
  Run I/O–62 external line powerup tests: NO
Reset all PCI cards on RCP8 shutdown: YES
Provide IRIS RPC network status server: YES
Pedestal has an auxiliary second antenna: YES
  AZ offset from Primary––>Secondary:   0.00 deg
  EL offset from Primary––>Secondary:  90.00 deg
  Use secondary antenna beginning w/IRIS mode: 4
  Secondary antenna uses (180+AZ)&(180–EL) : YES

(Site Custom) – Customer–specific Setups
----------------------------------------
Output serial TAG lines: NO
Use WSR–88D DCU Interface (Antenna/Pedestal): NO
Use WSR–88D DAU Interface (BITE/Status): NO
Use Kavouras TCU Interface (Radiate/BITE): NO
Use Andrew–Canada serial pedestal interface: NO
Use Applied Systems TWT Transmitter: NO
Use Orbit serial pedestal controller: NO
HPIB bus interface hardware is installed: NO
Use Dual/Redundant system configuration: NO
Generate trigger sector blanking output: NO
Enable Shaft Encoder Simulator: NO
Automatically calibrate Shaft Encoder: NO

(Status) – Antenna/Transmitter/Receiver Status Input Lines
----------------------------------------------------------
LOCAL input is enabled:  NO
STANDBY input is enabled:  YES
INTERLOCK input is enabled:  NO
MAGNETRON–CURRENT input is enabled:  NO
AIRFLOW input is enabled:  NO
WAVE–GUIDE–PRESSURE input is enabled:  NO
PULSE–WIDTH–0 input is enabled:  NO
PULSE–WIDTH–1 input is enabled:  NO
```

```
RADIATE input is enabled:  YES
SERVO-POWER input is enabled:  NO
LOWER-LIMIT-SWITCH input is enabled:  YES
UPPER-LIMIT-SWITCH input is enabled:  YES
T/R-POWER input is enabled:  NO
T/R-LOCAL input is enabled:  YES
IRIS-MODE-0 input is enabled:  YES
IRIS-MODE-1 input is enabled:  YES
IRIS-MODE-2 input is enabled:  YES
SYSTEM-RESET input is enabled:  NO
NOISEGEN-ON input is enabled:  NO
SIGGEN-ON input is enabled:  NO
SIGGEN-CW input is enabled:  NO
SIGGEN-FAULT input is enabled:  NO
SIGGEN-LEVEL input is enabled:  NO

Please choose 'Lines', 'Logic', 'VarMisc', 'VarADC' or 'VarAnt'./

(Control Lines) - Antenna/Transmitter/Receiver Control Output Lines
-------------------------------------------------------------------
RADIATE control protocol: Level

(Control Logic) - Boolean Control Equations
-------------------------------------------
Enable logic override of control lines: YES

EQ00: # EL Stow pin when upper and lower limit faults set
 \--: s6 = sUpperEL & sLowerEL
EQ01: # Reset Antenna when BITEX or ANTENNA reset button is pushed
 \--: sReset = c0 | cReset
EQ02: # Pulse coax switch to NS
 \--: t0_single_1 = cSigGenOn
EQ03: c64 = t0_single_1
EQ04: # Pulse coax switch to ANT
 \--: t1_single_1 = !cSigGenOn
EQ05: c65 = t1_single_1
EQ06: # Pulse to reset transmitter
 \--: t2_single_1 = c6
EQ07: c66 = t2_single_1
EQ08: # Mag Current Fault if Peak OC or Avg OC
 \--: sMagCurrentFlt = !(s9 & s10)
EQ09: # Local Status
 \--: sLocal = sTransmitLocal
EQ10:
EQ11: # V7 represents a request to switch to the primary antenna
 \--: v7 = (!(sTransmitLocal | sAuxAnt)) | (sTransmitLocal & c10)
EQ12: # V8 represents a request to switch to the secondary antenna
 \--: v8 = ((!sTransmitLocal) & sAuxAnt) | (sTransmitLocal & c11)
EQ13: # V9 latches these antenna requests to produce a desired state
 \--: v9 = (v9 & !v7) | (v8)
EQ14: # T3 debounces the requested antenna so we don't thrash around
 \--: t3_fickle_5 = v9
EQ15: # V11 holds that clean requested antenna for others to reference
 \--: v11 = t3_fickle_5
```

```
EQ16: # The acutal selected antenna follows this clean request
 \--: sAuxAnt = v11
EQ17:
EQ18: # T4 detects changes in the requested ant, & times the RAD test
 \--: t4_change_1 = v11
EQ19: # T5 represents the start-to-finish window for changing antennas
 \--: t5_single_3 = t4_change_1
EQ20: # T6 fires the WG switches after verifying that RADIATE is off
 \--: t6_single_0.50 = !((!t5_single_3) | t4_change_1 | sRadiate)
EQ21: # v6 gates the final Okay/Fault check at the end of the attempt
 \--: v6 = v5 & !t5_single_3
EQ22: # V10 represents a WG switch status error (inconsistent or mismatch)
 \--: v10 = (!((!s14) & s15 & v11)) & ((!s14) | s15 | v11)
EQ23: # Shutdown if we have any kind of error at the end of the attempt
 \--: cShutdown1 = (v6 & v10) | (v6 & sRadiate)
EQ24: # Drive the WG switch momentary solenoids in each direction
 \--: c67 = t6_single_0.50 & !v11
EQ25: # misc
 \--: c68 = t6_single_0.50 & v11
EQ26: # Force RADIATE off during shutdown or antenna change (use v13)
 \--: v13 = !((!cRadiate) | sShutdown | t5_single_3)
EQ27: # v12 is the qualified WG status error
 \--: v12 = v10 & !t6_single_0.50
EQ28: # Assign waveguide fault status from an external status line
 \--: sWavegpFlt = s18
EQ29: # Also force radiate off if antenna has stopped
 \--: cRadiate = v13 & !sAntStopped
EQ30: # V5 holds the previous state of the T5 start-to-finish time
 \--: v5 = t5_single_3
EQ31:
EQ32:
EQ33:
EQ34:
EQ35:
EQ36:
EQ37:
EQ38:
EQ39:
EQ40:
EQ41:
EQ42:
EQ43:
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EQ55:
EQ56:
EQ57:
EQ58:
EQ59:
EQ60:
EQ61:
EQ62:
EQ63:
EQ64:
EQ65:
EQ66:
EQ67:
EQ68:
EQ69:
EQ70:
EQ71:
EQ72:
EQ73:
EQ74:
EQ75:
EQ76:
EQ77:
EQ78:
EQ79:

Please choose 'Lines', 'Logic', 'VarMisc', 'VarADC' or 'Va-
rAnt'./

(Axis AZ) – AZIMUTH Axis Parameters
-----------------------------------
Use internal antenna simulator: NO
Angle input signal source: Synchro
  Synchro reference frequency: 60 Hz
  Shutdown for invalid synchro voltages: NO
Angle offset from true orientation: 135.00 deg
Use tachometer voltage to estimate velocity: YES
  Tachometer calibration -- Level:  30.37 T-Units
  Tachometer calibration -- Speed:  22.86 deg/sec
Enforce soft limits of position travel: NO
Enforce shutdown limits of position travel: NO
Force shutdown if tach/pos are inconsistent: YES
  Permissible fixed error:     3.00 deg/sec
  Permissible relative error: 20.00 %
Force shutdown for unresponsive antenna: NO
Moment of Inertia: 30.00 (D-Units / T-Units/sec)
Enforce model-based acceleration limits: NO
Use drive compensation for unbalanced antenna: NO
Maximum output drive voltage:  +/- 10.00 Volts
Drive voltage is positive for positive motion: NO
Tach voltage is positive for positive motion: YES
Drive output offset:       0.00 D-Units
Tachometer input offset:  -0.08 T-Units
```

```
(Vservo AZ) – AZIMUTH Velocity Servo parameters
-----------------------------------------------
Motor positive sustaining drive:  27.00 D–Units
Motor negative sustaining drive: –30.00 D–Units
Nominal positive drive slope:   0.000 D/T–Units
Nominal negative drive slope:   0.000 D/T–Units
Velocity feedback slope:    25.000 D/dT–Units
Velocity feedback deadzone:      0.10 T–Units
Apply velocity error integral correction: NO
Generate stepper motor drive control signals: NO
Maximum absolute velocity:      55.00 T–Units
Velocity shutdown safe margin:  10.00 T–Units
Velocity shutdown check time:  2.00 sec
Tach zero–delay–smoother window: 0.150 sec
  Model order within the window: 3
Drive slew rate limit for Zero––>Max:  0.00 sec

(Pservo AZ) – AZIMUTH Position Servo parameters
-----------------------------------------------
Hysteresis outer zone:      0.100 deg
Hysteresis inner zone:      0.070 deg
First position break point:  1.00 deg
Second position break point: 5.00 deg
First interval slope:  4.00 (T–Units)/deg
Second interval slope: 2.00 (T–Units)/deg
Third interval slope:  1.00 (T–Units)/deg

(Axis EL) – Elevation Axis Parameters
-------------------------------------
Use internal antenna simulator: NO
Angle input signal source: Synchro
  Synchro reference frequency: 60 Hz
  Shutdown for invalid synchro voltages: NO
Angle offset from true orientation:   0.00 deg
Use tachometer voltage to estimate velocity: YES
  Tachometer calibration –– Level:  35.00 T–Units
  Tachometer calibration –– Speed:  10.00 deg/sec
Enforce soft limits of position travel: YES
  Minimum soft limit of travel:  –5.10 deg
  Maximum soft limit of travel:  95.10 deg
Enforce shutdown limits of position travel: YES
  Minimum shutdown limit of travel:  –5.90 deg
  Maximum shutdown limit of travel:  95.90 deg
Force shutdown if tach/pos are inconsistent: YES
  Permissible fixed error:     3.00 deg/sec
  Permissible relative error: 20.00 %
Force shutdown for unresponsive antenna: NO
Moment of Inertia:  2.00 (D–Units / T–Units/sec)
Enforce model–based acceleration limits: NO
Use drive compensation for unbalanced antenna: NO
Maximum output drive voltage:  +/– 10.00 Volts
Drive voltage is positive for positive motion: NO
Tach voltage is positive for positive motion: YES
```

```
Drive output offset:       0.00 D–Units
Tachometer input offset:  –0.01 T–Units

(Vservo EL) – Elevation Velocity Servo parameters
------------------------------------------------
Motor positive sustaining drive:  15.00 D–Units
Motor negative sustaining drive: –15.00 D–Units
Nominal positive drive slope:   0.200 D/T–Units
Nominal negative drive slope:   0.200 D/T–Units
Velocity feedback slope:    25.000 D/dT–Units
Velocity feedback deadzone:      0.10 T–Units
Apply velocity error integral correction: NO
Generate stepper motor drive control signals: NO
Maximum absolute velocity:      70.00 T–Units
Velocity shutdown safe margin:  10.00 T–Units
Velocity shutdown check time:  1.00 sec
Tach zero–delay–smoother window: 0.150 sec
  Model order within the window: 3
Drive slew rate limit for Zero––>Max:  0.00 sec

(Pservo EL) – Elevation Position Servo parameters
-------------------------------------------------
Hysteresis outer zone:      0.090 deg
Hysteresis inner zone:      0.070 deg
First position break point:  1.00 deg
Second position break point: 5.00 deg
First interval slope: 10.00 (T–Units)/deg
Second interval slope: 6.00 (T–Units)/deg
Third interval slope:  2.00 (T–Units)/deg

(INU) – Inertial Navigation Unit (INU) Setups
---------------------------------------------
Use platform stabilization algorithms: NO
Serial INU Simulation: NO

RCP>

Script done on Sun 27 Mar 2005 12:29:19 PM EST
```

3.2 rcp-b TTY Setups (from antx)

Note: the antx TTY setup files were documented on a system at SIGMET so the "Board configuration and status" does not correspond to the WX/ASR system.

```
Script started on Mon 28 Mar 2005 09:59:10 AM EST

$ antx
-------- RCP Setup TTY 'Chat' Mode (^C to exit) --------
¿
¿RCP>               help               listall
(Help View) – Board Configuration and Status
-------------------------------------------
RCP8 Radar Control Processor V7.3 IRIS–8.07.4
  Settings were last saved using V7.3
  RCP8 started at: 09:54:41 28 MAR 2005
  Current time is: 09:59:20 28 MAR 2005

Physical hardware inventory:
  Found PCI Card I/O–62  – Rev.B  Serial:1755  Code:25 (/dev/rda/io62–0)
   \––> IO62CP Backpanel – Rev.B  Serial:2190  Code:3
       ( Supply Currents – Panel: 461 mA,  Relays: 1 mA )

Parallel execution threads:
      CS–Tick – PID:6109   Priority:12  Policy:RealTimeRR
       Servos – PID:6109   Priority:12  Policy:RealTimeRR
     Watchdog – PID:6109   Priority:11  Policy:RealTimeRR
     Host–RCV – PID:6109   Priority:11  Policy:RealTimeRR
     Host–XMT – PID:6109   Priority:11  Policy:RealTimeRR
     Host–NET – PID:6109   Priority:11  Policy:RealTimeRR
  Seapath/INU – PID:6109   Priority:11  Policy:RealTimeRR

Shared library build dates:
  RCP8/Core: Fri Dec  3 11:50:48 EST 2004
  RCP8/Open: Fri Dec  3 11:50:58 EST 2004
  RCP8/Site: Fri Dec  3 11:50:49 EST 2004

AZ Axis – Pos:    0.00    Off:–135.00    Vel:   0.0    Synchro Ref: 0% Syn: 0%
(FAULT)
EL Axis – Pos:    0.00    Off:   –0.00    Vel:   0.0    Synchro Ref: 0% Syn: 0%
(FAULT)

(Site Host) – Host Computer Setups
----------------------------------
Connection type for host computer I/O: Network
  Multicast address : 239.255.0.1
  Port number: 30785
  Network interface : eth0
Data format transmitted by host computer: XMT02
  Dead–Host–Computer detection time: 5.0 sec
Data format received by host computer: RCV03
  RCP8 transmission rate: 20.00 records/sec
Process incoming servo control packets: YES
RCP8 transmits Time–of–Day records: YES
  Time between Time–of–Day records :  60 sec
RCP8 transmits internal BITE packets: YES
  ID of internal BITE packets: 0x01
```

```
RCP8 transmits AUX status BITE packets: YES
  Xmt ID of status  BITE packets: 0x02
RCP8 receives AUX control BITE packets: YES
  Rcv ID of control BITE packets: 0x03
RCP8 transmits analog voltage Q-BITE packets: YES
  ID of analog voltage Q-BITE packets: 0x04
Maximum signal generator power level:    0 dBm
Default user interface: Local-TTY

(Site Misc) - Miscellaneous Setups
----------------------------------
External reset 'unsafe' duration: 1.0 sec
Lower EL limit switch causes shutdown: YES
Upper EL limit switch causes shutdown: YES
Primary   I/O-62 PCI card (-1:None) :  0
Secondary I/O-62 PCI card (-1:None) : -1
  Run I/O-62 external line powerup tests: NO
Reset all PCI cards on RCP8 shutdown: YES
Provide IRIS RPC network status server: YES
Pedestal has an auxiliary second antenna: YES
  AZ offset from Primary-->Secondary:   0.00 deg
  EL offset from Primary-->Secondary:  90.00 deg
  Use secondary antenna beginning w/IRIS mode: 4
  Secondary antenna uses (180+AZ)&(180-EL) : YES

(Site Custom) - Customer-specific Setups
----------------------------------------
Output serial TAG lines: NO
Use WSR-88D DCU Interface (Antenna/Pedestal): NO
Use WSR-88D DAU Interface (BITE/Status): NO
Use Kavouras TCU Interface (Radiate/BITE): NO
Use Andrew-Canada serial pedestal interface: NO
Use Applied Systems TWT Transmitter: NO
Use Orbit serial pedestal controller: NO
HPIB bus interface hardware is installed: NO
Use Dual/Redundant system configuration: NO
Generate trigger sector blanking output: NO
Enable Shaft Encoder Simulator: NO
Automatically calibrate Shaft Encoder: NO

(Status) - Antenna/Transmitter/Receiver Status Input Lines
----------------------------------------------------------
LOCAL input is enabled:  NO
STANDBY input is enabled:  YES
INTERLOCK input is enabled:  NO
MAGNETRON-CURRENT input is enabled:  NO
AIRFLOW input is enabled:  NO
WAVE-GUIDE-PRESSURE input is enabled:  NO
PULSE-WIDTH-0 input is enabled:  NO
PULSE-WIDTH-1 input is enabled:  NO
RADIATE input is enabled:  YES
SERVO-POWER input is enabled:  NO
LOWER-LIMIT-SWITCH input is enabled:  YES
UPPER-LIMIT-SWITCH input is enabled:  YES
T/R-POWER input is enabled:  NO
T/R-LOCAL input is enabled:  YES
```

```
IRIS–MODE–0 input is enabled:  YES
IRIS–MODE–1 input is enabled:  YES
IRIS–MODE–2 input is enabled:  YES
SYSTEM–RESET input is enabled:  NO
NOISEGEN–ON input is enabled:  NO
SIGGEN–ON input is enabled:  NO
SIGGEN–CW input is enabled:  NO
SIGGEN–FAULT input is enabled:  NO
SIGGEN–LEVEL input is enabled:  NO
Please choose 'Lines', 'Logic', 'VarMisc', 'VarADC' or 'VarAnt'./
(Control Lines) – Antenna/Transmitter/Receiver Control Output Lines
------------------------------------------------------------------
RADIATE control protocol: Level
(Control Logic) – Boolean Control Equations
-------------------------------------------
Enable logic override of control lines: YES
EQ00: # EL Stow pin when upper and lower limit faults set
 \--: s6 = sUpperEL & sLowerEL
EQ01: # Reset Antenna when BITEX or ANTENNA reset button is pushed
 \--: sReset = c0 | cReset
EQ02: # Pulse coax switch to NS
 \--: t0_single_1 = cSigGenOn
EQ03: c64 = t0_single_1
EQ04: # Pulse coax switch to ANT
 \--: t1_single_1 = !cSigGenOn
EQ05: c65 = t1_single_1
EQ06: # Pulse to reset transmitter
 \--: t2_single_1 = c6
EQ07: c66 = t2_single_1
EQ08: # Mag Current Fault if Peak OC or Avg OC
 \--: sMagCurrentFlt = !(s9 & s10)
EQ09: # Local Status
 \--: sLocal = sTransmitLocal
EQ10:
EQ11: # V7 represents a request to switch to the primary antenna
 \--: v7 = (!(sTransmitLocal | sAuxAnt)) | (sTransmitLocal & c10)
EQ12: # V8 represents a request to switch to the secondary antenna
 \--: v8 = ((!sTransmitLocal) & sAuxAnt) | (sTransmitLocal & c11)
EQ13: # V9 latches these antenna requests to produce a desired state
 \--: v9 = (v9 & !v7) | (v8)
EQ14: # T3 debounces the requested antenna so we don't thrash around
 \--: t3_fickle_5 = v9
EQ15: # V11 holds that clean requested antenna for others to reference
 \--: v11 = t3_fickle_5
EQ16: # The acutal selected antenna follows this clean request
 \--: sAuxAnt = v11
EQ17:
EQ18: # T4 detects changes in the requested ant, & times the RAD test
 \--: t4_change_1 = v11
EQ19: # T5 represents the start–to–finish window for changing antennas
 \--: t5_single_3 = t4_change_1
EQ20: # T6 fires the WG switches after verifying that RADIATE is off
```

```
 \--: t6_single_0.50 = !((!t5_single_3) | t4_change_1 | sRadiate)
EQ21: # V6 gates the final Okay/Fault check at the end of the attempt
 \--: v6 = v5 & !t5_single_3
EQ22: # V10 represents a WG switch status error (inconsistent or mismatch)
 \--: v10 = (!((!s14) & s15 & v11)) & ((!s14) | s15 | v11)
EQ23: # Shutdown if we have any kind of error at the end of the attempt
 \--: cShutdown1 = (v6 & v10) | (v6 & sRadiate)
EQ24: # Drive the WG switch momentary solenoids in each direction
 \--: c67 = t6_single_0.50 & !v11
EQ25: # misc
 \--: c68 = t6_single_0.50 & v11
EQ26: # Force RADIATE off during shutdown or antenna change (use v13)
 \--: v13 = !((!cRadiate) | sShutdown | t5_single_3)
EQ27: # v12 is the qualified WG status error
 \--: v12 = v10 & !t6_single_0.50
EQ28: # Assign waveguide fault status from an external status line
 \--: sWavegpFlt = s18
EQ29: cRadiate = v13 & !sAntStopped
EQ30: # V5 holds the previous state of the T5 start-to-finish time
 \--: v5 = t5_single_3
EQ31:
EQ32:
EQ33:
EQ34:
EQ35:
EQ36:
EQ37:
EQ38:
EQ39:
EQ40:
EQ41:
EQ42:
EQ43:
EQ44:
EQ45:
EQ46:
EQ47:
EQ48:
EQ49:
EQ50:
EQ51:
EQ52:
EQ53:
EQ54:
EQ55:
EQ56:
EQ57:
EQ58:
EQ59:
EQ60:
EQ61:
EQ62:
EQ63:
EQ64:
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EQ65:
EQ66:
EQ67:
EQ68:
EQ69:
EQ70:
EQ71:
EQ72:
EQ73:
EQ74:
EQ75:
EQ76:
EQ77:
EQ78:
EQ79:
```

```
Please choose 'Lines', 'Logic', 'VarMisc', 'VarADC' or 'VarAnt'./
```

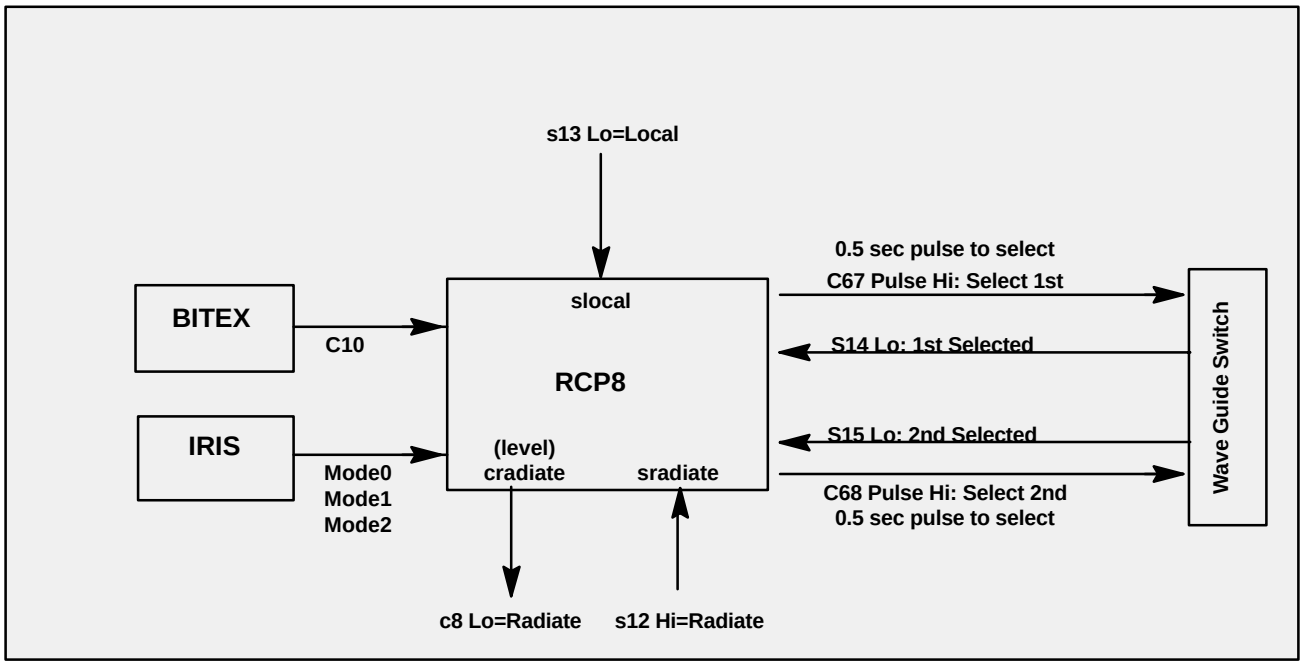
```
(Axis AZ) – AZIMUTH Axis Parameters
-----------------------------------
Use internal antenna simulator: NO
Angle input signal source: Synchro
  Synchro reference frequency: 60 Hz
  Shutdown for invalid synchro voltages: NO
Angle offset from true orientation: 135.00 deg
Use tachometer voltage to estimate velocity: YES
  Tachometer calibration -- Level:  49.50 T-Units
  Tachometer calibration -- Speed:  25.00 deg/sec
Enforce soft limits of position travel: NO
Enforce shutdown limits of position travel: NO
Force shutdown if tach/pos are inconsistent: NO
Force shutdown for unresponsive antenna: NO
Moment of Inertia: 30.00 (D-Units / T-Units/sec)
Enforce model-based acceleration limits: NO
Use drive compensation for unbalanced antenna: NO
Maximum output drive voltage:  +/- 10.00 Volts
Drive voltage is positive for positive motion: NO
Tach voltage is positive for positive motion: YES
Drive output offset:       0.00 D-Units
Tachometer input offset:   0.20 T-Units
```

```
(Vservo AZ) – AZIMUTH Velocity Servo parameters
-----------------------------------------------
Motor positive sustaining drive:   8.00 D-Units
Motor negative sustaining drive:  -8.00 D-Units
Nominal positive drive slope:   0.050 D/T-Units
Nominal negative drive slope:   0.050 D/T-Units
Velocity feedback slope:    15.000 D/dT-Units
Velocity feedback deadzone:      0.10 T-Units
Apply velocity error integral correction: NO
Generate stepper motor drive control signals: NO
Maximum absolute velocity:      85.00 T-Units
Velocity shutdown safe margin:  10.00 T-Units
Velocity shutdown check time:  2.00 sec
Tach zero-delay-smoother window: 0.150 sec
```

```
  Model order within the window: 3
Drive slew rate limit for Zero-->Max:  0.00 sec

(Pservo AZ) – AZIMUTH Position Servo parameters
-----------------------------------------------
Hysteresis outer zone:      0.090 deg
Hysteresis inner zone:      0.070 deg
First position break point:  1.00 deg
Second position break point: 5.00 deg
First interval slope:  7.00 (T–Units)/deg
Second interval slope: 4.00 (T–Units)/deg
Third interval slope:  1.00 (T–Units)/deg

(Axis EL) – Elevation Axis Parameters
-------------------------------------
Use internal antenna simulator: NO
Angle input signal source: Synchro
  Synchro reference frequency: 60 Hz
  Shutdown for invalid synchro voltages: NO
Angle offset from true orientation:   0.00 deg
Use tachometer voltage to estimate velocity: YES
  Tachometer calibration -- Level:  22.00 T–Units
  Tachometer calibration -- Speed:   7.00 deg/sec
Enforce soft limits of position travel: YES
  Minimum soft limit of travel:  –5.10 deg
  Maximum soft limit of travel:  95.10 deg
Enforce shutdown limits of position travel: YES
  Minimum shutdown limit of travel:  –5.90 deg
  Maximum shutdown limit of travel:  95.90 deg
Force shutdown if tach/pos are inconsistent: YES
  Permissible fixed error:     3.00 deg/sec
  Permissible relative error: 20.00 %
Force shutdown for unresponsive antenna: NO
Moment of Inertia:  2.00 (D–Units / T–Units/sec)
Enforce model–based acceleration limits: NO
Use drive compensation for unbalanced antenna: NO
Maximum output drive voltage:  +/– 10.00 Volts
Drive voltage is positive for positive motion: NO
Tach voltage is positive for positive motion: YES
Drive output offset:       0.00 D–Units
Tachometer input offset:  –0.01 T–Units

(Vservo EL) – Elevation Velocity Servo parameters
-------------------------------------------------
Motor positive sustaining drive:  25.00 D–Units
Motor negative sustaining drive: –25.00 D–Units
Nominal positive drive slope:   0.050 D/T–Units
Nominal negative drive slope:   0.050 D/T–Units
Velocity feedback slope:    40.000 D/dT–Units
Velocity feedback deadzone:      0.10 T–Units
Apply velocity error integral correction: NO
Generate stepper motor drive control signals: NO
Maximum absolute velocity:      50.00 T–Units
Velocity shutdown safe margin:  10.00 T–Units
Velocity shutdown check time:  1.00 sec
Tach zero–delay–smoother window: 0.150 sec
```

```
  Model order within the window: 3
Drive slew rate limit for Zero-->Max:  0.00 sec

(Pservo EL) - Elevation Position Servo parameters
------------------------------------------------
Hysteresis outer zone:      0.090 deg
Hysteresis inner zone:      0.070 deg
First position break point:  1.00 deg
Second position break point: 5.00 deg
First interval slope:  7.00 (T-Units)/deg
Second interval slope: 4.00 (T-Units)/deg
Third interval slope:  1.00 (T-Units)/deg

(INU) - Inertial Navigation Unit (INU) Setups
---------------------------------------------
Use platform stabilization algorithms: YES
  Serial port: /usr/sigmet/config/inu_fifo-x
  Baud rate for INU: 38400
  Negate sign of Roll angles:    YES
  Negate sign of Pitch angles:   YES
  Negate sign of Heading angles: NO
  Roll offset from true orientation:      0.00 deg
  Pitch offset from true orientation:     0.00 deg
  Heading offset from true orientation:   0.00 deg
  Upper pedestal angle auto-soft-limit:  75.00 deg
  Dead INU detection time:  5.0 sec
  Enable stabilization for invalid data: NO
  Ignore CRC errors in INU data stream: NO
Serial INU Simulation: NO

¿RCP>
¿--------       Exit       from       RCP       Chat       --------
$ exit¿

Script done on Mon 28 Mar 2005 09:59:25 AM EST
```

3.3 Discussion of Control Logics



Valid Switch Status

	Ant	c67	c68	s14	s15
Select 1st	Lo	Hi Pulse	NA	Lo	Hi
Select 2nd	Hi	NA	Hi Pulse	Hi	Lo

Invalid Switch States

1st Selected	Lo	Hi	Lo
		Hi	Hi
2nd Selected	Hi	Lo	Hi
		Lo	Lo

Switching Rules

1. If slocal is Hi (local mode) then BITEX controls the switching, else the switching is controlled by the mode selection made by IRIS.

2. In the case of BITEX Manual Control, Button C10 Hi (in) will select 1st (Primary) antenna. Button C11 Hi (in) will select 2nd (Aux) Antenna.

3. The switching sequence from 1st to 2nd is as follows:

A. Set cradiate (Hi=off, via c8)

B. Confirm sradiate off (Lo=off, via s12)

C. Pulse 2nd WG Switch Solonoid for 0.5 sec (c68)

D. Start 2 sec timer to wait for valid switch state.

E. Verify switch state is to select 2nd (s14 Hi and s15 Lo)

F. If not achieved in 2 sec, then set fault bit (v10) and do not radiate. V10 is displayed in BITEX as “WG Switch Failure”

G. If OK state is achieved, then switch:

Radiate On (cradiate via c8 Lo)

Antenna mode AntAuxSwitch Hi (2nd)

Done

3. The switching sequence from 2nd to 1st is as follows:

A. Set cradiate (Hi=off, via c8)

B. Confirm sradiate off (Lo=off via s12)

C. Pulse 1st WG Switch Solonoid for 0.5 sec (c67)

D. Start 2 sec timer to wait for valid switch state.

E. Verify switch state is to select 2nd (s15 Lo and s14 Hi)

F. If not achieved in 2 sec, then set fault bit (v10) and do not radiate. V10 is displayed in BITEX as “WG Switch Failure”

G. If OK state is achieved, then switch:

Radiate On (cradiate via c8 Lo)

Antenna mode AntAuxSwitch Lo (1st)

Control Logic Description

Control logic equations in the RCP8 are used for controlling the switching of the waveguide switch between the Primary (Weather) and the Aux (ASR) antennas. The control logics also cause the RCP8 to perform a selection of the active antenna. This selection of the active antenna involves the RCP8 rotating the antenna by 90 degrees in elevation. Specifically, the control logics:

1) Disable the transmitter from radiating during the switching time.
2) Check to make sure that transmitter is reporting no radiation prior to actually allowing the waveguide switch to transition.
3) Select the active antenna and indirectly rotate the antenna 90 degrees in elevation.
4) Provide the pulse to transition the waveguide switch if the radiate is indeed off.
5) After the transition is complete, the control logics check to make sure that the waveguide switch is reporting a successful transition.
6) If yes, then the transmitter is allowed to radiate again.
7) If not, then an RCP8 shutdown is declared and the transmitter radiation is left off.

In detail, the above functions are accomplished by:

1) A pulse of V7 is caused when either IRIS asks for a mode change to a mode mapped in the RCP8 setups to Weather mode, or the operator manually selecting Weather mode through BITEX (when the radar is in local mode).
2) A pulse of V8 is caused when either IRIS asks for a mode change to a mode mapped in the RCP8 setups to ASR mode, or the operator manually selecting ASR mode through BITEX (when the radar is in local mode).
3) V9 transitions from high to low on a pulse from V7 and then V9 holds this level.
4) V9 transitions from low to high on a pulse from V8 and then V9 holds this level.
5) V9 when transitioned from a high to low represents a command to switch the antenna from the primary (Weather) to the Aux (ASR) position.
6) V9 when transitioned from low to high represents a command to switch the antenna from the Aux (ASR) to the Primary (Weather) position.
7) V9 is filtered to remove any debounces and hold its state for 5 seconds in variable V11.
8) V11 is equated to sAuxAnt to actually cause the RCP8 to select the active antenna and rotate the antenna 90 degrees in elevation. A transition in V11 initiates this process.
9) Upon any transition of V11, a one second timer (T4) is started and a three second timer (T5) is started. T4 is the timer that causes us to wait before checking if radiate is off and thus if we can proceed. T5 is the timer that is used to signal, ”everything should be finished now”.
10) During the three–second period that T5 is set, radiate is disabled through variable V13. V13 is also including other conditions that could possibly disable radiate.
11) After T4 expires, if radiate is indeed off, then a 0.5 second timer (T6) is started.
12) T6 will actually provide the pulse to switch the waveguide switch to the new position.
13) After T5 expires, the state of the switch is checked. If the switch is in a consistent state, radiate is allowed to turn back on. We are done. If the switch is not in a consistent state, then we shutdown the RCP8 which causes a fault to be signaled and causes the transmitter to stay off and prevents the antenna from moving.

4. RCP8 softplane.conf file (identical for rcp–a and rcp–b)

```
# *********************************
# *                               *
# *  Softplane Configuration File  *
# *                               *
# *********************************

# The following general purpose control and status signals
# can be routed to/from any available hardware pin.  The '~'
# prefix character may be used for signal inversion.
#
#         Control Outputs            Status Inputs
#        -----------------          ---------------
#            cPedAZ[15:0]             sPedAZ[15:0]
#            cPedEL[15:0]             sPedEL[15:0]
#          cEarthAZ[15:0]                sServoPwr
#          cEarthEL[15:0]                   sLocal
#               cServoPwr                sStandby
#           cCabinetRelay                sLowerEL
#            cTransmitPwr                sUpperEL
#            cPWidth[3:0]               sProxSwAZ
#              cTrigBlank               sProxSwEL
#              cRadiateOn             sTransmitPwr
#             cRadiateOff           sTransmitLocal
#                  cReset             sPWidth[3:0]
#          cIrisMode[2:0]               sTrigBlank
#              cAux[80:0]                 sRadiate
#              cStepCntAZ              sAirflowFlt
#              cStepCntEL                sWavegpFlt
#               cStepUpAZ             sInterlockFlt
#               cStepUpEL           sMagCurrentFlt
#                    true                    sReset
#                   false             sIrisMode[2:0]
#                                        sAux[319:0]

splConfig.sVersion = "8.06"

# ------------------- IO62 Slot #0 -------------------
#
splConfig.Io62[0].lInUse = 1

# The remote backpanel type must be one of the following:
#     Direct : Direct I/O with IO62 connector itself
#     IO62CP : Standard IO62-CP connector panel
#     RCP88D : RCP8 portion of WSR88D panel
#     RVP88D : RVP8 portion of WSR88D panel
#     TDWRV1 : MIT/LL TDWR customization of IO62-CP
#
splConfig.Io62[0].sExtPanel = "IO62CP"

# TTL/CMOS on J1
#
# Noise Source Enable
splConfig.Io62[0].Opt.Cp.J1.pin01 = "cNoiseGenOn"
# Coax Switch to Noise Source
splConfig.Io62[0].Opt.Cp.J1.pin02 = "cAux[64]"
```

```
# Coax Switch to Antenna
splConfig.Io62[0].Opt.Cp.J1.pin03 = ″cAux[65]″
splConfig.Io62[0].Opt.Cp.J1.pin04 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin05 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin06 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin07 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin08 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin09 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin10 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin11 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin12 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin13 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin14 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin15 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin16 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin17 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin18 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin19 = ″″
splConfig.Io62[0].Opt.Cp.J1.pin20 = ″″

# TTL/CMOS on J2
#
splConfig.Io62[0].Opt.Cp.J2.pin01 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin02 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin03 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin04 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin05 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin06 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin07 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin08 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin09 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin10 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin11 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin12 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin13 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin14 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin15 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin16 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin17 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin18 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin19 = ″″
splConfig.Io62[0].Opt.Cp.J2.pin20 = ″″

# TTL/CMOS on J4
#
splConfig.Io62[0].Opt.Cp.J4.pin01 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin02 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin03 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin04 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin05 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin06 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin07 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin08 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin09 = ″″
splConfig.Io62[0].Opt.Cp.J4.pin10 = ″″
```

```
splConfig.Io62[0].Opt.Cp.J4.pin11 = ""
splConfig.Io62[0].Opt.Cp.J4.pin12 = ""
splConfig.Io62[0].Opt.Cp.J4.pin13 = ""
splConfig.Io62[0].Opt.Cp.J4.pin14 = ""
splConfig.Io62[0].Opt.Cp.J4.pin15 = ""
splConfig.Io62[0].Opt.Cp.J4.pin16 = ""
splConfig.Io62[0].Opt.Cp.J4.pin17 = ""
splConfig.Io62[0].Opt.Cp.J4.pin18 = ""
splConfig.Io62[0].Opt.Cp.J4.pin19 = ""
splConfig.Io62[0].Opt.Cp.J4.pin20 = ""

# TTL/CMOS on J5
#
splConfig.Io62[0].Opt.Cp.J5.pin01 = ""
splConfig.Io62[0].Opt.Cp.J5.pin02 = ""
splConfig.Io62[0].Opt.Cp.J5.pin03 = ""
splConfig.Io62[0].Opt.Cp.J5.pin04 = ""
splConfig.Io62[0].Opt.Cp.J5.pin05 = ""
splConfig.Io62[0].Opt.Cp.J5.pin06 = ""
splConfig.Io62[0].Opt.Cp.J5.pin07 = ""
splConfig.Io62[0].Opt.Cp.J5.pin08 = ""
splConfig.Io62[0].Opt.Cp.J5.pin09 = ""
splConfig.Io62[0].Opt.Cp.J5.pin10 = ""
splConfig.Io62[0].Opt.Cp.J5.pin11 = ""
splConfig.Io62[0].Opt.Cp.J5.pin12 = ""
splConfig.Io62[0].Opt.Cp.J5.pin13 = ""
splConfig.Io62[0].Opt.Cp.J5.pin14 = ""
splConfig.Io62[0].Opt.Cp.J5.pin15 = ""
splConfig.Io62[0].Opt.Cp.J5.pin16 = ""
splConfig.Io62[0].Opt.Cp.J5.pin17 = ""
splConfig.Io62[0].Opt.Cp.J5.pin18 = ""
splConfig.Io62[0].Opt.Cp.J5.pin19 = ""
splConfig.Io62[0].Opt.Cp.J5.pin20 = ""

# TTL/CMOS on J7
#
# Arc Status
splConfig.Io62[0].Opt.Cp.J7.pin01 = "sAux[16]"
# RF Power Status
splConfig.Io62[0].Opt.Cp.J7.pin02 = "sAux[17]"
splConfig.Io62[0].Opt.Cp.J7.pin03 = ""
splConfig.Io62[0].Opt.Cp.J7.pin04 = ""
splConfig.Io62[0].Opt.Cp.J7.pin05 = ""
splConfig.Io62[0].Opt.Cp.J7.pin06 = ""
splConfig.Io62[0].Opt.Cp.J7.pin07 = ""
splConfig.Io62[0].Opt.Cp.J7.pin08 = ""
splConfig.Io62[0].Opt.Cp.J7.pin09 = ""
splConfig.Io62[0].Opt.Cp.J7.pin10 = ""
splConfig.Io62[0].Opt.Cp.J7.pin11 = ""
splConfig.Io62[0].Opt.Cp.J7.pin12 = ""
splConfig.Io62[0].Opt.Cp.J7.pin13 = ""
splConfig.Io62[0].Opt.Cp.J7.pin14 = ""
splConfig.Io62[0].Opt.Cp.J7.pin15 = ""
splConfig.Io62[0].Opt.Cp.J7.pin16 = ""
splConfig.Io62[0].Opt.Cp.J7.pin17 = ""
```

```
splConfig.Io62[0].Opt.Cp.J7.pin18 = ""
splConfig.Io62[0].Opt.Cp.J7.pin19 = ""
splConfig.Io62[0].Opt.Cp.J7.pin20 = ""

# Eight IO62 line pairs on J3
#
splConfig.Io62[0].Opt.Cp.J3_01_14.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_01_14.iTerm = 1
# WG Switch pos 2 status (active low)
splConfig.Io62[0].Opt.Cp.J3_01_14.pinPos = "~sAux[15]"
# Coax Switch Noise Source Indicate
splConfig.Io62[0].Opt.Cp.J3_01_14.pinNeg = "sAux[7]"

splConfig.Io62[0].Opt.Cp.J3_02_15.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_02_15.iTerm = 1
# WG Switch pos 1 status (active low)
splConfig.Io62[0].Opt.Cp.J3_02_15.pinPos = "~sAux[14]"
# Coax Switch Antenna Indicate
splConfig.Io62[0].Opt.Cp.J3_02_15.pinNeg = "sAux[8]"

splConfig.Io62[0].Opt.Cp.J3_03_16.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_03_16.iTerm = 1
# Transmitter Local / Remote Status
splConfig.Io62[0].Opt.Cp.J3_03_16.pinPos = "sTransmitLocal"
splConfig.Io62[0].Opt.Cp.J3_03_16.pinNeg = ""

splConfig.Io62[0].Opt.Cp.J3_04_17.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_04_17.iTerm = 1
splConfig.Io62[0].Opt.Cp.J3_04_17.pinPos = ""
splConfig.Io62[0].Opt.Cp.J3_04_17.pinNeg = ""

splConfig.Io62[0].Opt.Cp.J3_05_18.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_05_18.iTerm = 0
# Transmitter Peak OC Status
splConfig.Io62[0].Opt.Cp.J3_05_18.pinPos = "sAux[9]"
splConfig.Io62[0].Opt.Cp.J3_05_18.pinNeg = ""

splConfig.Io62[0].Opt.Cp.J3_06_19.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_06_19.iTerm = 0
# Transmitter Avg OC Status
splConfig.Io62[0].Opt.Cp.J3_06_19.pinPos = "sAux[10]"
splConfig.Io62[0].Opt.Cp.J3_06_19.pinNeg = ""

splConfig.Io62[0].Opt.Cp.J3_07_20.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_07_20.iTerm = 0
# Transmitter Ready Status
splConfig.Io62[0].Opt.Cp.J3_07_20.pinPos = "~sStandby"
splConfig.Io62[0].Opt.Cp.J3_07_20.pinNeg = ""

splConfig.Io62[0].Opt.Cp.J3_08_21.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J3_08_21.iTerm = 0
# Transmitter Radiate Status
splConfig.Io62[0].Opt.Cp.J3_08_21.pinPos = "~sRadiate"
splConfig.Io62[0].Opt.Cp.J3_08_21.pinNeg = ""

# Two RS-422 Tx/Rx chips on J3
#
splConfig.Io62[0].Opt.Cp.J3_09_22 = ""
splConfig.Io62[0].Opt.Cp.J3_10_23 = ""
```

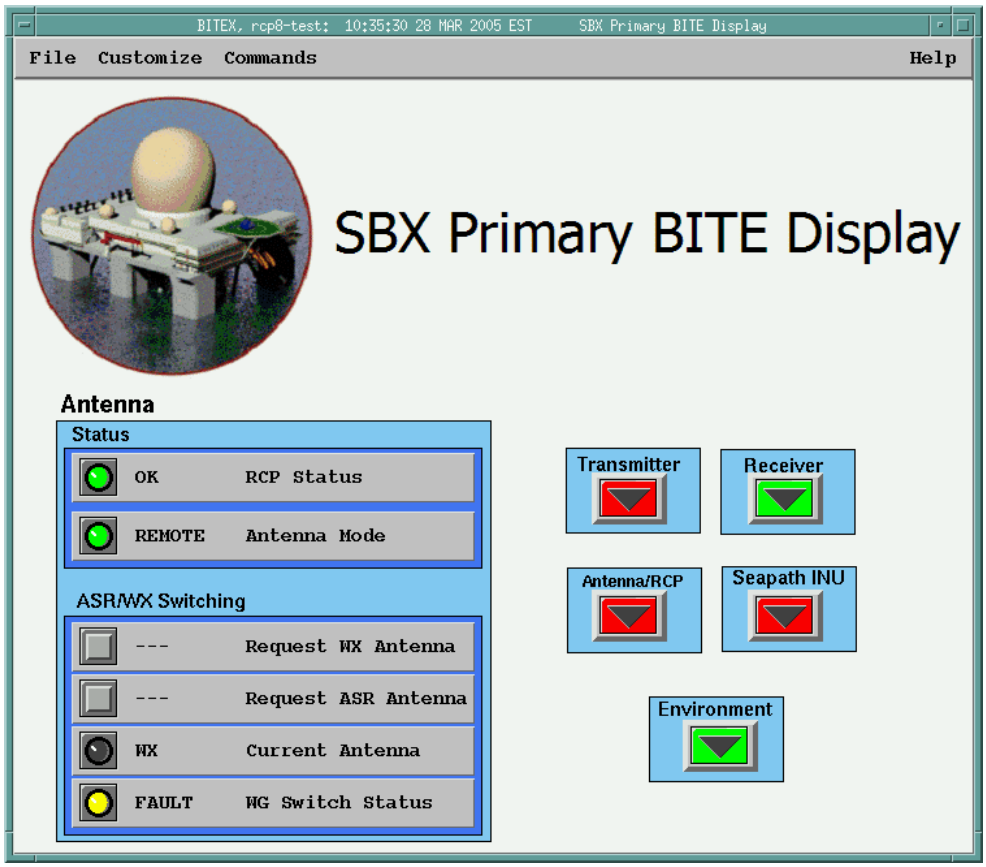
```
# Seven IO62 line pairs on J9
#
splConfig.Io62[0].Opt.Cp.J9_01_14.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_01_14.iTerm = 1
# EL Drive Over Temp
splConfig.Io62[0].Opt.Cp.J9_01_14.pinPos = ″sAux[1]″
# AZ Stow Pin
splConfig.Io62[0].Opt.Cp.J9_01_14.pinNeg = ″~sAux[5]″

splConfig.Io62[0].Opt.Cp.J9_02_15.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_02_15.iTerm = 1
# AZ Drive Over Temp
splConfig.Io62[0].Opt.Cp.J9_02_15.pinPos = ″sAux[4]″
# Dehydrator
splConfig.Io62[0].Opt.Cp.J9_02_15.pinNeg = ″sAux[18]″

splConfig.Io62[0].Opt.Cp.J9_03_16.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_03_16.iTerm = 1
# Pedestal Upper Limit
splConfig.Io62[0].Opt.Cp.J9_03_16.pinPos = ″~sUpperEL″
splConfig.Io62[0].Opt.Cp.J9_03_16.pinNeg = ″″

splConfig.Io62[0].Opt.Cp.J9_04_17.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_04_17.iTerm = 1
# Pedestal Lower Limit
splConfig.Io62[0].Opt.Cp.J9_04_17.pinPos = ″~sLowerEL″
splConfig.Io62[0].Opt.Cp.J9_04_17.pinNeg = ″″

splConfig.Io62[0].Opt.Cp.J9_05_18.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_05_18.iTerm = 0
splConfig.Io62[0].Opt.Cp.J9_05_18.pinPos = ″″
splConfig.Io62[0].Opt.Cp.J9_05_18.pinNeg = ″″

splConfig.Io62[0].Opt.Cp.J9_06_19.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_06_19.iTerm = 0
splConfig.Io62[0].Opt.Cp.J9_06_19.pinPos = ″″
splConfig.Io62[0].Opt.Cp.J9_06_19.pinNeg = ″″

splConfig.Io62[0].Opt.Cp.J9_07_20.lRS422 = 0
splConfig.Io62[0].Opt.Cp.J9_07_20.iTerm = 0
splConfig.Io62[0].Opt.Cp.J9_07_20.pinPos = ″″
splConfig.Io62[0].Opt.Cp.J9_07_20.pinNeg = ″″

# Hookup model for shared status/counter inputs.  Options are:
#   MIT/LL-TDWR-V1 : MIT/LL Custom TDWR patchpanel, Ver.1
#
splConfig.Io62[0].Opt.Cp.SharedStsModel = ″″

# Pin assignments for generic serializer #0.  Options are:
#             TTY0 : Rx/Tx on TTY0 RS-232 line pair
#      Rx:12/Tx:16 : Rx/Tx on lines 12/16 (J9 Pins 1/5)
#
splConfig.Io62[0].Opt.Cp.ioSerial0_TxRx = ″″

# Relays and relay drivers on J6
#
# Elevation Servo Enable
splConfig.Io62[0].Opt.Cp.J6_IntRelay1 = ″cAux[1]″
# Azimuth Servo Enable
```

```
splConfig.Io62[0].Opt.Cp.J6_IntRelay2 = ”cAux[2]”
# Transmitter Radiate
splConfig.Io62[0].Opt.Cp.J6_IntRelay3 = ”cRadiateOn”

# WG Switch Pos 2 CMD
splConfig.Io62[0].Opt.Cp.J6_ExtRelay1 = ”cAux[68]”
# WG Switch Pos 1 CMD
splConfig.Io62[0].Opt.Cp.J6_ExtRelay2 = ”cAux[67]”
# Transmitter Reset
splConfig.Io62[0].Opt.Cp.J6_ExtRelay3 = ”cAux[66]”
# Transmitter Power
splConfig.Io62[0].Opt.Cp.J6_ExtRelay4 = ”cTransmitPwr”

# BNC testpoint monitors
#
splConfig.Io62[0].Opt.Cp.J13_BNC = ””
splConfig.Io62[0].Opt.Cp.J16_BNC = ””

# BNC 75–Ohm trigger drivers direct from IO62 PCI card.
# Special trigger assignments may also be used here:
#    Driver–0:  ’trigger[1]’  or  ’trigger[5]
#    Driver–1:  ’trigger[2]’  or  ’trigger[6]
#    Driver–2:  ’trigger[3]’  or  ’polar[1]
#    Driver–3:  ’trigger[4]’  or  ’polar[2]
#
splConfig.Io62[0].Opt.Cp.J14_BNC = ””
splConfig.Io62[0].Opt.Cp.J15_BNC = ””
splConfig.Io62[0].Opt.Cp.J17_BNC = ””
splConfig.Io62[0].Opt.Cp.J18_BNC = ””

# RS232 TTY Transmitters/Receivers from IO62
#
splConfig.Io62[0].Opt.Cp.TTY0_Tx = ””
splConfig.Io62[0].Opt.Cp.TTY1_Tx = ””
splConfig.Io62[0].Opt.Cp.TTY0_Rx = ””
splConfig.Io62[0].Opt.Cp.TTY1_Rx = ””

# Relays from IO62 (requires jumper settings on the IO62
# which may conflict with using the above TTY/Trig lines).
#    Relay1  –  NO:J17      Arm:J18      NC:J15
#    Relay2  –  NO:J11,3    Arm:J11,4    NC:J11,2
#
splConfig.Io62[0].Opt.Cp.Relay1 = ””
# Select Either PW1 or PW3
splConfig.Io62[0].Opt.Cp.Relay2 = ”cPWidth[0]”

# ------------------- IO62 Slot #1 -------------------
#
splConfig.Io62[1].lInUse = 0

# ------------------- IO62 Slot #2 -------------------
#
splConfig.Io62[2].lInUse = 0

# ------------------- IO62 Slot #3 -------------------
#
splConfig.Io62[3].lInUse = 0
```

5. RCP8 BITE Features

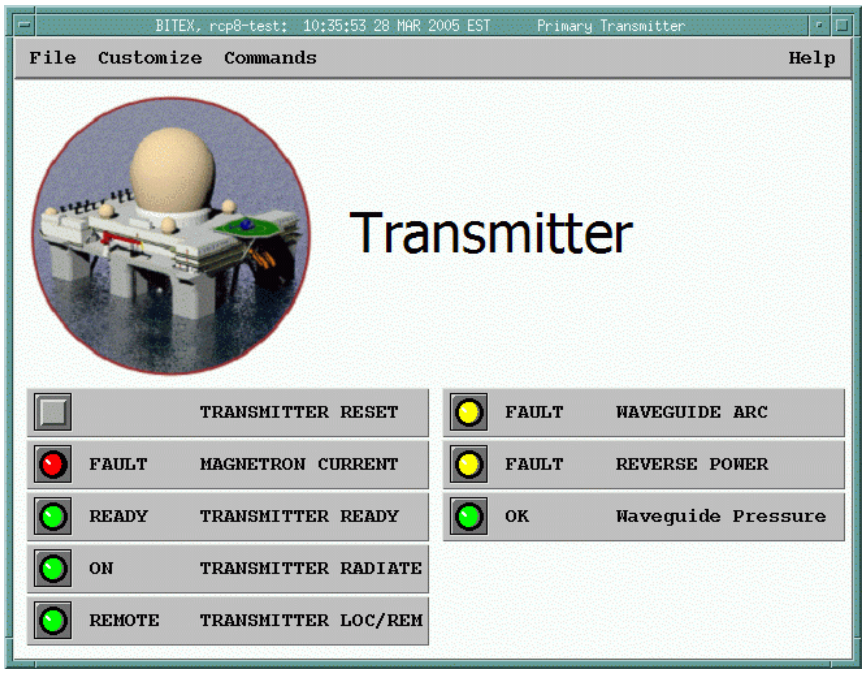
The bitex utility displays are described here along with a list of the BITE addresses of the various parameters configured in bitex.

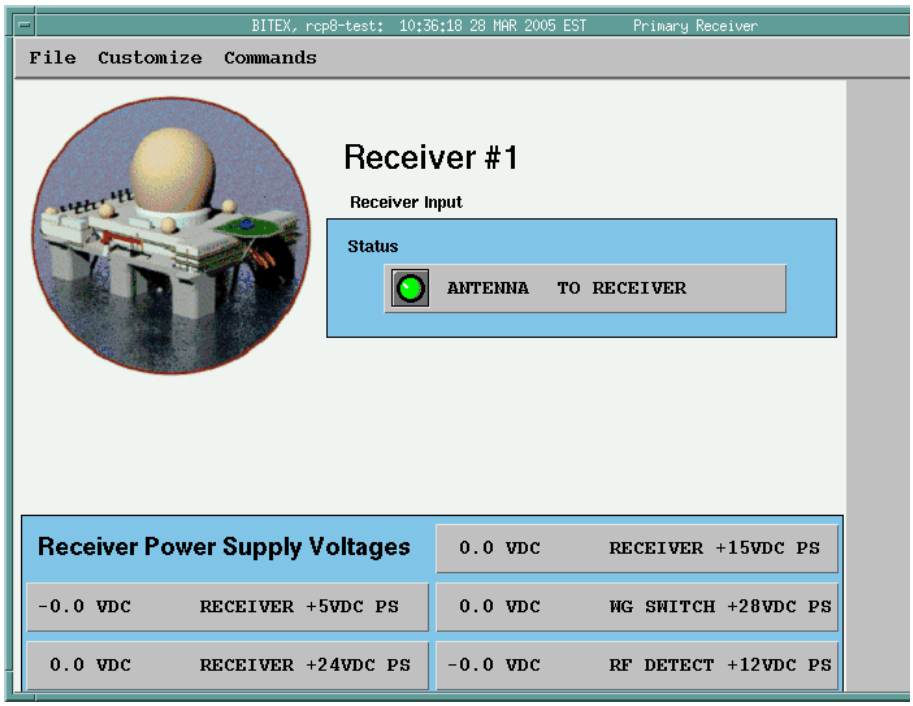
5.1 BITE displays (identical for rcp−a and rcp−b)

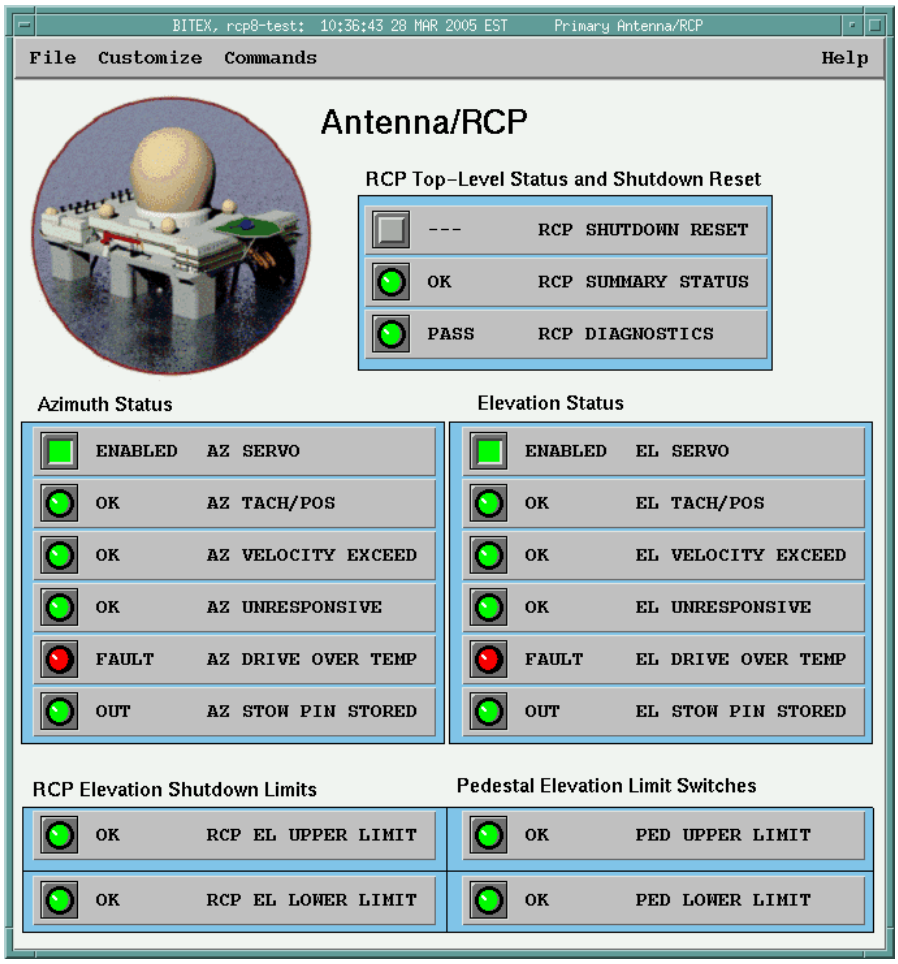


The top–level bitex display shows the status of key elements such as the RCP, whether the IRIS has control (Antenna Mode Remote) and the current antenna that is selected. For maintenance purposes, there is a manual antenna selection as well.

The buttons on the right show the overall status of and provide access to the maintenance sub panels for the various subsystems. These are shown below.

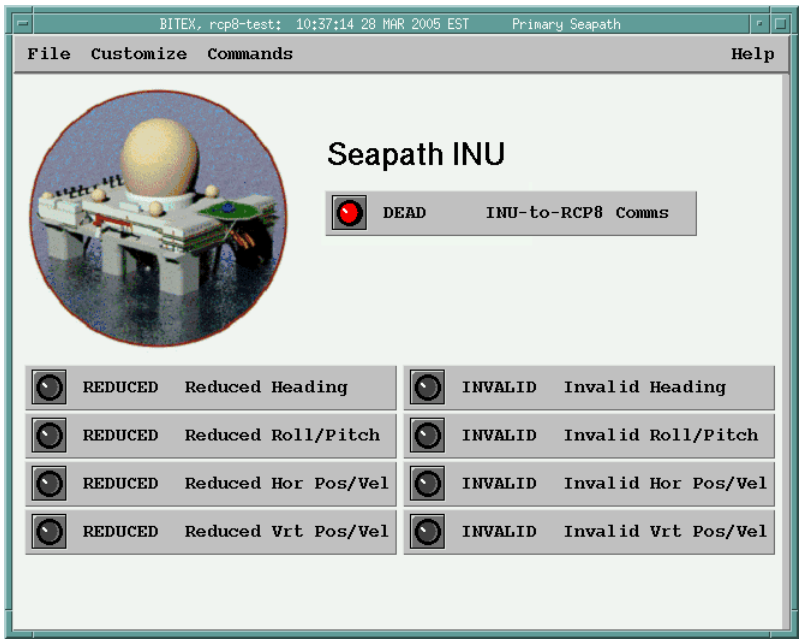

BITEX, rcp8-test: 10:35:53 28 MAR 2005 EST Primary Transmitter
File Customize Commands Help
Transmitter
TRANSMITTER RESET
FAULT WAVEGUIDE ARC
FAULT MAGNETRON CURRENT
FAULT REVERSE POWER
READY TRANSMITTER READY
OK Waveguide Pressure
ON TRANSMITTER RADIATE
REMOTE TRANSMITTER LOC/REM


BITEX, rcp8-test: 10:36:18 28 MAR 2005 EST Primary Receiver
File Customize Commands
Receiver #1
Receiver Input
Status
ANTENNA TO RECEIVER
Receiver Power Supply Voltages
0.0 VDC RECEIVER +15VDC PS
-0.0 VDC RECEIVER +5VDC PS
0.0 VDC WG SWITCH +28VDC PS
0.0 VDC RECEIVER +24VDC PS
-0.0 VDC RF DETECT +12VDC PS



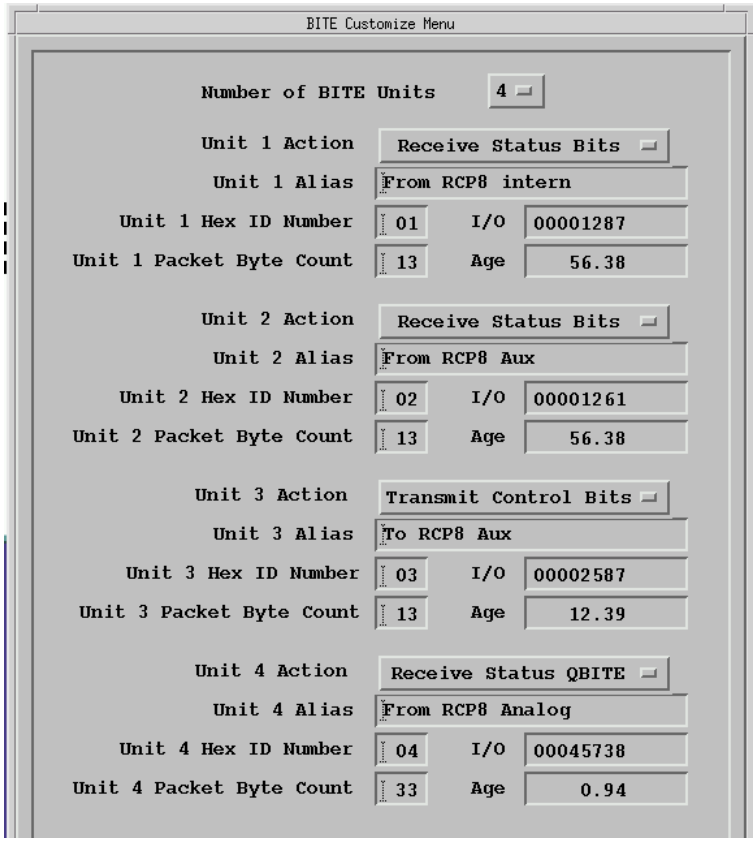
IMPORTANT: The Antenna/RCP subpanel contains a reset button for the RCP8 in the event that there is an antenna shutdown for out of limit operation. This performs the same function as the “Reset” button in the antenna utility.

To avoid antenna damage, always try to determine the reason for an antenna shutdown before performing a reset.


BITEX, rcp8-test: 10:37:14 28 MAR 2005 EST Primary Seapath
File Customize Commands Help
Seapath INU
DEAD INU-to-RCP8 Comms
REDUCED Reduced Heading
INVALID Invalid Heading
REDUCED Reduced Roll/Pitch
INVALID Invalid Roll/Pitch
REDUCED Reduced Hor Pos/Vel
INVALID Invalid Hor Pos/Vel
REDUCED Reduced Vrt Pos/Vel
INVALID Invalid Vrt Pos/Vel

5.2 BITE Packet Format (identical for rcp−a and rcp−b)

There are four “BITE Units”. Information from all three is collected by the RCP8. The units are:



Field Name	Unit	Byte	Bit
RCP Status	1	7	4
Antenna Mode	1	10	3
Request WX Antenna	3	4	3
Request ASR Antenna	3	4	4
Current Antenna	1	12	4
WG Switch Status	1	12	5
Transmitter Reset	3	3	6
Magnetron Current	1	9	0
Transmitter Ready	1	10	1
Transmitter Radiate	1	10	0

Transmitter Local/Remote	1	9	3
Waveguide Arc	2	5	2
Forward Power	2	5	3
Waveguide Pressure	2	5	4
RCP Shutdown Reset	3	3	0
RCP Summary Status	1	7	4
RCP Diagnostics	1	3	0
AZ Servo	3	3	2
AZ Tach/Pos	1	3	1
AZ Velocity Exceed	1	3	5
AZ Unresponsive	1	3	3
AZ Drive Over Temp	2	3	4
AZ Stow Pin Stored	2	3	5
RCP EL Upper Limit	1	4	3
RCP EL Lower Limit	1	4	2
EL Servo	3	3	1
EL Tach/Pos	1	3	2
EL Velocity Exceed	1	3	6
EL Unresponsive	1	3	4
EL Drive Over Temp	2	3	1
EL Stow Pin Stored	2	3	6
Ped Upper Limit	1	4	5
Ped Lower Limit	1	4	4
Noise/Antenna to Receiver	2	4	0
Receiver +5VDC PS	4	6	3
Receiver +24VDC PS	4	3	3
Receiver +15VDC PS	4	9	3
Receiver +28VDC PS	4	12	3
RF Detect +12VDC PS	4	15	3