

## RDA 8.09.6 Release Notes (2 Sep 2005)

These release notes cover changes made to the SIGMET Radar Data Acquisition platform. The last public release was RDA-8.09.5 dated 4 August 2005. If you are upgrading from an earlier version please also read the release notes that have been published since then.

### New Features

1. Dual-Polarization clutter filters are now available within the RVP8. A hybrid filtering approach is used in which the Dual-Pol algorithms still run within the Pulse-Pair major mode, but the clutter filters themselves are implemented using a DFT approach that is essentially equivalent to an FIR filtering of the raw timeseries data. In this way, the RVP8 Dual-Pol clutter filters are a significant improvement over the legacy IIR filters that were provided in the RVP7 signal processor.

When no clutter filter is selected (Filter #0) the Dual-Pol parameters are computed via DFT algorithms that are algebraically equivalent to the standard time-domain algorithms described in Appendix B. The implementation now utilizes DFTs of timeseries data rather than direct summation of correlation terms, but the results are numerically identical. Of course, having done this, it then becomes a simple matter to implement clutter notch filters via these intermediate transformed arrays.

The **Mf** setup menu should be used to configure the available clutter filters; only the **FIXED** and **VARIABLE** types can be selected (GMAP is not available for Dual-Pol). These spectral filters behave much like they do in FFT, RPH, etc., modes except that a zero value is substituted within the clutter notch (no interpolation across the clutter gap) and the largest **VARIABLE** span is applied to all Rx data within any given bin. Both of these modifications are needed because the clutter filter must produce identical side effects in all of the receiver channels that contribute to a given range.

We recommend starting with a set of **FIXED** width filters, each of which invokes the Hamming window explicitly. This allows you to keep the rectangular window as the default window when no filter is applied, so that the results in that case are identical to legacy behavior. To help with debugging, **ascope**'s "Spectra from DSP" during PPP mode now shows the clutter filtered data from the Co-Receive channel.

2. The TDWR support code in the IO62 FPGA now extends the *STC-Clock-Trigger* an additional 2047 36MHz clocks (56.86  $\mu$ sec). This makes it possible to redefine:

```
Trigger #5 - Start:    -1.00 usec
              #5 - Width: 66.67 usec      High: YES
```

to be:

```
Trigger #5 - Start:    -1.00 usec
              #5 - Width:  9.81 usec      High: YES
```

which then allows the RVP8 to synthesize trigger PRTs as low as 506  $\mu$ sec.

## RDA 8.09.5 Release Notes (4 Aug 2005)

These release notes cover changes made to the SIGMET Radar Data Acquisition platform. The last public release was RDA-8.09.4 dated 18 July 2005. If you are upgrading from an earlier version please also read the release notes that have been published since then.

### New Features

1. The RVP8 now takes a *-verbose* command line option that will add more information to whatever optional printouts have been selected. So far, only the *-showCPI* printout is augmented by prefixing both the real time and the data time to each CPI shown.
2. The RCP8 logic equations now contain two new builtin status variables: *sHostAlive* is true as long as the RCP8 is receiving valid XMT\_XXX packets from the host computer, and *sHostControl* is true when the host computer is actually in control of the antenna. For example, the former will go false if the serial packet stream is dead, and the latter will go false if motion commands have been typed within the *Monitor Angles* menu.
3. This release includes the first version of the RDA kernel module for 2.6 Linux kernels such as in RedHat RHEL4.

### Bug Repairs

1. The parity of the TDWR serial STC data stream was changed from NONE to EVEN.
2. An obscure PCI/DMA buffering error has been repaired in the RVP8's acquisition of live timeseries data from the RVP8/Rx card (all versions). Depending on the PRF and bin count, portions of (I,Q) data within an individual pulse could sometimes be corrupted, and might then show up as sporadic loss of clutter suppression within a radial. This is the oldest RVP8 bug in the entire history of the product, dating back to pre-release versions in May 2002.
3. A trigger synthesis bug was repaired that would cause BATCH triggers to have slightly incorrect periods across the PRT transitions. The effect would only occur when trigger PRT quantization was used along with one or more triggers having fractional start time.

## RDA 8.09.4 Release Notes (18 Jul 2005)

These release notes cover changes made to the SIGMET Radar Data Acquisition platform. The last public release was RDA-8.09.3 dated 6 July 2005. If you are upgrading from an earlier version please also read the release notes that have been published since then.

### New Features

1. The RVP8 TSAPI now contains an optional routine *rvp8tsEndCurrentAcqMode()* to announce the end of the current acquisition mode. This call can be issued by the timeseries writer when it knows that no more pulses will be written in the current manner. The advantage of doing this is that it gives readers (such as the RVP8 CPI finder) a clue for early exit from their processing routines.
2. The RVP8 front panel will now show “—Hz” whenever triggers are blanked.
3. The RVP8 CPI finder will now exit immediately whenever it is within it's 1-second timeout window and new opcode words are written to the RVP8. If a synchronous PROC command is running, then a timeout (zero pulse) ray will be output; but for a free running PROC command, no final ray will be output (since the number of output rays is indeterminate anyway).

### Bug Repairs

1. The *IRvp8RxTrigBlanked()* routine was not returning the correct time of stable trigger blanking. This could cause spurious *Missing Burst Pulse* errors to be generated by the RVP8. This bug has been present since RDA-8.06.12.
2. The RVP8 CPI finder would sometimes not return properly alternating Hi/Lo Dual-PRF blocks when PROC commands were issued with deliberate delays between. This was visible in certain configurations of **ascope**. Also, the first CPI following certain PROC commands would sometimes timeout.
3. The range mask being stored in the timeseries API's *rvp8PulseInfo* structure was not correct when the *2-way (Tx+Rx) total waveguide length* was nonzero (the mask would be offset by the waveguide length). This caused a number of peculiar side effects, the worst being that **ascope** would display no data and a PRF of “NoTr” whenever the waveguide length exceeded half the range mask resolution for a given pulsewidth.



**Note: A temporary work around for systems running 8.08.3 and earlier is to set the waveguide length to zero.**

## RDA 8.09.3 Release Notes (6 Jul 2005)

These release notes cover changes made to the SIGMET Radar Data Acquisition platform. The last public release was RDA-8.09.1 dated 19 June 2005. If you are upgrading from an earlier version please also read the release notes that have been published since then.

### New Features

1. The Rev.E-G RVP8/IFD can now produce a reference clock on its J4 SMA connector. A new setup question in the **Mc** section configures the desired frequency:

**IFD auxiliary (J4) output clock: 12.00000 MHz**

The frequency that is chosen must be a submultiple (2–128) of the frequency of the IFD's internal crystal oscillator. Even divisors will result in a symmetric square wave, whereas odd divisors yield an asymmetric waveform and the word “odd” will appear to remind you that the DC balance is not zero. The output power is approximately +15dBm.

A recommended use for this output is to drive the Clock-In port of an RVP8/Tx card in systems that use a fixed frequency IFD. The IFD's J4 output clock is very low jitter, and gives a superior locking reference for other components in the radar system.

2. The **rdadiags** utility can now be used to perform exhaustive I/O tests on every connector pin of the ORDA custom backpanel. These tests require an RDA system having four I/O-62 PCI cards as well as two external custom adapter panels.
3. The TDWRV1 softplane option now includes a feature in which five input status lines can be sampled synchronously on either the rising or falling edges of three of the user triggers.

J3 Pin(s)	Sampled-On	TDWR Signal
1/14	Trig-8 Rising	TRLFLT
2/15	Trig-7 Falling	STABFLT1
3/16	Trig-6 Falling	STABFLT2
7(TTL)	Trig-7 Rising	RFFM
8/21	Trig-6 Rising	STCFLT

Call `ilo62Tdwrv1GetLatchedStatus(Io_c)` within the RVP8 to retrieve the most recently sampled values of these input lines.

### Bug Repairs

1. A timing skew was repaired in the Rev.E-G RVP8/IFD that caused IF sampling errors under certain power/temperature/signal conditions. The bug appears to be the result of changes in PLL synthesis by Altera's Quartus compiler within their 4.1–4.2–5.0 revs.
2. The RVP8 will now attempt to use all of the timeseries pulses that have been queued so far when assembling the first CPI following a PROC command. Previously, it would not look back as far as possible and this could cause a missing first ray during TS playback.

3. A race condition has been repaired in the RVP8's **rtctrl** (Real-Time Control) thread, in which a requested trigger bank change would sometimes not occur in response to a fired timer. This bug did not affect any out-of-the-box RVP8 features, but was noticed within a developer's code.
4. The **ascope** utility was not reading the current time correctly from the RVP8 when it was running in its timeseries and spectra modes. The time from the last Doppler parameter ray would be used instead.

## RDA 8.09.2 Release Notes (23 Jun 2005)

No significant changes since 8.09.1.

## RDA 8.09.1 Release Notes (19 Jun 2005)

These release notes cover changes made to the SIGMET Radar Data Acquisition platform. The last public release was RDA-8.09 dated 11 June 2005. If you are upgrading from an earlier version please also read the release notes that have been published since then.

### New Features

1. The *-perpetual* command line argument has been removed from both the RVP8 and RCP8 products. Please use the **rdadiags** utility for burn-in diagnostic testing.
2. The semantics of the CLTSIG\_DEFAULT driver flag have been improved; the flag now causes the RVP8's *Residual Clutter LOG Noise Margin* parameters to be reloaded from their saved file values rather than from the values shown in the **Mf** menu. This means that the **Mf** menu is guaranteed to always show the current working values, in keeping with how all other RVP8 setup parameters are handled.
3. Two new timeseries "mismatch" bits have been added to the RVP8. Errors in placement of range mask bins are indicated by MMTS\_BINPLACE, while MMTS\_RMASKRES shows when the range mask resolutions differ by more than 2.5cm.

### Bug Repairs

1. The 16-bit velocity and width parameters that are output by the RVP8 during Dual-PRF modes have been incorrect for several years. The velocities were being scaled down by the unfolding factor, and the widths were being scaled up.
2. The default reflectivities in BATCH mode now come directly from the raw LoPRF power sums in each bin. Previously, the range averaged LoPRF sums were being used (to reduce the variance), but this had the side effect of defeating the point clutter algorithm later in the process. Many thanks to the ORDA software team for identifying what was happening here.
3. When timeseries playback was stopped the RVP8 would sometimes keep returning rays from the last few seconds of TS data. The correct response now is that rays will never be output from retrograde timeseries data.

## RDA 8.09 Release Notes (11 Jun 2005)

These release notes cover changes made to the SIGMET Radar Data Acquisition platform. The last public release was RDA-8.08.14 dated 27 May 2005. If you are upgrading from an earlier version please also read the release notes that have been published since then.

### New Features

1. An additional element *fdBAddNseThr* has been added to *struct rvp8BatchSetup* to allow a slightly higher noise threshold to be set for the BATCH surveillance powers versus the Doppler powers. The default value is zero, meaning that the same noise threshold will be used for both sets of pulses just as it always has been.

This new parameter is experimental. Please be sure to initialize it prior to calling the DSP driver routine *dspw\_batchSetup()*. A conservative suggestion for reducing the density of speckles in BATCH mode is to set this parameter to 0.5dB, and also turn on the standard “1D” RVP8 speckle remover.

### Bug Repairs

1. A bug was repaired in RVP8 BATCH mode wherein Doppler data might (very rarely) be unfolded into more than one range bin.
2. Timeseries data that were recorded using PRF-Sectors could not be played back properly on the RVP8.
3. The RVP8 algorithm for finding the next Coherent Processing Interval would sometimes fail to properly resume after a network timeout that interrupted the reporting of angles to the RVP8.