

RDA 8.12.9 Release Notes (15 July 2011)

These notes cover changes made in RDA since release 8.12.8 of 10 February 2011. If you are upgrading from an earlier release, please read those notes also. Revised to svn [26895]

Installation/Upgrade Changes

1. Please read all the Installation/Upgrade changes in the *IRIS 8.12.9 Release Notes*.
2. We have changed the name of the service file used to start the RVP900 from “rvp901” to “rvp900”. So now you will start this with:

```
# service rvp900 start
```

After upgrading, be sure to delete the old file with the commands:

```
# chkconfig --del rvp901  
# rm /etc/init.d/rvp901
```

3. The **sigconfig** script is improved to no longer need the “-rcw” command line flag. If you wish to install a “Radar Control Workstation”, please just ask for those packages required. See below for an example of installing IRIS, RVP900, and the RCP8. IRIS-237

```
# sigconfig -iris -rvp900 -rcp8 -6 -instldir <mount-point>
```

New Features

1. All of our kernel modules now use dkms (Dynamic Kernel Module Support). You no longer need to recompile when changing your kernel version. IRIS-237
2. The **RCP8** now has a new question for configuring a control bit to control the power monitor reset. This is in the “site custom” section, just after the “Control bit for sensor zeroing”:

```
Control bit for reset: 0
```

3. The RVP900 can now receive an external serial stream that allows each individual pulse to be tagged with arbitrary user data up to 32 bits. Three new electrical inputs are defined in the softplane.conf file: **utgExtClk** (clock), **utgExtDat** (data) and **utgExtEna** (enable). These form a synchronous 3-wire interface in which sixteen sequential data bits (sent MSB first) are bracketed by the enable line to define each pulse header word. Both the data and enable lines are sampled on the rising of the clock. Packets can arrive at any time within the overall radar trigger pattern, but the bits included in each pulse will be the most recent packet that was completely received prior to the earliest trigger or pretrigger activity.

Note that the serial interface is actually defined for *any* word width between 1 and 32 bits, as defined by the width of the enable line. There are 32 bits allocated within the (I,Q) time-series headers to bring down as many bits as you happen to send. Unused upper bits are padded as zeros, and it is permissible for the number of bits to vary from one packet to the next.

The **rvpts_example** utility has been modified to display the new pulse tags whenever the “allheaders” flag is supplied. This can give you a quick diagnostic look into the incoming serial headers. The low sixteen bits of packet data are shown in the “uTag” column for every pulse.

A serial test simulator is also available and can be requested via output signals in softplane.conf: **utgSimClk**, **utgSimDat**, **utgSimEna**. The simulated packets consist simply of 16-bit values incrementing by one on each pulse. Packets are sent at 1/16 the ADC sample clock rate, and appear shortly after the start of each pulse. For testing, you can route these three output signals back to their corresponding inputs to verify that the incrementing headers are seen in the timeseries data. It also may be useful to view the simulated outputs on an oscilloscope for comparison with the real packet data that you are sending.

Bug Repairs

1. The RVP900 external digital electrical inputs **tgExtern** and **tgBlankReq** were not working.
2. The RVP900 Trig-A and Trig-B SMA signals would sometimes not follow the line direction set by the softplane.conf file. This might also result in a pin configured for input becoming an output when the rvp9/main Linux threads were exited.
3. Two questions have been removed in the **Mt** menu that specified the polarity of the polarization output lines. These choices are now made using the “~” modifier for the txPolar[1] and txPolar[2] output lines in the softplane.conf file.
4. The selection of transition times for the polarization output lines and phase control output lines are now working properly. Both are specified in the **Mt<n>** menu, and previously the lines would simply switch at a fixed point near the beginning of each trigger pulse sequence, i.e., the setup questions were being ignored.
5. Under certain circumstances a softplane defined output line would sometimes affect an input line. For instance, routing the txPhase[7] line to any output pin would sometimes cause spurious trigger blanking to occur, as if the tgBlankReq line were being asserted. These randomly blanked triggers would then cause subsequent processing to fail if the major mode was expecting uniform pulse data.
6. The **RCP8** canbus code was modified to change the encoder status polling interval from 1 sec to 10 sec. And the warning time was changed from 10 sec to 60 sec. Also changed encoder status polling message data length code to 1. ECR-392
7. The **RCP8** custom interface for the **Orbit controller** now includes support for adding the antenna angle offsets to the measured angles in the RCP8. IRIS-258
8. In the **RVP900** and **RVP8**, we reduced the minimum range bin spacing from 15m to 5m.

RDA 8.12.8 Release Notes (10 February 2011)

These notes cover changes made in RDA since release 8.12.7 of 19 October 2010. If you are upgrading from an earlier release, please read those notes also. Revised to svn [25730]

Installation/Upgrade Changes

1. There are now new Vaisala supplied OS Install Disks available for RHEL5.4 and 5.5. These are dated 19 January 2011. If you are installing using our disk, be sure to get a new one. IRIS-69, IRIS-71

Bug Repairs

1. Fixed a bug in the **RVP8** and **RVP900**. The main observed symptoms were that the GMAP filters would not work on IRIS tasks after **ascope** was run. It turns out that the problem was that the RVP was not correctly setting the major mode after reset. You could see the major mode on the front panel of the **RVP8** and see that it did not match the task. Whenever the major mode was changed after that, it was set. As a temporary work around you can configure “Reset the DSP on INGEST startup” to “No” in **setup**. This bug has always been in the **RVP8** processor, and is also fixed in patch release 8.12.7.1. #1695
2. Fixed a bug in the **RVP900** wide dynamic range mode. Utilities such as **zauto** and **ascope** were limited to show a noise level no lower than -99.5 dBm. However values in this mode can go a lot lower. The scaling factor was changed to support values down to -135 dBm. This bug is also fixed in patch 8.12.7.1. Also done, but not in 8.12.7.1 is lowering the **dspix** non-volatile setup to allow a power up noise level below -110 dBm. #1689
3. The new data type dBTa (usually total vertical power) was thresholded incorrectly in the **RVP8** and **RVP900**. It had both the thresholds for dBTa and dBZa applied. Only broken in 8.12.7. If you are running 8.12.7, we can supply a patch for this if needed. #1726
4. Another bug found in dBTa: the 1D speckle filter was not being applied. IRIS-93
5. Updated the **RCP8**'s eec_ddc_main.c code from Steve Farnworth.
6. We now fill unknown/not-computed areas of KDP with 0.0 instead of NAN. This fixes radial streaks in KDP. #956
7. The **tsarchive** program was leaving a shared semaphore array allocated when it is closed. You could see this by running **ipcs** after running **tsquit**. #1683
8. With higher A/D sampling rates of 50 — 100 MHz available in **RVP8** and **RVP900**, sampling of lower frequency carrier waves, such as 30 MHz results in Nyquist intervals between samples. Subsequently every other sample has the reverse sign. For customers used to the **RVP7** sample rates of about 36 MHz, it was confusing not to see the frequency-folded low frequency sine wave.

A new non-volatile setup question in the “M+” debugging menu asks whether IF samples should be plotted with Nyquist flipping (multiplication by +1,−1,+1,−1...). If answered YES, then the “Pr” and “Pb” plots will modify their rendering of IF samples. As a reminder within those menus, the text “(NyFlip?)” will appear in the plot text heading whenever sample flipping is being applied. Note that other plots within these menus, such as spectra and LOG magnitude, are not affected by the Nyquist flipping, nor are any live parameters derived from the IF samples. Only the visual appearance of the IF samples themselves is affected. #1694

9. When we added support for the **RCP8** to read the Az, El, and blanking input from the **RVP900** IFDR in release 8.12.7, we by mistake broke it on the **RVP8**. This is now fixed.
10. The **sigconfig** script used for quick installation, as well as the *IRIS/RDA Software Installation Manual* were enhanced to set the kernel variables `rmem_default=1000000` and `rmem_max=4000000`. This is done by editing the `/etc/sysctl.conf` file. This is needed for the time series to work correctly since a lot of bytes per second are sent over the network. #1717
11. The **tsview** program by default prints out time series samples in dBm and phase. It has an “-i/q” option to print out I and Q in volts instead. These voltages were scaled wrong, the values printed were too low. For data from an **RVP900**, it displayed 0.56 times the correct value. For data from an **RVP8** it displayed 0.45 times the correct value. This is repaired. You can check for consistency using the following equation. #1719
$$dBm = 10 \log_{10} \left[1000 \frac{mW}{W} \times \frac{(I^2 + Q^2)}{50\Omega} \right].$$
12. The install scripts for an **RVP900** will now set the second network card `eth1` to an IP address of 10.0.1.213 and an MTU of 8192. This allows it to talk to the IFDR. IRIS-90
13. The **RVP8** was failing the `rdiags` Rx round trip jitter and CAT5 error tests in release 8.12.7. It would pass the first time, but subsequent tests would almost always fail. #1728

RDA 8.12.7 Release Notes (19 Oct 2010)

These notes cover changes made in IRIS since release 8.12.6 of 2 July 2010. If you are upgrading from an earlier release, please read those notes also. Revised to svn [25151]

Important Upgrade Changes

1. **RVP900 systems only:** Because the signals on the IFDR J3 “MISC I/O-B”, J6 “MISC I/O-A”, J8 “TRIG-B” and J15 “TRIG-A” are now controlled by the softplane.conf file, you must configure this after upgrade to restore these functions after an upgrade. Do this as follows:
 - Run the “softplane –resave” command.
 - Edit the softplane.conf file, go to the line near the end of the file which says:

```
splConfig.Rvp9[0].lInUse = 0
```

and change it to be “= 1”.
 - Run the “softplane –resave” command again.
 - Edit the softplane.conf file again. If you are a normal IFDR user, without the TDWR breakout panel, go to the lines near the end of the file which say:

```
splConfig.Rvp9[0].Opt.Comm.trig[0].pin = ""  
splConfig.Rvp9[0].Opt.Comm.trig[1].pin = ""
```

and change these to read “= trigger[1]” and “= trigger[2]”, or whatever else you want these connectors to mean. Note that “trig[0].pin” is the connector labelled “TRIG-A”, and “trig[1].pin” is the connector labelled “TRIG-B”.
 - If, however, you are using the TDWR breakout panel, you need to find the line which says:

```
splConfig.Rvp9[0].sNetPanel = "Common"
```

and change these to read “= TDWR”. Then run “softplane –resave” a third time.
2. Because we have changed the rdasys kernel module, you will need to reboot the system after upgrading so the new kernel module will be installed.

New Features

1. The **RVP900** can now control the PW control lines via the softplane.conf file. The TRIG-A and TRIG-B signals are also now controlled by the softplane.conf file, and not by separate non-volatile setup questions. #1056
2. The **RCP8** now properly supports TTL/RS422/Trig I/O with the **RVP900/IFDR**. It can now also use measured ADC voltages from the **RVP900/IFDR**.
3. The **RVP8** can now emulate the **RVP7** signals on the uplink cable by limiting the frequency of the OPT command. #1424

4. The **RVP900** now optionally blanks triggers during PW changes. #1056
5. Changed the **ascope** Noise Popup to default to “From Time Series”. This will allow the long term burst correction to work. #652
6. The IRIS and RDA licenses previously were always locked to the host computer. Now we have the option of locking them to the **RVP900**/IFDR instead. This allows host computer replacement without a license change. You can tell which you have by looking at the license document. It will say “Locked to=host” or “Locked to=rvp”. When running **show_machine_code**, you can specify which you want with the command line option `—lock_to=`. #1034

Bug Repairs

1. Repaired a bug in the **RVP900**. It was producing an intermittent misaligned burst error. #955
2. Fixing a bug causing the **RCP8** to lock up on the system when you are attempting to shutdown the computer. This only happened on systems with more than one PCI card. It is caused by the OS feature that interrupts are often shared between cards in the backplane. This was a bug in the `rdasys` kernel module, and it can cause problems with 3rd party boards also. Any system with more than one PCI card should upgrade to the new kernel module. #1661
3. The **RVP900** systems were getting “Error from call to `DspResetFifo?`” after running for a few days. This will be followed by the message “Device Timeout `<DspResetFifo?>`” once every minute for an interval from a few minutes to a few hours. It will then recover by itself. We think we have fixed this, there were some race conditions in the kernel module FIFOs. #1611
4. Fixed a bug in the KDP calculations in the RVP processors. It often produced the wrong results when range averaging was turned on. #956
5. The dual polarization data had the log threshold forced on inside the RVPs, even if the user did not ask for it. This behavior was different if `HydroClass` was turned on. #1630
6. The **RVP900** had a bug which cause it to fail if you asked for a large sample size. The symptoms varied, but it would either hang or crash when you asked for sizes above 256. This is fixed to work up to 1024 as intended. #1638

RDA 8.12.6 Release Notes (2 July 2010)

These notes cover changes made in RDA since release 8.12.5 of 26 February 2010. If you are upgrading from an earlier release, please read those notes also. Revised to svn [24656]

Installation/Upgrade Changes

1. Starting with this 8.12.4 release, the Canbus software is changed to run slower. Due to this the Vaisala weather radar encoders (223177WR and 223178WR) must be configured to lower their cycle period, from 1 ms to 5 ms to avoid overflow of the canbus messages at the RCP8 end. If you are upgrading from a version before 8.12.4 you must make this change.

Software and instructions are found on the 8.12.6 release cdrom:

```
# mount /dev/cdrom /mnt/cdrom
# cd /mnt/cdrom/RHEL5/extras/Canbus
```

Or on our ftp site:

```
ftp://ftp.sigmet.vaisala.com/outgoing/patches/8.12.4/RHEL5/Canbus
```

2. After upgrading, please remove you old dpolatten.conf file and install the new dualpol.conf file from the config_template directory. If you made customizations, you will need to manually make them again. #956

New Features

1. The **RVP8** and **RVP900** now support additional threshold criteria beyond the legacy WSP/SQI/CSR/LOG tests that have always been available. The new features are opcode compatible with the old signal processor, meaning that any code that used to work with an **RVP8** or **RVP900** will continue to work as-is (no need to recompile old 3rd party applications). There were no changes to SOPRM, GPARM, or any other opcodes related to data thresholding. To accomplish this, the changes to the signal processor itself are only in the XOP_THRESH command. In particular, a (16-bit) word now conveys the choice of which four threshold criteria will participate in the Boolean function defined by the 16-bit threshold control flags. By allowing any four terms to be combined in an arbitrary logical equation the processor can choose from a larger set of tests. In particular, a PMI comparison threshold was also added to XOP_THRESH as the newest of the available threshold tests. The **RVP8/RVP900** “Vp” (View Parameters) command has been expanded to show the exact threshold equations being used for all possible parameters. Here is an interesting (though not a useful configuration) example printout:

```
RVP9> vp
Threshold Settings for All Data Parameters
```

	LOG	CSR	WSP	SQI	PMI	TCF (Equation)
DBZ:	0.81dB	-18.1dB	5.0dB	0.398	0.504	0x8888 (LOG & CSR)
						Post Classification : 0xF8F8 (PMI or (LOG & CSR))

```

DBT:  0.81dB  -18.1dB   5.0dB   0.398   0.504   0xAAAA ( LOG )
      Post Classification : 0x8888 ( LOG & PMI )
VEL:  0.81dB  -18.1dB   5.0dB   0.398   0.504   0x8888 ( LOG & CSR )
WID:  0.81dB  -18.1dB   5.0dB   0.398   0.504   0x8080 ( LOG & CSR & SQI )
ZDR:  0.81dB  -18.1dB   5.0dB   0.398   0.504   0xFFAA ( LOG or SIG )
      Post Classification : 0xFEFE ( LOG or SIG or PMI )
KDP:  0.81dB  -18.1dB   5.0dB   0.398   0.500   0xAAAA ( LOG )
PHIDP: 0.81dB  -18.1dB   5.0dB   0.398   0.500   0xAAAA ( LOG )

```

The DSP library functions that deal with TCF flags are now called with the 16-bit mask word telling which tests are being used. This is needed to convert a TCF equation to a string, for example, because the names of the terms will vary. Also, when a string is parsed, both the TCF flags and a usage mask are returned. There were no changes to `dspw_thresh()`, but `dspw_thresh_types()` now takes a `dspThreshOneParam` structure (rather than many separate args) that conveys the extended threshold options that will be applied to an arbitrary set of output data parameters. This is the new interface to the **RVP8/RVP900** extended thresholding features.

The only Vaisala application that presently supports separate thresholds for each output parameter in **ascope**, and the new threshold extensions have been incorporated into it. In **ascope**'s Threshold Menu, arbitrary Boolean expressions of any four terms may be typed in the "Individual Level" slots, but the OTHER slot, which is the default that applies to all parameters not shown in the menu, is still confined to the legacy WSP/SQI/CSR/LOG set, as are the "Unified Levels". If you type an equation into those slots that uses an extended term, that term will be removed from the equation. **Ascope**'s saved file format is still compatible with old config files. New **ascope** running with an old file will fill in defaults for the new saved threshold terms, and an old **ascope** running with a new file will ignore the new fields. #1010

2. The KDP calculations in the RDA were changed to implement the CSU (Colorado State University) algorithm. #956

This included moving more controls under **dspix** command, in the mp section:

```

KDP computation - 0:LSQ, 1:Weighted LSQ, 2:Cubic Splines : 2
KDP - Standard Smoothing Factor: 0.10
KDP - Adaptive Smoothing Factor: 1.10

```

3. Added support in the **RVP900** and **RVP8** for data types TA and ZA (A stands for "alternative polarization") to "scientific polarimetric moments" (struct `ctSciPrmPolar`), and added DBZA, DBTA, and SNR to opcodes in `dsp.h`. Support for these new data types is in **ascope** and in IRIS ingest in the Task Configuration Menu. #911
4. The **RVP8** and **RVP900** now support separate Tx/Rx intermediate frequencies, so that the RF up-conversion chain for transmission could be different from the down-conversion chain for reception. So now in the `mt<n>` nonvolatile setup section there are two configuration questions, such as:

```

Tx Intermediate Frequency: 30.0000 MHz
Rx Intermediate Frequency: 30.0000 MHz

```

5. The **RVP900** now supports longer FIR filters. 80 usec at 125-meter resolution in dual-pol mode. In single-pol mode, they can be twice as long. #1056

Bug Repairs

1. Fixed a bug introduced in the **RVP900** when we raised the number of range bins from 3072 to 4200 in release 8.12.4. The legacy OP_LFILT command (load clutter filters) was supposed to read in the same 3072 input values, but was instead expecting 4200. There are patches for this on our ftp site for 8.12.5. This typically only is a problem when using 3rd party radar software. #977
2. Fixed a bug in the **RCP8** causing intermittent “Antenna Angle communication dead” messages. Also improved the interface to tolerate up to a 5 second gap in communication before it will shut down the antenna. #1103, #1291, ECR-392
3. **Zauto** is changed to now turn off siggen RF when taking a noise sample. #1002
4. When sourcing the **real-time display** data from the **RVP900**, or from the **RVP8**, it worked after a fresh start, but often stopped working. The RTD_XMT process was gone. This was caused by **qiris** always explicitly killing the RTD_XMT process, left over from the days when it was always sourced by IRIS/Ingest. This is now fixed. #1328
5. Repaired the wrong return code from **zdrca1**. This was originally fixed in release 8.12.3, but was back again in 8.12.4 and 8.12.5. There are patches on our ftp site for those two versions, if needed. #891
6. The **RVP8/RVP900** were not being fully reset at program initializing time. This had the side effect that noise levels, for example, could be changed by running an exec task in the IRIS task schedule. #1427

RDA 8.12.5 Release Notes (26 February 2010)

These notes cover changes made in RDA since release 8.12.4 of 28 September 2009. If you are upgrading from an earlier release, please read those notes also. Revised to svn [23563]

Installation/Upgrade Changes

1. The release now requires the **lapack** and **blas** libraries from the RedHat installation media. These rpms will be automatically installed on a new OS install, using our new version 4 install disk, or following the new manual instructions in the *Software Installation Manual*. Be sure to get our new version 4 Installation disks if you use them. There are available for Redhat Enterprise Linux Desktop, releases 4, 5.0, 5.3, and 5.4. #1004

However, if you are just upgrading IRIS on an existing system, you will need to install these manually. Here are instructions after you mount your Redhat Installation Disk:

```
# cd /mnt/cdrom/client
# rpm -Uvh blas-*.el5.i386.rpm
# cd /mnt/cdrom/workstations
# rpm -Uvh lapack-*.el5.i386.rpm
```

If you do not have your original Redhat Installation Disks, do not panic. We have also placed these rpms on our ftp site at:

```
ftp://ftp.sigmet.vaisala.com/outgoing/os_patches/RHEL5/RPMS/blas-3.0-37.el5.i386.rpm
ftp://ftp.sigmet.vaisala.com/outgoing/os_patches/RHEL5/RPMS/lapack-3.0-37.el5.i386.rpm
```

These should work for the family of RHEL5s: 5.1, 5.2, 5.3, 5.4. For RHEL4 we have placed the appropriate rpms in the RHEL4 directory.

If you do not have access to ftp, still do not panic. Starting at release 8.13.0 we have also placed these rpms (for RHEL5) on our release dvd and iso file in the extras/RPMS directory.

2. Starting with this 8.12.4 release, the Canbus software is changed to run slower. Due to this the Vaisala weather radar encoders (223177WR and 223178WR) must be configured to lower their cycle period, from 1 ms to 5 ms to avoid overflow of the canbus messages at the RCP8 end. If you are upgrading from a version before 8.12.4 you must make this change.

Software and instructions are found on our ftp site:

```
ftp://ftp.sigmet.vaisala.com/outgoing/patches/8.12.4/RHEL5/Canbus
```

3. There are new versions of our “OS INSTALL DISC”s available, revision 4. They are changed to install the lapack-devel rpm, which will allow compiling our code. They are available for RHEL Desktop 5.0, 5.3 and 5.4.

New Features

1. The **RCP8** is now able to access the I/O lines on the RVP900/IFDR. If you wish to use this feature, please read the new section 4.8.7 in the *RCP8 User's Manual*. #1008

2. We have added support in the **RCP8** to interface to the EEC DDC interface. To enable this interface, use the “site custom” command and say “YES” to “Use EEC DDC pedestal control interface”. The control and status is sent over the internet to a specified IP address and port. #925 #985

Bug Repairs

1. The **RVP900** had a bug which caused the main process to go to 100 percent of the CPU about once a day. IRIS would get messages of the form “Error in call to DspResetFifo”. This only could happen on a multi-core computer. #969
2. The **RVP900** had a bug which caused it to fail if you attempted to process a long compressed pulse. Anything longer than 2400 FIR taps would fail in various ways. The code is now fixed, it can go up to 8000 taps, and a nice error message is generated if you attempt to exceed that. #928
3. The 2D (AKA 3X3) filtering in the **RVP8/RVP900** was displaced in time one ray behind. This was causing several artifacts in the T, Z, V and W field, such as shifts of echo edges in the direction of antenna rotation, and smearing of narrow echo data in the direction of rotation. This can be seen when searching IRIS historical data for chance sun returns. This is fixed, and the 3x3 smoothing matrix is now centered about the gate in consideration. One ray delay is added in the data pipeline. This bug has been present since the 2D filter was created.

We have also enhanced the 2D to apply to all data types except SQI and FLAGS. Previously it was applied to just the T, Z, V, and W data. #904
4. Left over from adding the *RVP900 User’s Manual* in the last release, the “manuals -rda” command launched the wrong manual for **RVP8** and **RCP02**. #922
5. The **RVP8** IF extrapolation algorithm attempts to unwind saturation effects in the IF A/D converter. The algorithm did not work correctly in dual-pol mode when the halfband filter is used in the IFD. The problem is that saturation occurs also in the halfband filter and it is impossible to unwind both effects combined. The solution was to scale down the dual-pol IF samples by 0.75, thus preventing saturation in the halfband filter. This allows the normal single-pol headroom calculations on the Linux side to work correctly even on the dual-pol data. A minor side effect is a loss of approx. 0.5 dB at the low end of the IF input. That is, the A/D quantization noise is 0.5 dB higher than before. #1009
6. The **rdaflash** program was failing to program **RVP8** PCI cards on new faster computers. This was repaired by replacing the JAMPLAYER with a new version.
7. The **RVP8** was failing to process data correctly on very slow scans. It failed at 4 degrees/second in batch mode. This was caused by the time series ring buffers overflowing. #976
8. The **rdasys** kernel module source now supports newer kernels, and is 64-bit safe. There was also a bug in the **rdasys** script. It was trying to read the old profile file at

/usr/sigmet/config_template/profile. This file is no longer used, and we have removed it from the release. If you are installing our software at a root point other than /usr/sigmet, you should be aware that we have hard coded paths in all the /etc/rc.d/init.d/* files which should be changed. Whenever you upgrade a system, you will get new versions of these files installed, so keep track of any customizations. #982

RDA 8.12.4 Release Notes (28 September 2009)

These notes cover changes made in RDA since release 8.12.3 of 26 June 2009. If you are upgrading from an earlier release, please read those notes also. Revised to svn [23088]

Installation/Upgrade Changes

1. The release cdrom no longer includes an RDA release for RHEL4. If you have an older OS on your RVP8 or RCP8 machine, you will need to upgrade the OS before upgrading to the new version.
2. If you are upgrading a system running the RCP8, you will need to manually install the `nrpz-lib` RPM. This is taken from the *Software Installation Manual*, section A.4.1:

Insert the release cdrom, then:

```
# mount /dev/cdrom /mnt/cdrom
# cd /mnt/cdrom/RHEL5/extras/RPMS
# rpm -Uvh nrpz-lib-*.el5.i686.rpm
```

3. Starting with this 8.12.4 release, the Canbus software is changed to run slower. Due to this the Vaisala weather radar encoders (223177WR and 223178WR) must be configured to lower their cycle period, from 1 ms to 5 ms to avoid overflow of the canbus messages at the RCP8 end.

Software and instructions are found on our ftp site:

```
ftp://ftp.sigmet.vaisala.com/outgoing/patches/8.12.4/RHEL5/Canbus
```

New Features

1. Increased the maximum number of range bins in the **RVP900** to 4200 from 3072. #780
2. A number of changes were made to support automatic adjustment of the **RVP8** and **RVP900** reflectivity calibration in the event that the burst pulse power changes. The basic idea is to store the burst pulse power at calibration time, then if we notice that the burst pulse power has drifted up or down, we can modify the reflectivity calibration accordingly. We added the burst noise, transmit power, and radar constant to the `zcalib.conf` file, and fill them in when running **zauto**. **Zauto** and **zcal** are enhanced to display these numbers. We pass the burst power into the **RVP** along with other configuration values. For this feature to work, you will now need to calibrate while the transmitter is turned on, so this value can be measured. Warning: If you have separate IRIS and RDA computers, you need to upgrade both past version 8.12.4 because the **DspExport** format has changed.

There is a new NV setup question inside the **RVP** accessible via **dspix** which enables this feature. Type the “mb” command and look for the question “Enable burst power based correction of Z0”. You also need to configure the RVP8 to use the Z0 from the time series. This is configured in both the IRIS Task Configuration Menu, and in **ascope**. Unfortunately in **ascope** it defaults to off, and cannot be saved on. #652

3. We have enhanced the RCP8 to support the new Vaisala Klystron status and power monitoring features. This includes enhancing the interface such that we now pass the pulsewidth and PRF to the RCP8. Also we now require `nrpz-lib RPM` to be installed for the RCP8 to run. This is done by **sigconfig**, but on an upgrade you will need to install it. #897
4. The software release now includes the *RVP900 User's Manual*. The **manuals** utility is changed to display the RVP900 and RVP8 manual, and we have removed the *RVP7 User's Manual*. The new RVP900 manual is also on our ftp site at:

`ftp://ftp.sigmet.com/outgoing/manuals/rvp900`

so you can see it without needing the installation cdrom. The *RVP7 User's Manual* is still on disk, so you can read it if you need to. #896

Bug Repairs

1. Changed the default RCP8 transmission rate to the host machine from 0.5 to 20 reports per second. #862
2. Increased the order of the new RVP8 IIR filters from 4 to 5 and replacing 40dB filters with 30dB filters. #651.
3. The **RVP900** was not generating the Real-time display data output. This feature was never there. #849
4. Because the **RVP900** requires jumbo packets on the interface to the IFDR, we have modified our **sigconfig** script to now set the MTU. This is done by editing the `/etc/sysconfig/network-scripts/ifcfg-th0` file and adding the line `MTU=8196` to the end. #886
5. Improvements were made in the RCP8 Canbus interface. In heavily loaded systems excessive messages of "Bad Az angle skipped..." were dumped into the `rcp8_err.log` file and the ray angle data quality was compromised with additional jitter. #898

RDA 8.12.3 Release Notes (26 June 2009)

These notes cover changes made in RDA since release 8.12.2 of 5 March 2009. If you are upgrading from an earlier release, please read those notes also. Revised to svn [22608]

New Features

1. The **RCP8** was enhanced add to the “site custom” section 2 questions: “Use TDRS pedestal angle input” and “Use TDRS pedestal control output”. These allow for interfacing to TDRS pedestals. #688

Bug Repairs

1. In the **RVP900**, repaired the TDWR serial STC loadup timing.
2. **Rdaflash** was allowing you to flash a device while it is busy. #721
3. The “TS Source” button in **tsarchive** fails to launch **tsswitch** on some systems. It caused the program to crash. #729
4. There are changes to the **RCP8** specification for source of angle information. The Custom interfaces can now use parallel angles if you want. Visible changes made:
 - 1) The angle source questions now have a new choice “Canbus”, which is used when you are using the canbus interface. For canbus users, this will automatically upgrade correctly. Please set both azimuth and elevation questions to the same value.
 - 2) If you are using another custom interface, such as Orbit, Andrew, DCU, or ARA-ACU3, you must now set the angle source questions to “custom” if you want the angles from the custom interfaces, or set them to one of the standard values, if wanted. Previously these questions were ignored and it always used the custom interface. You will have to change this if you upgrade.
 - 3) The Andrew interface no longer has the NV setup question “Get Pos/Vel from serial status packets”. To get this effect, please set the new angle source questions to “Custom”. #593
5. In the **RCP8**, the **ARA ACU3** serial angle offsets were reversed. If you are using a ARA ACU3 with Custom angle source, you will need to reverse the sign after upgrading. Also the **RCP8** will now issue a STOP command on all command mode changes to the ARA ACU3. #547
6. Bug fix in **RVP8** to SNR corrections of RhoHV, RhoH, RhoV. This bug has been there since release 8.09.4 in July 2005. In the Mp section of the non-volatile setups there are two new configuration questions:

Polarimetric Power Parameters – Noise Corrected: YES
Polarimetric Correlations – Noise Corrected: YES

The recommended setting is Yes for both of these. After upgrade you need to check this section and turn on the Polarimetric Correlations noise corrections. #565

7. The **RCP8** was having trouble when it was fed parallel angles, but the angles are actually updating slower than the 600Hz internal sample rate. It thought that the antenna was moving and stopping repeatedly. This was fixed by adding a setup question for the maximum period between angle updates, and by raising the tolerance. #800
8. The **RVP8** now supports clutter filtering using the IIR filters from the older RVP7 processor. #651
9. The **RVP900** now ships with a default IFDR IP address of 10.0.1.254 which matches the manufactured configuration of the IFDRs. #806
10. The **RCP8** is enhanced to support interfacing to Applied Systems controller model 337, in addition to the previously supported models 177 and 377. #835
11. The **RVP900** now implements the dual-polarization data processing. #785.

RDA 8.12.2 Release Notes (5 March 2009)

These notes cover changes made in RDA since release 8.12.1 of 21 October 2008. If you are upgrading from an earlier release, please read those notes also. Revised to svn [21763]

New Features

1. The kernel module used by the **RVP8**, **RCP8** and **RVP900** is now automatically rebuilt at system boot time if required. The kernel module version must exactly match the running kernel version, so this is required if you are running on a kernel other than plain RHEL5 or RHEL4.
2. The **RCP8** open source code is now included with the RDA release.

Bug Repairs

1. There were significant bugs fixed in the **RCP8** support for the ARA ACU3 antenna controller. #547
 - 1) We were sending the non-RP commands (SET, CW, CCW, BIT, POS, STOP) frequently. Because the controller stops communicating for 200ms each time, we now send them only once per minute, or immediately if there is a change. Also, we spread these out over different RP cycles.
 - 2) For efficiency we switched to sending a single RP0 command instead of one for each axis.
 - 3) We needed to add a STOP command whenever the command changes. While the antenna is stopping, we cannot get normal antenna position reports out, and we cannot issue any other commands, so we just have to wait.
2. In the **RCP8**, when disconnecting either of the canbus channels the **RCP8** did not go to the shutdown state. Disconnecting the channel one however did stop the antenna as the heartbeat disappears from the pedestal side. Also, reset now will close canbus channels and re-open them. #557
3. In the **RCP8**, for Vaisala pedestals only, the gear heater in Vaisala WRM200 was controlled by the equipment bay temperature sensor. It now uses the Radome Room temperature sensor located inside the pedestal. #569
4. The **rdaflash** utility program was not detecting a busy device. It now checks the device status and will not run if any devices are in use. #721
5. The “TS Source” button on **tsarchive** would fail to launch the **tsswitch** utility on some systems. This happend on RHEL5.2 systems, for example. #729

RDA 8.12.1 Release Notes (21 October 2008)

These notes cover changes made in RDA since release 8.12.0 of 14 July 2008. If you are upgrading from an earlier release, please read those notes also. Revised to svn [20849].

New Features

1. **Suncal** has been enhanced to not only measure the position of the sun, but on dual-polarization radars it will measure the LDR gain offset. This is based on the assumption that the sun is a unpolarized source. #380

After upgrade, please run “suncal –resave”. This will resave the suncal.conf file with 4 new fields (plus more comments):

```
sun_cal.iTaskXmtPolarization = 0
sun_cal.iBeam2DataType = 0
sun_cal.iBeam3dBArea = 0.2
sun_cal.fBeamLdrOffsetThresh = 0.2
```

The first number controls the primary transmit polarization of the acquired data. The value of 0 means horizontal, comments explain the other choices. The second number controls the generation of a second BEAM product for LDR calibration. 0 means none, 25 LDR, and 5 ZDR. After the resave operation, the configuration remains the same as before, which is doing a single polarization calibration.

If you wish to also perform the LDR calibration, then edit the file to configure one of the 2 ways to get this data: 1) Transmit horizontal, generate LDR, or 2) transmit H+V, generate ZDR. Note that since no echo returns are coming back from the sun, these two modes are equivalent. Also note that you must configure your RVP8 to not calculate Z based on a combined H+V returns, or it will mess up the results.

The previous version of **suncal** produced 1 BEAM product with name “SUNCAL”. The new version produces 1 or 2 (depending on the config), and they are named “SUNCAL_Z” and “SUNCAL_LDR”. These are output as before so they can be viewed in IRIS.

The resulting BEAM products are also processed to produce the same values as before, plus some. Some of the new values are just improved housekeeping: Radar altitude, transmit polarization, wavelength, pulsewidth, area within 3dB of the peak value, flags indicating calculation success or failure. Some of the new values are for the LDR calibration: LDR measured (average LDR value within the 3dB beamwidth), LDR Offset, area of the LDR average, and cross polarization sun’s position (to see if it is the same as the horizontal). Fixed a bug in the fTargetArea value. It was biased by 1/cos(ε). You will probably need to lower your fBeamArea after upgrading.

We now have an additional quality threshold iBeam3dBArea which requires that the area of sun return within 3 dB of the peak value is above a minimum. The last new configuration field is the threshold for how much the LDR offset can drift before it is flagged as a calibration error.

There is a new final pass to the **suncal** operation: An interactive update of the LDR offset in the config files. If you are running from IRIS's exec tasks, you will be signalled to run the interactive update if needed.

2. We now ship a new calibration utility called **zdrca1**. It is only used on dual-polarization systems. It calibrates the ZDR offset by pointing the antenna at 90 degrees elevation, scanning in azimuth for a full 360 degrees and averaging a lot of samples. The average ZDR value should be zero.

This program is very similar to the new **suncal** above, in that it has 3 phases to its operation:

- 1) Collect radar data scans and store in IRIS RAW product format.
- 2) Process those RAW products to calculate the ZDR offset.
- 3) Allow interactive updating of the calibration value.

One good feature of **zdrca1** is that it can still produce a calibration without any precipitation. In that case it has to average a lot more data (maybe a few hours) to pull out enough valid return signals from the usual dust and insects, etc. Please see the new chapter in the *IRIS/RDA Utilities Manual* for more details. #381

3. The new RVP900 is now included in the release, #541
4. Biases have been corrected in the computation of autocorrelations from spectra. Theory behind these changes is from the article: Autocorrelation Bias in the ORDA FFT Mode, Sebastian Torres, 2007. There are two parts:
 - A new OPF_FFTPPP bit has been added to the iflags word of the OPPRM structure, and a new Mp setup question provides a Never/User/Always override of that bit. This bit causes non-windowed spectra to produce autocorrelation terms that exactly match those that would be computed by traditional PPP sums, i.e., with the spurious end-around term removed.
 - The biases due to spectral windowing are now computed exactly and applied directly to the autocorrelation terms, rather than via the previous adhoc method that only provided an approximate correction for computed widths.

Bug Repairs

1. Due to 1% resistors being used in the RCP8 Synchro inputs, it is possible to have small position errors, up to 1% over a 120 degree span. We have added synchro gain corrections to handle this. Because of the redundancy in the 3-wire synchro signals it is possible to examine a collection of (S12,S23,S31) measurements and deduce whether gain errors exist among the three terms. We have added two new setup questions to set calibration gains for synchro inputs on the RCP8. They default to 1.00000 (no correction):

```
RCP> a a
AZIMUTH Axis Parameters
```

```

- - - - -
Angle input signal source: Synchro
Synchro reference frequency: 60 Hz
Shutdown for invalid synchro voltages: NO
Calibration Gain #1: 1.00000
Calibration Gain #2: 1.00000

```

The monitor command then contains an additional ALT display format in which synchro information is shown in detail for each axis that uses those inputs. The fields are:

SyMag?: Magnitude of the synchro input, 0-to-1 range
 SyUse?: Fraction of synchro usage history table in use, 0-to-1 range
 Gains: The two estimated (suggested) gain terms

```

RCP> mo
AZ-Pos SyMag SyUse  Synchro Gains  EL-Pos SyMag SyUse  Synchro Gains  Time
-----
120.90  0.93  0.00 -----,-----  0.00  0.00  0.00 -----,-----  9.77 res
120.89  0.93  0.00 -----,-----  0.00  0.00  0.00 -----,-----  1.39
 62.38  0.94  0.17 1.00194,1.00111  0.00  0.00  0.00 -----,-----  7.00

```

The idea is to estimate the gain terms from synchro information that has been collected over the widest possible span of angles on each axis. In the above example the "reset" command is first used to clear the history tables, then the antenna was moved slowly over a 60-degree interval. The SyUse? of 17% corresponds to the 60/360 span of collected samples. A pair of gain terms will be suggested whenever SyUse? exceeds 5%. Take these gain numbers and type them into calibration gain setups, and save. #516

2. The **tsview** "I/Q" now displays the number in signed volts. Previously it was in power (dBm) which lost the sign information. So now the listing uses more characters. #457
3. Fixed "/sbin/service rvp8 restart" by adding one extra second to allow for IPCS cleanups.
4. Added **softplane**, **makeAsciiSetups**, **nr_noisefig**, **nr_velcal**, **overlay** and the **tsarchive** font file to the RDA release #538

RDA 8.12.0 Release Notes (14 July 2008)

These notes cover changes made in RDA since release 8.11.7 of 3 Mar 2008. If you are upgrading from an earlier release, please read those notes also. Revised to svn [20334].

New Features

1. The standard binary RDA release now includes “plugin_test” to test extended header plug-ins, and it includes irisnet.
2. There is a new command line utility shipped with **tsarchive** called **tsclientshell** which allows control of essentially all the buttons in the tsarchive GUI. This will make it easy to automate time series recording and playback from script files. #458
3. The standard RDA source tar file now includes the kernel module source, as documented in the developer’s appendix of the *RVP8 User’s Manual*. The kernel recompiling instructions were significantly updated. #506
4. Biases have been corrected in the computation of autocorrelations from spectra. Theory behind these changes is from the article: *Autocorrelation Bias in the ORDA FFT Mode*, Sebastian Torres, 2007. There are two parts:
 - A new OPF_FFTPPP bit has been added to the `iflags` word of the OPPRM structure, and a new **Mp** setup question provides a Never/User/Always override of that bit. This bit causes non-windowed spectra to produce autocorrelation terms that exactly match those that would be computed by traditional PPP sums, i.e., with the spurious end-around term removed.
 - The biases due to spectral windowing are now computed exactly and applied directly to the autocorrelation terms, rather than via the previous adhoc method that only provided an approximate correction for computed widths.

Bug Repairs

1. The newer io62 and rvp8rx cards using the 1K100 silicon FPGA chips could not be reprogrammed using **rdaflash**. #440
2. Improvements were made in the RCP8 related to debugging problems in the Orbit controller interface:
 - RCP8 monitor sio raw now has time stamps, for each packet, as well as a line break for each separate packet. #409
 - The Orbit interface now has a simulator available from the site custom command. This simulator includes occasional errors, so we can test error handling.
 - The interface got confused if it happened to read a partial packet from the Orbit controller, and it would stop running for 1 second. #412

- We now log all parsing errors incoming Orbit data.
 - The timeout for when no data arrives from Orbit is reduced from 1500 to 200 ms.
 - When changing from slew mode to point mode we now go momentarily into standby mode. This prevents the antenna from oscillating. #435
3. In the Malibu ARINC interface code, changed both channels are 100K and GPS and IRS channels were swapped.
 4. Improved the soft limits for the Vaisala WRM100/200 pedestal so the slow down period is shorter. #388
 5. The RVP8 now sets a gparm flag bit if the DP attenuation is done. #364
 6. Fixed a bug in the RCP8 canbus code. It was burning a lot of cpu time. #462
 7. The RCP8 canbus driver code was improved to not shutdown if ntp causes a time skip of greater than 0.5 seconds. #505

Source Changes

1. Most rvp8proc source code is moved to rvp8proc tree.
2. Added utils/dsp8 to the public source.