RVP7 V17 Release Notes

These notes cover changes made to the RVP7 code since release V16 of 2 February 2000. If you are upgrading from an earlier release, please read those notes also.

Bug Repairs

1. If the RVP7 was booted by a powerup, and if the fiber signal from the IFD was missing at boot time, then the RVP7 will automatically reboot as soon as the fiber signal reappears solidly for five seconds. This remedies a power sequencing problem in which the diagnostics would fail if the IFD were turned on *after* the main chassis, rather than before or at the same time. Thus, you may now powerup your equipment in any order. The automatic reboot will occur only once; since, after it happens the first time, the RVP7 is no longer considered to be booted from a cold powerup.

2. A FIFO queueing bug was repaired that prevented the scope plots from working properly on the parallel interface to the host computer -- the RVP7 would only output the first few strokes of each plot. There was no problem when the SCSI interface was used.

3. A minor bug was repaired in which the **Pb** plot command would sometimes not draw a particular trigger if it was less than one pixel wide at the given plot span. A related fix prevents the burst window outline from sometimes vanishing when a large plot span is selected.

New Features

1. The RVP7 now has TTY support for debugging the physical level of the host computer's SCSI or Parallel interface. From within the local TTY monitor, the new "X" (eXamine) command allows you to watch all incoming 16-bit words as they arrive from the host computer. In addition, you may also send 16-bit words back the other way. The "X" command is only available from the RS232 hardware TTY interface; it can not (obviously) be used via chat mode over the same I/O interface that it trying to examine. As such, the "X" command will not even be listed in the RVP7's top level help menu during a chat mode session.

   While the "X" command is running, any words that arrive from the computer will immediately be printed in hex format, along with an "address" (word counter, starting from zero) at the start of each line. Meanwhile, the "W" subcommand can be used to write individual words back to the computer, and the "Q" subcommand will exit the I/O examiner entirely.

   Note: When the "X" command is running, the RVP7 does not interpret the incoming 16-bit words as commands and arguments. Data sent to the RVP7 are discarded after being printed; and output from the RVP7 will occur only if the "W" subcommand is manually used. The "X" command is intended to debug the physical layer of the computer interface in a very controlled manner.

The following dialog was captured in response to the host computer writing 100, 200, 300 (decimal) to the RVP7. The "W" subcommand was then used twice to output a 0x4000 and 0x8000 from the RVP7, and the computer then sent the values 1, 2, 3, 4, 5.

```
RVP7> X
Host Computer I/O Debug Monitor
-------------------------------
  Q: Exit the monitor
  W: Output a word to the computer

0x0000:  0x0064 0x00C8 0x012C
Output Word : 0x4000
Output Word : 0x8000
0x0003:  0x0001 0x0002 0x0003 0x0004  0x0005
```

2. The RVP7 now has TTY support for debugging the application level of the host computer's SCSI or Parallel interface. The existing Real Time TTY Monitor can be configured to expose the computer's complete I/O stream while the RVP7 is running and processing commands in its normal manner.

   The TTY printout shows incoming opcodes called out by name, and subsequent input and output words formatted into a table. The data are printed in Hex, twelve words per line, and include a word offset (origin zero) at the start of each line. The offset is reset to zero at the start of each new input or output sequence.

   Lines of data that are repeats of identical values will be skipped with a "..." indication. This shortens and simplifies the printout; but more importantly, it reduces TTY overhead so that the processor is less I/O bound. Also for this reason, the "0x" Hex prefix is omitted during the possibly lengthy printing of the data word tables.

   i **Note: As with all other Real Time TTY Monitor (RTM) functions, the RVP7 remains completely functional while host computer I/O is being monitored. However, unlike all other RTM functions, the I/O monitor will stall the main processor whenever the TTY becomes I/O bound; and the performance of the RVP7 will be degraded, perhaps severely. It is recommended that you configure the TTY for 38.4-KBaud to minimize the serial I/O delays.**

   The following sample transactions were captured in response to starting the IRIS/Open ZAUTO utility. An I/O RESET and diagnostic OTEST are first performed. The pulse width selection bits and maximum trigger rates are then set with PWINFO, and angle sync is disabled with LSYNC. The header words for processed data are decided using CFGHDR, operational parameters are loaded with SOPRM, and final RVP7 parameters are read back with GPARM. Finally, the trigger rate is set using SETPWF, and a dummy range mask consisting of a single bin is setup with LRMSK.

```
Opcode 0x008C (RESET)
Opcode 0x0004 (OTEST)
Output Words
    0: 0001 0002 0004 0008  0010 0020 0040 0080  0100 0200 0400 0800
   12: 1000 2000 4000 8000
Opcode 0x000F (PWINFO)
```

```
Input Words
    0: 8421 012C 0BB8 0FA0  1F40
Opcode 0x0011 (LSYNC)
Opcode 0x005F (CFGHDR)
Input Words
    0: 0001 0000
Opcode 0x0002 (SOPRM)
Input Words
    0: 0019 000F 07AE 0008  FE70 0080 00A0 0000  0003 000A AAAA 8888
   12: C0C0 C000 0000 0000  0000 AAAA 0000 2710
Opcode 0x0009 (GPARM)
Output Words
    0: 1200 0001 0960 FFFF  FFFF 0D5B 0000 0000  0000 4284 0000 0000
   12: 0019 743D 0007 0000  0000 230B 0032 5DC0  0BB8 1770 1D4C 2EE0
   24: 8421 0000 2EE0 2EE0  0960 0960 000F 07AE  0008 FE70 0080 00A0
   36: 0000 0000 0000 0000  0000 0000 0001 000E  0000 000E 0000 0D5B
   48: 8000 0000 0000 0000  0000 0000 0000 0000  0000 0000 0000 0000
   60: 0000 0000 0000 0000
Opcode 0x0010 (SETPWF)
Input Words
    0: 2EE0
Opcode 0x0001 (LRMSK)
Input Words
    0: 0001 0000 0000 0000  0000 0000 0000 0000  0000 0000 0000 0000
   12: ...
  504: 0000 0000 0000 0000  0000 0000 0000 0000
```

3. The internal trigger generator can now produce triggers whose start time includes a component that varies linearly with the period of each individual pulse. This allows you to produce trigger patterns that were not possible before, e.g., a trigger that occurs half way between every pair of transmitted pulses, and remains correctly positioned regardless of changes in the PRF (See *Setup Change #2.*).
4. The LFCOEFS (Load Clutter Filter Coefficients) command no longer permits altering the coefficients of the all-pass filter (filter number zero). This exclusion is for general sanity.
5. The RESET command has been added to the list of minimal opcodes that the RVP7 is allowed to execute at all times, even when its internal TTY monitor is running. The other opcodes in this list are: NOP, TTYOP, IOTEST, OTEST, RBACK, GPARM, and XARGS. The minimal opcode set is assumed by the IRIS/Open DSP driver during certain startup sequences, e.g., when verifying the byte order of the I/O interface.
6. An optional interference filter is now available to remove impulsive-type noise from the demodulated (I,Q) data stream. See Section 5.13 of the *RVP7 User's Manual* for a complete description of the algorithm(s). A new CFGINTF command has been added to configure and enable the filter (Section 6.23), and additional words have been added to the GPARM command (Section 6.9) to readback those settings.

Setup Changes

1. A new question "*Show Host Computer I/O*" now appears under the Real Time TTY Monitor (RTM) setups within the **M+** command (See *New Feature #2.*). Because of the

enormous amount of TTY output that can be generated by this option, all other RTM selections are disabled whenever host computer I/O is being monitored. Also, those other RTM selections would interfere with the multi-line formatting of the I/O text.

The RTM option to monitor computer I/O is automatically disabled at powerup, and therefore can not be saved permanently. This is to avoid confusing situations in which the monitor is accidently left running — the RVP7 would appear to be working, but at a puzzling level of degraded performance.

2. The **Mt<n>** trigger setup questions have been reworded so that the Start Time includes an optional additive component that varies linearly with pulse period. The new format is shown below.

```
RVP7> mt0
Parameters for Pulse Width #0
-----------------------------
Trigger #1 - Start:    0.00 usec
        #1 - Width:    1.00 usec     High:YES
Trigger #2 - Start:    0.00 usec + ( 0.500000 * PRT )
        #2 - Width:   10.00 usec     High:YES
Trigger #3 - Start:   -3.00 usec
        #3 - Width:    1.00 usec     High:YES
Trigger #4 - Start:   -2.00 usec
        #4 - Width:    1.00 usec     High:YES
Trigger #5 - Start:   -1.00 usec
        #5 - Width:    1.00 usec     High:YES
Trigger #6 - Start:   -5.00 usec + (-0.001000 * PRT )
        #6 - Width:    2.00 usec     High:NO
```

Each trigger is still defined as before; using the same starting offset, trigger width, and line polarity. However, the start time can now include an additional term consisting of the pulse period times a fractional multiplier between –1.0 and +1.0. Enter this multiplier as “0” if you do not wish to use the new term, and it will be omitted entirely from the printout.

In the above example, Trigger #2 is a 10.0 μsec active-high pulse whose leading edge occurs precisely halfway between the zero-range of every pair of pulses. Likewise, Trigger #6 is a 2.0 μsec active-low pulse whose falling edge is nominally 5.0 μsec prior to range zero, but which is advanced by 1.0 μsec for every millisecond of trigger period. All other triggers behave normally, and have fixed starting times that do not vary with trigger period.

Some subtleties of these variable start times are:

- The PRT multipliers can only be used in conjunction with the RVP7’s internal trigger generator. The PRT-relative start times are completely disabled whenever an external trigger source is chosen from the **Mt** menu.
- When PRT-relative triggers are plotted by the **Pb** command, the active portion of the trigger will be drawn cross-hatched and at a location computed according to the current PRF. The cross-hatching serves as a reminder that the actual location of that trigger may vary from it’s presently plotted position.

- The PRT multiplier for a given pulse is applied to the interval of time between that pulse and the next one. This distinction is important whenever the RVP7 is generating multiple-PRT triggers, e.g., during DPRT mode, or during Dual-PRF processing. Multipliers from 0.0 to +1.0 are generally safe to use because they shift the trigger into the same pulse period that originally defined it. For example, a start time of (0.0 μsec + (0.98 * PRT)) would position a trigger 98% of the way up to the next range zero. But, if –0.98 were used, and if the period of the previous pulse was shorter than the current one, then that shorter period would become incorrect (longer) as a result of having to fit in the very early trigger.

i **Note: Look carefully at your trigger definitions if the RVP7 ever seems to be generating incorrect pulse periods. This advice applies to all triggers, whether they have fixed start times or PRT–relative start times. First priority is always given to synthesizing every trigger waveform in its entirety, i.e., the RVP7 will never miss a trigger, nor shorten one to fit within the pulse period. Rather, the pulse period is lengthened so that all defined triggers will fit.**

3. The maximum plot span of the **Pb** command has been increased from 1000 μsec to 5000 μsec. Triggers having large positive or negative start times can now be plotted using this wider time span.

4. The setup question that defines the output control bits in the **Mt<n>** section now stands on its own as a separate question. Previously it was rather meaninglessly coupled with the *Maximum number of Pulses/Sec* question.

5. New setup questions appear in the **Mp** section to configure the optional interference filter (See *New Feature #6.*).

```
Interference Filter– 0:None, Alg.1, Alg.2, Alg.3 : 3
  Threshold parameter C1: 10.00 dB
  Threshold parameter C2: 12.00 dB
```