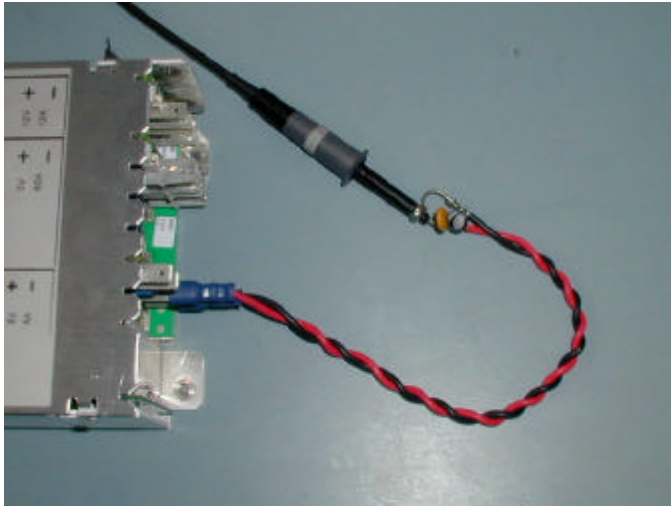
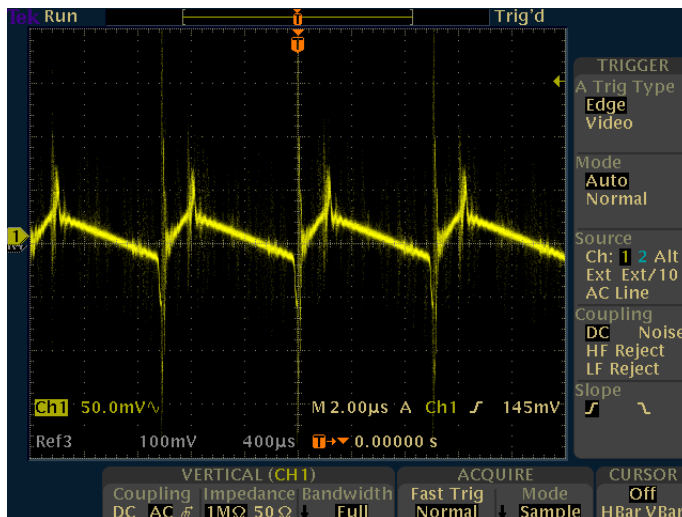


The Measurement of ripple and noise.

Lambda measures ripple and noise on switching power supplies using an oscilloscope with the bandwidth limited to 20Mhz. The measurement is taken at the end of a 150mm length pair of twisted cables terminated with 10uF electrolytic capacitor and 0.1uF ceramic capacitor. The earth wire of the oscilloscope probe should be as short as possible, winding link wire around the earth collar of the probe is the preferred method.



Noise from a switching power supply is made up of two distinct elements "ripple" and "high frequency". "Ripple" noise is the variation at the switching frequency of the supply. "High frequency" noise is superimposed on top of the "ripple" and results in a typical waveform as below.



The term PARD means "Periodic and Random Deviation" and is a measure of the TOTAL noise (ie high frequency noise + ripple) quoted as peak to peak. This is the figure quoted in the specifications of each module.

Minimising System noise.

The application note "Vega Connection" gives information on basic connection of Vega and good wiring practice. This includes using twisted pairs for cabling and de-coupling at loads. This will help minimise noise in a system designed using Vega power supplies.

There is also an Application note "Vega RFI" which gives more detailed information on installation to improve EMC performance and reduce system noise.

During system design, if there are any noise problems encountered, there are a number of common causes :-

- 1) No (or insufficient) de-coupling on the PCB and/or at the load.
- 2) Poor system earthing.
- 3) Poor routing of the wiring cables.
- 4) Faulty wiring connection or bad terminations.
- 5) PCB tracking or cabling insufficient for peak currents carried.
- 6) Power supply being intermittently overloaded. (High switching currents drawn).

There are a number of practical steps that can be used to help reduce or identify the source of high frequency noise :-

- 1) Try and ascertain if the noise is radiated or conducted by re-orienting the PSU or by screening. If neither helps, the noise is likely to be conducted noise.
- 2) Common zero volt connections should be made with the shortest possible wiring either directly or via a capacitor to the nearest point on the chassis.
- 3) Ensure the common earth / zero volt connection is connected to the system starpoint earth once only and not by any other route.
- 4) Twist all pairs of power and sense cables separately.
- 5) Try connecting a "ring" of capacitors (100nF ceramics) from rail to rail.
- 6) Decouple individual rails at the load using capacitors (eg 100nF ceramics).