

IMPORTANT NOTE FOR USERS OF ACTIVE ANTENNAS

Radiated emissions measurements are sometimes made with active antennas. Some of these antennas are not compatible with Sonoma Instrument amplifiers and are likely to damage them. Please read this document to familiarize yourself with the problem and prevent damage to your amplifier.

An active antenna consists of an antenna element and a battery powered built-in amplifier. Theoretically, there should be no need for an additional external amplifier, but in practice many users prefer some additional gain.

Sonoma Instrument amplifiers are low noise, high gain devices designed to handle very weak signals. The incompatibility with some active antennas arises from the switching transients produced by the active antenna when it is powered on or off.

The transient signals from one such antenna are shown below. Figures 1 and 2 show the antenna output voltage into a high impedance ($1\text{ M}\Omega$) oscilloscope input. The vertical scale is set to 2 V/div . The switching transients shown below are by no means the strongest examples available.

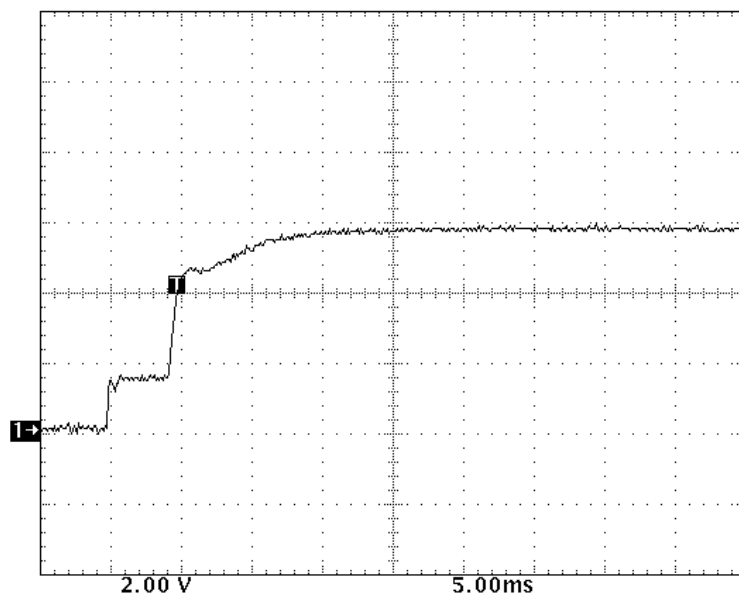


Fig. 1
The power-on transient
reaches almost 6 Volts.

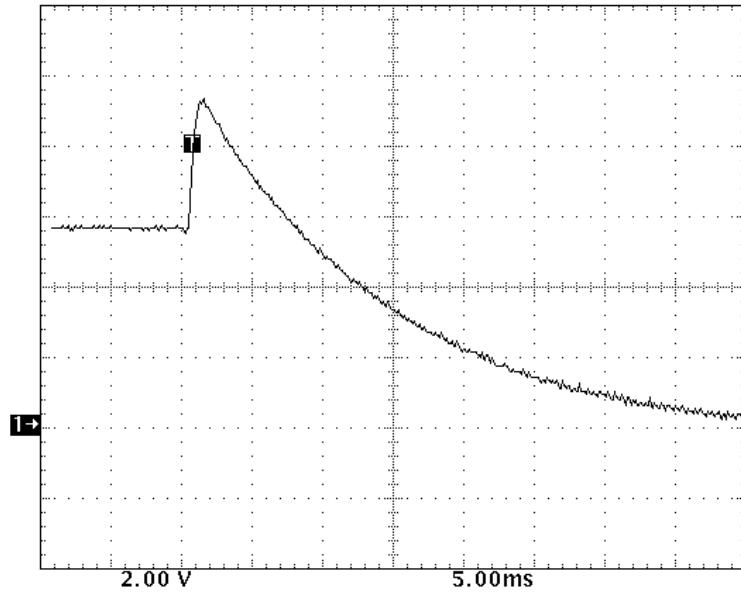


Fig. 2
The power-off transient adds another 3 Volts to the previous transient, for a total of 9 V at the peak.

The following figures show the power-on and power-off transients when the same active antenna is loaded with a 50 Ω oscilloscope input. It is important to note that the amplifier input impedance approximates 50 Ω only while the amplifier is operating in its linear range. As the amplifier becomes overloaded, its input impedance will change and the voltage at the amplifier input will be closer to that shown in figures 1 and 2. In addition, most Sonoma Instrument amplifiers do not present a 50 Ω input resistance at d.c.

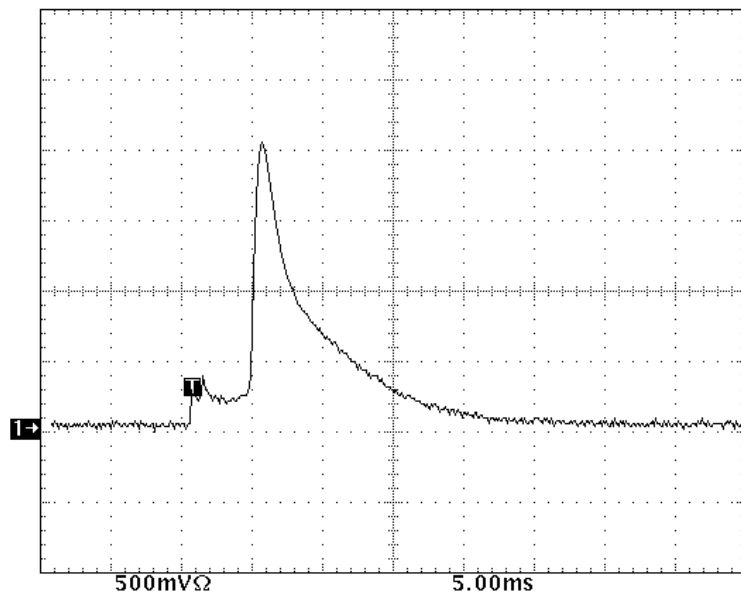


Fig. 3
Power-on transient, 50 Ω oscilloscope input.

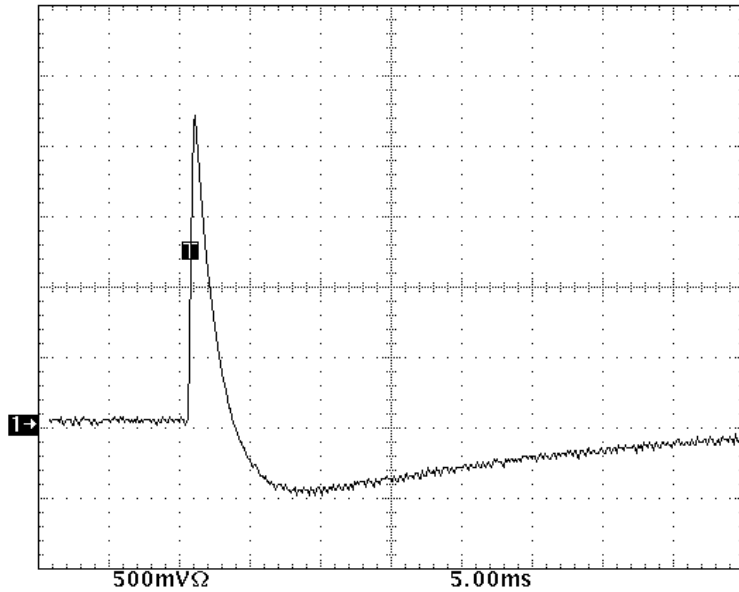


Fig. 4
Power-off transient,
50 Ω oscilloscope
input.

It is in theory possible to follow a sequence of power-up and power-down procedures which will protect the amplifier from the transients. In practice, it is difficult to guarantee that the procedures will be accurately followed at all times. The preferred method of protection is by means of the Agilent 11947A Transient Limiter. It is specified for operation between 9 kHz and 200 MHz. Shown below are the power-on transients after they have passed through the limiter. The power-off transients are negligible. Note the great reduction in peak amplitude and duration.

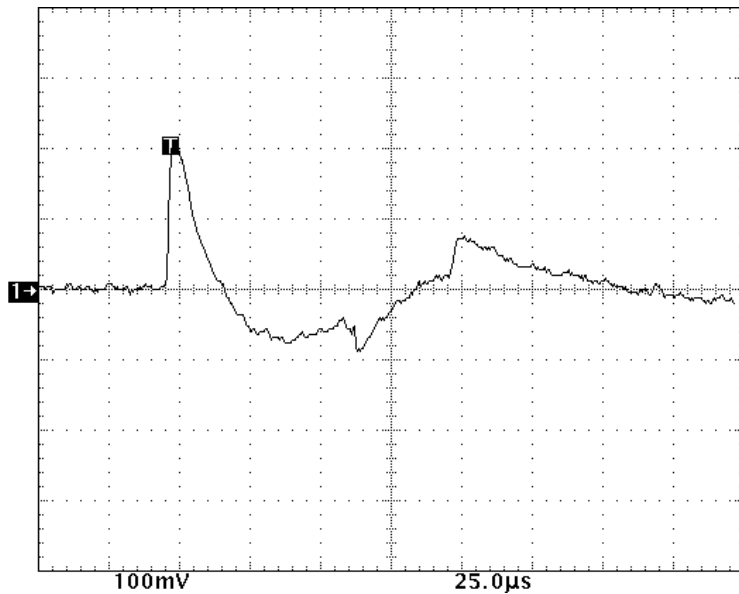


Fig. 5
Power-on transient with
Agilent 11947A limiter
and 1 M Ω oscilloscope
input.

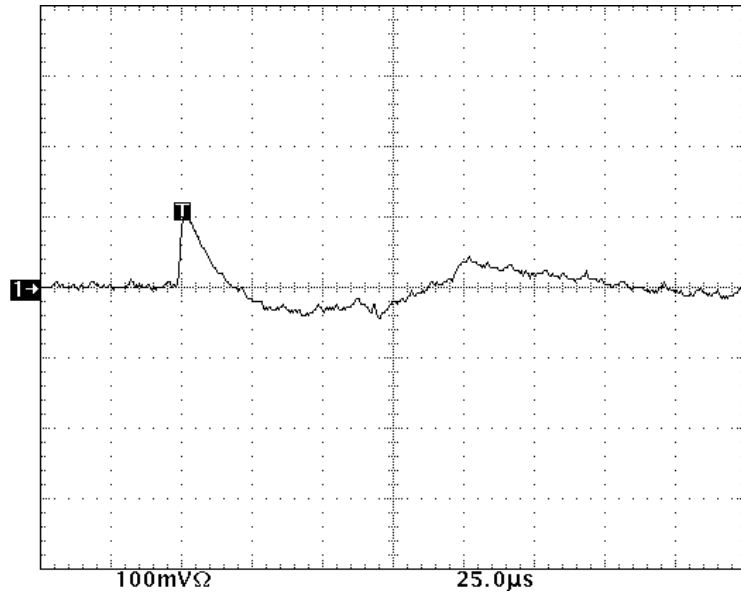


Fig. 6
Power-on transient with
Agilent 11947A limiter
and 50 Ω oscilloscope
input.

Active antennas are not recommended for use with Sonoma Instrument amplifiers, except in conjunction with a protective device such as the Agilent 11947A Transient Limiter. Damage caused by excessive signals at the amplifier input is not covered under the warranty.