The development of a time-resolved coherent anti-Stokes Raman scattering (CARS) variant has been applied to the excited state vibrational dynamics of model non-linear optical chromophores in the condensed phase. This variant, termed fs/ps-CARS combines two initial femtosecond laser pulses ($\omega_1$ and $\omega_2$) generating vibrational population and a third picosecond narrowband probe to integrate the molecular response. The resulting signal contains reasonable spectral width ($\omega_3$ bandwidth limited with a typical linewidth of $\omega_3$ in the 6-15 cm$^{-1}$ regime) while maintaining the femtosecond time resolution of the first two pulses. This technique proves amenable to a detailed study of the vibrational dynamics of excited state molecules by the addition of a femtosecond excitation pulse ($\omega_{ex}$) with a total time resolution of about 150 fs. As a demonstration, the excited state dynamics, known to internally convert on sub-picosecond timescales, of two model chromophores (para-nitroaniline and N,N-dimethyl-para-nitroaniline) are followed.