High Gain RF Feedback using a Parallel Comb-Filter, K. AKAI, E. EZURA and S. YOSHIMOTO, KEK - An RF feedback system using a parallel comb-filter has been developed in order to cope with longitudinal coupled-bunch instabilities driven by the accelerating mode of significantly detuned RF cavities. It can reduce the effective cavity impedance at the synchrotron sidebands responsible for the instabilities. This paper describes the experimental results of the RF feedback, which included a low-powered damped cavity, 1.2 MW klystron and 1 ms cable delay. The real part of the cavity impedance was reduced by 33 dB at maximum over the 7 synchrotron sidebands 100 kHz apart from each other. Although the klystron presented a frequency-dependent group delay, the high gain was achieved mainly due to the nature of the parallel comb-filter, which enables us to precisely adjust the phase of each sideband frequency.