Using a high resolution Monte Carlo simulation technique based on a multihistogram method and cluster Algorithm, we have investigated the critical properties of a coupled XY model, consisting of a six fold symmetric Hexatic and a hidden order parameter of three fold symmetry in two dimensions. The simulation results Demonstrate a series of continuous transitions in which both kinds of orderings are established simultaneously. It is found that the specific-heat anomaly exponents for some regions in coupling constants space are in Excellent agreement with the experimentally measured exponents extracted from heat-capacity data near the smectic-A–hexatic-B transition of two-layer free standing films.