We present an action which possesses the properties expected from the action of multiple D0-brane (mD0) system in D=10. Besides manifest spacetime (target superspace) supersymmetry it possesses also a counterpart of local fermionic kappa-symmetry of single D0-brane (Dirichlet superparticle). The action contains an arbitrary nonvanishing function M(H) of the relative motion Hamiltonian H. A particular model with constant M has been constructed before. We show how another representative of the family with particular non-constant form of M(H) can be obtained by dimensional reduction from D=11 multiple M0-brane system. The further study of the equations of motion allows to show the on-shell gauge equivalence of the models with different nonvanishing M(H)’s thus resolving the problem of their 11D origin.