This paper evolved from an endeavor to construct a Lyapunov function of interconnected nonlinear systems described by ordinary differential equations. This construction is an intractable problem and crucial part of the design when applied to problems of high dimension with intricate structure. The design obtained is applicable if the system under investigation is a generalization of the strict feedback form and whose dependency graphs satisfies the decomposition into lower triangular form. This design is mainly developed for moderated nonlinear continuous time dynamical systems. However, as we show in the example, it is emphasized that the present results can be extended to discontinuous systems provided they can be approximated by smooth modifications. A key step in our approach which based on back integrating procedure is to decompose the interconnected system into subsystems using graph theoretic decomposition. In the proposed methodology, the postulated Lyapunov function is obtained by backward integration the composite system trajectory. This novel approach leads straightforward and by one shot methods to both Lyapunov function of the composite system and its time derivative. A practical example is presented to illustrate the effectiveness of the results