In this paper, we aim to extend the Secure Electronic Transaction (SET) protocol to have the property of Atomic Transaction. The SET protocol is a well-known and widely used credit card payment protocol which was developed by VISA and MASTER Card companies. On the other hand, the Atomic Transaction offers the property that either all sub-tasks in a transaction are executed completely, or none of them are executed at all. Indeed, Atomic Transaction is employed in Database technology. Recently, there is a work which applies the concept of atomicity to general payment protocols for electronic commerce. However, such protocols are restricted to electronic goods only. In this paper, we aim to apply the atomicity to an actual payment protocol (ie. SET protocol) which is not only for electronic goods but also for non-electronic goods.