

- b. The MTTF is a function of complexity of the component, the quality of manufacturing, the harshness of the operating environment, the degree of redundancy, and the degree of preventative maintenance. The Mean Time to Repair is a function of the time to detection and diagnosis of the failure, availability of qualified repair technicians, complexity of the component exchange, the proximity of spares to the failure site, and the volume of spares available.
- c. The SIGNET Internetwork Service availability analysis is based upon the following model, illustrated in Figures 5.2 and 5.3:

$$A_l = A_c^4 * A_b^2 * A_{rl} * A_w^8 * A_{pm}$$

$$A_r = A_c^4 * A_b^2 * A_{rl} * A_{rc}^2 * A_{mc} * A_{ml} * A_w^8 * A_{ws}^4 * A_{pm} * A_{ph}$$

$$A_{eus} = 0.7 * A_l + 0.3 * A_r + 0$$

where

A = Availability of

l Local Subnetwork Internetwork Service
 r Wide Area Subnetwork Internetwork Service
 c Concentrator
 b Bridge
 rl Mission router
 rc SIGNET core router
 w series path wiring/cabling
 ws Router to MITNET node serial cable
 kg encryption device
 mc MITNET Core
 ml MITNET Mission Link
 pm Mission power
 ph Headquarters power
 eus End User Service

- d. The value of zero is added to the formula for the overall availability, A_{eus} , for completeness. The zero term represents the probability that a user does not wish to use the network at some particular time; in the case where a user is a person, the user will not require access to the network upwards of 75% of the time due to evenings, weekends, and vacation absence. In the case where the user is a process, the process may be automated to run at any time, thereby requiring a higher degree of availability in the network. Detailed data and calculations are contained in Appendix 2.
- e. A significant factor in the overall internetwork architecture is the link between the MITNET regional node and the mission. Initial discussions with the MITNET personnel led to the use of a Mean-Time-To-Failure of 1 month with a Mean-Time-To-Repair of 6 hours for the region to mission access links. Further