Network Communications Chapter 9

Token Ring and Token Bus Networking Technology

Token Ring (Logical) Topology

- IEEE 802.5
- Token: 3 bytes
  "Permission to send"
- Early Systems
  - IBM
  - Apollo Workstations
  - Bay Networks (now Netgear/Nortel)

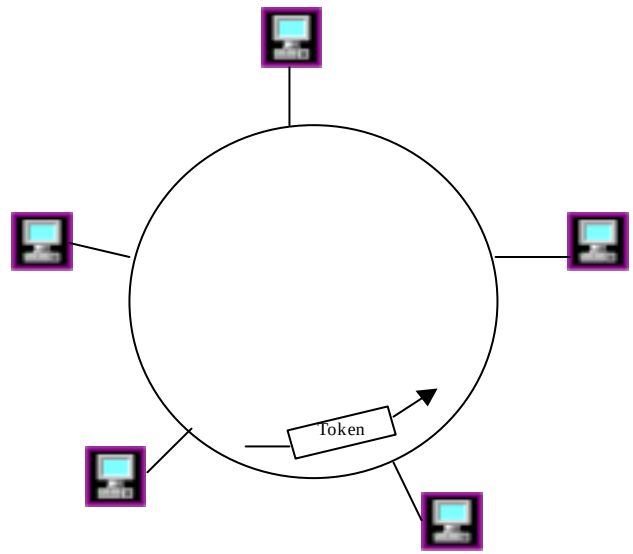

Figure 9.1

Token Ring Physical Topology

- Physical “Star”, Logical “Ring”
- MAU: Multi-station Access Unit
  - Localizes connections (ease of Maintenance)
  - Automatic bypass of unused ports

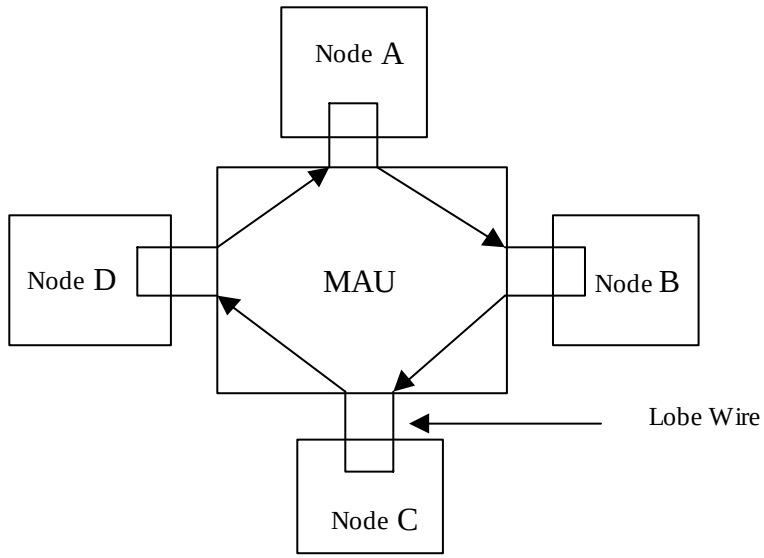

Figure 9.2

Multi-Station Access Unit

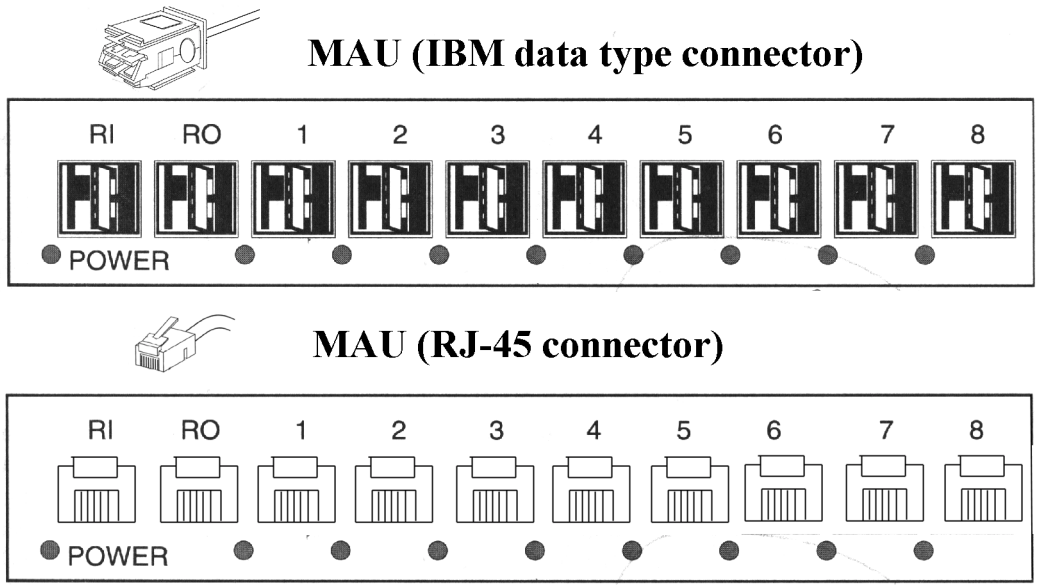

Figure 9.3a &9.3b

MAU Operation

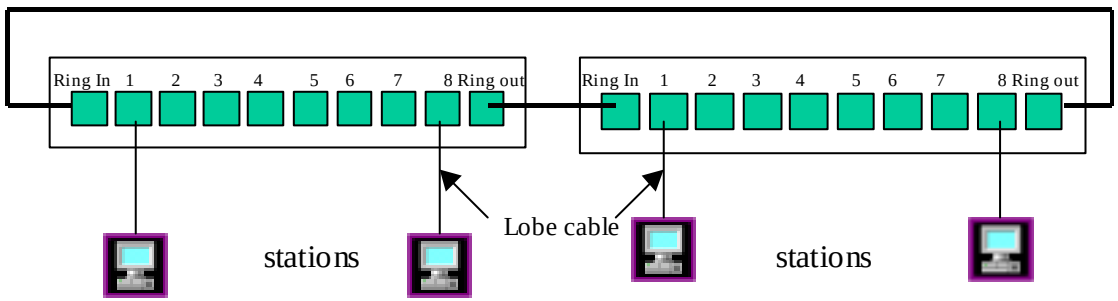

Figure 9.4

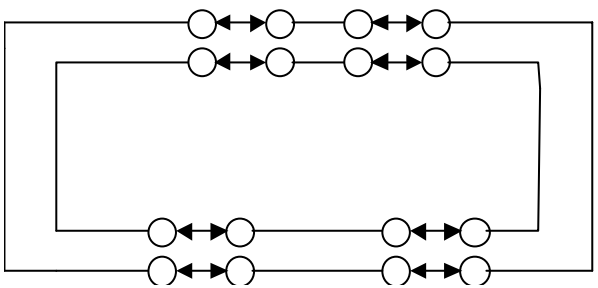

Figure 9.5a

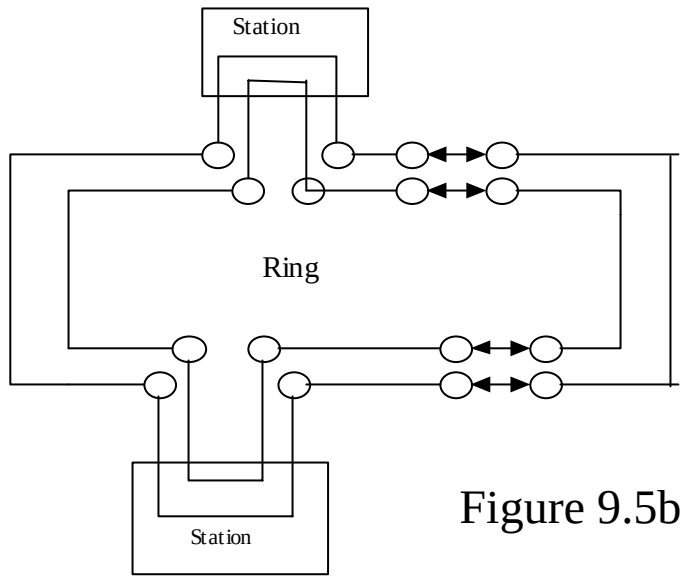

Figure 9.5b

Token Frame Format

- j & k bits: Differential Manchester code violations
- ED: j k 1 j k 1 0 e (error = 1)

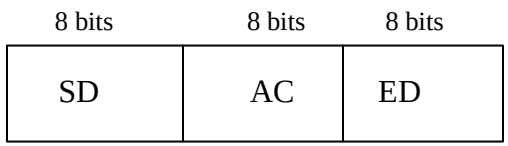

Figure 9.6
Token Frame Format

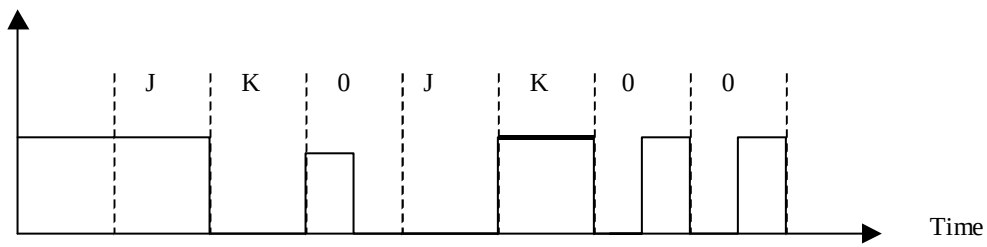

Figure 9.7
SD Timing

Access Control Byte

- P: priority
- T: token (0- frame, 1- token)
- R: reserve
- M: monitor (1- active monitor removes frame)

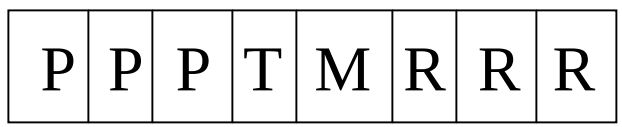

Figure 9.8

802.5 Formats

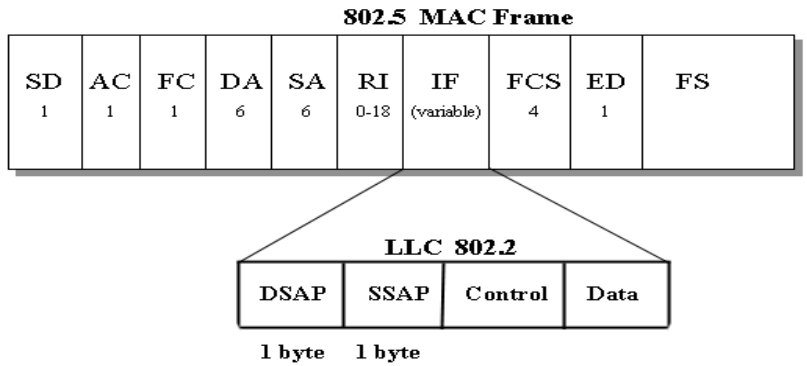

Figure 9.9: MAC & LLC (802.2)

Figure 9.10: Frame Control

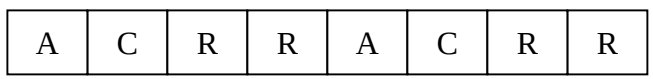

Figure 9.11: Frame Status

Token Ring NIC

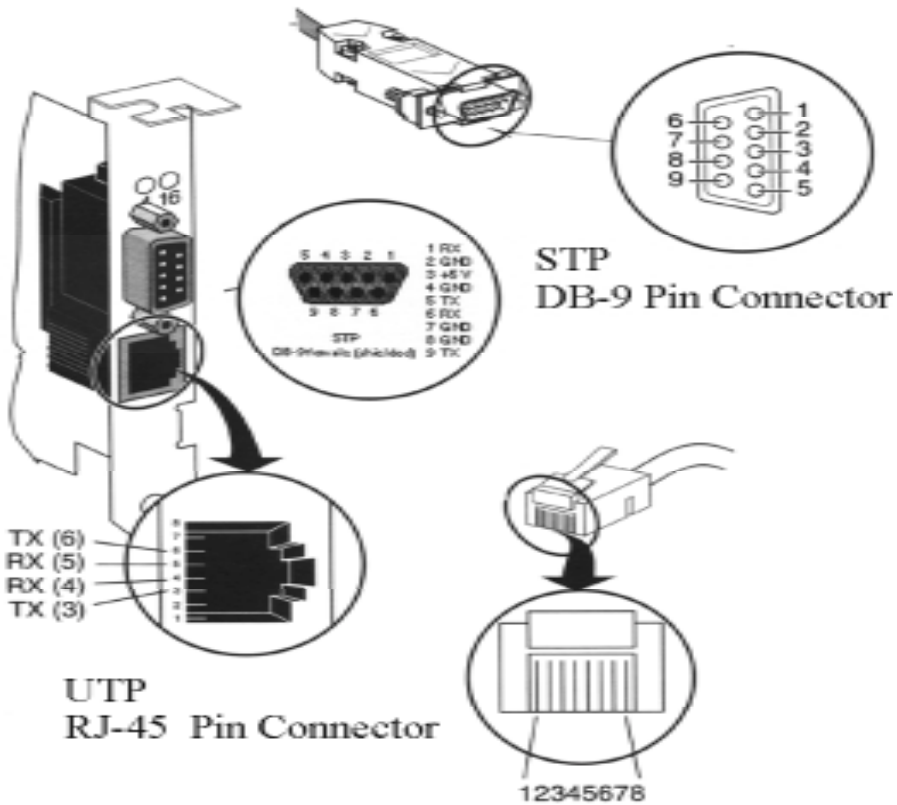

Figure 9.12

Token Ring vs. Ethernet

	Token Ring	Ethernet
Priority	Yes	No
Routing Info	Yes	No
Frame Type	IEEE 802.5	IEEE 802.3
Frame Size	1 – 18 Kbytes	1 – 1.5 Kbytes
Performance	Deterministic (sic)	Variable
Cable	UTP/STP/Fiber/Coax	UTP/STP/Fiber/Coax
Speed	4/16 Mb/s	10/100/1000 Mb/s

Table 9.3

Token Bus

- Defined for factory automation LANs
- Not widely used (Ethernet performance adequate)

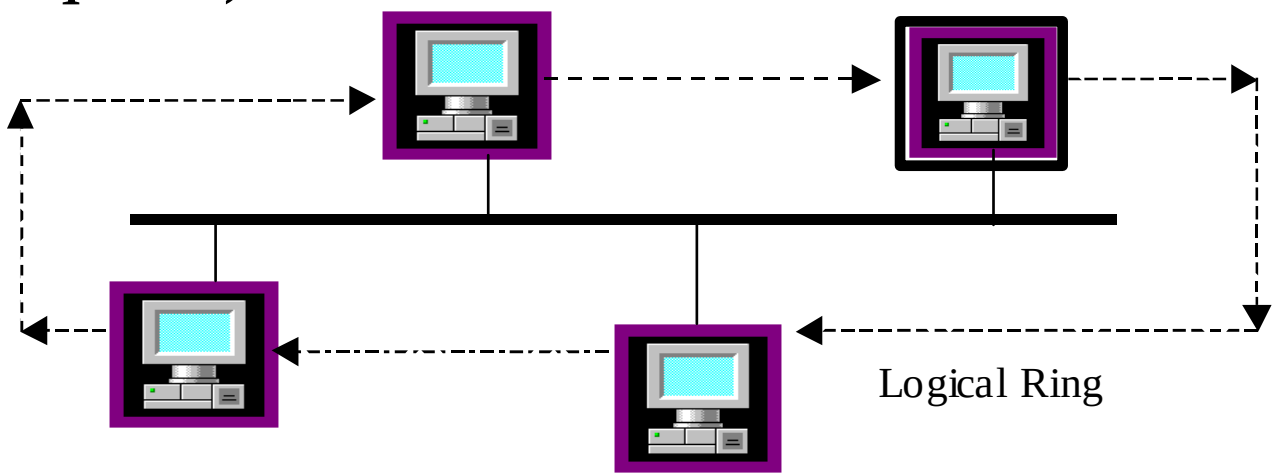

Figure 9.13