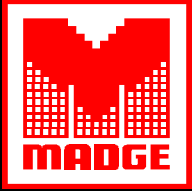# IEEE 802.5 Technical Presentation

Token Ring MAC*lite*
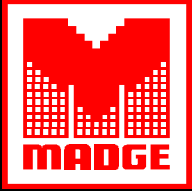
Neil Jarvis
Simon Harrison
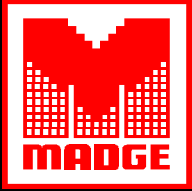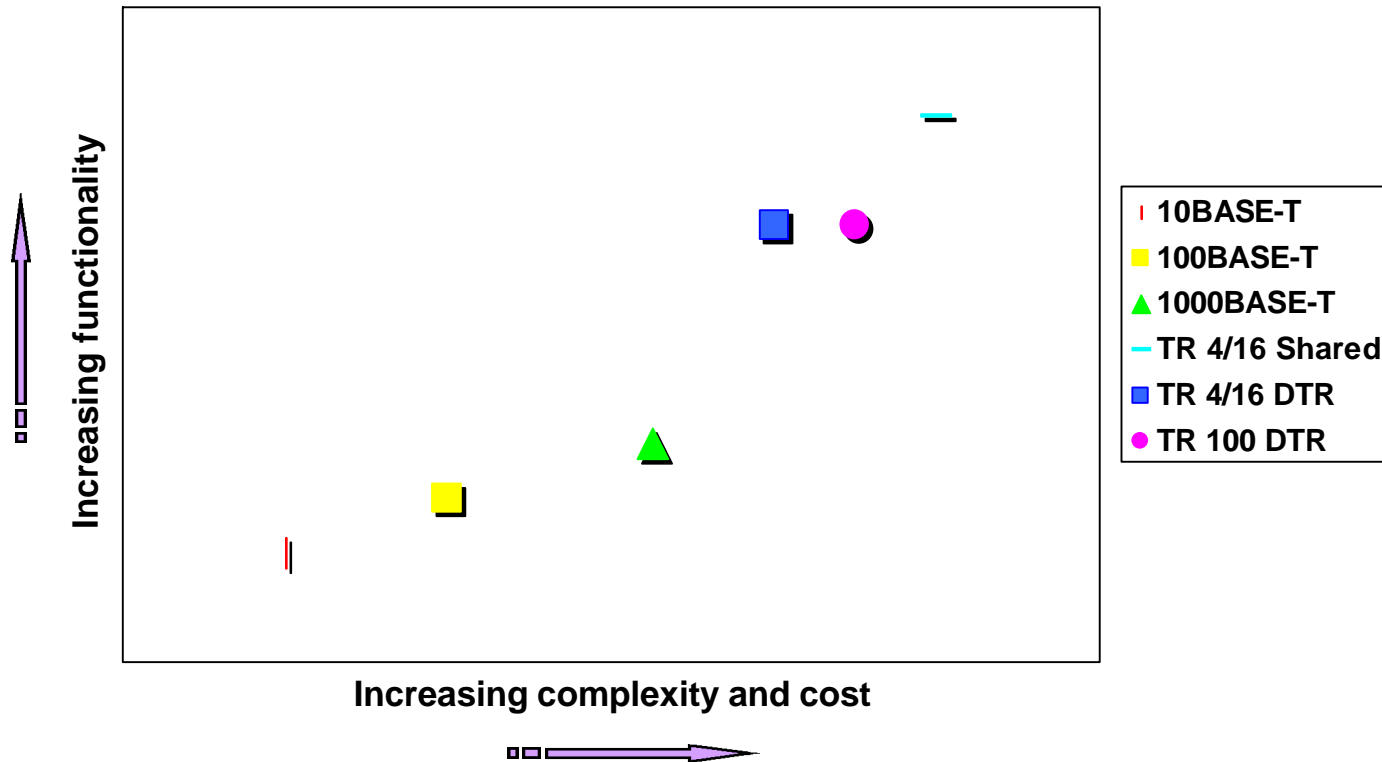
12 November, 1998

Overview

- **Cost of Token Ring vs. Ethernet**

- **Functionality of Token Ring MAC**

- **Goals and assumptions for MAC*lite***

- **Proposal for Token Ring MAC*lite* functionality**

- **Conclusions**

# Token Ring vs. Ethernet

- **Complexity and cost of implementation vs. Benefit of functionality**

Increasing functionality

Increasing complexity and cost

Legend:
- 10BASE-T
- 100BASE-T
- 1000BASE-T
- TR 4/16 Shared
- TR 4/16 DTR
- TR 100 DTR

What is the benefit of Token Ring MAC?

■ **Token Ring MAC adds functionality for the user and network manager**

◆ **Lobe media testing**

◆ **Registration (DTR only)**

◆ **Link maintenance**

◆ **Hard error recovery**

◆ **Fault isolation (limited in DTR)**

◆ **Error reporting**
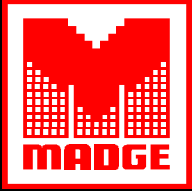
# Where is the increased cost of Token Ring MAC?

- **Implementing Token Ring MAC**
  - ◆ Requires a processor to implement high priority foreground tasks
    - On chip
    - Off chip
    - Shared central processor
  - ◆ Requires multiplexing of Token Ring MAC control traffic with normal data traffic
 - ◆ Requires queuing of Token Ring MAC control traffic
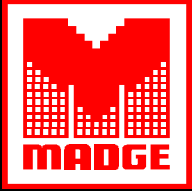
MAC*lite* Goals

- **Remove the need for a dedicated processor**

- **Remove the need for MAC control traffic multiplexing**

- **Remove the need for MAC control traffic queuing**

  - **Design for a single traffic stream**

- **Retain beneficial Token Ring MAC functionality**

- **Add new functionality**
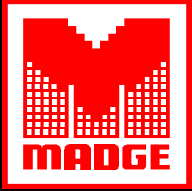
MAC*lite* Assumptions

- **Dedicated Token Ring only**

  - Point to point links

  - Station and C-Port

- **High Media Rate only**

  - 100 Mbit/s

  - 1000 Mbit/s

  - ...and above
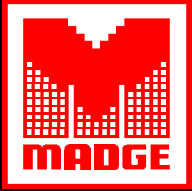
Proposed MAC*lite* Functionality

- **Lobe Media Testing**
  - Retain HSTR LMT
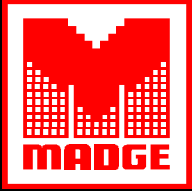 - Can be implemented in hardware
    - High bandwidth requirement

- **Registration**
  - Retain HSTR registration
    - Extensibility is a useful feature
  - Can be implemented in a shared processor

- **Lobe Maintenance**
  - Retain heart beat and link_status monitoring
 - Can be implemented on a shared processor with hardware assist

Proposed MAC*lite* Functionality (cont.)

■ **Hard Error Recovery**

  ◆ **Remove recovery process**

  ◆ **Close link on detection of hard error**

   ● **Report fault in remove alert MAC frames**

   ● **No need for beacon frames**

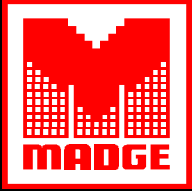 ◆ **Can be implemented on shared processor**

■ **Error Reporting**

  ◆ **Retain HSTR error reporting**

  ◆ **Add symbol error reporting**

  ◆ **Low priority task**

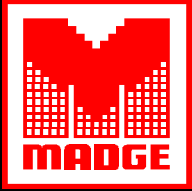 ◆ **Can be implemented on shared processor**
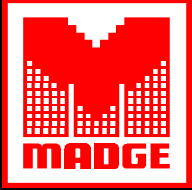
New MAC*lite* Functionality

- **Zero Configuration End Stations**

  - ◆ **Central management of end station configuration**

  - ◆ **Configuration sent to end station during registration**

  - ◆ **Opportunity to standardise CRS functionality which was missing from DTR**

    - ● **LAA**

    - ● **Frame size**

    - ● **etc.**

Issues

- **This is only a proposal…**

- **Must be compatible with HSTR DTR**
    - ◆ **Registration will include MAC*lite* negotiation**
    - ◆ **Can implement MAC*bloat*, an entity that can support both MAC and MAC*lite* connections**

Conclusions

- **Proposed MAC*lite* functionality meets most of the stated goals**

  - Simple multiplexing requirement is still needed, but so does Ethernet when 802.3x is implemented.

- **Proposed MAC*lite* has the opportunity of providing Token Ring functionality at Ethernet cost and complexity**

- **Proposed MAC*lite* can be further enhanced**

- **Proposed MAC*lite* can be standardised by the IEEE 802.5 committee**