

## AT-MR420TR & AT-MR820TR, Ethernet Micro Hubs

AT-MR420TR, 4 port Ethernet hub with internal power supply with 1 x AUI and 1 x BNC port

AT-MR820TR, 8 port Ethernet hub with internal power supply with 1 x AUI and 1 x BNC port

### KEY FEATURES

IEEE 802.3 compliant 10T and Ethernet, Version 1.0 and 2.0 compatible

IEEE 802.3 compliant AUI and BNC connectors for coaxial, twisted pair and fiber optic connectivity

UTP uplink for network cascading

User selectable AUI or BNC backbone

Backbone network enable/disable switch

Packet regeneration, automatic polarity detection/correction and link test capabilities

Segment partitioning and jabber lock-up protection

Status and diagnostic LEDs

Rugged steel chassis

Lifetime warranty\*  
\*(see facing for details)

These Micro Hubs are twisted pair hubs intended to connect as many as eight IEEE 802.3 10T network segments through one unit. Each hub has one twisted pair port specifically designed with an uplink (cascading) capability supporting a Media Dependent Interface (MDI/MDI-X) crossover switch. As many as four hubs can be cascaded together to form an independent workgroup containing as many as 26 nodes. To form an independent workgroup, the micro hubs are equipped with a Backbone Enable/Disable Switch to separate (or reconnect) all connected or cascaded nodes from the backbone ports.

These Micro Hubs also contain two additional ports for attachment to the Local Area Network (LAN) backbone. One such port is configured with an Attachment Unit Interface (AUI), which with an external transceiver can provide attachment to thick coax, twisted pair or fiber-optic media. The other port is configured with a Bayonet Nut Couple (BNC) connection for direct attachment to thin coax media. Either port may be selected manually with a Media Select Switch.



These micro hubs utilize the latest IC and Surface Mount Technology (SMT), which increases functionality and reliability. Additionally, these hubs are small in size, yet they provide the complete functionality of large hubs including packet regeneration and network partitioning. The packet regeneration results in a higher performance network by regenerating preamble, retiming the data packets and extending collision fragments to ensure collision enforcement by all nodes. Each segment automatically detects the polarity of the receive pair and reverses should the pair be incorrectly installed. The IEEE-defined link integrity test function continually monitors the receive pair to ensure link continuity. It also includes a partitioning capability where each segment automatically disconnects itself after repeated collisions are detected.

The hubs supports jabber lock-up protection on all interfaces, preventing transceiver lock-up resulting from packets that exceed the maximum packet length. Network diagnostic LEDs are provided on the front of the Micro Hubs to aid in troubleshooting and fault isolation.

There are two LEDs associated with each twisted pair segment that indicate packet "Receive" and "Link OK" (indicating an operational segment). Additionally, there are three central LEDs indicating "Activity," "Collision" and "Power."

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## STATUS INDICATORS

Receive Indicates port is not partitioned and activity on the port  
 Link OK Indicates port OK (valid link and segment not partitioned)

### Front Panel Central:

Power Indicates power is on  
 Collision Indicates there is a collision detected within the hub  
 Activity Indicates the hub is transmitting packets to all ports

## PACKET TRANSMISSION CHARACTERISTICS

Delay Times:  
 (Any segment in to all other segments out)

AUI to UTP	
Start of Packet	900ns Maximum
Collision to Jam	900ns Maximum
UTP to UTP	
Start of Packet	700ns Maximum
Collision to Jam	700ns Maximum
BNC to UTP	
Start of Packet	770ns Maximum
Collision to Jam	1000ns Maximum

### Preamble:

Input 32 bits Minimum including SFD  
 Output 64 bits including SFD (last 2 bits are 1,1)

### Jam Output:

A pattern of 1,0 is sent to all segments (except receive port) when a collision is detected.

### Packet Fragment Extension:

96 bits including preamble.  
 Packet fragments are extended using the 1,0 pattern.

### Auto Partitioning/Reconnection:

Port partitioning occurs after 32 consecutive collisions or if collision has a duration of more than 1 ms. Reconnection occurs after 512 bits are received or transmitted on the partitioned port without collision (IEEE standard algorithm) or after data is transmitted without collision for 512 bits (alternate algorithm.)

### Jabber Lock-Up Protection:

For packets that exceed 64k bit, packet output is interrupted for 96 bit times.

## AUI INTERFACE (IEEE 802.3 COMPLIANT)

Parameter:	Typical	Maximum
Signaling Rate	10Mbps	
DI/CI Input Impedance	78 Ω	73 to 83 Ω
DO Output Impedance	78 Ω	73 to 83 Ω
DO Output Voltage	900mv	450 to 1315mv
DO Common Mode		
Output Voltage (DC)	5.5v	
DI, CI Threshold Level	160 to 275mv	
AUI iCable Length	50m	

## UTP INTERFACE (IEEE 802.3 10T COMPLIANT)

Transmitter:	Typical	Range
Peak Differential Signal Amplitude	2.5v	2.2 to 2.8v
Transmitter Jitter	±3.5ns	
Harmonics Content		<27 dB below fund.
Common Mode		
Output Voltage		≤50 mV
Silence Voltage	0	±50 mV
Link Test Pulse	100ns	60 to 130ns
Output Impedance	100 Ω	85 to 115 Ω
UTP Length		100m

### Receiver:

Receiver Threshold -400mv -300 to -520mv  
 Differential Noise Rejection 300mv

### Ports:

	MR820TR	MR420TR
AUI (15-pin D-connector)	1	1
BNC	1	1
Twisted Pair (RJ-45 connector)	8	4

## COAXIAL INTERFACE (IEEE 802.3 COMPLIANT)

Input Impedance >100K Ω  
 Coaxial Tap Capacitance <6 pf

Input/Output Voltage:	Typical	Range
DC Offset	-01v	-.05 to 0v
AC Offset	1.86Vp-p	1.2 to 2.4Vp-p
Transmit Rise/Fall Time	25ns	±5ns

## POWER CHARACTERISTICS

Input Voltage 100-120vAC, 50/60Hz, 0.5A  
 200-240vAC, 50/60Hz, 0.25A  
 Power 15W

## ENVIRONMENTAL SPECIFICATIONS

Operating Temp. 0°C to 50° C  
 Storage Temp. -20°C to 60° C  
 Relative Humidity 5% to 80% noncondensing

## PHYSICAL CHARACTERISTICS

Dimensions 33.3cm x 11.2cm x 3.8cm  
 (13.1" x 4.4" x 1.5")  
 Weight 1.25kg (2lbs 12.0oz)

## ELECTRICAL/MECHANICAL APPROVALS

EMI FCC Class A  
 Safety UL, CSA, TUV-GS

## ORDERING INFORMATION

### AT-MR420TR-xx

4 UTP Ports  
 1 AUI Port  
 1 BNC Port

### AT-MR820TR-xx

8 UTP Ports  
 1 AUI Port  
 1 BNC Port

### Where xx =

15 for 100-120 V with internal power supply and U.S. power cord  
 25 for 200-240 V with internal power supply and without power cord

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