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A PRACTICAL COMPARISON OF ETHERNET STANDARDS

by

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1. INTRODUCTION

This document describes a series of tests carried out at Daresbury Laboratory to examine the degree of interworking possible between Ethernet equipment designed to the DIX 1.0 specification [1] and that designed to the IEEE 802.3 specification [2]. The following table shows the equipment used and the specification to which it adheres.

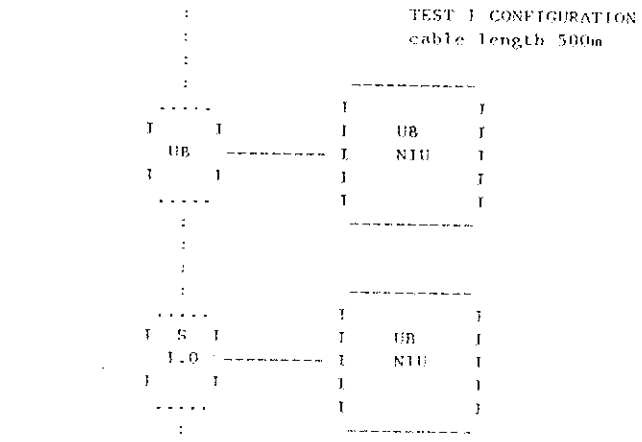
Description of equipment	Specification
Ungermann-Bass, Inc. transceivers	DIX 1.0
Sension Scientific Ltd. transceivers	DIX 1.0
Sension Scientific Ltd. transceivers	IEEE 802.3
Interlan, Inc. eThernet interface board (NM10)	DIX 1.0
Sension Scientific Ltd. PADS	IEEE 802.3
Sension Scientific Ltd. repeater	IEEE 802.3
Ungermann-Bass, Inc. Network Interface Units (NIUs)	DIX 1.0

2. DETAILS OF THE TESTS

2.1 Test 1

A network conforming to DIX 1.0 was set up comprising two Ungermann-Bass Network Interface Units (UB NIUs), one UB transceiver and one Sension (DIX 1.0) transceiver.

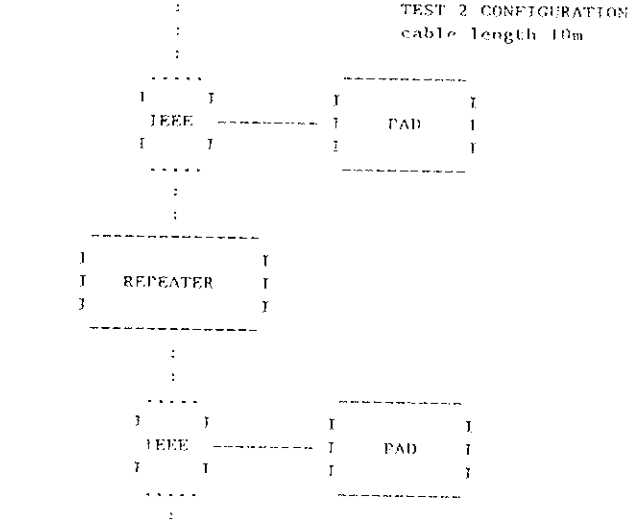
Results: Communication was possible between a terminal attached to one NIU and a host machine attached to the other NIU.



2.2 Test 2

A network conforming to IEEE 802.3 was set up comprising two Sension PADs, two Sension (IEEE 802.3) transceivers, and a Sension repeater.

Results: Communication was possible between two terminals one connected to each of the PADs.

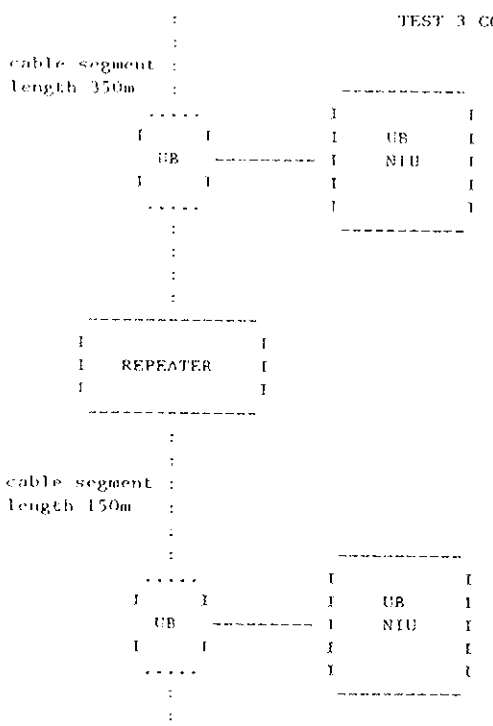


2.3 Test 3

A repeater (IEEE 802.3) was introduced into the DIX 1.0 network between the two UB NIUs, and test 1 was repeated.

Results: Communication was possible between the two UB NIUs through the repeater.

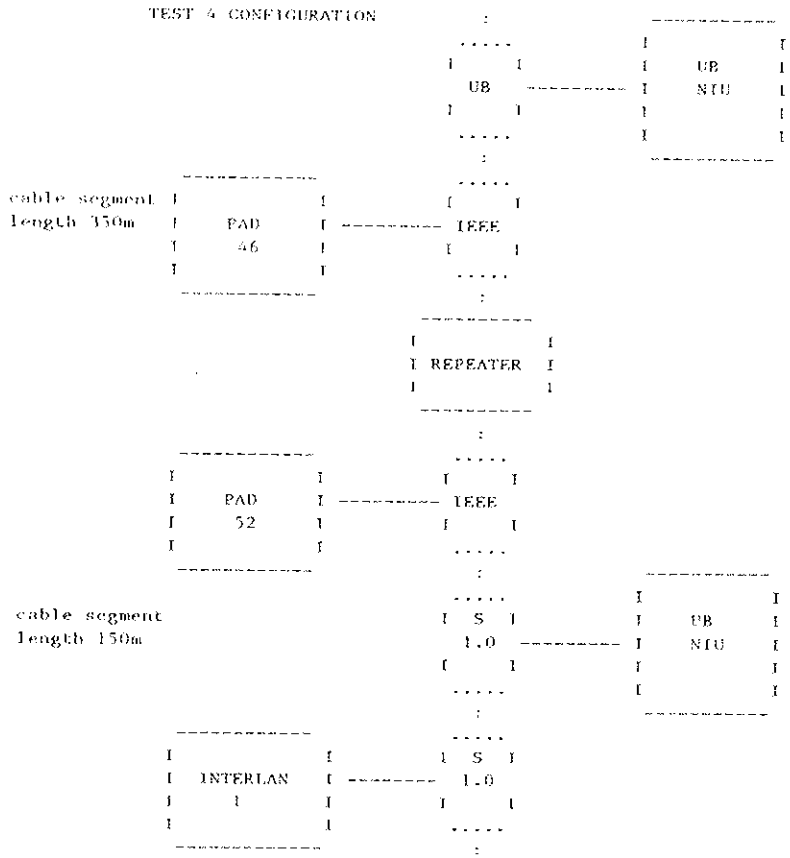
TEST 3 CONFIGURATION



2.4 Test 4

The arrangements described in 2.1 and 2.2 were amalgamated as detailed in the following diagram. An Interlan, Inc. ethernet interface board was added to the network connected through a Sension (DIX 1.0) transceiver. The Interlan board was running a network monitor and displaying packets observed and accumulated statistics on a terminal.

TEST 4 CONFIGURATION



(The numbers on the above PADs and Interlan board are purely to distinguish between the devices).

Tests 1 and 2 were then repeated separately to confirm that communication was still possible and then both tests were set up simultaneously and left for over an hour.

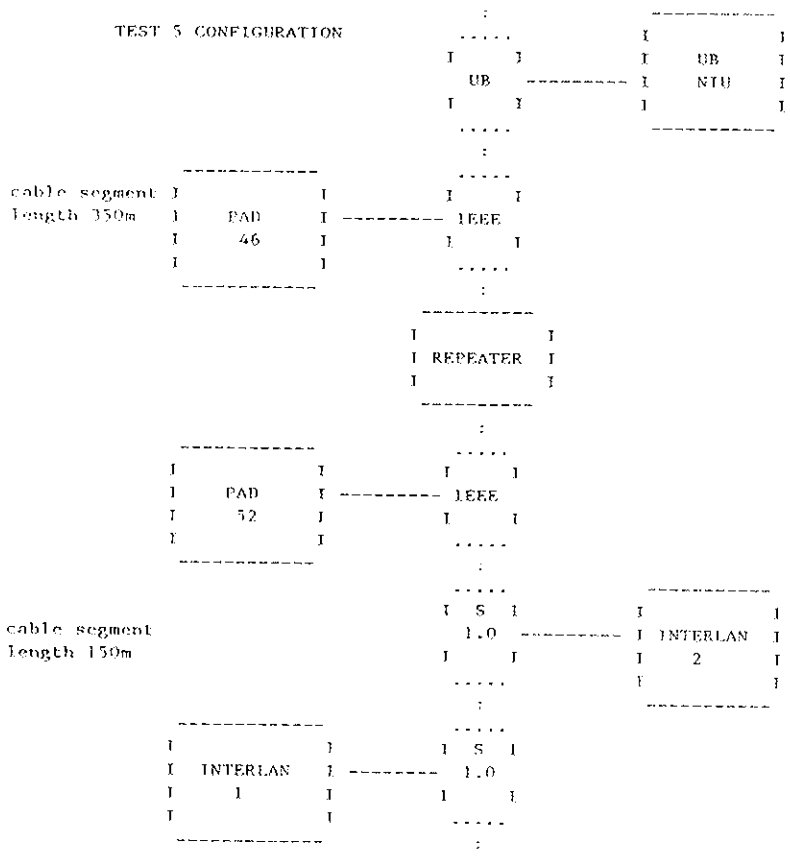
Results: Approximately 250 thousand packets were transmitted without error.

2.5 Test 5

For this test one UB NIU was replaced by an Interlan board to enable one Interlan board to be actively involved in the test

whilst the other ran the network monitor. PAD 46 ran a program that sent a packet onto the ether and waited for a packet to come back. On receipt of a packet the program compared Interlan board 1 ran a program that waited for a packet to come off the ether and sent it back with its source and destination addresses interchanged. As can be seen from the diagram below packets travelling between PAD 46 and Interlan board 1 were passing through the repeater. After approximately 7,000 packets had been monitored a switch on the repeater was used to disconnect the two sections of ether.

Results: Packets travelled successfully between PAD 46 and Interlan board 1. When the path through the repeater was broken movement of packets stopped.



2.6 Test 6

Test 5 was repeated using PAD 52 and Interlan board 1. As can be seen from the diagram in section 2.5 packets travelling between PAD 52 and Interlan board 1 did not pass through the repeater. The switch on the repeater was used to isolate the unused segment of ether after about 7,000 packets had been monitored.

Results: Packets travelled successfully between PAD 52 and Interlan board 1. When the unused segment of ether was isolated no effect was observed on the packet exchange in progress.

2.7 Test 7

Test 7 was to test whether an Interlan board could be connected to the ether through an IEEE 802.3 transceiver. The network used was as described in section 2.4 except for the substitution of the Sension (IEEE 802.3) transceiver on the Interlan board connection. The Interlan board and PAD 46 ran the programs described in section 2.5.

Results: Packets were transmitted successfully between PAD 46 and the Interlan board.

2.8 Test 8

Test 8 was to discover whether a UB NIU could be connected to the ether through an IEEE 802.3 transceiver. The network used was as described in section 2.4 except for the substitution of a Sension (IEEE 802.3) transceiver on a UB NIU connection. Attempts were made to connect a terminal to a host through the two UB NIUs.

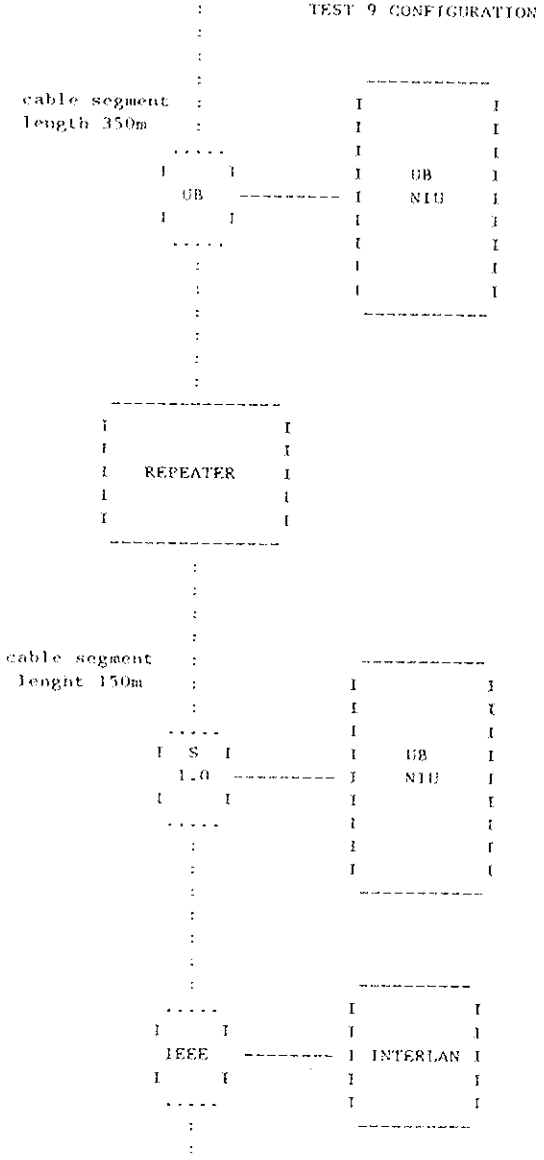
Results: Packets could not be exchanged between a UB NIU connected to the ether through a UB transceiver and one connected through a Sension (IEEE 802.3) transceiver.

2.9 Test 9

A test was made to check that packets admitted onto the ether by a UB transceiver could be received successfully by an IEEE 802.3 transceiver. Two UB NIUs and an Interlan board were used as in the following diagram. The Interlan board ran the network monitor and a connection was made between a terminal and a host through the UB NIUs.

Results: Packets were successfully received by the network monitor.

TEST 9 CONFIGURATION



3. CONCLUSIONS

i) All three standards (UB, Session(DIX 1.0), and Session(IEEE 802.3)) interwork on the ether and through the IEEE 802.3 repeater.

ii) UB transceivers and Session (DIX 1.0) transceivers are interchangeable.

iii) Interlan boards work with both IEEE 802.3 and DIX 1.0 transceivers.

iv) UB interface does not work with IEEE 802.3 transceivers. This is expected as the UB interface requires DC coupling to its transceivers.

NOTE: Information received from Ungermann-Bass on 26th April 1984 indicates that the Net/One range will now interface to an IEEE 802.3 transceiver as the Encoder/Decoder module on each NIU has been modified.

ACKNOWLEDGEMENTS

The experiments described in this document were carried out with the aid of equipment and personnel from Sension Scientific Ltd., Denton Drive Industrial Estate, Northwich, Cheshire.

We would like to thank Sension Scientific Ltd. for their help.

The tests described in this paper were performed on equipment at Daresbury Laboratory. Daresbury Laboratory do not wish to infer that the same results would be obtained on a different configuration or that current manufacturer's equipment will give the same results.

REFERENCES

(1) Digital Equipment Corporation, Intel Corporation, and Xerox Corporation. "The Ethernet A Local Area Network Data Link Layer and Physical Layer Specifications." September 1980.

(2) IEEE. "IEEE Standard 802.3 CSMA/CD Medium Access Method." December 1982. delete 2360 2570