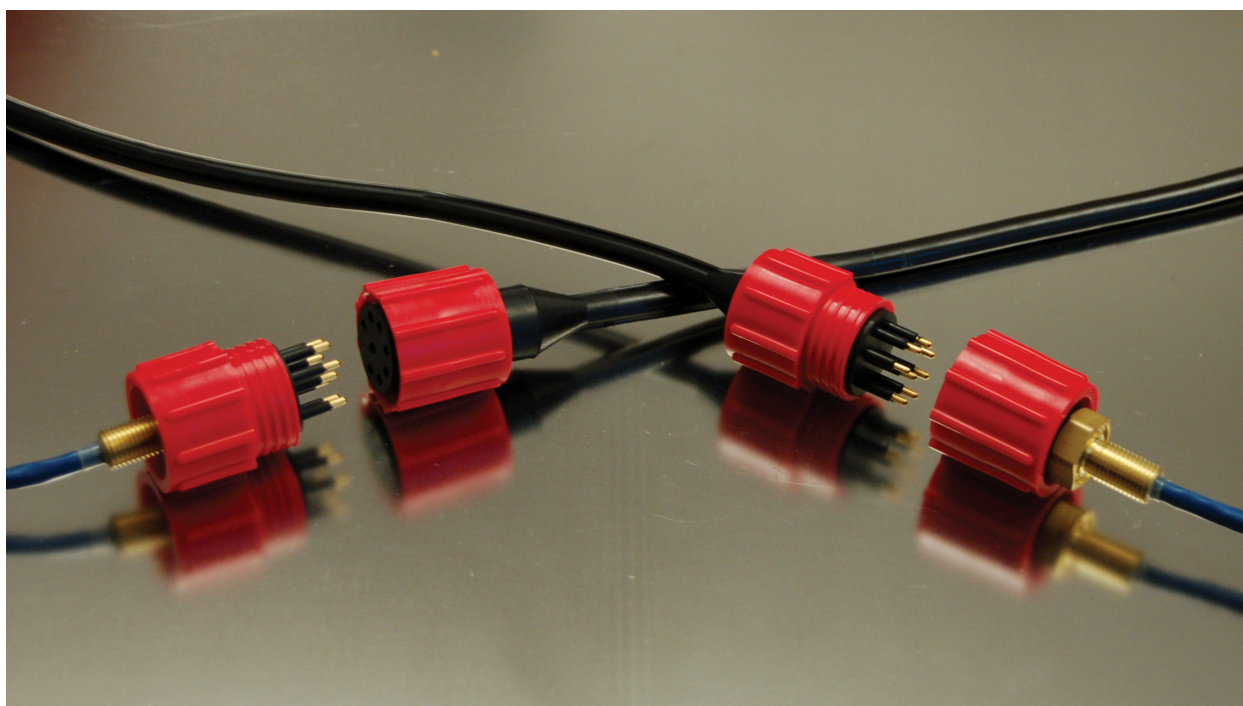


Test report:

MacArtney Ethernet Instrumentation Cable



Test Report - MacArtney Ethernet Instrumentation Cable

Prepared by: HSM Date: 20-01-2008

Checked by: J/L Date: 21-1-08

Test summary

The test of the MacArtney Ethernet Instrumentation Cable was carried out using an EXFO FTB-400 Ethernet protocol analyzer. This tester is based on the IEEE802.3 standard, and performs the test according to the RFC-2544 protocol specification.

The test setup, described in section 2.0, is also based on IEEE802.3, dictating maximum cable length, connector wiring etc.

Test results

In the table below bandwidth vs. cable length can be seen for different environments.

	2 m	10 m	25 m	50 m	100 m
Air	1 Gbps	1 Gbps	1 Gbps	100 Mbps	10Mbps
Water 200bar	1 Gbps	1 Gbps	1 Gbps	*	*
Water 600bar	1 Gbps	1 Gbps	1 Gbps	*	*

* Not tested with this setup

Protocol analyzer reports is mentioned further in Section 6.0.

Conclusion

The test concludes that the MacArtney Ethernet Instrumentation Cable can be used for Ethernet applications running at 1 Gbps speed in lengths up to 25m, however it should be noted that this test covers only use complying with the IEEE standard, therefore equipment not complying with the standard, e.g. prototypes and “one off” laboratory equipment, may not function properly with this cable.

On cable lengths above 25m the environment should be examined individually with regards cable length and speed.

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1.0 Objective

The objective of this qualification test is to establish the suitability of the MacArtney Ethernet Instrumentation Cable for use with high-speed data communication equipment. This test is limited to the Ethernet protocol.

2.0 Material

The test is performed on 5 cable assemblies according to drawing: "V040170000-05 Layout 1". The drawing is found in appendix 1.

3.0 Design

The design is based on the IEEE802.3, stating that the length may not exceed 100m. The cables are designed with Subconn moulded inline connectors on instrumentation cables and Subconn bulkhead connectors for access to equipment in dry ends. Cat5e cables are used on bulkhead parts, mounted with RJ45 connectors according to ANSI-568B.

4.0 Test procedure

The test is performed using an EXFO FTB-400 Ethernet protocol analyzer. This tester is based on the IEEE802.3 standard, and performs the test according to the RFC-2544 protocol specification.

The test is performed on 5 cable assemblies; with 3 setups for each cable: Cable in air, cable under 200 bars water pressure and cable under 600 bars water pressure. The test procedure has been prepared by MacArtney A/S, as the IEEE802.3 does not mention any specific test requirements.

Test Report - MacArtney Ethernet Instrumentation Cable

Prepared by: HSM Date: 20-01-2008 Checked by: [Signature] Date 21-1-08

5.0 Test

Test setup #1

This setup comprises the protocol analyzer and cables.

Bandwidth of cables:

	Bandwidth	Package loss	Latency
2m	1 Gbps	0%	100% util.
10m	1 Gbps	0%	100% util.
25m	1 Gbps	0%	100% util.
50m	100 Mbps	0%	100% util.
100m	10 Mbps	0%	100% util.

Test setup #2

This setup comprises the protocol analyzer, cables, and pressure test facilities at MacArtney premises.

Test Pressure: 200 bars

Bandwidth of cables:

	Bandwidth	Package loss	Latency
2m	1 Gbps	0%	100% util.
10m	1 Gbps	0%	100% util.
25m	1 Gbps	0%	100% util.
50m	*	*	*
100m	*	*	*

* Not tested with this setup

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Prepared by: HSM Date: 20-01-2008 Checked by: *HL* Date 21-1-08

Test setup #3

This setup comprises the protocol analyzer, cables, and pressure test facilities at MacArtney premises.

Test Pressure: 600 bars

Bandwidth of cables:

	Bandwidth	Package loss	Latency
2m	1 Gbps	0%	100% util.
10m	1 Gbps	0%	100% util.
25m	1 Gbps	0%	100% util.
50m	*	*	*
100m	*	*	*

* Not tested with this setup

6.0 Test evaluation

The test shows that cable length as long as 25 m will run gigabit Ethernet, lengths above

25 m will decrease the bandwidth, according to the table below.

In the table below bandwidth vs. cable length can be seen for different environments.

	2 m	10 m	25 m	50 m	100 m
Air	1 Gbps	1 Gbps	1 Gbps	100 Mbps	10Mbps
Water 200bar	1 Gbps	1 Gbps	1 Gbps	*	*
Water 600bar	1 Gbps	1 Gbps	1 Gbps	*	*

* Not tested with this setup

The protocol analyzer reports can be seen in the following appendices:

Appendix 2: 25 m 1000Mbps (valid for 2 m and 10 m as well)

Appendix 3: 25 m 1000Mbps 200 bars (valid for 2 m and 10 m as well)

Appendix 4: 25 m 1000Mbps 600 bars (valid for 2 m and 10 m as well)

Appendix 5: 50 m 100Mbps

Appendix 6: 100 m 10Mbps

Test Report - MacArtney Ethernet Instrumentation Cable

Prepared by: HSM Date: 20-01-2008

Checked by: [Signature] Date 21-1-08



7.0 Design evaluation

The design has proven to fulfil the IEEE802.3 standard with some exceptions.

The test shows that cable length as long as 25m will run gigabit Ethernet; lengths above 25m will decrease the bandwidth, according to the tables in section 5.0.

Furthermore it is important to consider the protocol; this test has been performed using TCP/IP RFC2544 protocol. In case an application specific protocol differs from this, several issues can change the bandwidth.

8.0 Reference Documentation

IEEE802.3 standard.

Test Report - MacArtney Ethernet Instrumentation Cable

Prepared by: HSM Date: 20-01-2008

Checked by: *[Signature]* Date 21-1-08