

# ISO/IEC 14165-114 :2005-04 (E)

## Information technology\_ - Fibre Channel\_ - Part\_114: 100 MB/s Balanced copper physical interface (FC-100-DF-EL-S)

---

### CONTENTS

- FOREWORD.....5
- INTRODUCTION.....6
- 1 Scope .....7
- 2 Normative references .....7
- 3 Definitions, symbols and abbreviations.....8
  - 3.1 Definitions .....8
  - 3.2 Symbols .....9
  - 3.3 Abbreviations .....9
- 4 MAC interface .....9
  - 4.1 General .....9
  - 4.2 Overview .....9
  - 4.3 Detailed specification.....10
    - 4.3.1 RD<7:0> received data .....10
    - 4.3.2 RV receive valid.....10
    - 4.3.3 RE receive error.....10
    - 4.3.4 RCLK receive clock.....10
    - 4.3.5 TD<7:0> transmit data.....10
    - 4.3.6 TV transmit valid.....11
    - 4.3.7 TE transmit error.....11
    - 4.3.8 TCLK transmit clock .....11
    - 4.3.9 DC characteristics.....11
    - 4.3.10 MAC characteristics .....11
    - 4.3.11 MAC, GMII and MII interfaces.....11
  - 4.4 Testing.....12
  - 4.5 Data stream.....12
  - 4.6 Service control functions.....12
  - 4.7 Timers.....13
  - 4.8 Delay requirements.....13
  - 4.9 Reset .....13
- 5 Operation .....13
  - 5.1 Detail of the physical interfaces .....13
  - 5.2 Signalling .....14
  - 5.3 Frame format.....14
  - 5.4 Functions at the MAC interface .....15
- 6 Coding .....15
  - 6.1 Timers.....15
  - 6.2 Receive status OK.....15
  - 6.3 Errors.....15
  - 6.4 PHY control .....15
  - 6.5 Bit error rate.....15
- 7 Test .....15

7	Test .....	15
7.1	General .....	15
7.2	Tests .....	16
7.3	Fixtures .....	16
7.4	Interoperability compliance points .....	16
8	Transmitter signal.....	16
8.1	General .....	16
8.2	Differential output voltage and accuracy .....	16
8.3	Scrambling .....	16
8.4	Transmit eye diagram .....	17
8.5	Jitter.....	17
9	Receiver signal.....	18
9.1	General .....	18
9.2	Differential input voltage and accuracy .....	18
9.3	Descrambling .....	18
9.4	Receive eye diagram .....	18
10	Electrical and mechanical requirements .....	19
10.1	Isolation .....	19
10.2	Clock frequency.....	19
10.3	Receiver common mode rejection .....	19
10.4	Transmitter common mode output voltage .....	19
10.5	Input tolerance .....	19
10.6	Return loss.....	20
10.7	Connector .....	20
10.8	Connector configuration.....	20
11	Cabling channel.....	20
11.1	General conditions.....	20
11.2	External noise .....	20
12	Environmental .....	20
12.1	Safety .....	20
12.2	Grounding .....	20
12.3	Telephone voltages .....	21
12.4	Susceptibility .....	21
12.5	Temperature and humidity .....	21
12.6	Labelling .....	21
	BIBLIOGRAPHY .....	22

Figure 1 – Model.....	6
Figure 2 – MAC interface .....	9
Figure 3 – Interface overview via 100 $\Omega$ Class F cabling .....	10
Figure 4 – MAC interface data stream .....	12
Figure 5 - State diagram of MLT-3.....	13
Figure 6 – Coding scheme of MLT-3.....	13
Figure 7 – Transmission with MLT-3.....	14
Figure 8 – Frame format .....	14
Figure 9 – Scrambler polynomial and correspondent circuit diagram .....	16
Figure 10 – Transmission eye diagram .....	17
Figure 11 – Transmission eye diagram detail.....	17
Figure 12 – Receiver eye diagram.....	18
Figure 13 – Receiver common mode rejection test.....	19
Figure 14 – Common mode voltage test .....	19
Table 1 – DC characteristics .....	11
Table 2 – AC characteristics .....	11
Table 3 – Signal mapping.....	12
Table 4 – Delay requirements .....	13
Table 5 – Control functions .....	15
Table 6 – Eye diagram mask at points R1 and R2.....	18
Table 7 – Return loss.....	20
Table 8 – Connector configuration.....	20