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CONTENTS

FOREWORD.....	14
INTRODUCTION.....	16
1 Scope.....	18
2 Normative references.....	18
3 Terms, definitions, symbols, abbreviations, keywords, and conventions.....	20
3.1 Terms and definitions.....	20
3.2 Symbols and abbreviations.....	33
3.2.1 Abbreviations.....	33
3.2.2 Symbols.....	36
3.2.2.1 Units.....	36
3.2.2.2 Mathematical operators.....	36
3.2.2.3 Other symbols.....	37
3.3 Keywords.....	38
3.4 Editorial conventions.....	39
3.5 Numeric and character conventions.....	40
3.5.1 Numeric conventions.....	40
3.5.2 Units of measure.....	40
3.5.3 Byte encoded character strings conventions.....	41
4 General.....	42
4.1 Physical links and phys.....	42
4.2 Phy test functions.....	42
5 Physical layer.....	43
5.1 Physical layer overview.....	43
5.2 Conventions for defining maximum limits for S-parameters.....	43
5.3 Compliance points.....	44
5.3.1 Compliance points overview.....	44
5.3.2 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s compliance points.....	45
5.3.3 12 Gbit/s compliance points.....	53
5.4 Interconnects.....	55
5.4.1 SATA connectors and cable assemblies.....	55
5.4.2 SAS connectors and cables.....	56
5.4.3 Connectors.....	60
5.4.3.1 Connectors overview.....	60
5.4.3.2 Connector categories.....	62
5.4.3.3 Recommended electrical performance limits for mated connector pairs supporting rates of 12 Gbit/s.....	63
5.4.3.4 SAS internal connectors.....	64
5.4.3.4.1 SAS Drive connectors.....	64
5.4.3.4.1.1 SAS Drive plug connector.....	64
5.4.3.4.1.2 SAS Drive cable receptacle connector.....	65
5.4.3.4.1.3 SAS Drive backplane receptacle connector.....	66
5.4.3.4.1.4 SAS Drive connector pin assignments.....	67
5.4.3.4.1.5 SAS MultiLink Drive plug connector.....	69
5.4.3.4.1.6 SAS MultiLink Drive cable receptacle connector.....	69
5.4.3.4.1.7 SAS MultiLink Drive backplane receptacle connector.....	70
5.4.3.4.1.8 SAS MultiLink Drive connector pin assignments.....	70
5.4.3.4.1.9 Micro SAS plug connector.....	74
5.4.3.4.1.10 Micro SAS receptacle connector.....	74
5.4.3.4.1.11 Micro SAS connector pin assignments.....	75
5.4.3.4.2 SAS 4i connectors.....	76
5.4.3.4.2.1 SAS 4i cable receptacle connector.....	76

5.4.3.4.2.2 SAS 4i plug connector.....	76
5.4.3.4.2.3 SAS 4i connector pin assignments	77
5.4.3.4.3 Mini SAS 4i connectors.....	79
5.4.3.4.3.1 Mini SAS 4i cable plug connector	79
5.4.3.4.3.2 Mini SAS 4i receptacle connector	79
5.4.3.4.3.3 Mini SAS 4i connector pin assignments.....	80
5.4.3.4.4 Mini SAS HD internal connectors	82
5.4.3.4.4.1 Mini SAS HD 4i cable plug connector	82
5.4.3.4.4.2 Mini SAS HD 8i cable plug connector	83
5.4.3.4.4.3 Mini SAS HD 4i receptacle connector	84
5.4.3.4.4.4 Mini SAS HD 8i receptacle connector	85
5.4.3.4.4.5 Mini SAS HD 16i receptacle connector.....	86
5.4.3.4.4.6 Mini SAS HD 4i connector pin assignments.....	87
5.4.3.5 SAS external connectors.....	90
5.4.3.5.1 Mini SAS 4x connectors.....	90
5.4.3.5.1.1 Mini SAS 4x cable plug connector	90
5.4.3.5.1.2 Mini SAS 4x receptacle connector	97
5.4.3.5.1.3 Mini SAS 4x connector pin assignments.....	103
5.4.3.5.1.4 Mini SAS 4x active connector pin assignments	104
5.4.3.5.1.5 Mini SAS 4x active cable power requirements.....	105
5.4.3.5.2 Mini SAS HD external connectors	106
5.4.3.5.2.1 Mini SAS HD 4x cable plug connector	106
5.4.3.5.2.2 Mini SAS HD 8x cable plug connector	107
5.4.3.5.2.3 Mini SAS HD 4x receptacle connector	108
5.4.3.5.2.4 Mini SAS HD 8x receptacle connector	109
5.4.3.5.2.5 Mini SAS HD 16x receptacle connector.....	110
5.4.3.5.2.6 Mini SAS HD 4x connector pin assignments.....	111
5.4.3.5.2.7 Mini SAS HD external connector management interface.....	112
5.4.3.5.2.8 Mini SAS HD external connector memory map.....	113
5.4.3.5.3 QSFP+ connectors	113
5.4.3.5.3.1 QSFP+ cable plug.....	113
5.4.3.5.3.2 QSFP+ receptacle.....	114
5.4.3.5.3.3 QSFP+ connector pin assignments	115
5.4.3.5.3.4 QSFP+ memory map	116
5.4.4 Cable assemblies.....	117
5.4.4.1 SAS internal cable assemblies.....	117
5.4.4.1.1 SAS Drive cable assemblies.....	117
5.4.4.1.2 SAS internal symmetric cable assemblies.....	119
5.4.4.1.2.1 SAS internal symmetric cable assemblies overview	119
5.4.4.1.2.2 SAS internal symmetric cable assembly - SAS 4i.....	120
5.4.4.1.2.3 SAS internal symmetric cable assembly - Mini SAS 4i	121
5.4.4.1.2.4 SAS internal symmetric cable assembly - Mini SAS HD 4i.....	122
5.4.4.1.2.5 SAS internal symmetric cable assembly - Mini SAS HD 8i.....	123
5.4.4.1.2.6 SAS internal symmetric cable assembly - SAS 4i to Mini SAS 4i with vendor-specific sidebands.....	124
5.4.4.1.2.7 SAS internal symmetric cable assembly - SAS 4i controller to Mini SAS 4i backplane with SGPIO.....	125
5.4.4.1.2.8 SAS internal symmetric cable assembly - Mini SAS 4i controller to SAS 4i backplane with SGPIO.....	126
5.4.4.1.2.9 SAS internal symmetric cable assembly - Mini SAS 4i to Mini SAS HD 4i	127
5.4.4.1.3 SAS internal fanout cable assemblies	128
5.4.4.1.3.1 SAS internal fanout cable assemblies overview	128
5.4.4.1.3.2 SAS internal controller-based fanout cable assemblies.....	129
5.4.4.1.3.3 SAS internal backplane-based fanout cable assemblies	132
5.4.4.2 SAS external cable assemblies.....	135
5.4.4.2.1 SAS external cable assemblies overview	135
5.4.4.2.2 SAS external cable assembly - Mini SAS 4x.....	136
5.4.4.2.3 SAS external cable assembly - Mini SAS HD 4x.....	139

5.4.4.2.4 SAS external cable assembly - Mini SAS HD 8x	141
5.4.4.2.5 SAS external cable assembly - Mini SAS HD 8x to Mini SAS HD 4x	143
5.4.4.2.6 SAS external cable assembly - Mini SAS HD 4x to Mini SAS 4x	145
5.4.4.2.7 SAS external cable assembly - QSFP+	146
5.4.5 Backplanes	146
5.5 TxRx connection characteristics	147
5.5.1 TxRx connection characteristics overview	147
5.5.2 TxRx connection general characteristics	148
5.5.3 Passive TxRx connection S-parameter limits	149
5.5.4 Passive TxRx connection characteristics for untrained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	151
5.5.5 Passive TxRx connection characteristics for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	152
5.5.6 Passive TxRx connection characteristics for trained 12 Gbit/s	153
5.5.7 TxRx connection characteristics for active cable assemblies	157
5.5.7.1 Active cable assembly electrical characteristics for trained 6 Gbit/s overview	157
5.5.7.2 Active cable assembly output electrical characteristics for trained 6 Gbit/s	157
5.5.7.3 Active cable assembly S-parameter limits for trained 6 Gbit/s and trained 12 Gbit/s	158
5.5.7.4 Active cable assembly electrical characteristics overview for 12 Gbit/s	159
5.5.7.5 Active cable assembly electrical characteristics for 12 Gbit/s	160
5.6 Test loads	161
5.6.1 Test loads overview	161
5.6.2 Zero-length test load	162
5.6.3 TCTF test load	163
5.6.4 Low-loss TCTF test load	168
5.6.5 Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter test load	169
5.7 End to end simulation for trained 12 Gbit/s	173
5.7.1 End to end simulation for trained 12 Gbit/s overview	173
5.7.2 Usage models for end to end simulation for trained 12 Gbit/s	174
5.7.3 Reference transmitter equalization for trained 12 Gbit/s	175
5.7.4 Crosstalk measurement for end to end simulations and 12 Gbit/s jitter tolerance	177
5.8 Transmitter device and receiver device electrical characteristics	178
5.8.1 General electrical characteristics	178
5.8.2 Transmitter device and receiver device transients	179
5.8.3 Eye masks and the JTF	180
5.8.3.1 Eye masks overview	180
5.8.3.2 JTF	180
5.8.3.3 Transmitter device eye mask for untrained 1.5 Gbit/s and 3 Gbit/s	181
5.8.3.4 Receiver device eye mask for untrained 1.5 Gbit/s and 3 Gbit/s	182
5.8.3.5 Receiver device jitter tolerance eye mask for untrained 1.5 Gbit/s and 3 Gbit/s	182
5.8.4 Transmitter device characteristics	184
5.8.4.1 Transmitter device characteristics overview	184
5.8.4.2 Transmitter device coupling requirements	184
5.8.4.3 Transmitter device general electrical characteristics	184
5.8.4.4 Transmitter device signal output characteristics for untrained 1.5 Gbit/s and 3 Gbit/s as measured with the zero-length test load	186
5.8.4.5 Transmitter device signal output characteristics for untrained 1.5 Gbit/s and 3 Gbit/s as measured with each test load	187
5.8.4.6 Transmitter device signal output characteristics for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s ..	189
5.8.4.6.1 Transmitter device signal output characteristics for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s overview	189
5.8.4.6.2 Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s transmitter device test procedure	190
5.8.4.6.3 Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s Transmitter device S-parameter limits	191
5.8.4.6.4 Recommended trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s transmitter device settings for interoperability	192
5.8.4.6.5 Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter device characteristics	193
5.8.4.6.6 Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s Transmitter equalization, VMA, and $V_{P,P}$ measurement	194
5.8.4.7 Transmitter device signal output characteristics for trained 12 Gbit/s	196
5.8.4.7.1 Transmitter device signal output characteristics for trained 12 Gbit/s overview	196

5.8.4.7.2 12 Gbit/s Transmitter device S-parameter limits.....	203
5.8.4.7.3 12 Gbit/s reference transmitter device.....	205
5.8.4.7.4 Transmitter device end to end simulation characteristics for trained 12 Gbit/s	207
5.8.4.7.5 Transmitter device signal output characteristics at CTS for 12 Gbit/s when an active cable is connected.....	208
5.8.4.8 Transmitter device signal output characteristics for OOB signals	208
5.8.5 Receiver device characteristics	210
5.8.5.1 Receiver device characteristics overview.....	210
5.8.5.2 Receiver device coupling requirements	210
5.8.5.3 Receiver device general electrical characteristics.....	211
5.8.5.4 Delivered signal characteristics for untrained 1.5 Gbit/s and 3 Gbit/s.....	213
5.8.5.5 Maximum delivered jitter for untrained 1.5 Gbit/s and 3 Gbit/s	214
5.8.5.6 Receiver device jitter tolerance for untrained 1.5 Gbit/s and 3 Gbit/s	215
5.8.5.7 Receiver device and delivered signal characteristics for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s, and 12 Gbit/s	216
5.8.5.7.1 Delivered signal characteristics for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s, and 12 Gbit/s	216
5.8.5.7.2 Receiver device S-parameter limits	216
5.8.5.7.3 Reference receiver device characteristics	218
5.8.5.7.3.1 Reference receiver device overview	218
5.8.5.7.3.2 Reference receiver device DFE	219
5.8.5.7.3.3 Reference receiver device equalization for trained 12 Gbit/s.....	219
5.8.5.7.4 Reference receiver device termination characteristics for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	220
5.8.5.7.5 Reference receiver device termination characteristics for trained 12 Gbit/s.....	220
5.8.5.7.6 Stressed receiver device jitter tolerance test	221
5.8.5.7.6.1 Stressed receiver device jitter tolerance test overview for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	221
5.8.5.7.6.2 Stressed receiver device jitter tolerance test procedure for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	223
5.8.5.7.6.3 Test equipment calibration and ISI generator calibration for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	224
5.8.5.7.6.4 Crosstalk source calibration for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s.....	224
5.8.5.7.6.5 Stressed receiver device jitter tolerance test procedure for trained 12 Gbit/s.....	225
5.8.5.7.6.6 ISI generator calibration for trained 12 Gbit/s	225
5.8.5.7.6.7 Crosstalk calibration for the trained 12 Gbit/s stressed receiver device jitter tolerance test	228
5.8.5.7.6.8 Applied RJ for trained 12 Gbit/s stressed receiver device jitter tolerance test	228
5.8.5.7.6.9 Applied SJ.....	228
5.8.5.8 Delivered signal characteristics for OOB signals	230
5.8.6 Spread spectrum clocking (SSC).....	230
5.8.6.1 SSC overview.....	230
5.8.6.2 Transmitter SSC modulation	231
5.8.6.3 Receiver SSC modulation tolerance	232
5.8.6.4 Expander device center-spreading tolerance buffer.....	233
5.8.7 Non-tracking clock architecture.....	234
5.9 READY LED signal electrical characteristics.....	234
5.10 POWER DISABLE signal electrical characteristics	235
5.11 Out of band (OOB) signals	237
5.11.1 OOB signals overview.....	237
5.11.2 Transmitting OOB signals.....	238
5.11.3 Receiving OOB signals.....	240
5.11.4 Transmitting the SATA port selection signal.....	241
Annex A (normative) Jitter tolerance pattern (JTPAT)	242
Annex B (normative) SASWDP	244
B.1 SASWDP introduction	244
B.2 SASWDP.m.....	244

B.3 SASWDP_testcase.m	251
Annex C (informative) StatEye	253
C.1 StatEye introduction	253
C.2 analysis.py	253
C.3 cdr.py	254
C.4 extractJitter.py	255
C.5 penrose.py	257
C.6 portalocker.py	259
C.7 stateye.py	262
C.8 touchstone.py	277
C.9 testcase.py	285
C.10 testall.py	290
C.11 File StatEye_readme.pdf	293
C.11.1 How to install and run the SAS-2.1 StatEye	293
Annex D (normative) End to end simulation for trained 12 Gbit/s	294
D.1 Detailed end to end simulation procedure description for trained 12 Gbit/s	294
D.2 Trained 12 Gbit/s usage models, S-parameter files, and crosstalk amplitude	296
D.2.1 Transmitter device connected to a separable passive TxRx connection segment	296
D.2.2 Transmitter device connected to a non-separable passive TxRx connection segment	298
D.2.3 TxRx connection segment	301
D.2.4 Stressed Receiver device delivered signal calibration end to end simulation diagram	302
Annex E (informative) 12 Gbit/s S-parameters and end to end simulation	304
E.1 S-parameters for 12 Gbit/s simulation	304
E.1.1 Measurement procedure	304
E.1.2 Multiple channel segments	305
E.2 End to end simulation using SAS3_EYEOPENING	306
Annex F (informative) Signal performance measurements	307
F.1 Signal performance measurements overview	307
F.2 Glossary	307
F.3 Simple physical link	307
F.3.1 Simple physical link overview	307
F.3.2 Assumptions for the structure of the transmitter device and the receiver device	308
F.3.3 Definition of receiver sensitivity and receiver device sensitivity	309
F.4 Signal measurement architecture	310
F.4.1 General	310
F.4.2 Relationship between signal compliance measurements at interoperability points and operation in systems	310
F.5 De-embedding connectors in test fixtures	311
F.6 De-embedding test fixture for 12 Gbit/s transmitter compliance	311
F.7 Measurement conditions for signal output at the transmitter device	312
F.8 Measurement conditions for signal tolerance at the transmitter device	313
F.9 Measurement conditions for signal output at the receiver device	315
F.10 Measurement conditions for signal tolerance at the receiver device	315
F.11 S-parameter measurements	316
F.11.1 S-parameter overview	316
F.11.2 S-parameter naming conventions	316
F.11.3 Use of single ended instrumentation in differential applications	317
F.11.4 Measurement configurations for physical link elements	319
F.11.4.1 Measurement configuration overview	319
F.11.4.2 Transmitter device S_{22} measurements	319
F.11.4.3 Receiver device S_{11} measurements	320
F.11.4.4 TxRx connection S_{11} measurements at IT or CT	320
F.11.4.5 TxRx connection S_{22} measurements at IR or CR	321
F.12 Calibration of JMDs	322

F.12.1 Calibration of JMDs overview	322
F.12.1.1 Purpose of JMD calibration	322
F.12.1.2 Overview of low frequency calibration for SSC configurations	322
F.12.1.3 Overview of low frequency calibration for non-SSC configurations	324
F.12.1.4 High frequency calibration	324
F.12.2 JMD calibration procedure	325
F.12.2.1 General characteristics and equipment	325
F.12.2.2 Calibration of the JMD for testing SSC configurations	326
F.12.2.3 Calibration of the JMD for testing non-SSC configurations	327
Annex G (informative) Description of the included Touchstone models for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	329
G.1 Description of included Touchstone models for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s overview ...	329
G.2 Reference transmitter device termination model for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	329
G.3 Reference receiver device termination model for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	330
G.4 Generic return loss circuit model for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	331
G.5 Reference transmitter test load for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	332
Annex H (informative) Mini SAS 4x active cable assembly power supply and voltage detection circuitry	335
Annex I (informative) SAS icons	336
Annex J (informative) Standards bodies contact information	338
Bibliography	339

Figure 1 – SCSI document relationships	16
Figure 2 – ATA document relationships	17
Figure 3 – Physical links and phys	42
Figure 4 – Maximum limits for S-parameters definitions	44
Figure 5 – 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s External cable assembly CT compliance points and CR compliance points	46
Figure 6 – Backplane with SAS Drive connector 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s IT compliance points and IR compliance points	47
Figure 7 – Backplane with SAS Drive connector 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s compliance points with SATA phy attached	48
Figure 8 – SAS multilane internal cable assembly 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s IT compliance points and IR compliance points	49
Figure 9 – SAS multilane internal cable assembly and backplane 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s IT compliance points and IR compliance points	50
Figure 10 – SAS multilane internal cable assembly and backplane 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s IT compliance points and IR compliance points with SATA device attached	51
Figure 11 – SAS Drive cable assembly 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s IT compliance points and IR compliance points	52
Figure 12 – 12 Gbit/s TxRx connection and compliance points	53
Figure 13 – Simulated 12 Gbit/s TxRx connection and compliance points	53
Figure 14 – 12 Gbit/s CTS and CR compliance points	54
Figure 15 – SATA connectors and cables	55
Figure 16 – SAS Drive cable environments	56
Figure 17 – SAS Drive backplane environment	57
Figure 18 – SAS external cable environment	57
Figure 19 – SAS internal symmetric cable environment - controller to backplane	58
Figure 20 – SAS internal symmetric cable environment - controller to controller	58
Figure 21 – SAS internal controller-based fanout cable environment	59
Figure 22 – SAS internal backplane-based fanout cable environment	59
Figure 23 – Recommended $ S_{DD21} $, $ S_{CC22} $, $ S_{DD22} $, NEXT, and FEXT limits for connector mated pairs supporting rates of 12 Gbit/s	64
Figure 24 – SAS Drive plug connector	65
Figure 25 – Single-port SAS Drive cable receptacle connector	65
Figure 26 – Dual-port SAS Drive cable receptacle connector	66
Figure 27 – SAS Drive backplane receptacle connector	66
Figure 28 – SAS MultiLink Drive plug connector	69
Figure 29 – SAS MultiLink Drive cable receptacle connector	69
Figure 30 – SAS MultiLink Drive backplane receptacle connector	70
Figure 31 – Micro SAS plug connector	74
Figure 32 – Micro SAS receptacle connector	74
Figure 33 – SAS 4i cable receptacle connector	76
Figure 34 – SAS 4i plug connector	76
Figure 35 – Mini SAS 4i cable plug connector	79
Figure 36 – Mini SAS 4i receptacle connector	79
Figure 37 – Mini SAS HD 4i cable plug connector	82
Figure 38 – Mini SAS HD 8i cable plug connector	83
Figure 39 – Mini SAS HD 4i receptacle connector	84
Figure 40 – Mini SAS HD 8i receptacle connector	85
Figure 41 – Mini SAS HD 16i receptacle connector	86
Figure 42 – Mini SAS 4x cable plug connector	90
Figure 43 – Mini SAS 4x cable plug connector for untrained 1.5 Gbit/s and 3 Gbit/s that attaches to an enclosure out port or an enclosure in port	92
Figure 44 – Mini SAS 4x cable plug connector for untrained 1.5 Gbit/s and 3 Gbit/s that attaches to an enclosure out port	92
Figure 45 – Mini SAS 4x cable plug connector for untrained 1.5 Gbit/s and 3 Gbit/s that attaches to an enclosure in port	93
Figure 46 – Mini SAS 4x cable plug connector for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s that attaches to an enclosure out port or an enclosure in port	93

Figure 47 – Mini SAS 4x cable plug connector for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s that attaches to an enclosure out port	94
Figure 48 – Mini SAS 4x cable plug connector for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s that attaches to an enclosure in port	94
Figure 49 – Mini SAS 4x active cable plug connector for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s that attaches to an enclosure out port or an enclosure in port	95
Figure 50 – Mini SAS 4x active cable plug connector for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s that attaches to an enclosure out port	95
Figure 51 – Mini SAS 4x active cable plug connector for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s that attaches to an enclosure in port	96
Figure 52 – Mini SAS 4x receptacle connector	97
Figure 53 – Mini SAS 4x receptacle connector - end device or enclosure universal port for untrained 1.5 Gbit/s and 3 Gbit/s	98
Figure 54 – Mini SAS 4x receptacle connector - enclosure out port for untrained 1.5 Gbit/s and 3 Gbit/s	99
Figure 55 – Mini SAS 4x receptacle connector - enclosure in port for untrained 1.5 Gbit/s and 3 Gbit/s	99
Figure 56 – Mini SAS 4x receptacle connector - end device or enclosure universal port for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s and for untrained 1.5 Gbit/s and 3 Gbit/s	100
Figure 57 – Mini SAS 4x receptacle connector - enclosure out port for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s and for untrained 1.5 Gbit/s and 3 Gbit/s	100
Figure 58 – Mini SAS 4x receptacle connector - enclosure in port for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s and for untrained 1.5 Gbit/s and 3 Gbit/s	101
Figure 59 – Mini SAS 4x active receptacle connector - end device or enclosure universal port	101
Figure 60 – Mini SAS 4x active receptacle connector - enclosure out port	102
Figure 61 – Mini SAS 4x active receptacle connector - enclosure in port	102
Figure 62 – Mini SAS HD 4x cable plug connector	106
Figure 63 – Mini SAS HD 8x cable plug connector	107
Figure 64 – Mini SAS HD 4x receptacle connector	108
Figure 65 – Mini SAS HD 8x receptacle connector	109
Figure 66 – Mini SAS HD 16x receptacle connector	110
Figure 67 – QSFP+ cable plug connector	113
Figure 68 – QSFP+ receptacle connector	114
Figure 69 – Single-port SAS Drive cable assembly	117
Figure 70 – Dual-port SAS Drive cable assembly	118
Figure 71 – MultiLink SAS Drive cable assembly	119
Figure 72 – SAS internal symmetric cable assembly - SAS 4i	120
Figure 73 – SAS internal symmetric cable assembly - Mini SAS 4i	121
Figure 74 – SAS internal symmetric cable assembly - Mini SAS HD 4i	122
Figure 75 – SAS internal symmetric cable assembly - Mini SAS HD 8i	123
Figure 76 – SAS internal symmetric cable assembly - SAS 4i to Mini SAS 4i with vendor-specific sideband signals	124
Figure 77 – SAS internal symmetric cable assembly - SAS 4i controller to Mini SAS 4i backplane with SGPIO connections	125
Figure 78 – SAS internal symmetric cable assembly - Mini SAS 4i controller to SAS 4i backplane with SGPIO connections	126
Figure 79 – SAS internal symmetric cable assembly - Mini SAS 4i to Mini SAS HD 4i	127
Figure 80 – SAS internal controller-based fanout cable assembly - SAS 4i	129
Figure 81 – SAS internal controller-based fanout cable assembly - Mini SAS 4i	130
Figure 82 – SAS internal controller-based fanout cable assembly - Mini SAS HD 4i	131
Figure 83 – SAS internal backplane-based fanout cable assembly - SAS 4i	132
Figure 84 – SAS internal backplane-based fanout cable assembly - Mini SAS 4i	133
Figure 85 – SAS internal backplane-based fanout cable assembly - Mini SAS HD 4i	134
Figure 86 – Mini SAS 4x external cable assembly	136
Figure 87 – Mini SAS 4x active external cable assembly	137
Figure 88 – SAS external cable assembly with Mini SAS 4x cable plug connectors	138
Figure 89 – SAS external cable assembly - Mini SAS HD 4x	139
Figure 90 – SAS external cable assembly with Mini SAS HD 4x cable plug connectors	140
Figure 91 – SAS external cable assembly - Mini SAS HD 8x	141
Figure 92 – SAS external cable assembly with Mini SAS HD 8x cable plug connectors	142

Figure 93 – SAS external cable assembly - Mini SAS HD 8x to Mini SAS HD 4x	143
Figure 94 – SAS external cable assembly with a Mini SAS HD 8x cable plug connector and two Mini SAS HD 4x cable plug connectors	144
Figure 95 – SAS external cable assembly - Mini SAS HD 4x to Mini SAS 4x	145
Figure 96 – SAS external cable assembly with a Mini SAS HD 4x cable plug connector and a Mini SAS 4x cable plug connector	146
Figure 97 – Passive TxRx connection $ S_{DD22} $, $ S_{CD22} $, $ S_{CD21} $, and NEXT limits	151
Figure 98 – Example of a passive TxRx connection compliance testing for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	152
Figure 99 – Example passive TxRx connection compliance testing for trained 12 Gbit/s	154
Figure 100 – Passive TxRx connection segment between CTS and CR or ITS and IR end to end simulation diagram for trained 12 Gbit/s	155
Figure 101 – Active cable S-parameter limits	159
Figure 102 – Active cable eye mask for 12 Gbit/s	160
Figure 103 – Zero-length test load for transmitter device compliance point	162
Figure 104 – Zero-length test load for receiver device compliance point	162
Figure 105 – Zero-length test load $ S_{DD21}(f) $ requirements	163
Figure 106 – TCTF test load	163
Figure 107 – TCTF test load $ S_{DD21}(f) $ and ISI loss requirements at IT for untrained 3 Gbit/s	164
Figure 108 – TCTF test load $ S_{DD21}(f) $ and ISI loss requirements at CT for untrained 3 Gbit/s	165
Figure 109 – TCTF test load $ S_{DD21}(f) $ and ISI loss requirements at IT for untrained 1.5 Gbit/s	166
Figure 110 – TCTF test load $ S_{DD21}(f) $ and ISI loss requirements at CT for untrained 1.5 Gbit/s	167
Figure 111 – Low-loss TCTF test load	168
Figure 112 – Low-loss TCTF test load $ S_{DD21}(f) $ and ISI loss requirements	169
Figure 113 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter with a test load $ S_{DD21}(f) $ up to 6 GHz	170
Figure 114 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter test load pulse response	171
Figure 115 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter test load impulse response for 6 Gbit/s	172
Figure 116 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter test load D24.3 response	173
Figure 117 – NEXT and FEXT measurement definition	174
Figure 118 – Reference sampling point and reference pulse response cursor	175
Figure 119 – Reference transmitter coefficient error computation	176
Figure 120 – Convergence of reference transmitter equalization	177
Figure 121 – Transmitter device transient test circuit	179
Figure 122 – Receiver device transient test circuit	179
Figure 123 – Transmitter device eye mask	181
Figure 124 – Receiver device eye mask	182
Figure 125 – Deriving a receiver device jitter tolerance eye mask for untrained 1.5 Gbit/s and 3 Gbit/s	183
Figure 126 – Transmitter device common mode voltage limit	190
Figure 127 – Transmitter device $ S_{CC22} $, $ S_{DD22} $, and $ S_{CD22} $ limits	192
Figure 128 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter device	193
Figure 129 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter device termination S-parameters model	194
Figure 130 – Transmitter equalization measurement	195
Figure 131 – Minimum and maximum coefficient ranges at maximum peak to peak voltage	198
Figure 132 – 12 Gbit/s transmitter device common mode voltage limit	199
Figure 133 – Transmitter circuit compliance test configuration	201
Figure 134 – 12 Gbit/s transmitter circuit output waveform	202
Figure 135 – 12 Gbit/s transmitter device $ S_{CC22} $, $ S_{DD22} $, and $ S_{CD22} $ limits	204
Figure 136 – 12 Gbit/s reference transmitter device	205
Figure 137 – 12 Gbit/s reference transmitter	205
Figure 138 – Simulation of the reference transmitter from a captured signal	208
Figure 139 – Applied SJ for untrained 1.5 Gbit/s and 3 Gbit/s	215
Figure 140 – Receiver device $ S_{CC11} $, $ S_{DD11} $, and $ S_{CD11} $ limits	217
Figure 141 – Reference receiver device for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	218
Figure 142 – Reference receiver device for trained 12 Gbit/s	218

Figure 143 – Reference receiver device termination S-parameters for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	220
Figure 144 – Stressed receiver device jitter tolerance test block diagram for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	221
Figure 145 – Stressed receiver device jitter tolerance test D24.3 eye opening for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s	223
Figure 146 – Stressed receiver transmitter equalization adjustment for 12 Gbit/s	225
Figure 147 – Simulation of the reference transmitter from a captured signal	226
Figure 148 – Applied SJ for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s, and 12 Gbit/s without SSC support	228
Figure 149 – Applied SJ for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s and 12 Gbit/s with SSC support	229
Figure 150 – Center-spreading tolerance buffer	234
Figure 151 – OOB signal transmission	239
Figure 152 – SATA port selection signal	241
Figure C.1 – Reference channel eye opening	293
Figure D.1 – Trained 12 Gbit/s die to die insertion loss model	294
Figure D.2 – Transmitter device end to end simulation diagram that includes a separable TxRx connection segment	297
Figure D.3 – End to end simulation diagram from target device usage model for a transmitter device connected to a non-separable TxRx connection segment	299
Figure D.4 – End to end simulation diagram of the target device usage model for a transmitter device connected to a non-separable TxRx connection segment	300
Figure D.5 – Stressed receiver device delivered signal calibration end to end simulation diagram	302
Figure E.1 – S-parameter measurement connections for a four port VNA	304
Figure E.2 – Example of a SAS three TxRx connection segment	305
Figure F.1 – A simple physical link	307
Figure F.2 – Transmitter device details	308
Figure F.3 – Receiver device details	309
Figure F.4 – De-embedding of connectors in test fixtures	311
Figure F.5 – De-embedding to ET for 12 Gbit/s transmitter compliance	312
Figure F.6 – De-embedding calibration test structure	312
Figure F.7 – Measurement conditions for signal output at the transmitter device	313
Figure F.8 – Transmitter device signal output measurement test fixture details	313
Figure F.9 – Measurement conditions for signal tolerance at the transmitter device	314
Figure F.10 – Calibration of test fixture for signal tolerance at the transmitter device	314
Figure F.11 – Measurement conditions for signal output at the receiver device	315
Figure F.12 – Measurement conditions for signal tolerance at the receiver device	315
Figure F.13 – Calibration of test fixture for signal tolerance at the receiver device	316
Figure F.14 – S-parameter port naming conventions	317
Figure F.15 – Four single ended port or two differential port element	318
Figure F.16 – S-parameters for single ended and differential systems	318
Figure F.17 – Measurement conditions for S_{22} at the transmitter device connector	319
Figure F.18 – Measurement conditions for S_{11} at the receiver device connector	320
Figure F.19 – Measurement conditions for S_{11} at IT or CT	321
Figure F.20 – Measurement conditions for S_{22} at IR or CR	322
Figure G.1 – Reference transmitter device and reference receiver device termination circuit model	329
Figure G.2 – Generic return loss circuit model	331
Figure G.3 – Generic return loss model $ S_{11} $	332
Figure G.4 – Reference transmitter test load measurement setup	333
Figure G.5 – Reference transmitter test load $ S_{DD21}(f) $ up to 20 GHz	334
Figure H.1 – Dual comparator design for active cable assembly detection	335
Figure I.1 – SAS primary icon	336
Figure I.2 – SAS alternate icon	336
Figure I.3 – MultiLink SAS icon	337

Table 1 – Numbering conventions	40
Table 2 – Comparison of decimal prefixes and binary prefixes	41
Table 3 – Compliance points.....	45
Table 4 – Connectors.....	60
Table 5 – Connector categories.....	62
Table 6 – Recommended electrical performance limits for the mated connector pairs that support rates of 12 Gbit/s.....	63
Table 7 – SAS Drive connector pin assignments.....	67
Table 8 – SAS MultiLink connector pin assignments.....	71
Table 9 – Micro SAS connector pin assignments	75
Table 10 – Controller SAS 4i connector pin assignments and physical link usage.....	77
Table 11 – Backplane SAS 4i connector pin assignments and physical link usage	78
Table 12 – Controller Mini SAS 4i connector pin assignments and physical link usage	80
Table 13 – Backplane Mini SAS 4i connector pin assignments and physical link usage.....	81
Table 14 – Controller Mini SAS HD 4i connector pin assignments and physical link usage.....	87
Table 15 – Backplane Mini SAS HD 4i connector pin assignments and physical link usage.....	88
Table 16 – Mini SAS 4x cable plug connector and Mini SAS 4x active cable plug connector icons, key slot positions, and key positions	91
Table 17 – Mini SAS 4x receptacle connector icons, key positions, and key slot positions.....	98
Table 18 – Mini SAS 4x connector pin assignments and physical link usage.....	103
Table 19 – Mini SAS 4x active connector pin assignments and physical link usage	104
Table 20 – Mini SAS 4x active cable supplied power requirements	105
Table 21 – Mini SAS HD 4x connector pin assignments and physical link usage	111
Table 22 – Management interface connection requirements	112
Table 23 – QSFP+ connector pin assignments	115
Table 24 – TxRx connection general characteristics	148
Table 25 – Maximum limits for S-parameters of the passive TxRx connection between ITS and IR or CTS and CR.....	150
Table 26 – Passive TxRx connection characteristics for trained 6 Gbit/s	152
Table 27 – Passive TxRx connection characteristics for trained 12 Gbit/s at ET and ER.....	156
Table 28 – Active cable assembly output electrical characteristics for trained 6 Gbit/s.....	157
Table 29 – Maximum limits for S-parameters for active cable assemblies	158
Table 30 – Active cable assembly electrical characteristics for 12 Gbit/s.....	160
Table 31 – General electrical characteristics	178
Table 32 – JTF parameters.....	181
Table 33 – Transmitter device general electrical characteristics	184
Table 34 – Transmitter device termination characteristics.....	185
Table 35 – Transmitter device signal output characteristics for untrained 1.5 Gbit/s and 3 Gbit/s as measured with the zero-length test load at IT and CT	186
Table 36 – Transmitter device signal output characteristics for untrained 1.5 Gbit/s and 3 Gbit/s as measured with each test load at IT and CT	188
Table 37 – Transmitter device signal output characteristics for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s at IT and CT.....	189
Table 38 – Transmitter device common mode voltage limit characteristics.....	190
Table 39 – Maximum limits for S-parameters at IT _S or CT _S	191
Table 40 – Recommended trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s transmitter device settings at IT and CT compliance point	192
Table 41 – Trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s reference transmitter device characteristics at IT and CT compliance point	193
Table 42 – Transmitter device signal output characteristics for trained 12 Gbit/s at ET, IT, and CT	196
Table 43 – 12 Gbit/s transmitter device common mode voltage limit characteristics.....	199
Table 44 – Transmitter coefficient requests and corresponding transmitter circuit response	200
Table 45 – Transmitter circuit coefficient presets at ET.....	203
Table 46 – 12 Gbit/s maximum limits for S-parameters at IT _S or CT _S	204
Table 47 – 12 Gbit/s reference transmitter device characteristics at ET.....	206
Table 48 – Transmitter device characteristics for trained 12 Gbit/s at ET and ER	207
Table 49 – Transmitter device signal output characteristics for 12 Gbit/s at CTS when an active cable is connected.....	208

Table 50 – Transmitter device signal output characteristics for OOB signals	209
Table 51 – Receiver device general electrical characteristics	211
Table 52 – Recommended receiver device common mode tolerance for 6 Gbit/s, and 12 Gbit/s	211
Table 53 – Receiver device termination characteristics	212
Table 54 – Delivered signal characteristics for untrained 1.5 Gbit/s and 3 Gbit/s as measured with the zero-length test load at IR and CR.....	213
Table 55 – Maximum delivered jitter for untrained 1.5 Gbit/s and 3 Gbit/s at IR and CR	214
Table 56 – Receiver device jitter tolerance for untrained 1.5 Gbit/s and 3 Gbit/s at IR and CR	215
Table 57 – f_{\min} , f_c , and f_{\max} for untrained 1.5 Gbit/s and 3 Gbit/s.....	216
Table 58 – Delivered signal characteristics for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s, and 12 Gbit/s at IR and CR compliance point.....	216
Table 59 – Maximum limits for S-parameters at IR or CR	217
Table 60 – Reference receiver equalization stage characteristics for trained 12 Gbit/s	219
Table 61 – Stressed receiver device jitter tolerance test characteristics for trained 1.5 Gbit/s, 3 Gbit/s, and 6 Gbit/s.....	222
Table 62 – Number of bits received per number of errors for desired BER.....	224
Table 63 – ISI generator characteristics for trained 12 Gbit/s at ET and ER	227
Table 64 – RJ characteristics for trained 12 Gbit/s stressed receiver device tolerance test.....	228
Table 65 – f_{\min} , f_c , and f_{\max} for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s, and 12 Gbit/s without SSC support ...	229
Table 66 – f_{\min} , f_c , f_{\max} , and SJ_{lf} for trained 1.5 Gbit/s, 3 Gbit/s, 6 Gbit/s, and 12 Gbit/s with SSC support.....	229
Table 67 – Delivered signal characteristics for OOB signals	230
Table 68 – SSC modulation types.....	230
Table 69 – SAS phy transmitter SSC modulation types.....	231
Table 70 – Expander phy transmitter SSC modulation types	232
Table 71 – Receiver SSC modulation types tolerance.....	232
Table 72 – Expander device center-spreading tolerance buffer	233
Table 73 – Output characteristics of the READY LED signal.....	235
Table 74 – Characteristics of the POWER DISABLE signal applied to the SAS target device.....	236
Table 75 – OOB signal timing specifications.....	237
Table 76 – OOB signal transmitter device requirements	238
Table 77 – OOB signal receiver device burst time detection requirements	240
Table 78 – OOB signal receiver device idle time detection requirements.....	240
Table 79 – OOB signal receiver device negation time detection requirements	240
Table 80 – SATA port selection signal transmitter device requirements.....	241
Table A.1 – JTPAT for RD+	242
Table A.2 – JTPAT for RD-	243
Table D.1 – Crosstalk transmitter characteristics.....	295
Table D.2 – S-parameter files for transmitter devices connected to separable TxRx connection segment..	296
Table D.3 – The S-parameter files for a transmitter device connected to a non-separable TxRx connection segment.....	298
Table D.4 – S-parameter files for a TxRx connection segment	301
Table D.5 – S-parameter files for stressed receiver device delivered signal calibration.....	303
Table F.1 – High frequency jitter source amplitudes.....	325
Table F.2 – Low frequency jitter source calibration amplitudes	327
Table F.3 – Low frequency jitter attenuation targets	328
Table J.1 – Standards bodies	338

INFORMATION TECHNOLOGY – SMALL COMPUTER SYSTEM INTERFACE (SCSI) –

Part 154: Serial Attached SCSI - 3 (SAS-3)

FOREWORD

- 1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.
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International Standard ISO/IEC 14776-154 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This publication contains attached files in the form of S-parameter files required for electrical performance measurements and examples of scripts for running simulations.

The list of all currently available parts of the ISO/IEC 14776 series, under the general title *Information technology – Small computer system interface (SCSI)*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2, except as described in 3.4 and 3.5..

IMPORTANT - The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

General

The SCSI family of standards provides for many different transport protocols that define the rules for exchanging information between different SCSI devices. This document specifies the functional requirements for the Serial Attached SCSI (SAS) physical interconnect, which is compatible with the Serial ATA physical interconnect. The SAS Protocol Layer - 3 (SPL-3) standard documents the SAS protocol layer corresponding to the Serial Attached SCSI - 3 (SAS-3), defining the rules for exchanging information between SCSI devices using a serial interconnect. Other SCSI transport protocol standards define the rules for exchanging information between SCSI devices using other interconnects.

Figure 1 shows the relationship of this document to the other standards and related projects in the SCSI family of standards.

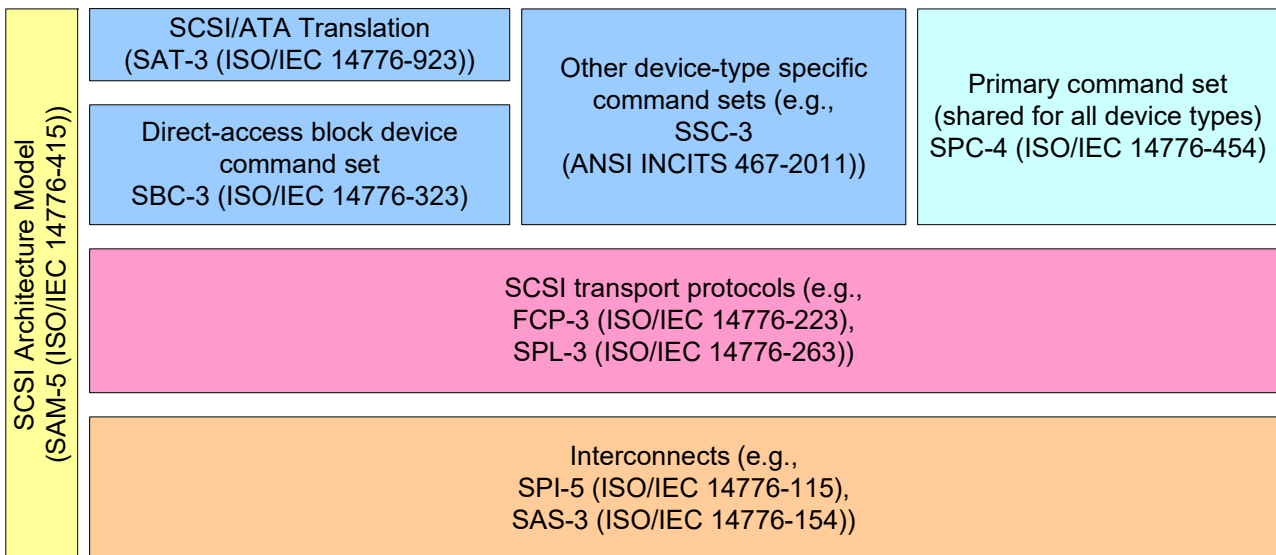


Figure 1 – SCSI document relationships

Figure 2 shows the relationship of this document to other standards and related projects in the ATA family of standards.

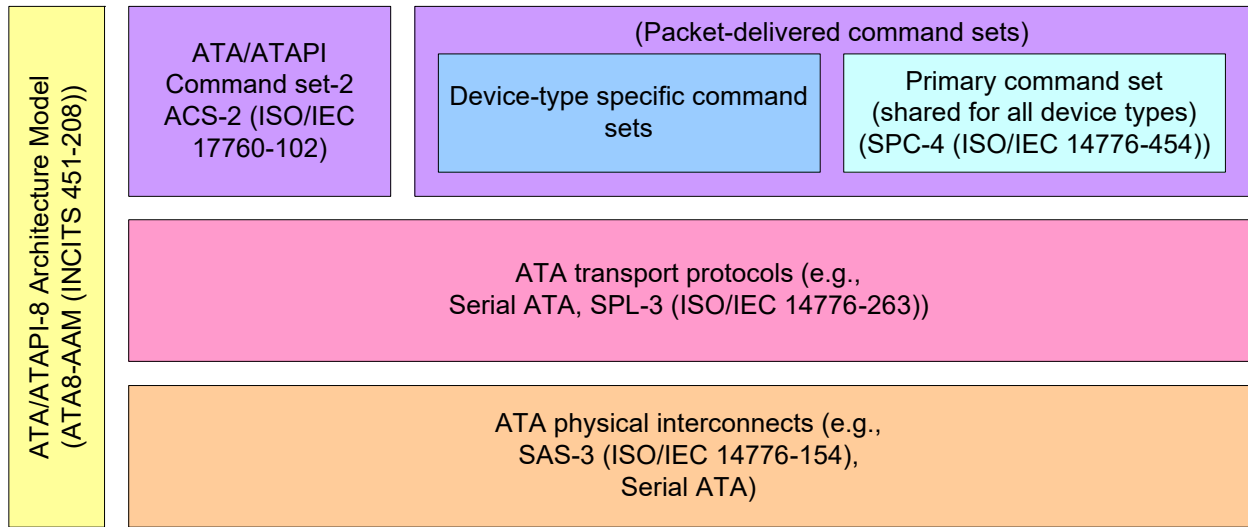


Figure 2 – ATA document relationships

Figure 1 and figure 2 show the general relationship of the documents to one another, and do not imply a relationship such as a hierarchy, protocol stack or system architecture.

These standards specify the interfaces, functions and operations necessary to ensure interoperability between conforming implementations. This document is a functional description. Conforming implementations may employ any design technique that does not violate interoperability.

INFORMATION TECHNOLOGY – SMALL COMPUTER SYSTEM INTERFACE (SCSI) –

Part 154: Serial Attached SCSI - 3 (SAS-3)

1 Scope

This part of ISO/IEC 14776 defines the physical layer of the Serial Attached SCSI (SAS) interconnect.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC TR 14165-117, *Information technology – Fibre channel – Part 117: Methodologies for jitter and signal quality (MJSQ)*^{1 2}

ISO/IEC 14776-151, *Information technology - Small Computer System Interface (SCSI) – Part 151: Serial Attached SCSI -1.1 (SAS-1.1)*

ISO/IEC 14776-153, *Information Technology - Small Computer System Interface (SCSI) – Part 153: Serial Attached SCSI - 2.1 (SAS-2.1)*

INCITS 457-2010, *Information Technology - Serial Attached SCSI - 2 (SAS-2)*

INCITS 492-2015, *SAS Protocol Layer-3 (SPL-3)*

INCITS 515-2016, *SCSI Architecture Model - 5 (SAM-5)*

Serial ATA Revision 3.1 (SATA). 18 July 2011³

SFF-8086, *Compact Multilane Series: Common Elements*⁴

SFF-8087, *Compact Multilane Series: Unshielded*⁴

SFF-8088, *Compact Multilane Series: Shielded*⁴

SFF-8147, *54mm x 71mm Form Factor w/micro SAS Connector*⁴

SFF-8223, *2.5" Drive Form Factor with Serial Connector*⁴

SFF-8323, *3.5" Drive Form Factor with Serial Connector*⁴

SFF-8410, *HSS Copper Testing and Performance Requirements*⁴

SFF-8416, *Measurement and Performance Requirements for HPEI Bulk Cable*⁴

SFF-8449, *Mini Multilane Series Management Interface*⁴

SFF-8460, *HSS Backplane Design Guidelines*⁴

SFF-8484, *Multi-Lane Unshielded Serial Attachment Connectors*⁴

SFF-8485, *Serial GPIO (SGPIO) Bus*⁴

SFF-8486, *Serial Attachment Micro Connector*⁴

1. INCITS TR-35-2004

2. When MJSQ is referenced from this document, the FC Port terminology used within MJSQ is substituted with SAS phy terminology.

3. Serial ATA specifications are available from the Serial ATA International Organization (see <http://www.sata-io.org>).

4. SFF specifications are available from the SNIA SFF Technology Affiliate (see <http://www.snia.org/sff>).

SFF-8523, *5.25" Drive Form Factor with Serial Connector* ⁴
SFF-8630, *Serial Attachment 12 Gbs 4X Unshielded Connector (Style B)* ⁴
SFF-8636, *Shielded Cables Common Management Interface* ⁴
SFF-8639, *Multifunction 12 Gb/s 6X Unshielded Connector* ⁴
SFF-8643, *Mini Multilane Series: Unshielded HD Integrated Connector* ⁴
SFF-8644, *Mini Multilane Series: Shielded HD Integrated Connector* ⁴
SFF-8680, *Serial Attachment 12 Gb/s 2X Unshielded Connector* ⁴
SFF-8685, *QSFP+ 14 Gb/s 4X Pluggable Transceiver Solution (QSFP14)* ⁴
SFF-9639, *Multifunction 12 Gb/s 6X Unshielded Connector Pinouts* ⁴
Touchstone[®] *File Format Specification*. Revision 1.1. IBIS Open Forum ¹

1. Touchstone[®] is a registered trademark of Agilent Corporation. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC or ISO. For more information on the Touchstone specification, contact the IBIS Open Forum (see <http://www.eigroup.org>).