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Part 113: Parallel Interface-3 (SPI-3)

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CONTENTS

FOREWORD.....	17
INTRODUCTION.....	18
1 Scope.....	19
2 Normative references	20
2.1 Normative references	20
2.2 Approved references	20
2.3 References under development	21
2.4 Other references.....	21
3 Definitions, symbols, abbreviations, and conventions	21
3.1 Definitions	21
3.2 Symbols and abbreviations	30
3.3 Keywords.....	31
3.4 Conventions	32
3.5 Notation for Procedures and Functions	33
4 General	34
4.1 General overview.....	34
4.2 Cables, Connectors, Signals, Transceivers.....	34
4.3 Physical architecture of bus.....	34
4.4 Physical topology details and definitions.....	35
4.5 Bus loading.....	37
4.6 Termination requirements	38
4.7 SCSI device Addressing	38
4.8 Data transfers.....	38
4.9 Data transfer modes	40
4.9.1 Data transfer modes overview	40
4.9.2 ST DATA phase parallel transfers	40
4.9.3 DT DATA phase parallel transfers	40
4.9.3.1 DT DATA phase parallel transfers format	40
4.9.3.2 Data group transfers	40
4.9.3.3 Information unit transfers	40
4.10 Protocol.....	40
5 SCSI parallel interface connectors.....	44
5.1 SCSI parallel interface connectors overview	44
5.2 Nonshielded connector	44
5.2.1 Nonshielded connector alternative 1 – A cable	44
5.2.2 Nonshielded connector alternative 2 – A cable	44
5.2.3 Nonshielded connector alternative 3 – P cable	44
5.2.4 Nonshielded connector alternative 4.....	45
5.3 Shielded connector.....	50
5.3.1 Shielded connector overview	50
5.3.2 Shielded connector alternative 1 – A cable.....	51
5.3.3 Shielded connector alternative 2 – A cable.....	51
5.3.4 Shielded connector alternative 3 – P cable.....	51
5.3.5 Shielded connector alternative 4 – P cable.....	51

5.4	Connector contact assignments	59
5.4.1	Connector contact assignments overview	59
5.4.2	SE assignments	60
5.4.3	Differential connector contact assignments	63
6	SCSI bus interconnect	66
6.1	SCSI bus interconnect overview	66
6.2	SCSI bus cables	66
6.3	Interconnect characteristics for signals	67
6.3.1	Applicability of requirements for SCSI cable media	67
6.3.2	Minimum conductor size for signals	67
6.3.3	Local transmission line impedance	67
6.3.4	Extended distance transmission line impedance	68
6.3.5	Capacitance	68
6.3.6	SE propagation time and propagation time skew	68
6.3.7	Differential propagation time and propagation time skew	68
6.3.8	SE attenuation	68
6.3.9	Differential attenuation	69
6.3.10	Crosstalk	69
6.4	Decoupling characteristics for TERMPWR lines	69
6.5	Connection requirements for RESERVED lines	70
6.6	Cables used with SE transceivers	70
6.7	SE ground offset	70
6.8	Cables used with LVD transceivers	71
6.9	LVD stub length and spacing	71
7	SCSI parallel interface electrical characteristics	72
7.1	SCSI parallel interface electrical characteristics overview	72
7.2	SE alternative	73
7.2.1	SE termination	73
7.2.2	SE output characteristics	73
7.2.3	SE input characteristics	76
7.2.4	SE input and output characteristics	77
7.3	LVD alternative	78
7.3.1	LVD termination	78
7.3.2	LVD driver characteristics	82
7.3.3	LVD receiver characteristics	83
7.3.4	LVD capacitive loads	83
7.3.4.1	Management of LVD release glitches	85
7.3.5	SE/HVD transmission mode detection	87
7.3.5.1	SE/HVD transmission mode detection overview	87
7.3.5.2	LVD DIFFSENS driver	87
7.3.5.3	LVD DIFFSENS receiver	88
7.4	LVD/MSE multimode alternative	90
7.4.1	LVD/MSE multimode termination	90
7.4.2	LVD/MSE multimode transceiver characteristics	91
7.4.3	Transceiver ground drivers	92
7.5	Terminator power	93

8	SCSI bus signals	95
8.1	SCSI bus signals overview.....	95
8.2	Signal descriptions	95
8.3	Signal states.....	97
8.3.1	SE signals.....	97
8.3.2	LVD signals.....	97
8.4	OR-tied signals.....	98
8.5	Signal sources.....	98
9	SCSI parallel bus timing	100
9.1	SCSI parallel bus timing values	100
9.2	Timing description	103
9.2.1	Arbitration delay.....	103
9.2.2	ATN transmit setup time	103
9.2.3	ATN receive setup time	103
9.2.4	Bus clear delay	103
9.2.5	Bus free delay	103
9.2.6	Bus set delay	103
9.2.7	Bus settle delay.....	103
9.2.8	Cable skew	103
9.2.9	pCRC receive hold time.....	104
9.2.10	pCRC receive setup time.....	104
9.2.11	pCRC transmit hold time	104
9.2.12	pCRC transmit setup time	104
9.2.13	Data release delay	104
9.2.14	DIFFSENS voltage filter time.....	104
9.2.15	Physical disconnection delay.....	104
9.2.16	Power on to selection.....	104
9.2.17	QAS arbitration delay.....	104
9.2.18	QAS assertion delay.....	104
9.2.19	QAS release delay	104
9.2.20	QAS non-DATA phase REQ (ACK) period	105
9.2.21	Receive assertion period.....	105
9.2.22	Receive hold time.....	105
9.2.23	Receive negation period.....	105
9.2.24	Receive setup time.....	105
9.2.25	Receive REQ (ACK) period tolerance	105
9.2.26	Receive REQ assertion period with P_CRCA transitioning.....	105
9.2.27	Receive REQ negation period with P_CRCA transitioning	105
9.2.28	REQ (ACK) period.....	106
9.2.29	Reset delay	106
9.2.30	Reset hold time	106
9.2.31	Reset to selection	106
9.2.32	Selection abort time	106
9.2.33	Selection time-out delay.....	106
9.2.34	Signal timing skew	106
9.2.35	System deskew delay.....	106
9.2.36	Transmit assertion period.....	106

9.2.37	Transmit hold time.....	107
9.2.38	Transmit negation period.....	107
9.2.39	Transmit setup time.....	107
9.2.40	Transmit REQ (ACK) period tolerance	107
9.2.41	Transmit REQ assertion period with P_CRCA transitioning.....	107
9.2.42	Transmit REQ negation period with P_CRCA transitioning	107
9.3	Measurement points	107
9.3.1	Measurement points overview	107
9.3.2	SE fast-5 and fast-10 measurement points	107
9.3.3	SE fast-20 measurement points.....	108
9.3.4	LVD measurement points	109
9.4	Setup and hold timings	112
9.4.1	ST data transfer calculations.....	112
9.4.2	DT data transfer calculations.....	113
10	SCSI bus phases.....	115
10.1	SCSI bus phases overview	115
10.2	BUS FREE phase	115
10.3	Unexpected bus free phases.....	115
10.4	Expected bus free phases.....	116
10.5	Arbitration.....	116
10.5.1	Arbitration and QAS overview.....	116
10.5.2	NORMAL ARBITRATION phase	116
10.5.3	QAS protocol.....	117
10.5.4	QAS phase.....	118
10.6	SELECTION phase.....	119
10.6.1	Selection Overview	119
10.6.2	Selection using attention condition	119
10.6.2.1	Information unit transfers disabled	119
10.6.2.2	Information unit transfers enabled.....	119
10.6.2.3	Selection using attention condition time-out procedure	120
10.6.3	Selection without using attention condition	120
10.6.3.1	Information unit transfers disabled or enabled.....	120
10.6.3.2	Selection without using attention condition time-out procedure	120
10.7	RESELECTION phase	121
10.7.1	RESELECTION phase overview	121
10.7.2	Physical reconnection	121
10.7.3	Physical reconnection time-out procedure	122
10.8	Information transfer phases	122
10.8.1	Information transfer phases overview	122
10.8.2	Asynchronous information transfer	123
10.8.3	Synchronous data transfer	123
10.8.3.1	Synchronous data transfer overview.....	123
10.8.3.2	ST synchronous data transfer	124
10.8.3.3	DT synchronous data transfer	124
10.8.3.4	Wide data transfer.....	129

10.9	COMMAND phase	130
10.9.1	COMMAND phase description	130
10.9.2	COMMAND phase exception condition handling	130
10.10	DATA phase	131
10.10.1	DATA phase overview	131
10.10.2	DT DATA IN phase	131
10.10.3	DT DATA OUT phase	131
10.10.4	ST DATA IN phase	131
10.10.5	ST DATA OUT phase	131
10.11	STATUS phase	131
10.11.1	STATUS phase description	131
10.11.2	STATUS phase exception condition handling	132
10.12	MESSAGE phase	132
10.12.1	MESSAGE phase overview	132
10.12.2	MESSAGE IN phase	132
10.12.3	MESSAGE IN phase exception condition handling	132
10.12.4	MESSAGE OUT phase	132
10.12.5	MESSAGE OUT phase exception condition handling	132
10.13	Signal restrictions between phases	133
11	DATA BUS protection	134
11.1	DATA BUS protection overview	134
11.2	ST DATA BUS protection (parity)	134
11.3	DT DATA BUS protection (CRC)	134
11.3.1	DT DATA BUS protection (CRC) overview	134
11.3.2	Error detection capabilities	134
11.3.3	Order of bytes in the CRC field	134
11.3.4	CRC generation and checking	135
11.3.5	Test cases	136
12	SCSI bus conditions	137
12.1	SCSI bus conditions overview	137
12.2	Attention condition	137
12.3	Hard reset	138
12.4	Reset events	138
12.4.1	Reset events overview	138
12.4.2	Transceiver mode change reset event	138
13	SCSI bus phase sequences	140
13.1	SCSI bus phase sequences overview	140
13.2	Phase sequences for physical reconnection and selection using attention condition with information unit transfers disabled	140
13.3	Phase sequences for selection without using attention condition with information unit transfers disabled	142
13.4	Phase sequences for selection without using attention condition/physical reconnection with information unit transfers enabled	143
13.5	Phase sequences for physical selection using attention condition with information unit transfers enabled	144
14	SPI information unit sequences	145
14.1	SPI information unit overview	145
14.2	Information unit transfer logical operations	145

14.3	SPI information units	150
14.3.1	SPI command information unit.....	150
14.3.2	SPI L_Q information unit	153
14.3.3	SPI data information unit	155
14.3.4	SPI data stream information unit	155
14.3.5	SPI status information unit	156
15	SCSI pointers	159
16	SCSI messages.....	160
16.1	SCSI messages overview	160
16.2	Message protocols and formats	160
16.2.1	Message protocol rules	160
16.2.2	Message formats.....	160
16.2.3	One-byte messages	161
16.2.4	Two-byte messages	161
16.2.5	Extended messages.....	161
16.3	Link control messages	163
16.3.1	Link control message codes	163
16.3.2	DISCONNECT	163
16.3.3	IDENTIFY.....	164
16.3.4	IGNORE WIDE RESIDUE.....	165
16.3.5	INITIATOR DETECTED ERROR.....	165
16.3.6	MESSAGE PARITY ERROR.....	166
16.3.7	MESSAGE REJECT	166
16.3.8	MODIFY DATA POINTER.....	166
16.3.9	NO OPERATION	167
16.3.10	PARALLEL PROTOCOL REQUEST	167
	16.3.10.1 PARALLEL PROTOCOL REQUEST message description	167
	16.3.10.2 PARALLEL PROTOCOL REQUEST negotiation	171
16.3.11	QAS REQUEST.....	172
16.3.12	RESTORE POINTERS	172
16.3.13	SAVE DATA POINTER.....	172
16.3.14	SYNCHRONOUS DATA TRANSFER REQUEST.....	172
	16.3.14.1 SYNCHRONOUS DATA TRANSFER REQUEST message description	172
	16.3.14.2 Target initiated SDTR negotiation	175
	16.3.14.3 Initiator initiated SDTR negotiation.....	176
16.3.15	TASK COMPLETE.....	176
16.3.16	WIDE DATA TRANSFER REQUEST	176
	16.3.16.1 WIDE DATA TRANSFER REQUEST message description	176
	16.3.16.2 Target initiated WDTR negotiation.....	178
	16.3.16.3 Initiator initiated WDTR negotiation.....	178
16.4	Task attribute messages.....	179
16.4.1	Task attribute message overview and codes	179
16.4.2	ACA	180
16.4.3	HEAD OF QUEUE	180
16.4.4	LINKED COMMAND COMPLETE	181

16.4.5	ORDERED	181
16.4.6	SIMPLE.....	181
16.5	Task management messages.....	182
16.5.1	Task management message codes.....	182
16.5.2	ABORT TASK.....	182
16.5.3	ABORT TASK SET	182
16.5.4	CLEAR ACA	183
16.5.5	CLEAR TASK SET	183
16.5.6	LOGICAL UNIT RESET	183
16.5.7	TARGET RESET	183
17	Command processing considerations and exception conditions	184
17.1	Command processing considerations and exception conditions overview.....	184
17.2	Asynchronous event notification	184
17.3	Incorrect initiator connection.....	184
17.4	Unexpected RESELECTION phase.....	185
18	SCSI management features for the SCSI parallel interface	186
18.1	SCSI mode parameters.....	186
18.1.1	SCSI mode parameter overview and codes	186
18.1.2	Disconnect-reconnect mode page	186
18.1.3	Logical Unit Control mode page	188
18.1.4	Port Control mode page	189
19	SCSI parallel interface services.....	191
19.1	SCSI parallel interface services overview	191
19.2	Procedure objects.....	191
19.3	Application client SCSI command services.....	193
19.3.1	Application client SCSI command services overview	193
19.3.2	Send SCSI command service	193
19.4	Device server SCSI command services.....	193
19.4.1	Device server SCSI command services overview	193
19.4.2	Data-in delivery service.....	193
19.4.3	Data-out delivery service.....	194
19.5	Task management services	194
19.5.1	Task management services overview	194
19.5.2	Task management function service	194
19.5.3	ABORT TASK.....	194
19.5.4	ABORT TASK SET	195
19.5.5	CLEAR ACA	195
19.5.6	CLEAR TASK SET	195
19.5.7	LOGICAL UNIT RESET	195
19.5.8	RESET SERVICE DELIVERY SUBSYSTEM.....	195
19.5.9	TARGET RESET	195
19.5.10	WAKEUP.....	195
Annex A	(normative) Additional requirements for LVD SCSI drivers and receivers.....	196
A.1	System level requirements.....	196
A.2	Driver requirements.....	196
A.2.1	Driver requirements overview	196

A.2.2	Differential output voltage, VS	197
A.2.3	Offset (common-mode output) voltage, VCM.....	199
A.2.4	Short-circuit currents, IO-S and IO+S	200
A.2.5	Open-circuit output voltages, V O-(OC) and V O+(OC)	201
A.2.6	Output signal waveform	201
A.2.7	Dynamic output signal balance, VCM(PP)	203
A.3	Receiver characteristics	205
A.3.1	Receiver characteristics overview	205
A.3.2	Receiver steady state input voltage requirements	205
A.3.3	Compliance test.....	205
A.3.4	Receiver setup and hold times.....	206
A.4	Transceiver characteristics	206
A.4.1	Transceiver output/input currents, II-L and II+L.....	206
A.4.2	Transceiver maximum input voltages	207
Annex B	(normative) SCSI bus fairness	208
B.1	Model	208
B.2	Determining fairness by monitoring prior bus activity	208
B.2.1	Fairness for normal arbitration method	208
B.2.2	Fairness for QAS	208
B.3	Fairness algorithm.....	209
B.3.1	Fairness states overview	209
B.3.2	Fairness idle state	209
B.3.3	Fairness wait state.....	209
B.3.4	Fairness participate state.....	209
B.3.5	Lockout delay	209
B.3.6	Mixed arbitration.....	209
B.4	Initiator fairness recommendations	210
Annex C	(normative) Nonshielded connector alternative 4	211
C.1	Nonshielded connector alternative 4 signal definitions	211
C.2	VOLTAGE and GROUND signals.....	211
C.3	CHARGE signals	212
C.4	SPINDLE SYNC	212
C.5	ACTIVE LED OUT	213
C.6	Motor start controls	213
C.7	SCSI ID selection	214
C.8	MATED signals.....	215
C.8.1	MATED signals overview	215
C.8.2	MATED 2/drive side.....	216
C.8.3	MATED 2/backplane side.....	216
C.8.4	MATED 1/drive side.....	216
C.8.5	MATED 1/backplane side.....	216
Annex D	(normative) Removal and insertion of SCSI devices	218
D.1	Removal and insertion of SCSI devices overview	218
D.2	Case 1 - Power off during removal or insertion	218
D.3	Case 2 - RST signal asserted continuously during removal or insertion	218

D.4 Case 3 - Current I/O processes not allowed during insertion or removal	218
D.5 Case 4 - Current I/O process allowed during insertion or removal.....	219
Annex E (normative) SCSI cable media performance testing	220
E.1 Overview	220
E.2 Impedance	222
E.2.1 Local impedance for SE transmission	222
E.2.1.1 Local impedance for SE transmission overview	222
E.2.1.2 Sample preparation.....	222
E.2.1.3 Test fixture and measurement equipment.....	223
E.2.1.4 Calibration and verification procedure	223
E.2.1.5 Testing procedure	225
E.2.2 Local impedance for differential transmission	226
E.2.2.1 Local impedance for differential transmission overview	226
E.2.2.2 Sample preparation.....	226
E.2.2.3 Test fixture and measurement equipment.....	226
E.2.2.4 Testing procedure	228
E.2.3 Differential extended distance (balanced) impedance (frequency domain)	229
E.2.3.1 Sample preparation.....	229
E.2.3.2 Test fixture for differential extended distance impedance	230
E.2.3.3 Calibration procedure.....	231
E.2.3.4 Measurement procedure	231
E.3 Capacitance	231
E.3.1 Single ended capacitance.....	231
E.3.1.1 Sample preparation.....	231
E.3.1.2 Test fixture for single ended capacitance	232
E.3.1.3 Calibration procedure.....	232
E.3.1.4 Measurement procedure	232
E.3.2 Differential capacitance	233
E.3.2.1 Sample preparation.....	233
E.3.2.2 Test fixture for differential capacitance.....	233
E.3.2.3 Calibration procedure.....	233
E.3.2.4 Measurement procedure	234
E.4 Propagation time (differential frequency mode).....	234
E.4.1 Sample preparation	234
E.4.2 Test fixture for propagation time (differential frequency mode).....	234
E.4.3 Calibration procedure	234
E.4.4 Measurement procedure	234
E.5 Propagation time (differential - time domain mode).....	234
E.5.1 Sample preparation	234
E.5.2 Test fixture for propagation time (differential - time domain mode).....	235
E.5.3 Test configuration calibration procedure	235
E.5.4 Measurement procedure	236
E.6 Propagation time skew (differential).....	236
E.6.1 Measurement procedure	236
E.7 Attenuation.....	236
E.7.1 Differential attenuation.....	236
E.7.2 Sample preparation	238
E.7.3 Balun selection	238

E.7.4	Sample length.....	238
E.7.5	Measurement test fixture and measurement equipment	241
E.7.6	Calibration procedure	242
E.7.7	Testing procedure.....	243
E.8	Near end crosstalk (quiescent noise).....	245
E.8.1	Near end crosstalk description.....	245
E.8.2	Sample preparation	245
E.8.3	Test fixture and measurement equipment	246
E.8.4	Calibration procedure	246
E.8.5	Testing procedure.....	246
Annex F	(informative) Interconnecting buses of different widths	249
Annex G	(informative) Transmission line considerations for SE fast-20 data transfer rates	252
Annex H	(informative) Measuring SE pin capacitance.....	255
Annex I	(informative) SCSI ICONS	256
Annex J	(informative) Backplane construction guidelines.....	258
J.1	Universal backplane construction	258
J.1.1	Universal backplane construction overview.....	258
J.1.2	Microstrip.....	258
J.1.3	Embedded Microstrip	258
J.1.4	Stripline	259
J.1.5	Dual Stripline.....	260
J.1.6	Differential Impedance.....	261
J.1.7	Single ended impedance.....	262
J.1.8	Differential stripline.....	262
J.1.9	Dielectric material selection	264
J.1.10	Vias.....	265
J.1.11	Transmission Lines.....	266
Annex K	(informative) SPI-3 to SCSI-2 terminology mapping	271
Annex L	(informative) Physical layer integrity checking.....	272
L.1	Introduction	272
L.1.1	Overview and glossary.....	272
L.2	Integrity checking methods	272
L.2.1	Basic integrity check.....	272
L.2.2	Enhanced integrity check.....	272
L.3	Fall back	273
L.4	System considerations.....	273
L.5	Buffer protection.....	273
L.6	Failure modes during integrity checking.....	273
Annex M	(informative) Alternate error detection for the asynchronous information phases (COMMAND, MESSAGE and STATUS).....	275
M.1	Error detection for asynchronous information phases	275
M.2	Protection code	275
M.2.1	Protection code overview.....	275
M.2.2	Covered signals.....	275
M.2.3	Code description.....	277
M.2.4	Error detection properties	277

M.3 Protection code usage	277
M.3.1 Protection code usage overview	277
M.3.2 Protection code transmission	278
M.3.3 Enabling protection code checking.....	278
M.3.4 Disabling protection code checking.....	278
M.4 Parity.....	278
M.5 Error handling.....	278
M.6 Examples	278
M.6.1 C code example.....	278
M.6.2 Verilog® Hardware Description Language example.....	281
M.6.3 Protection code examples.....	281
M.6.3.1 Message phase example.....	281
M.6.3.2 Command phase example.....	281
M.6.3.3 Example of a “shifting ones” sequence.....	282
M.6.3.4 Example of a “shifting zeroes” sequence.....	282
Annex N (informative) SCA-2 Unshielded Connections	284
N.1 Definitions and Conventions	285
N.2 General Description.....	286
Annex O (informative) VHDCI Shielded Configurations.....	289
O.1 Definitions and Conventions	289
O.2 General Description.....	289
Figure 1 – General Structure of SCSI.....	20
Figure 2 – SE SCSI bus	35
Figure 3 – Differential SCSI bus.....	35
Figure 4 – SCSI bus topology details	37
Figure 5 – ST latching data vs. DT latching data	39
Figure 6 – ST data transfer example	39
Figure 7 – DT data transfer example.....	40
Figure 8 – SCSI Parallel Interface service reference mode	42
Figure 9 – Model for a four step confirmed service.....	42
Figure 10 – Model for a two step confirmed service	43
Figure 11 – 50/68-contact alternative 1/alternative 3 nonshielded SCSI device connector.....	46
Figure 12 – 50/68-contact alternative 1/alternative 3 nonshielded mating connector	47
Figure 13 – 50-contact alternative 2 nonshielded SCSI device connector (A cable).....	48
Figure 14 – 50-contact alternative 2 nonshielded mating connector (A cable)	49
Figure 15 – 80-contact alternative 4 nonshielded SCSI device connector (P cable).....	50
Figure 16 – 80-contact alternative 4 nonshielded contact positions (P cable)	50
Figure 17 – 50-contact alternative 1 shielded SCSI device connector (A cable).....	52
Figure 18 – 50-contact alternative 1 shielded mating connector (A cable)	53
Figure 19 – 50-contact alternative 2 shielded SCSI device connector (A cable).....	54
Figure 20 – 50-contact alternative 2 shielded mating connector (A cable)	55
Figure 21 – 68-contact alternative 3 shielded SCSI device connector (P cable).....	56
Figure 22 – 68-contact alternative 3 shielded mating connector (P cable)	57
Figure 23 – 68-contact alternative 4 shielded SCSI device connector (P cable).....	58
Figure 24 – 68-contact alternative 4 shielded contact positions (P cable).....	59
Figure 25 – Terminator decoupling example.....	70
Figure 26 – Active negation current versus voltage	75

Figure 27 – SE A.C. test circuit	76
Figure 28 – LVD bus terminator	78
Figure 29 – Test circuit for terminator differential impedance	79
Figure 30 – Termination I-V characteristics for differential and common mode impedance tests	79
Figure 31 – Test circuit for termination common mode impedance test.....	80
Figure 32 – Termination balance test configuration	81
Figure 33 – Termination balance test data definition	81
Figure 34 – LVD transceiver architecture	82
Figure 35 – LVD receiver example	83
Figure 36 – LVD Capacitive loads	84
Figure 37 – LVD DIFFSENS driver signal definitions.....	88
Figure 38 – DIFFSENS receiver function.....	88
Figure 39 – LVD DIFFSENS receiver example	89
Figure 40 – Multimode terminator architecture	90
Figure 41 – Multimode transceiver architecture.....	91
Figure 42 – Voltage and current definitions.....	97
Figure 43 – LVD Signaling sense	98
Figure 44 – Fast-5 and fast-10 SE timing measurement points.....	108
Figure 45 – Fast-20 SE timing measurement points	109
Figure 46 – LVD timing measurement points for ST data transfers	110
Figure 47 – LVD timing measurement points for DT data transfers.....	111
Figure 48 – LVD receiver mask.....	112
Figure 49 – System setup and hold timings for ST data transfers (all times in ns)	113
Figure 50 – System setup and hold timings for DT data transfers (all times in ns).....	114
Figure 51 – CRC generation and transmission	135
Figure 52 – Phase sequences for selection using attention condition/physical reconnection and information unit transfers disabled	141
Figure 53 – Phase sequences for selection without using attention condition and information unit transfers disabled	142
Figure 54 – Phase sequences for selection without using attention condition/physical reconnection and information unit transfers enabled	143
Figure 55 – Phase sequences for selection with attention condition/physical reconnection and information unit transfers enabled.....	144
Figure 56 – SPI information unit sequence during initial connection	146
Figure 57 – SPI information unit sequence during data type transfers	147
Figure 58 – SPI information unit sequence during data stream type transfers	148
Figure 59 – SPI information unit sequence during status transfers	149
Figure A.1 – Differential steady-state output voltage test circuit	198
Figure A.2 – Domain for driver assertion and negation levels.....	199
Figure A.3 – Driver offset steady-state voltage test circuit.....	200
Figure A.4 – Common mode output voltage test.....	200
Figure A.5 – Driver short-circuit test circuit	201
Figure A.6 – Open-circuit output voltage test circuit	201
Figure A.7 – Differential output switching voltage test circuit.....	202
Figure A.8 – Driver output signal waveform.....	203
Figure A.9 – Driver offset switching voltage test circuit	204
Figure A.10 – Receiver input voltage threshold test circuit	206
Figure A.11 – Transceiver off-state output current test circuit	207
Figure C.1 – Sample circuit for mated indications	217

Figure E.1 – Test configuration for SE impedance	223
Figure E.2 – SE impedance calibration	224
Figure E.3 – Signal transition duration calibration	225
Figure E.4 – SE impedance measurement	226
Figure E.5 – Example of a differential calibration trace	227
Figure E.6 – Differential impedance test	229
Figure E.7 – Test fixtures for differential extended distance impedance profile	230
Figure E.8 – Test fixture for single ended capacitance measurement	232
Figure E.9 – Test fixture for differential capacitance measurement	233
Figure E.10 – Test fixture for propagation time measurement	235
Figure E.11 – Form of attenuation plots	237
Figure E.12 – Effect of balun selection on measured attenuation for very long cables	238
Figure E.13 – Effects of mismatched baluns in a short DUT	239
Figure E.14 – Effect of matched baluns on a short sample	240
Figure E.15 – Effects of mismatched baluns with 6 dB LF attenuation	241
Figure E.16 – Source-end test fixture for attenuation tests	242
Figure E.17 – Sink end test fixture for attenuation tests	242
Figure E.18 – Calibration configuration for attenuation tests	243
Figure E.19 – Attenuation scan with proper balun isolation	244
Figure E.20 – Attenuation scan without good balun isolation	244
Figure E.21 – Calibration system for NEXT	246
Figure E.22 – Test configuration for NEXT	247
Figure E.23 – Example of crosstalk measurement	247
Figure F.1 – Interconnecting SE A and P cables	250
Figure F.2 – Interconnecting LVD/MSE A and P cables	251
Figure G.1 – Minimum SCSI device spacing versus bus and SCSI device capacitance	254
Figure I.1 – SE icon for SCSI	256
Figure I.2 – LVD icon for SCSI	256
Figure I.3 – SE/LVD multimode icon for SCSI	257
Figure J.1 – Microstrip geometry	258
Figure J.2 – Embedded microstrip geometry	259
Figure J.3 – Stripline geometry	259
Figure J.4 – Dual stripline geometry	260
Figure J.5 – Lossless model for differential impedance	261
Figure J.6 – Edge coupled differential microstrip	262
Figure J.7 – Edge coupled differential stripline	263
Figure J.8 – Broadside coupled differential stripline	263
Figure J.9 – Typical transmission line element	267
Figure M.1 – Protection code generator	277
Figure N.1 – Mating side gender definition	286
Figure N.2 – Contact positioning architecture	288
Figure O.1 – Mating side gender definition	290
Table 1 – Transceiver/speed support map	34
Table 2 – Cross-reference to A cable contact assignments	59
Table 3 – SE contact assignments – A cable	60
Table 4 – SE contact assignments – P cable	61
Table 5 – SE contact assignments – nonshielded alternative 4 connector	62

Table 6 – LVD/MSE contact assignments – A cable	63
Table 7 – LVD/MSE contact assignments – P cable	64
Table 8 – LVD/MSE contact assignments – nonshielded alternative 4 connector.....	65
Table 9 – SE and LVD local transmission line impedance	68
Table 10 – Cable media capacitance limits	68
Table 11 – Attenuation requirements for SCSI cable media.....	69
Table 12 – SE maximum bus path length between terminators.....	70
Table 13 – LVD maximum bus path length between terminators.....	71
Table 14 – Minimum stub connection spacing rules for LVD SCSI devices.....	71
Table 15 – Absolute electrical limits at the device connector.....	72
Table 16 – Input current requirements at the device connector for lines not being driven by the device.....	73
Table 17 – SE steady state output voltage characteristics.....	74
Table 18 – SE input voltage characteristics.....	77
Table 19 – SE input and output electrical characteristics	78
Table 20 – I-V requirements for differential impedance, common mode impedance, and V BIAS tests	80
Table 21 – Values for LVD termination balance test.....	82
Table 22 – Values for LVD capacitive loads	85
Table 23 – Glitch management requirements for SCSI devices using LVD drivers.....	86
Table 24 – LVD DIFFSENS driver specifications	87
Table 25 – DIFFSENS receiver operating requirements	89
Table 26 – Terminator power characteristics at the terminator	93
Table 27 – Arbitration priorities by SCSI ID.....	95
Table 28 – Signal sources.....	99
Table 29 – SCSI bus control timing values.....	100
Table 30 – SCSI bus data & information phase ST timing values	101
Table 31 – SCSI bus data & information phase DT timing values	102
Table 32 – Information transfer phases.....	123
Table 33 – Wide SCSI byte order.....	130
Table 34 – Parity checking rules for SELECTION and RESELECTION phases.....	134
Table 35 – SPI command information unit.....	151
Table 36 – TASK ATTRIBUTE.....	151
Table 37 – TASK MANAGEMENT FLAGS	152
Table 38 – SPI L_Q information unit	153
Table 39 – TYPE.....	154
Table 40 – SPI data information unit	155
Table 41 – SPI data stream information unit.....	156
Table 42 – SPI status information unit.....	157
Table 43 – PACKETIZED FAILURES field.....	158
Table 44 – PACKETIZED FAILURE CODE.....	158
Table 45 – Message format.....	161
Table 46 – Extended message format	161
Table 47 – Extended message codes.....	162
Table 48 – Link control message codes	163
Table 49 – IDENTIFY message format.....	164
Table 50 – IGNORE WIDE RESIDUE message format	165
Table 51 – IGNORE field definition	165
Table 52 – MODIFY DATA POINTER message format	167

Table 53 – PARALLEL PROTOCOL message format	167
Table 54 – TRANSFER PERIOD FACTOR field.....	168
Table 55 – Valid protocol options bit combinations.....	169
Table 56 – PARALLEL PROTOCOL REQUEST messages implied agreements.....	171
Table 57 – SYNCHRONOUS DATA TRANSFER message format.....	173
Table 58 – TRANSFER PERIOD FACTOR field.....	173
Table 59 – SDTR messages implied agreements	175
Table 60 – WIDE DATA TRANSFER message format	176
Table 61 – WDTR messages implied agreements	178
Table 62 – Task attribute message codes	180
Table 63 – ACA message format.....	180
Table 64 – HEAD OF QUEUE message format	180
Table 65 – ORDERED message format.....	181
Table 66 – SIMPLE message format	181
Table 67 – Task management message codes.....	182
Table 68 – Mode page codes for the SCSI parallel interface	186
Table 69 – Disconnect-reconnect page (02h)	187
Table 70 – DATA TRANSFER DISCONNECT CONTROL	188
Table 71 – Logical Unit Control page (18h)	189
Table 72 – Port Control page (19h)	189
Table 73 – This standards objects mapped to objects from other SCSI standards.....	191
Table 74 – Procedure objects	192
Table 75 – Processing of send SCSI command service procedure	193
Table 76 – Processing of data-in delivery service procedure	194
Table 77 – Processing of data-out delivery service procedure.....	194
Table A.1 – System level requirements	196
Table A.2 – Driver steady-state test limits and conditions	197
Table A.3 – Driver switching test circuit parameters.....	202
Table A.4 – Dynamic output balance limits.....	204
Table A.5 – Receiver steady state input voltage ranges	205
Table A.6 – Receiver minimum and maximum input voltages	206
Table C.1 – Voltage specification limits.....	211
Table C.2 – Charge supply to SCSI device	212
Table C.3 – Output characteristics of drive ACTIVE LED OUT signal	213
Table C.4 – Definition of motor start controls	214
Table C.5 – Electronic requirements for input controls	214
Table C.6 – SCSI device ID selection signals.....	215
Table E.1 – Cable media test summary.....	220
Table J.1 – Dielectric constants	265
Table K.1 – SPI-3 to SCSI-2 terminology mapping	271
Table M.1 – Signals be covered by the protection code and their bit locations	276
Table M.2 – Protection code	277
Table M.3 – Example of a sequence of an IDENTIFY message with a SIMPLE task attribute message having a tag field of zero.....	281
Table M.4 – Example of a sequence of a CDB for a READ(6) command with a logical block address of 1A BC DEh, and a transfer length of 55h	282
Table M.5 – Example of a “shifting ones” sequence	282
Table M.6 – Example of a “shifting zeroes” sequence	283

SMALL COMPUTER SYSTEM INTERFACE (SCSI) – Part 113: Parallel Interface-3 (SPI-3)

FOREWORD

- 1) ISO (International Organization for Standardization) and IEC (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.
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International Standard ISO/IEC 14776-113 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

Annexes A, B, C, D and E form an integral part of this standard.

Annexes F, G, H, I, J, K, L, M, N and O are for information only.

Introduction

The SCSI protocol is designed to provide an efficient peer-to-peer I/O bus with the maximum number of hosts and peripherals determined by the bus width (8 or 16). Data may be transferred asynchronously or synchronously at rates that depend primarily on device implementation and cable length.

SCSI is an I/O interface that may be operated over a wide range of media and transfer rates. The objectives of the parallel interface in SCSI are:

- a) To provide host computers with device independence within a class of devices. Thus, different disk drives, tape drives, printers, optical media drives, and other SCSI devices may be added to the host computers without requiring modifications to generic system hardware. Provision is made for the addition of special features and functions through the use of vendor-specific options. Reserved areas are provided for future standardization.
- b) To provide compatibility such that conforming SCSI-2 and SPI-2 devices may interoperate with SPI-3 devices given that the systems engineering is correctly done. Conforming SCSI-2 and SPI-2 devices should respond in an acceptable manner to reject SPI-3 protocol extensions. SPI-3 protocol extensions are designed to be permissive of such rejections and thus allow SCSI-2 and SPI-2 devices to continue operation without requiring the use of the extensions.

The interface protocol includes provision for the connection of multiple initiators (SCSI devices capable of initiating a task) and multiple targets (SCSI devices capable of responding to a request to perform a task). Distributed arbitration (i.e., bus-contention logic) is built into the architecture of parallel SCSI. A default priority system awards interface control to the highest priority SCSI device that is contending for use of the bus and an optional fairness algorithm is defined.

This international standard enhances the functionality of the SPI-2 standard. This international standard is intended to be the choice for new designs over the SPI-2 standard. Several new features have been added into this international standard. Some of those features are; fast-80 data transfers, double transition (DT) transfers, and CRC on parallel transfers.

The SCSI Parallel Interface-3 standard is divided into the following clauses:

- Clause 1 is the scope;
- Clause 2 enumerates the normative references that apply to this standard;
- Clause 3 describes the definitions, symbols, conventions and abbreviations used in this standard;
- Clause 4 describes the SCSI parallel interface model used in this standard;
- Clause 5 describes the connectors;
- Clause 6 describes the cable characteristics;
- Clause 7 describes the electrical characteristics;
- Clause 8 describes the SCSI bus signals;
- Clause 9 describes the SCSI parallel bus timing;
- Clause 10 describes the SCSI bus phases;
- Clause 11 describes the DATA BUS protection;
- Clause 12 describes the SCSI bus conditions;
- Clause 13 describes the SCSI bus phase sequences;
- Clause 14 describes the SPI information unit sequences;
- Clause 15 describes the SCSI pointers;
- Clause 16 describes the SCSI messages;
- Clause 17 describes the Command processing considerations and exception conditions;
- Clause 18 describes the SCSI management features for the SCSI parallel interface;
- Clause 19 describes the SCSI parallel interface services;

Small Computer System Interface (SCSI)

Part 113: Parallel Interface-3 (SPI-3)

1 Scope

This standard defines the mechanical, electrical, timing, and protocol requirements of the SCSI parallel interface to allow conforming SCSI devices to inter-operate. The SCSI parallel interface is a local I/O bus that may be operated over a wide range of transfer rates. The objectives of the SCSI parallel interface are:

- a) To provide host computers with device independence within a class of devices. Thus, different disk drives, tape drives, printers, optical media drives and other SCSI devices may be added to the host computers without requiring modifications to generic system hardware. Provision is made for the addition of special features and functions through the use of vendor-specific options. Reserved areas are provided for future standardization.
- b) To provide compatibility such that conforming SCSI-2 and SPI-2 devices may interoperate with SPI-3 devices given that the systems engineering is correctly done. Conforming SCSI-2 and SPI-2 devices should respond in an acceptable manner to reject SPI-3 protocol extensions. SPI-3 protocol extensions are designed to be permissive of such rejections and thus allow SCSI-2 and SPI-2 devices to continue operation without requiring the use of the extensions.

The interface protocol includes provision for the connection of multiple initiators (SCSI devices capable of initiating an I/O process) and multiple targets (SCSI devices capable of responding to a request to perform an I/O process). Distributed arbitration (i.e., bus-contention logic) is built into the architecture of this standard. A default priority system awards interface control to the highest priority SCSI device that is contending for use of the bus and an optional fairness algorithm is defined.

This standard defines the physical attributes of an input/output bus for interconnecting computers and peripheral devices.

This standard has made obsolete the following:

- a) The high voltage differential (HVD) option of differential driver/receivers. Implementations that use HVD should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).
- b) The 32-bit SCSI bus width option. Implementations that use 32-bit wide buses should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).
- c) The SCSI configured automatically (SCAM) option. Implementations that use SCAM should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).
- d) The CONTINUE TASK message and the TARGET TRANSFER DISABLE message. Implementations that use the CONTINUE TASK message or TARGET TRANSFER DISABLE message should reference the SCSI Parallel Interface-2 standard (ISO/IEC 14776-112).

Figure 1 is intended to show the general structure of SCSI standards. The figure is not intended to imply a relationship such as a hierarchy, protocol stack, or system architecture.

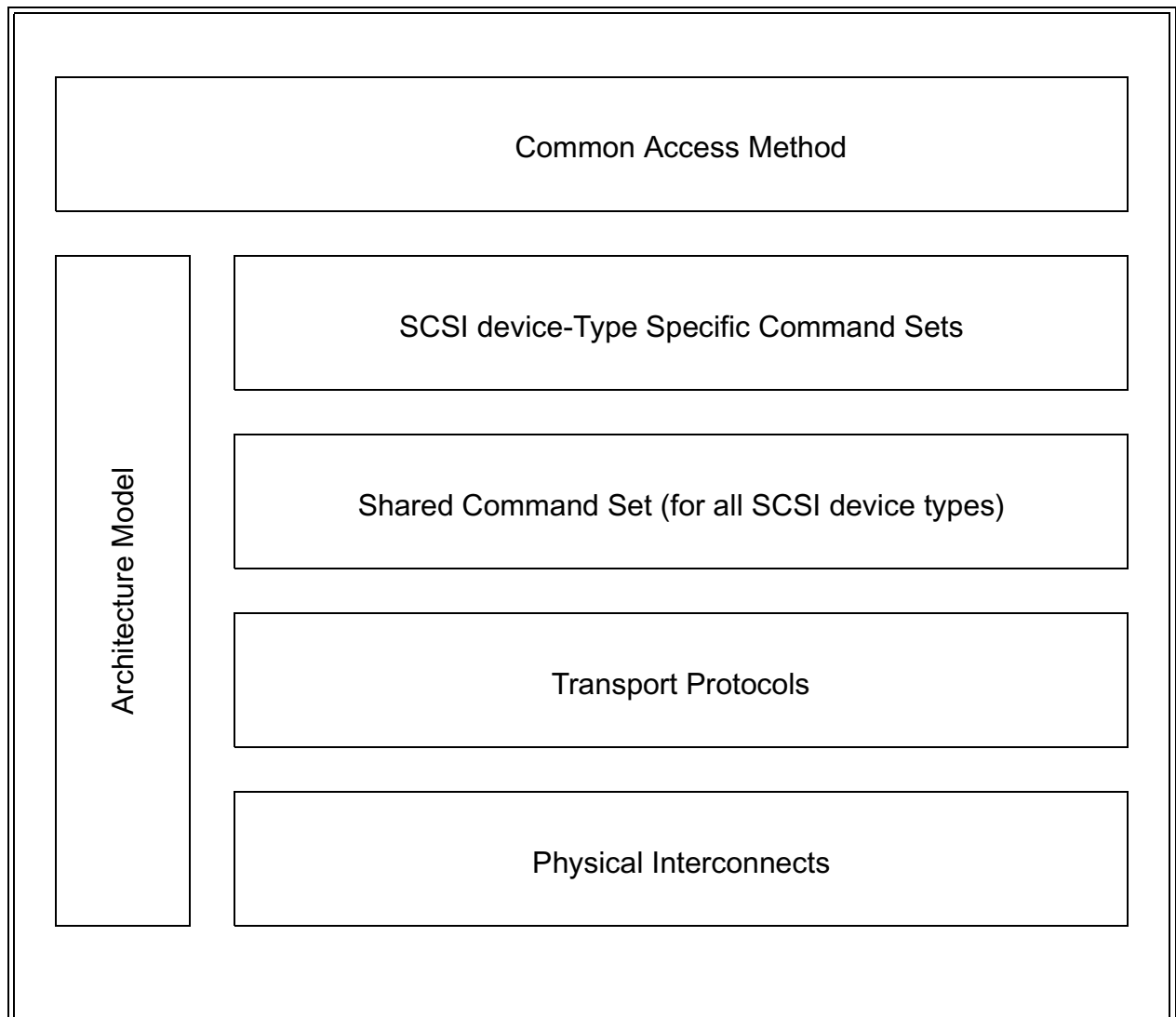


Figure 1 - General Structure of SCSI

2 Normative references

2.1 Normative references

The following standards contain provisions which, through reference in the text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below.

Members of IEC and ISO maintain registers of currently valid standards.

2.2 Approved references

EIA-700A0AE (SP-3651), Detail Specification for Trapezoidal Connectors with Non-removable Ribbon Contacts on 1.27 mm Pitch Double Row used with Single Connector Attachments (SCA-2)

EIA-700A0AF (SP-3652), Detail Specification for Trapezoidal Connector 0.8 mm Pitch used with Very High Density Cable Interconnect (VHDCI)

IEC 60512-2:1985, *Electromechanical components for electronic equipment; basic testing procedures and measuring methods – Part 2: General examination, electrical continuity and contact resistance tests, insulation tests and voltage stress tests*

IEC 60512-11-7:1996, *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods – Part 11: Climatic tests – Section 7: Test 11g: Flowing mixed gas corrosion test*

ISO 1660, *Technical drawings – Dimensioning and tolerancing of profiles*

2.3 References under development

At the time of publication, the following referenced standards were still under development. For information on the current status of the document, or regarding availability, contact the relevant standards body or other organization as indicated.

ISO/IEC 14776-112, – *Information technology – Small computer system interface (SCSI) – Part 112: Parallel Interface-2 (SPI-2)*

ISO/IEC 14776-312, – *Information technology – Small computer system interface (SCSI) – Part 312: Primary Commands-2*

ISO/IEC 14776-412, – *Information technology – Small computer system interface (SCSI) – Part 412: Architecture Model-2*

2.4 Other references

For information on the current status of the listed document(s), or regarding availability, contact the indicated organization.

IEEE 1364, Verilog® Hardware Description Language