

INTERNATIONAL STANDARD



**Industrial communication networks – Fieldbus specifications –
Part 6-10: Application layer protocol specification – Type 10 elements**

(<https://standards.iteh.ai>)

Document Preview

IEC 61158-6-10:2010

<https://standards.iteh.ai/catalog/standards/iec/102914c0-3cc5-400b-9348-657ecc5f7a0b/iec-61158-6-10-2010>

WITHDRAWN



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2010 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

<https://standards.iec.ch/standards/iec/102914c0-3cc5-400b-9348-657ecc5f7a0b/iec-61158-6-10-2010>



IEC 61158-6-10

Edition 2.0 2010-08

INTERNATIONAL STANDARD



**Industrial communication networks – Fieldbus specifications –
Part 6-10: Application layer protocol specification – Type 10 elements**

*(https://standards.iteh.ai)
Document Preview*

IEC 61158-6-10:2010

https://standards.iteh.ai/en/standards/iec/102914c0-3cc5-400b-9348-657ecc5f7a0b/iec-61158-6-10-2010

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE **XH**

ICS 25.04.40; 35.100.70; 35.110

ISBN 978-2-88912-128-1

CONTENTS

FOREWORD.....	20
INTRODUCTION.....	22
1 Scope.....	24
1.1 General.....	24
1.2 Specifications.....	24
1.3 Conformance.....	25
2 Normative references.....	25
3 Terms, definitions, abbreviations, symbols and conventions.....	27
3.1 Referenced terms and definitions.....	27
3.2 Additional terms and definitions for distributed automation.....	28
3.3 Additional terms and definitions for decentralized periphery.....	30
3.4 Additional abbreviations and symbols for distributed automation.....	37
3.5 Additional abbreviations and symbols for decentralized periphery.....	38
3.6 Additional abbreviations and symbols for media redundancy.....	39
3.7 Conventions.....	39
3.8 Conventions used in state machines.....	46
4 Application layer protocol specification for common protocols.....	49
4.1 FAL syntax description.....	49
4.2 Transfer syntax.....	52
4.3 Discovery and basic configuration.....	64
4.4 Precision time control.....	96
4.5 Media redundancy.....	162
4.6 Real-time cyclic.....	187
4.7 Real-time acyclic.....	206
4.8 Remote procedure call.....	219
4.9 Link layer discovery.....	236
4.10 MAC bridges.....	244
4.11 Virtual bridges.....	259
4.12 IP suite.....	269
4.13 Domain name system.....	273
4.14 Dynamic host configuration.....	273
4.15 Simple network management.....	273
4.16 Common DLL Mapping Protocol Machines.....	283
5 Application layer protocol specification for distributed automation.....	290
5.1 FAL syntax description.....	290
5.2 Transfer syntax.....	315
5.3 FAL protocol state machines.....	317
5.4 AP Context State Machine.....	318
5.5 FAL Service Protocol Machines.....	319
5.6 Application Relationship Protocol Machine (ARPM).....	418
5.7 DLL Mapping Protocol Machines.....	422
5.8 Protocol options.....	426
6 Application layer protocol specification for decentralized periphery.....	426
6.1 FAL syntax description.....	426
6.2 Transfer syntax.....	439
6.3 FAL protocol state machines.....	575

6.4	AP-Context state machine	577
6.5	FAL Service Protocol Machines	577
6.6	Application Relationship Protocol Machines	659
6.7	DLL Mapping Protocol Machines	739
Annex A (informative)	Filtering Data Base.....	740
Annex B (informative)	Establishing of a companion AR.....	743
Annex C (informative)	Establishing of a device access AR.....	744
Annex D (informative)	Establishing of an AR (simple procedure).....	745
Annex E (informative)	Establishing of an AR (accelerated procedure).....	746
Annex F (informative)	Establishing of an AR (fast startup procedure).....	749
Annex G (informative)	Example of the upload, storage, and retrieval procedure.....	750
Annex H (informative)	Establishing of an AR using RT_CLASS_3 CRs	753
Annex I (informative)	Overview of the AlarmCRs.....	754
Annex J (informative)	OSI reference model layers	756
Annex K (informative)	Overview of the IO device state machines.....	757
Annex L (informative)	Overview of the IO controller state machines.....	758
Annex M (informative)	Priority regeneration	759
Annex N (informative)	Overview of the synchronization master hierarchy.....	760
Annex O (informative)	Adapted baggy pants model of the IEEE 802.1D	762
Annex P (informative)	Optimization of bandwidth usage.....	765
Annex Q (informative)	Time constraints for bandwidth allocation.....	767
Annex R (informative)	Optimization for fast startup without autonegotiation	769
Annex S (informative)	TX-error handling.....	771
	Bibliography.....	772
	Figure 1 – Common structure of specific fields.....	43
	Figure 2 – Common structure of specific fields for octet 1 (high).....	44
	Figure 3 – Common structure of specific fields for octet 2 (low)	44
	Figure 4 – Common structure of specific fields for octet 1 (high).....	45
	Figure 5 – Common structure of specific fields for octet 2.....	45
	Figure 6 – Common structure of specific fields for octet 3.....	45
	Figure 7 – Common structure of specific fields for octet 4 (low)	46
	Figure 8 – Coding of the data type BinaryDate.....	54
	Figure 9 – Encoding of Time Of Day value.....	54
	Figure 10 – Encoding of Time Difference value.....	55
	Figure 11 – Encoding of Network Time value	55
	Figure 12 – Encoding of Network Time Difference value	56
	Figure 13 – Timescale correspondence between PTCP_Time and CycleCounter	102
	Figure 14 – Message timestamp point.....	107
	Figure 15 – Four message timestamps	108
	Figure 16 – Line delay protocol with follow up.....	109
	Figure 17 – Line delay protocol without follow up.....	109
	Figure 18 – Line delay measurement	111
	Figure 19 – Model parameter for GSDML usage	112

Figure 20 – Bridge delay measurement.....	113
Figure 21 – Delay accumulation.....	113
Figure 22 – Worst case accumulated time deviation of synchronization	114
Figure 23 – Scheme for measurement of deviation	115
Figure 24 – Measurement of deviation	115
Figure 25 – Sending Sync-Frame without Follow Up-Frame	116
Figure 26 – Sending Sync- Frame with FollowUp-Frame	116
Figure 27 – Forwarding Sync- and FollowUp-Frame.....	117
Figure 28 – Transition between Synchronization Variants	118
Figure 29 – State transition diagram of delay request	119
Figure 30 – State transition diagram of delay response.....	125
Figure 31 – Overview of PTCP.....	130
Figure 32 – State transition diagram of BMA.....	131
Figure 33 – State transition diagram of MPSM	143
Figure 34 – State transition diagram of SPSM.....	149
Figure 35 – State transition diagram of SRPM	155
Figure 36 – State transition diagram of SCHEDULER.....	160
Figure 37 – MRM protocol machine for MRP	166
Figure 38 – MRC protocol machine	173
Figure 39 – State transition diagram of RRT_RELAY.....	184
Figure 40 – CycleCounter value range	189
Figure 41 – Structure of the CycleCounter.....	190
Figure 42 – Optimized CycleCounter setting	191
Figure 43 – State transition diagram for generating events	251
Figure 44 – State transition diagram of RED_RELAY	255
Figure 45 – State transition diagram of MUX.....	261
Figure 46 – State transition diagram of DEMUX	266
Figure 47 – Structuring of the protocol machines within the DMPM (bridge).....	284
Figure 48 – Error message structure.....	290
Figure 49 – Coding scheme of ITEMQUALITYDEF.....	295
Figure 50 – Relationship among protocol machines	318
Figure 51 – State transition diagram of FSPM.....	333
Figure 52 – State transition diagram of ARPM	420
Figure 53 – State transition diagram of DMPM	425
Figure 54 – FrameSendOffset vs. duration of a cycle	477
Figure 55 – Classification of diagnosis, maintenance and qualified	511
Figure 56 – Definition of the reserved interval.....	531
Figure 57 – Definition of PLL window	534
Figure 58 – Detection of dropped frames — appear	542
Figure 59 – Detection of dropped frames — disappear.....	542
Figure 60 – Relationship among Protocol Machines	576
Figure B.1 – Establishing of a companion AR	743
Figure C.1 – Establishing of a device access AR	744

Figure D.1 – Accelerated establishing of an IOAR (simple procedure).....	745
Figure E.1 – Accelerated establishing of an IOAR without error	747
Figure E.2 – Accelerated establishing of an IOAR with “late” error	748
Figure F.1 – Establishing of an IOAR using fast startup	749
Figure G.1 – Example of upload with storage.....	751
Figure G.2 – Example of retrieval with storage.....	752
Figure H.1 – Establishing of an AR using RT_CLASS_3 CRs	753
Figure I.1 – Overview of an AlarmCR using high priority	754
Figure I.2 – Overview of an AlarmCR using low priority.....	755
Figure J.1 – Assignment of the OSI reference model layers	756
Figure K.1 – Overview of the IO device state machines	757
Figure L.1 – Overview of the IO controller state machines	758
Figure N.1 – Level model for synchronization master hierarchy.....	760
Figure N.2 – Two level variant of the synchronization master hierarchy.....	761
Figure O.1 – Adapted baggy pants model of the IEEE 802.1D.....	762
Figure O.2 – Adapted baggy pants model of the IEEE 802.1D for a frame transmitter	763
Figure O.3 – Adapted baggy pants model of the IEEE 802.1D for a frame receiver	764
Figure P.1 – Devices build up in a linear structure	765
Figure P.2 – Propagation of frames in linear transmit direction	765
Figure P.3 – Propagation of a frames in receive direction.....	766
Figure Q.1 – Overview of time constraints for bandwidth allocation.....	767
Figure Q.2 – Calculation of the length of a period	767
Figure R.1 – Scheme of a 2-port switch	769
Figure R.2 – Scheme of 2-ports	769
Table 1 – State machine description elements	46
Table 2 – Description of state machine elements	47
Table 3 – Conventions used in state machines	47
Table 4 – IEEE 802.3 DLPDU syntax	49
Table 5 – IEEE 802.11 DLPDU syntax	50
Table 6 – IEEE 802.15.1 DLPDU syntax	50
Table 7 – SourceAddress.....	57
Table 8 – DCP_MulticastMACAdd	57
Table 9 – PTCP_MulticastMACAdd range 1	57
Table 10 – PTCP_MulticastMACAdd range 2	58
Table 11 – PTCP_MulticastMACAdd range 3	58
Table 12 – PTCP_MulticastMACAdd range 4	58
Table 13 – PTCP_MulticastMACAdd range 5	58
Table 14 – PTCP_MulticastMACAdd range 6	59
Table 15 – PTCP_MulticastMACAdd range 7	59
Table 16 – PTCP_MulticastMACAdd range 8	59
Table 17 – MRP Organizationally Unique Identifier (OUI).....	59
Table 18 – MRPMulticastMACAdd	60

Table 19 – LT (Length/Type).....	60
Table 20 – TagControlInformation.Priority.....	61
Table 21 – FrameID range 1.....	61
Table 22 – FrameID range 2.....	61
Table 23 – FrameID range 3.....	62
Table 24 – FrameID range 4.....	62
Table 25 – FrameID range 5.....	62
Table 26 – FrameID range 6.....	62
Table 27 – FrameID range 7.....	62
Table 28 – FrameID range 8.....	63
Table 29 – FrameID range 9.....	63
Table 30 – FrameID range 10.....	63
Table 31 – FrameID range 11.....	63
Table 32 – FrameID range 12.....	64
Table 33 – FrameID range 13.....	64
Table 34 – DCP APDU syntax.....	64
Table 35 – DCP substitutions.....	66
Table 36 – ServiceID.....	68
Table 37 – ServiceType for request.....	68
Table 38 – ServiceType for response.....	68
Table 39 – ResponseDelayFactor.....	69
Table 40 – List of options.....	70
Table 41 – List of suboptions for option IPOption.....	70
Table 42 – List of suboptions for option DevicePropertiesOption.....	70
Table 43 – List of suboptions for option DHCPOption.....	70
Table 44 – List of suboptions for option ControlOption.....	71
Table 45 – List of suboptions for option DeviceInitiativeOption.....	71
Table 46 – List of suboptions for option AllSelectorOption.....	71
Table 47 – List of suboptions for option ManufacturerSpecificOption.....	71
Table 48 – SuboptionDHCP.....	73
Table 49 – Coding of DCPBlocklength in conjunction with SuboptionStart.....	74
Table 50 – Coding of DCPBlocklength in conjunction with SuboptionStop.....	74
Table 51 – Coding of DCPBlocklength in conjunction with SuboptionSignal.....	74
Table 52 – Coding of DCPBlocklength in conjunction with SuboptionFactoryReset.....	75
Table 53 – Coding of DCPBlocklength in conjunction with SuboptionDeviceInitiative.....	75
Table 54 – BlockQualifier with option IP.....	76
Table 55 – BlockQualifier with option DeviceProperties, DHCP, and ManufacturerSpecific.....	76
Table 56 – BlockError.....	77
Table 57 – BlockInfo for SuboptionIPParameter.....	77
Table 58 – Bit 1 and Bit 0 of BlockInfo for SuboptionIPParameter.....	77
Table 59 – Bit 7 of BlockInfo for SuboptionIPParameter.....	77
Table 60 – BlockInfo for all other suboptions.....	78

Table 61 – DeviceInitiativeValue	78
Table 62 – SignalValue	78
Table 63 – DeviceRoleDetails	80
Table 64 – IPAddress	80
Table 65 – Subnetmask	81
Table 66 – StandardGateway	82
Table 67 – DCPUCS state table	85
Table 68 – DCPUCR state table	89
Table 69 – DCPMCS state table	91
Table 70 – DCPMCR state table	93
Table 71 – DCPHMCS state table	95
Table 72 – DCPHMCR state table	96
Table 73 – PTCP APDU syntax	96
Table 74 – PTCP substitutions	97
Table 75 – PTCP_TLVHeader.Type	98
Table 76 – PTCP_Delay10ns	98
Table 77 – PTCP_Delay1ns_Byte.Value	98
Table 78 – PTCP_Delay1ns	99
Table 79 – PTCP_Delay1ns_FUP	99
Table 80 – PTCP_SequenceID	99
Table 81 – PTCP_SubType for OUI (=00-0E-CF)	100
Table 82 – PTCP_NanoSeconds	100
Table 83 – PTCP_Flags_LeapSecond	101
Table 84 – Timescale correspondence between MJD, UTC, and PTCP_EpochNumber	101
Table 85 – Timescale correspondence between PTCP_EpochNumber, PTCP_Second, PTCP_Nanosecond, CycleCounter, and SendClockFactor	101
Table 86 – PTCP_MasterPriority1.Priority for SyncID == 0 and SyncProperties.Role == 2	103
Table 87 – PTCP_MasterPriority1.Priority for SyncID == 0 and SyncProperties.Role == 1	103
Table 88 – PTCP_MasterPriority1.Priority for SyncID == 1 and SyncProperties.Role == 2	103
Table 89 – PTCP_MasterPriority1.Priority for SyncID == 1 and SyncProperties.Role == 1	103
Table 90 – PTCP_MasterPriority1.Level	103
Table 91 – PTCP_MasterPriority2	104
Table 92 – PTCP_ClockClass for SyncID == 0 (clock synchronization)	104
Table 93 – PTCP_ClockClass for SyncID == 1 (time synchronization)	105
Table 94 – PTCP_ClockAccuracy	106
Table 95 – PTCP_ClockVariance	106
Table 96 – PTCP_T2TimeStamp	107
Table 97 – DelayRequest state table	121
Table 98 – Macros used by DelayRequest	124
Table 99 – Functions used by DelayRequest	124
Table 100 – DelayResponse state table	127

Table 101 – Macros used by DelayResponse.....	128
Table 102 – Functions used by DelayResponse.....	129
Table 103 – BMA state table.....	133
Table 104 – BMA best remote sync master (RSM) state table.....	137
Table 105 – BMA get best sync master (GBSM) state table.....	139
Table 106 – Macros used by BMA.....	141
Table 107 – Functions used by BMA.....	142
Table 108 – MPSM state table.....	144
Table 109 – Macros used by MPSM.....	147
Table 110 – Functions used by MPSM.....	148
Table 111 – SPSM state table.....	150
Table 112 – Macros used by SPSM.....	153
Table 113 – Functions used by SPSM.....	154
Table 114 – SRPM state table.....	156
Table 115 – Macros used by SRPM.....	157
Table 116 – Functions used by the SRPM.....	158
Table 117 – Truth table for one SyncID.....	159
Table 118 – SCHEDULER state table.....	161
Table 119 – Functions used by the SCHEDULER.....	162
Table 120 – MRP APDU syntax.....	162
Table 121 – MRP substitutions.....	163
Table 122 – MRP_TLVHeader.Type.....	163
Table 123 – MRP_Prio.....	164
Table 124 – MRP_PortRole.....	164
Table 125 – MRP_RingState.....	164
Table 126 – MRP_Interval.....	165
Table 127 – MRP_Transition.....	165
Table 128 – MRP_TimeStamp.....	165
Table 129 – MRP_DomainUUID.....	165
Table 130 – Local variables of MRM protocol machine.....	167
Table 131 – MRM state machine.....	168
Table 132 – Local variables of MRC protocol machine.....	174
Table 133 – MRC state machine.....	175
Table 134 – Functions.....	180
Table 135 – FDB Clear Timer.....	182
Table 136 – Topology Change Timer.....	183
Table 137 – RRT_RELAY state table.....	185
Table 138 – Macros used by RRT_RELAY.....	187
Table 139 – RTC APDU syntax.....	187
Table 140 – RTC substitutions.....	188
Table 141 – CycleCounter Difference.....	189
Table 142 – DataStatus.State.....	191
Table 143 – DataStatus.Redundancy.....	192

Table 144 – DataStatus.DataValid	192
Table 145 – DataStatus.ProviderState	192
Table 146 – DataStatus.StationProblemIndicator	192
Table 147 – DataStatus.reserved_3	192
Table 148 – DataStatus.Ignore of a frame.....	193
Table 149 – TransferStatus for RT_CLASS_3	193
Table 150 – IOxS.Extension.....	194
Table 151 – IOCS.Instance	194
Table 152 – IOxS.DataState	194
Table 153 – PPM state table	197
Table 154 – Functions used by the PPM	200
Table 155 – CPM state table.....	202
Table 156 – Functions used by the CPM.....	206
Table 157 – RTA APDU syntax	206
Table 158 – RTA substitutions	207
Table 159 – PDUType.Type	208
Table 160 – PDUType.Version.....	208
Table 161 – VarPartLen	209
Table 162 – APMS state table.....	211
Table 163 – Functions used by the APMS and APMR	214
Table 164 – A_Timer_add.....	214
Table 165 – A_Timer_event.....	215
Table 166 – A_Timer_remove.....	215
Table 167 – APMR state table	217
Table 168 – RPC APDU syntax.....	219
Table 169 – RPC substitutions.....	220
Table 170 – RPCPacketType	221
Table 171 – RPCFlags.....	221
Table 172 – RPCFlags2	222
Table 173 – RPCDRep.Character- and IntegerEncoding	222
Table 174 – RPCDRep Octet 2 – Floating Point Representation	223
Table 175 – RPCObjectUUID.Data4.....	223
Table 176 – RPCObjectUUID for PNIO	224
Table 177 – RPCInterfaceUUID for PNIO	224
Table 178 – RPCInterfaceUUID for the RPC end point mapper	224
Table 179 – RPCOperationNmb (IO device, controller and supervisor)	226
Table 180 – RPCOperationNmb for endpoint mapper.....	226
Table 181 – RPCDataRepresentationUUID – defined values.....	228
Table 182 – RPCInquiryType	229
Table 183 – RPCEPMapStatus	231
Table 184 – Values of NCAFaultStatus	234
Table 185 – Values of NCARrejectStatus	235
Table 186 – LLDP APDU syntax	236

Table 187 – LLDP substitutions	237
Table 188 – LLDP_PNIO_SubType	238
Table 189 – PTCP_PortRxDelayLocal	239
Table 190 – PTCP_PortRxDelayRemote	239
Table 191 – PTCP_PortTxDelayLocal	239
Table 192 – PTCP_PortTxDelayRemote	239
Table 193 – CableDelayLocal	240
Table 194 – RTClass2_PortStatus.State	240
Table 195 – RTClass3_PortStatus.State	240
Table 196 – MRRT_PortStatus.State	241
Table 197 – LLDP_RedOrangePeriodBegin.Offset	241
Table 198 – LLDP_RedOrangePeriodBegin.Valid	241
Table 199 – LLDP_OrangePeriodBegin.Offset	242
Table 200 – LLDP_OrangePeriodBegin.Valid	242
Table 201 – LLDP_GreenPeriodBegin.Offset	242
Table 202 – LLDP_GreenPeriodBegin.Valid	243
Table 203 – LLDP_LengthOfPeriod.Length	243
Table 204 – LLDP_LengthOfPeriod.Valid	243
Table 205 – Primitives issued by LLDP to RTC3PSM	245
Table 206 – Primitives issued by IEEE 802.3 to RTC3PSM	245
Table 207 – Primitives issued by PTCP to RTC3PSM	245
Table 208 – Primitives issued by IEEE 802.1D to RTC3PSM	245
Table 209 – Primitives issued by RTC3PSM to IEEE 802.1D	245
Table 210 – RTC3PSM state table	246
Table 211 – RTC3PSM function table	250
Table 212 – Event function table	251
Table 213 – Primitives issued by LLDP to RTC2PSM	252
Table 214 – Primitives issued by IEEE 802.3 to RTC2PSM	252
Table 215 – Primitives issued by PTCP to RTC2PSM	252
Table 216 – Primitives issued by IEEE 802.1D to RTC2PSM	252
Table 217 – Primitives issued by RTC2PSM to IEEE 802.1D	252
Table 218 – RTC2PSM state table	253
Table 219 – RTC2PSM function table	255
Table 220 – RED RELAY state table	257
Table 221 – RED RELAY function table	259
Table 222 – RED RELAY macro table	259
Table 223 – Primitives issued by MUX to MAC	260
Table 224 – Primitives issued by MAC to MUX	260
Table 225 – MUX state table	262
Table 226 – MUX function table	264
Table 227 – Primitives issued by MAC to DEMUX	265
Table 228 – DEMUX state table	267
Table 229 – DEMUX function table	268

Table 230 – DEMUX macro table	269
Table 231 – IP/UDP APDU syntax	269
Table 232 – IP/UDP substitutions	270
Table 233 – UDP_SrcPort.....	271
Table 234 – UDP_DstPort.....	271
Table 235 – IP_DstIPAddress	271
Table 236 – IP Multicast DstIPAddress according to RFC 2365	272
Table 237 – Enterprise number.....	273
Table 238 – LMPM state table	286
Table 239 – LMPM macros table.....	289
Table 240 – LMPM function table.....	289
Table 241 – Error messages	291
Table 242 – VARTYPE values.....	294
Table 243 – ITEMQUALITYDEF values	296
Table 244 – STATEDEF values.....	299
Table 245 – GROUPEXCEPTIONDEF values	299
Table 246 – ACCESSRIGHTSDEF values.....	299
Table 247 – PERSISTDEF values	299
Table 248 – UUID values	303
Table 249 – Data format for serialized connection data.....	316
Table 250 – Calculation of the RT reference data size	317
Table 251 – Primitives issued by FAL User to FSPM.....	320
Table 252 – Primitives issued by FSPM to FAL User.....	327
Table 253 – FSPM state descriptions.....	333
Table 254 – FSPM state table.....	334
Table 255 – Primitives issued by FSPM to ARPM	419
Table 256 – Primitives issued by ARPM to FSPM	419
Table 257 – Parameters used with primitives exchanged between FSPM and ARPM	420
Table 258 – ARPM state descriptions	420
Table 259 – ARPM state table	420
Table 260 – Primitives issued by ARPM to DMPM	422
Table 261 – Primitives issued by DMPM to ARPM	423
Table 262 – Parameters used with primitives exchanged between ARPM and DMPM	423
Table 263 – Primitives issued by DMPM to ORPC model	424
Table 264 – Primitives issued by ORPC model to DMPM	424
Table 265 – Parameters used with primitives exchanged between DMPM and ORPC model	425
Table 266 – DMPM state descriptions.....	425
Table 267 – DMPM state table.....	426
Table 268 – IO APDU substitutions.....	428
Table 269 – BlockType	440
Table 270 – BlockVersionHigh	444
Table 271 – BlockVersionLow.....	444

Table 272 – AlarmType 445

Table 273 – AlarmSpecifier.ChannelDiagnosis 446

Table 274 – AlarmSpecifier.ManufacturerSpecificDiagnosis 446

Table 275 – AlarmSpecifier.SubmoduleDiagnosisState 446

Table 276 – AlarmSpecifier.ARDiagnosticsState 447

Table 277 – API 447

Table 278 – SlotNumber 447

Table 279 – SubslotNumber 448

Table 280 – Grouping of DiagnosisData 450

Table 281 – Index (user specific) 451

Table 282 – Index (subslot specific) 452

Table 283 – Index (slot specific) 453

Table 284 – Index (AR specific) 454

Table 285 – Index (API specific) 455

Table 286 – Index (device specific) 456

Table 287 – ARType 457

Table 288 – IOCRMulticastMACAdd using RT_CLASS_UDP 458

Table 289 – IOCRMulticastMACAdd using RT_CLASS_2 or RT_CLASS_3 458

Table 290 – Type 10 OUI 458

Table 291 – ARProperties.State 459

Table 292 – ARProperties.SupervisorTakeoverAllowed 459

Table 293 – ARProperties.ParametrizationServer 459

Table 294 – ARProperties.DeviceAccess 459

Table 295 – ARProperties.CompanionAR 460

Table 296 – ARProperties.AcknowledgeCompanionAR 460

Table 297 – ARProperties.PullModuleAlarmAllowed 460

Table 298 – IOCRProperties.RTClass 461

Table 299 – IOCRProperties.MediaRedundancy 461

Table 300 – IOCRTagHeader.IOCRVLANID 462

Table 301 – IOCRTagHeader.IOUserPriority 462

Table 302 – IOCRType 462

Table 303 – CMInitiatorActivityTimeoutFactor with ARProperties.DeviceAccess:=0 462

Table 304 – CMInitiatorActivityTimeoutFactor with ARProperties.DeviceAccess:=1 463

Table 305 – LengthIOCS 463

Table 306 – LengthIOPS 464

Table 307 – AlarmCRProperties.Priority 464

Table 308 – AlarmCRProperties.Transport 464

Table 309 – AlarmCRTagHeaderHigh.AlarmCRVLANID 465

Table 310 – AlarmCRTagHeaderHigh.AlarmUserPriority 465

Table 311 – AlarmCRTagHeaderLow.AlarmCRVLANID 465

Table 312 – AlarmCRTagHeaderLow.AlarmUserPriority 465

Table 313 – AlarmSequenceNumber 466

Table 314 – AlarmCRType 466

