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National Transportation
Communications for ITS Protocol

Object Definitions for Actuated
Traffic Signal Controller (ASC)
Units – version 02

Joint Standard of AASHTO, ITE, and NEMA

version 02.19

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- Robert DeRoche Consulting
- Trevilon Corp.
- U.S. Department of Transportation, Federal Highway Administration

FOREWORD

This document defines the Actuated Traffic Signal Controller Unit (ASC) objects that are supported by devices that are NTCIP-compliant. There are three normative annexes and one informative annex to this document.

The first version of this document, now called version 01, was published as NEMA TS 3.5-1996. In 1997, both AASHTO and ITE balloted and approved the standard. This version 02 was developed to reflect lessons learned, to update the document to the latest documentation format, and to add new features.

This document is an NTCIP Device Data Dictionary standard. Device Data Dictionary standards provide definitions of data elements for use within NTCIP systems. A Joint NTCIP Device Data Dictionary standards publication is equivalent to these document types at the standards organizations:

AASHTO – Standard Specification
ITE – Software Standard
NEMA – Standard

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Approvals

This document was separately balloted and approved by AASHTO, ITE, and NEMA after recommendation by the Joint Committee on the NTCIP. Each organization has approved this standard as the following standard type, as of the date:

AASHTO – Standard Specification; November 2004
ITE – Software Standard; March 2005
NEMA – Standard; November 2004

History

From 1996 to 1999, this document was referenced as NEMA TS 3.5-1996. However, to provide an organized numbering scheme for the NTCIP documents, this document is now referenced as NTCIP 1202. The technical specifications of NTCIP 1202 are identical to the former reference, except as noted in the development history below, and in the following Index of Revisions.

NEMA TS 3.5-1996. 1996 – Approved by NEMA. 1996 – Accepted as a Recommended Standard by the Joint Committee on the NTCIP. 1997 – Approved by AASHTO and ITE. v01.07a printed with NEMA cover.

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Compatibility of Versions

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INTRODUCTION

This publication defines data elements for use with Actuated Signal Controller Units. The data is defined using the Simple Network Management Protocol (SNMP) object-type format as defined in RFC 1212 and the defined NTCIP format defined in NTCIP 8004. This data would typically be exchanged using one of the NTCIP 1103 recognized Application Layers (e.g., SNMP).

This standard defines requirements that are applicable to all NTCIP environments and it also contains optional and conditional clauses that are applicable to specific environments for which they are intended.

The following keywords apply to this document: AASHTO, ITE, NEMA, NTCIP, data, data dictionary, object.

In 1992, the NEMA 3-TS Transportation Management Systems and Associated Control Devices Section began the effort to develop the NTCIP. Under the guidance of the Federal Highway Administration's NTCIP Steering Group, the NEMA effort was expanded to include the development of communications standards for all transportation field devices that could be used in an ITS network.

In September 1996, an agreement was executed among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain the NTCIP standards. In late 1998, the Actuated Signal Controller Working Group was tasked with the effort to update the Actuated Traffic Signal Controller Object Definitions document. The first meeting of this working group was held in October 1999.

CONTENTS

	Page
Acknowledgements	i
Foreword	ii
Introduction	v
v02.10 Revisions	xiii
v02.11 Revisions	xiv
v02.12 Revisions	xiv
v02.13 Revisions	xv
v02.14 Revisions	xvi
v02.15 Revisions	xvii
v02.16 Revisions	xviii
v02.17 Revisions	xviii
v02.18 Revisions	xix
v02.19 Revisions	xix
Section 1 GENERAL.....	1
1.1 Scope	1
1.2 References.....	1
1.2.1 Normative References.....	1
1.2.2 Other References	2
1.3 Actuated Controller Unit Terms	3
1.4 Abbreviations and Acronyms.....	7
Section 2 OBJECT DEFINITIONS.....	8
2.1 MIB Header.....	8
2.2 Phase Parameters	8
2.2.1 Maximum Phases	9
2.2.2 Phase Table.....	9
2.2.2.1 Phase Number	10
2.2.2.2 Phase Walk Parameter	10
2.2.2.3 Phase Pedestrian Clear Parameter	11
2.2.2.4 Phase Minimum Green Parameter.....	11
2.2.2.5 Phase Passage Parameter	11
2.2.2.6 Phase Maximum Green 1 Parameter.....	12
2.2.2.7 Phase Maximum Green 2 Parameter.....	12
2.2.2.8 Phase Yellow Change Parameter	13
2.2.2.9 Phase Red Clear Parameter	13
2.2.2.10 Phase Red Revert	13
2.2.2.11 Phase Added Initial Parameter	14

2.2.2.12 Phase Maximum Initial Parameter	14
2.2.2.13 Phase Time Before Reduction Parameter	14
2.2.2.14 Phase Cars Before Reduction Parameter.....	15
2.2.2.15 Phase Time to Reduce Parameter.....	15
2.2.2.16 Phase Reduce By.....	16
2.2.2.17 Phase Minimum Gap Parameter.....	16
2.2.2.18 Phase Dynamic Max Limit.....	16
2.2.2.19 Phase Dynamic Max Step.....	17
2.2.2.20 Phase Startup.....	18
2.2.2.21 Phase Options.....	18
2.2.2.22 Phase Ring Parameter.....	20
2.2.2.23 Phase Concurrency.....	20
2.2.3 Maximum Phase Groups.....	21
2.2.4 Phase Status Group Table	21
2.2.4.1 Phase Status Group Number	22
2.2.4.2 Phase Status Group Reds	22
2.2.4.3 Phase Status Group Yellows	23
2.2.4.4 Phase Status Group Greens	23
2.2.4.5 Phase Status Group Don't Walks.....	24
2.2.4.6 Phase Status Group Pedestrian clears.....	24
2.2.4.7 Phase Status Group Walks	25
2.2.4.8 Phase Status Group Vehicle Calls	25
2.2.4.9 Phase Status Group Pedestrian Calls.....	26
2.2.4.10 Phase Status Group Phase Ons	26
2.2.4.11 Phase Status Group Phase Nexts	27
2.2.5 Phase Control Table.....	27
2.2.5.1 Phase Control Group Number.....	28
2.2.5.2 Phase Omit Control	28
2.2.5.3 Pedestrian Omit Control.....	29
2.2.5.4 Phase Hold Control	29
2.2.5.5 Phase Force Off Control.....	30
2.2.5.6 Vehicle Call Control.....	30
2.2.5.7 Pedestrian Call Control	31
2.3 Detector Parameters.....	31
2.3.1 Maximum Vehicle Detectors.....	31
2.3.2 Vehicle Detector Parameter Table	32
2.3.2.1 Vehicle Detector Number.....	32
2.3.2.2 Vehicle Detector Options Parameter.....	33
2.3.2.3 Vehicle Detector Call Phase Parameter.....	34
2.3.2.4 Vehicle Detector Switch Phase Parameter	34
2.3.2.5 Vehicle Detector Delay Parameter.....	34
2.3.2.6 Vehicle Detector Extend Parameter.....	35
2.3.2.7 Vehicle Detector Queue Limit	35
2.3.2.8 Vehicle Detector No Activity Parameter	35
2.3.2.9 Vehicle Detector Maximum Presence Parameter	36
2.3.2.10 Vehicle Detector Erratic Counts Parameter	36
2.3.2.11 Vehicle Detector Fail Time Parameter	36
2.3.2.12 Vehicle Detector Alarms.....	37
2.3.2.13 Vehicle Detector Reported Alarms.....	38
2.3.2.14 Vehicle Detector Reset.....	38
2.3.3 Maximum Vehicle Detector Status Groups	39
2.3.4 Vehicle Detector Status Group Table	39
2.3.4.1 Detector Status Group Number.....	40
2.3.4.2 Detector Status Group Active.....	40
2.3.4.3 Detector Alarm Status	40
2.3.5 Volume / Occupancy report.....	41

2.3.5.1 Volume / Occupancy Sequence	41
2.3.5.2 Volume / Occupancy Period.....	41
2.3.5.3 Active Volume / Occupancy Detectors	42
2.3.5.4 Volume / Occupancy Table	42
2.3.5.4.1 Volume Data	43
2.3.5.4.2 Occupancy Data.....	43
2.3.6 Maximum Pedestrian Detectors	44
2.3.7 Pedestrian Detector Parameter Table.....	44
2.3.7.1 Pedestrian Detector Number.....	45
2.3.7.2 Pedestrian Detector Call Phase Parameter	45
2.3.7.3 Pedestrian Detector No Activity Parameter.....	45
2.3.7.4 Pedestrian Detector Maximum Presence Parameter.....	46
2.3.7.5 Pedestrian Detector Erratic Counts Parameter.....	46
2.3.7.6 Pedestrian Detector Alarms	46
2.4 Unit Parameters.....	47
2.4.1 StartUp Flash Parameter.....	47
2.4.2 Automatic Ped Clear Parameter.....	48
2.4.3 Backup Time Parameter.....	48
2.4.4 Unit Red Revert Parameter	49
2.4.5 Unit Control Status	49
2.4.6 Unit Flash Status	50
2.4.7 Unit Alarm Status 2.....	50
2.4.8 Unit Alarm Status 1.....	51
2.4.9 Short Alarm Status	52
2.4.10 Unit Control.....	52
2.4.11 Maximum Alarm Groups.....	53
2.4.12 Alarm Group Table	54
2.4.12.1 Alarm Group Number	54
2.4.12.2 Alarm Group State.....	54
2.4.13 Maximum Special Function Outputs.....	55
2.4.14 Special Function Output Table	55
2.4.14.1 Special Function Output Number	56
2.4.14.2 Special Function Output State	56
2.4.14.3 Special Function Output Control	56
2.4.14.4 Special Function Output Status.....	56
2.5 Coordination Parameters.....	57
2.5.1 Coord Operational Mode Parameter	57
2.5.2 Coord Correction Mode Parameter	57
2.5.3 Coord Maximum Mode Parameter	58
2.5.4 Coord Force Mode Parameter.....	58
2.5.5 Maximum Patterns Parameter.....	59
2.5.6 Pattern Table Type	59
2.5.7 Pattern Table	60
2.5.7.1 Pattern Number Entry.....	61
2.5.7.2 Pattern Cycle Time.....	61
2.5.7.3 Pattern Offset Time Parameter	62
2.5.7.4 Pattern Split Number Parameter	62
2.5.7.5 Pattern Sequence Number Parameter.....	62
2.5.8 Maximum Splits	63
2.5.9 Split Table.....	63
2.5.9.1 Split Number.....	64
2.5.9.2 Split Phase Number	64
2.5.9.3 Split Time Parameter.....	64
2.5.9.4 Split Mode Parameter.....	65
2.5.9.5 Split Coordinated Phase.....	66
2.5.10 Coordination Pattern Status	66

2.5.11 Local Free Status	67
2.5.12 Coordination Cycle Status	67
2.5.13 Coordination Sync Status	68
2.5.14 System Pattern Control	68
2.5.15 System Sync Control	69
2.6 Time Base Parameters	69
2.6.1 Time Base Pattern Sync Parameter	69
2.6.2 Maximum Time Base Actions	70
2.6.3 Time Base ASC Action Table	70
2.6.3.1 Time Base Action Number	71
2.6.3.2 Time Base Action Pattern Parameter	71
2.6.3.3 Time Base Action Auxiliary Function Parameter	71
2.6.3.4 Time Base Action Special Function Parameter	72
2.6.4 Time Base ASC Action Status	72
2.7 Preempt Parameters	72
2.7.1 Maximum Preempts	73
2.7.2 Preempt Table	73
2.7.2.1 Preempt Number	74
2.7.2.2 Preempt Control Parameter	74
2.7.2.3 Preempt Link Parameter	75
2.7.2.4 Preempt Delay Parameter	76
2.7.2.5 Preempt Duration Parameter	76
2.7.2.6 Preempt Minimum Green Parameter	76
2.7.2.7 Preempt Minimum Walk Parameter	77
2.7.2.8 Preempt Enter Pedestrian Clear Parameter	77
2.7.2.9 Preempt Track Green Parameter	77
2.7.2.10 Preempt Minimum Dwell Parameter	78
2.7.2.11 Preempt Maximum Presence Parameter	78
2.7.2.12 Preempt Track Phase Parameter	79
2.7.2.13 Preempt Dwell Phase Parameter	79
2.7.2.14 Preempt Dwell Ped Parameter	79
2.7.2.15 Preempt Exit Phase Parameter	80
2.7.2.16 Preempt State	80
2.7.2.17 Preempt Track Overlap Parameter	81
2.7.2.18 Preempt Dwell Overlap Parameter	81
2.7.2.19 Preempt Cycling Phase Parameter	81
2.7.2.20 Preempt Cycling Ped Parameter	82
2.7.2.21 Preempt Cycling Overlap Parameter	82
2.7.2.22 Preempt Enter Yellow Change Parameter	82
2.7.2.23 Preempt Enter Red Clear Parameter	83
2.7.2.24 Preempt Track Yellow Change Parameter	83
2.7.2.25 Preempt Track Red Clear Parameter	83
2.7.3 Preempt Control Table	84
2.7.3.1 Preempt Control Number	84
2.7.3.2 Preempt Control State	85
2.8 Ring Parameters	85
2.8.1 Maximum Rings	85
2.8.2 Maximum Sequences	85
2.8.3 Sequence Table	86
2.8.3.1 Sequence Number	86
2.8.3.2 Sequence Ring Number	87
2.8.3.3 Sequence Data	87
2.8.4 Maximum Ring Control Groups	87
2.8.5 Ring Control Group Table	88
2.8.5.1 Ring Control Group Number	88
2.8.5.2 Ring Stop Time Control	89

2.8.5.3 Ring Force Off Control	89
2.8.5.4 Ring Max 2 Control.....	90
2.8.5.5 Ring Max Inhibit Control	90
2.8.5.6 Ring Ped Recycle Control	91
2.8.5.7 Ring Red Rest Control	91
2.8.5.8 Ring Omit Red Control	92
2.8.6 Ring Status Table	92
2.8.6.1 Ring Status	93
2.9 Channel Parameters	94
2.9.1 Maximum Channels	94
2.9.2 Channel Table	94
2.9.2.1 Channel Number	95
2.9.2.2 Channel Control Source Parameter	95
2.9.2.3 Channel Control Type Parameter	95
2.9.2.4 Channel Flash Parameter	96
2.9.2.5 Channel Dim Parameter.....	96
2.9.3 Maximum Channel Status Groups	97
2.9.4 Channel Status Group Table	97
2.9.4.1 Channel Status Group Number	98
2.9.4.2 Channel Status Group Reds	98
2.9.4.3 Channel Status Group Yellows	98
2.9.4.4 Channel Status Group Greens.....	99
2.10 Overlap Parameters	99
2.10.1 Maximum Overlaps.....	99
2.10.2 Overlap Table	100
2.10.2.1 Overlap Number	100
2.10.2.2 Overlap Type	101
2.10.2.3 Overlap Included Phase Parameter	102
2.10.2.4 Overlap Modifier Phase Parameter	102
2.10.2.5 Overlap Trailing Green Parameter	102
2.10.2.6 Overlap Trailing Yellow Change Parameter.....	103
2.10.2.7 Overlap Trailing Red Clear Parameter.....	103
2.10.3 Maximum Overlap Status Groups	103
2.10.4 Overlap Status Group Table.....	104
2.10.4.1 Overlap Status Group Number.....	104
2.10.4.2 Overlap Status Group Reds	105
2.10.4.3 Overlap Status Group Yellows	105
2.10.4.4 Overlap Status Group Greens.....	105
2.11 TS2 Port 1 parameters	106
2.11.1 Maximum Port 1 Addresses	106
2.11.2 Port 1 Table	106
2.11.2.1 Port 1 Number	107
2.11.2.2 Port 1 Device Present	107
2.11.2.3 Port 1 Frame 40 Enable	108
2.11.2.4 Port 1 Status.....	108
2.11.2.5 Port 1 Fault Frame	108
2.12 ASC Block Objects	109
2.12.1 ASC Block Get Control	109
2.12.2 ASC Block Data.....	110
2.12.3 ASC Block Error Status	111
Section 3 BLOCK OBJECT DEFINITIONS.....	112
3.1 Block Data Type & ID	112
3.2 Phase Block Data	113
3.2.1 Phase Block Example.....	113
3.3 Vehicle Detector Block Data	114

3.3.1 Vehicle Detector Block Example	114
3.4 Pedestrian Detector Block Data	115
3.4.1 Pedestrian Detector Block Example	115
3.5 Pattern Block Data	116
3.5.1 Pattern Block Example	116
3.6 Split Block Data	117
3.6.1 Split Block Example	117
3.7 Time Base Block Data	118
3.7.1 Time Base Block Example	118
3.8 Preempt Block Data	119
3.8.1 Preempt Block Example	119
3.9 Sequence Block Data	120
3.9.1 Sequence Block Example	120
3.10 Channel Block Data	121
3.10.1 Channel Block Example	121
3.11 Overlap Block Data	122
3.11.1 Overlap Block Example	122
3.12 Port 1 Block Data	123
3.12.1 Port 1 Block Example	123
3.13 Schedule Block Data	123
3.13.1 sCHEDULE Block Example	124
3.14 Day Plan Block Data	124
3.14.1 Day Plan Block Example	125
3.15 Event Log Config Block Data	125
3.15.1 Event Log Config Block Example	126
3.16 Event Class Block Data	127
3.16.1 Event Class Block Example	128
3.17 Dynamic Object Config Block Data	128
3.17.1 Dynamic Object Config Block Example	129
3.18 Dynamic Object Owner Block Data	129
3.18.1 Dynamic Object Owner Block Example	130
3.19 Dynamic Object Status Block Data	130
3.19.1 Dynamic Object Status Block Example	131
3.20 Miscellaneous ASC Block Data	131
3.20.1 Miscellaneous ASC Block Example	131
Annex A Information Profile (Normative)	133
A.1 Notation	134
A.1.1 Type Symbols	134
A.1.2 Status Symbols	134
A.1.3 Conditional Status Notation	134
A.1.4 Support Column	135
A.2 ASC Requirements	135
A.3 Phase Conformance Group	136
A.4 Detector Conformance Group	137
A.5 Volume Occupancy Report Conformance Group	138
A.6 Unit Conformance Group	138
A.7 Special Function Conformance Group	139
A.8 Coordination Conformance Group	139
A.9 Time Base Conformance Group	140
A.10 Preempt Conformance Group	141
A.11 Ring Conformance Group	142
A.12 Channel Conformance Group	143
A.13 Overlap Conformance Group	143
A.14 TS 2 Port 1 Conformance Group	144
A.15 Block Object Conformance Group	144

A.16 Configuration Conformance Group	144
A.17 Database Management Conformance Group	145
A.18 Report Conformance Group	145
A.19 AuxIO Group.....	146
A.20 PMPP Group	146
A.21 SNMP Group	146
A.22 System Group.....	147
A.23 SFMP Group.....	148
A.24 STMP Group.....	148
A.25 Logical Name Group	149
A.26 Trap Management Group	149
A.27 Security Group.....	150
A.28 RS232 Group.....	150
A.29 HDLC Group.....	151
A.30 Interfaces Group.....	152
A.31 IP Group	152
A.32 ICMP Group.....	154
A.33 TCP Group	154
A.34 UDP Group	155
A.35 Ethernet Group	155
Annex B CONSISTENCY CHECKS (Normative)	156
B.1 Consistency Check Rules	156
B.2 Manufacturer Specific Consistency Checks.....	159
Annex C CONCEPT OF OPERATIONS (Informative)	160
C.1 Get Type 'C' - 'P' - 'S' Objects	160
C.2 Get Block Data	160
C.3 Set Type 'C' or 'P' Objects.....	161
C.4 Set Type 'P2' Objects.....	161
C.5 Set Block Data.....	162
C.6 Overlap Supplemental.....	163
Annex D DEPRECATED OBJECTS (Normative)	164
D.1 Special Function Output State	164

INDEX OF REVISIONS IN v02.10

The following is a list by page and/or section of the revisions included in the v02.10 draft of this Standard:

ALL SECTIONS:

Changed: references from TS 3.4 to NTCIP 1201

SECTION 2:

All Objects - Status from Mandatory to Optional – Changed
Page 18 - 2.2.2.20 Phase Startup - Changed
Page 33 - 2.3.2.2 Vehicle Detector Options Parameter - Changed
Page 48 - 2.4.3 Backup Time Parameter - Changed
Page 49 - 2.4.5 Unit control Status - Changed
Page 50 - 2.4.6 Unit Flash Status - Changed
Page 50 - 2.4.7 Unit Alarm Status 2 - Changed
Page 52 - 2.4.9 Short Alarm Status - Changed
Page 52 - 2.4.10 Unit Control - Changed
Page 56 - 2.4.14.2 Special Function Output State - Changed
Page 56 - 2.4.14.3 Special Function Output Control - Changed
Page 56 - 2.4.14.4 Special Function Output Status - Changed
Page 59 - 2.5.6 Pattern Table Type - Changed
Page 62 - 2.5.7.4 Pattern Split Number Parameter - Changed
Page 68 - 2.5.14 System Pattern Control - Changed
Page 69 - 2.5.15 System Sync Control - Changed
Page 71 - 2.6.3.2 Time Base Action Pattern Parameter - Changed
Page 71 - 2.6.3.3 Time Base Action Auxiliary Function Parameter - Changed
Page 74 - 2.7.2.2 Preempt Control Parameter - Changed
Page 80 - 2.7.2.16 Preempt Status – Changed
Page 81 - 2.7.2.17 Preempt Track Overlap Parameter - Added
Page 81 - 2.7.2.18 Preempt Dwell Overlap Parameter - Added
Page 85 - 2.7.3.2 Preempt Control State - Changed
Page 89 - 2.8.5.2 Ring Stop Time Control - Changed
Page 89 - 2.8.5.3 Ring Force Off Control - Changed
Page 90 - 2.8.5.4 Ring Max 2 Control - Changed
Page 90 - 2.8.5.5 Ring Max Inhibit Control - Changed
Page 91 - 2.8.5.6 Ring Ped Recycle Control - Changed
Page 91 - 2.8.5.7 Ring Red Rest Control - Changed
Page 92 - 2.8.5.8 Ring Omit Red Control - Changed
Page 96 - 2.9.2.4 Channel Flash Parameters - Changed
Page 96 - 2.9.2.5 Channel Dim Parameters - Changed
Page 109 - 2.12.ASC Block Objects - Added
Page 109 - 2.12.1 ASC Block Get Control - Added
Page 110 - 2.12.2 ASC Block Data - Added

SECTION 3:

Page 113- Section 3 for Block Object Definitions - Added

ANNEX A:

Page 139 - A.7 Special Function Conformance Group - Changed
Page 145 - A.16 Database Management Conformance Group (Object Status) - Changed
Page 145 - A.19 Report Conformance Group - Changed
Page 144 - A.20 Block Object Conformance Group - Added

ANNEX B:

Page 155 - Expanded definitions along with examples - Added

INDEX OF REVISIONS IN v02.11

The following is a list by page and/or section of the revisions included in the v02.11 draft of this Standard:

SECTION 2:

- Page 27 - 2.2.5 Phase Control Table - Changed
- Page 52 - 2.4.10 Unit Control - Changed
- Page 62 - 2.5.7.5 Pattern Sequence Number - Changed
- Page 67 - 2.5.11 Local Free Status - Changed
- Page 71 - 2.6.3.3 Time Base Action Auxiliary Function - Changed
- Page 74 - 2.7.2.2 Preempt Control - Changed
- Page 96 - 2.9.2.4 Channel Flash - Changed
- Page 96 - 2.9.2.5 Channel Dim - Changed
- Page 109 - 2.12.1 ASC Block Get Control
- Page 110 - 2.12.2 ASC Block Data

SECTION 3:

- Section 3 for Block Object Definitions - Changed

ANNEX A:

- Page 143 - A.13 Overlap Conformance Group - Changed

ANNEX B:

- Page 155 - B.1 Consistency Check Rules - Changed

ANNEX C:

- Page 159 - Annex C - Added

INDEX OF REVISIONS IN v02.12

The following is a list by page and/or section of the revisions included in the v02.12 draft of this Standard:

GENERAL:

- Cover Sheet & Following Page - Changed
- Page xii - Acknowledgements - Added
- Page ii - Foreword - Changed
- Page xii - Introduction - Added
- Page xiii - v02.08 Revisions - Deleted
- Page xiii - v02.09 Revisions - Deleted
- Page xiv - v02.12 Revisions - Added

SECTION 1:

- Page 1 - 1.1 Scope - Changed
- Page 1 - 1.2 References - Changed
- Page 1 - 1.2.1 Normative References - Changed
- Page 2 - 1.2.2 Other References - Changed
- Page 3 - 1.3 Actuated Controller Unit Terms - Changed

SECTION 2:

- Page All – Meta Commands - Added
- Section 2 Object Definitions - Added
- Page 50 - 2.4.7 Unit Alarm Status 2 - Changed
- Page 81 - 2.7.2.19 Preempt Cycling Phase Parameters - Added
- Page 82 - 2.7.2.20 Preempt Cycling Ped Parameters - Added
- Page 82 - 2.7.2.21 Preempt Cycling Overlap Parameters - Added
- Page 92 - 2.8.6 Ring Status Table - Added

Page 93 - 2.8.6.1 Ring Status - Added
Page 101 - 2.10.2.2 Overlap Type - Changed
Page 102 - 2.10.2.4 Overlap Modifier Phase Parameters - Changed
Page 109 - 2.12.1 Block Get Control - Changed
Page 110 - 2.12.2 Block Data – Changed
Page 111 - 2.12.3 Block Error Status - Added

SECTION 3:

Page Numerous - Block Examples - Added
Page 118 - 3.8 Block Preempt Data - Changed
Page 129 - 3.18 Block Dynamic Object Owner Data - Changed
Page 130 - 3.19 Block Dynamic Object Status Data - Changed

ANNEX A:

Page 146 - A.19 Aux IO Group - Added
Page 146 - A.20 PMPP Group - Added
Page 146 - A.21 SNMP Group - Added
Page 147 - A.22 System Group - Added
Page 148 - A.23 SFMP Group - Added
Page 148 - A.24 STMP Group - Added
Page 149 - A.25 Logical Name Group - Added
Page 149 - A.26 Trap Management Group - Added
Page 150 - A.27 Security Group - Added
Page 150 - A.28 RS232 Group - Added
Page 151 - A.29 HDLC Group - Added
Page 152 - A.30 Interfaces Group - Added
Page 152 - A.31 IP Group - Added
Page 154 - A.32 ICMP Group - Added
Page 154 - A.33 TCP Group - Added
Page 155 - A.34 UDP Group - Added
Page 155 - A.35 Ethernet Group

ANNEX B:

Page 155 - B.1 Consistency Check Rules - Changed

INDEX OF REVISIONS IN v02.13

The following is a list by page and/or section of the revisions included in the v02.13 User Comment Draft of this Standard:

GENERAL:

Title Page & Following Page – Revised
Page xii – Acknowledgements – Revised
Page ii – Foreword – Revised; added Approvals and History
Page xii – Introduction - Revised
Page xv – v02.13 Revisions – Added

INDEX OF REVISIONS IN v02.14

The following is a list by page and/or section of the revisions included in the v02.14 draft of this Standard:

GENERAL:

Page xvi – v02.14 Revisions - Added

SECTION 2:

Page 28 - 2.2.5.2 Phase Omit Control - Changed
Page 29 - 2.2.5.3 Pedestrian Omit Control - Changed
Page 29 - 2.2.5.4 Phase Hold Control - Changed
Page 30 - 2.2.5.5 Phase Force Off Control - Changed
Page 30 - 2.2.5.6 Vehicle Call Control - Changed
Page 31 - 2.2.5.7 Pedestrian Call Control - Changed
Page 33- 2.3.2.2 Vehicle Detector Options Parameter - Changed
Page 43 - 2.3.5.4.1 Volume Data - Changed
Page 43 - 2.3.5.4.2 Occupancy data - Changed
Page 48 - 2.4.3 Backup Time Parameter
Page 52 - 2.4.10 Unit Control - Changed
Page 56 - 2.4.14.3 Special Function Output Control - Changed
Page 68 - 2.5.14 System Pattern Control - Changed
Page 69 - 2.5.15 System Sync Control - Changed
Page 69 - 2.6.1 Time Base Pattern Sync Parameter - Changed
Page 62 - 2.5.7.3 Pattern Offset Time Parameter - Changed
Page 71 - 2.6.3.1 Time Base Action Number - Changed
Page 71 - 2.6.3.2 Time Base Action Pattern Parameter - Changed
Page 73 - 2.7.2 Preempt Table - Changed
Page 74 - 2.7.2.1 Preempt Number - Changed
Page 74 - 2.7.2.2 Preempt Control Parameter - Changed
Page 75 - 2.7.2.3 Preempt Link Parameter - Changed
Page 76 - 2.7.2.4 Preempt Delay Parameter - Added DEFVAL
Page 76 - 2.7.2.5 Preempt Duration Parameter - Changed
Page 76 - 2.7.2.6 Preempt Minimum Green Parameter - Changed
Page 77 - 2.7.2.7 Preempt Minimum Walk Parameter - Changed
Page 77 - 2.7.2.8 Preempt Enter Ped Clear Parameter - Changed
Page 77 - 2.7.2.9 Preempt Track Green Parameter - Changed
Page 78 - 2.7.2.10 Preempt Minimum Dwell Parameter - Changed
Page 78 - 2.7.2.11 Preempt Maximum Presence Parameter - Added DEFVAL
Page 79 - 2.7.2.12 Preempt Track Phase Parameter - Changed
Page 79 - 2.7.2.13 Preempt Dwell Phase Parameter - Changed
Page 79 - 2.7.2.14 Preempt Dwell Ped Parameter - Changed
Page 80 - 2.7.2.15 Preempt Exit Phase Parameter - Changed
Page 81 - 2.7.2.17 Preempt Track Overlap Parameter - Changed
Page 81 - 2.7.2.18 Preempt Dwell Overlap Parameter - Changed
Page 81 - 2.7.2.19 Preempt Cycling Phase Parameter - Changed
Page 82 - 2.7.2.20 Preempt Cycling Ped Parameter - Changed
Page 82 - 2.7.2.21 Preempt Cycling Overlap Parameter - Changed
Page 82 - 2.7.2.22 Preempt Enter Yellow Change Parameter - Added
Page 83 - 2.7.2.23 Preempt Enter Red Clear Parameter - Added
Page 83 - 2.7.2.24 Preempt Track Yellow Change Parameter - Added
Page 83 - 2.7.2.25 Preempt Track Red Clear Parameter - Added
Page 85 - 2.7.3.2 Preempt Control State - Changed
Page 87 - 2.8.3.3 Sequence Data

Page 89 - 2.8.5.2 Ring Stop Time Control - Changed
Page 89 - 2.8.5.3 Ring Force Off Control - Changed
Page 90 - 2.8.5.4 Ring Max 2 Control - Changed
Page 90 - 2.8.5.5 Ring Max Inhibit Control - Changed
Page 91 - 2.8.5.6 Ring Ped Recycle Control - Changed
Page 91 - 2.8.5.7 Ring Red Rest Control - Changed
Page 92 - 2.8.5.8 Ring Omit Red Control - Changed
Page 106 - 2.11 TS2 Port 1 Parameters - Changed
Page 106 - 2.11.2 Port 1 Table - Changed
Page 107 - 2.11.2.2 Port 1 Device Present - Changed

SECTION 3:

Page 113 - 3.2 Phase Block Data - Changed Heading
Page 114 - 3.3 Vehicle Detector Block Data - Changed Heading
Page 115 - 3.4 Pedestrian Detector Block Data - Changed Heading
Page 116 - 3.5 Pattern Block Data - Changed Heading
Page 117 - 3.6 Split Block Data - Changed Heading
Page 118 - 3.7 Time Base Block Data - Changed Heading
Page 117 - 3.8 Block Preempt Data - Changed
Page 119 - 3.8.1 Preempt Block Example
Page 120 - 3.9 Sequence Block Data - Changed Heading
Page 121 - 3.10 Channel Block Data - Changed Heading
Page 122 - 3.11 Overlap Block Data - Changed Heading
Page 123 - 3.12 Port 1 Block Data - Changed Heading
Page 123 - 3.13 Schedule Block Data - Changed Heading
Page 124 - 3.14 Day Plan Block Data - Changed Heading
Page 125 - 3.15 Event Log Config Block Data - Changed Heading
Page 127 - 3.16 Event Class Block Data - Changed Heading
Page 128 - 3.17 Dynamic Object Config Block Data - Changed Heading
Page 129 - 3.18 Dynamic Object Owner Block Data - Changed Heading
Page 130 - 3.19 Dynamic Object Status Block Data - Changed Heading
Page 131 - 3.20 Miscellaneous ASC Block Data - Changed Heading

ANNEX A:

Page 141 - A.10 Preempt Conformance Group - Changed

INDEX OF REVISIONS IN v02.15

The following is a list by page and/or section of the revisions included in the v02.15 draft of this Standard:

GENERAL:

Page xvii – v02.15 Revisions - Added

SECTION 2:

Page 9 - 2.2.1 Maximum Phases - Changed
Page 31 - 2.3.1 Maximum Vehicle Detectors - Changed
Page 39 - 2.3.3 Maximum Vehicle Detector Status Groups - Changed
Page 44 - 2.3.6 Maximum Pedestrian Detectors - Changed
Page 53 - 2.4.11 Maximum Alarm Groups - Changed
Page 55 - 2.4.13 Maximum Special Function Outputs - Changed
Page 51 - 2.4.8 Unit Alarm Status 1 - Changed
Page 52 - 2.4.9 Short Alarm Status - Changed
Page 59 - 2.5.5 Maximum Patterns - Changed
Page 61 - 2.5.7.2 Pattern Cycle time - Changed
page 63 - 2.5.8 Maximum Splits - Changed

Page 67 - 2.5.11 Local Free Status - Changed
Page 70 - 2.6.2 Maximum Time Base Actions - Changed
Page 73 - 2.7.1 Maximum Preempts - Changed
Page 85 - 2.8.1 Maximum Rings - Changed
Page 85 - 2.8.2 Maximum Sequences - Changed
Page 87 - 2.8.4 Maximum Ring Control Groups - Changed
Page 94 - 2.9.1 Maximum Channels - Changed
Page 97 - 2.9.3 Maximum Channel Status Groups - Changed
Page 99 - 2.10.1 Maximum Overlaps - Changed
Page 103 - 2.10.3 Maximum Overlap Status Groups - Changed
Page 106 - 2.11.1 Maximum Port 1 Addresses - Changed

ANNEX D:

Page 163 - D.1 Special Function Output State - Added

INDEX OF REVISIONS IN v02.16

The following is a list by page and/or section of the revisions included in the v02.16 accepted Recommended Standard of this Standard:

PAGES:

Page xviii – v02.16 Revisions – Added
Page Numerous – Updated meta attribute fields
Page 9 – 2.2.1 Maximum Phases – Changed
Page 67 – 2.5.12 Coordination Cycle Status - Changed
Page 68 – 2.5.13 Coordination Sync Status - Changed
Page 134 – A.1.1 Type Symbols - Changed

INDEX OF REVISIONS IN v02.17

The following is a list by page and/or section of the revisions included in the v02.17 draft of this Standard:

PAGES:

Page xviii – v02.17 Revisions – Added
Page 38 – 2.3.2.14 Vehicle Detector RESET – Changed
Page 54 – 2.4.12 Alarm Group TABLE – Typographical error
Page 69 – 2.6.1 Time Base Pattern Sync PARAMETER – Changed
Page 71 – 2.6.3.2 Time Base Action Pattern PARAMETER – Changed
Page 74 – 2.7.2.2 Preempt Control PARAMETER – Changed
Page 85 – 2.7.3.2 Preempt Control STATE – Changed
Page 107 – 2.11.2.2 Port 1 Device PRESENT – Changed
Page 108 – 2.22.2.3 Port 1 Frame 40 ENABLE – Changed
Page 134 – A.1.2 STATUS SYMBOLS – Typographical Error
Page 135 – A.2 ASC Requirements – Changed
Page 144 – A.16 Configuration Conformance Group – Changed
Page 146 – A.19 AuxIO Group – Changed
Page 146 – A.21 SNMP GROUP – Changed
Page 147 – A.22 SYSTEM GROUP – Changed
Page 150 – A.27 SECURITY GROUP – Changed
Page 155 – Annex B Consistency Checks – Changed
Page 155 – B.1 Consistency Check Rules – Changed
Page 155 – Annex C Concept of Operations – Heading changed
Page 162 – C.6 Overlap Supplemental – Changed

Page 163 – D.1 Special Function Output State – Changed

INDEX OF REVISIONS IN v02.18

The following is a list by page and/or section of the revisions included in the v02.18 ballot copy of this Standard:

GENERAL:

- Formatted Headers and Footers
- Added blank page note to even pages before new section

PAGES:

- Page 55 – 2.4.14 Commented out specialFunctionOutputState in SpecialFunctionOutputEntry because it is deprecated.

INDEX OF REVISIONS IN v02.19

The following is a list by page and/or section of the revisions included in the v02.19 Jointly Approved and published edition of this Standard:

GENERAL:

- Revised version and Joint Approval year in Headers and copyright year in Footers
- Reorganized and edited front matter to comply with NTCIP 8002 A1 v02
- Updated NEMA suite number

PAGES:

- Page 2 – Section 1.2.1 References – updated IAB and RFC URLs.
- Page 101 – 2.10.2.2 Changed overlapType ACCESS to read-write
- Page 134 – A.2 Ref A.19 auxIO; corrected Clause reference to 1201 – 2.8
- Page 141 – A.11 1202 Clause 2.8.5.1; changed Allowed Values to 1-255
- Page 148 – A.26 Trap Management Group; deleted objects
- Page 151 – A.30 Interface if.2.7; changed Allowed Values to 1-3
- Page 151 – A.30 Interface if.2.8; changed Allowed Values to 1-3
- Page 151 – A.31 IP ip.1; changed Allowed Values to 1-2
- Page 152 – A.31 IP Group; changed one Object Type and four Allowed Values
- Page 153 – A.33 TCP Group; changed five Allowed Values
- Page 154 – A.34 UDP Group; changed four Allowed Values

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Section 1 GENERAL

1.1 SCOPE

The messaging between Transportation Management and Actuated Signal Controllers is accomplished by using the NTCIP Application Layer services to convey requests to access or modify values stored in a given device; these values are referred to as objects.

The purpose of this publication is to identify and define those objects definitions that may be supported by an Actuated Signal Controller.

1.2 REFERENCES

For approved revisions, contact:

NTCIP Coordinator
National Electrical Manufacturers Association
1300 North 17th Street, Suite 1752
Rosslyn, VA 22209-3806
e-mail: ntcip@nema.org

For draft revisions, which are under discussion by the relevant NTCIP Working Group, and recommended revisions of the NTCIP Joint Committee, visit the world wide web at <http://www.ntcip.org>.

The following standards (normative references) contain provisions which, through reference in this text, constitute provisions of this Standard. Other documents and standards (other references) are referenced in these documents, which might provide a complete understanding of the entire protocol and the relations between all parts of the protocol. 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 standard listed below.

1.2.1 Normative References

ANSI
11 West 42nd Street, 13th Floor
New York, NY 10036

ISO/IEC 8824-1:1998 *Information Technology—Abstract Syntax Notation One (ASN.1): Specification of Basic Notation*