Require		
FR ID	**Functional Requirement**	**Dialog ID**
3.4	Architectural Requirements	
3.4.1	Support Basic Communications Requirements	
3.4.1.1	Retrieve Data	ISO 9.2.1
3.4.1.2	Deliver Data	ISO 9.2.2
3.4.1.3	Explore Data	G.2
3.4.1.4	SNMP Requirements	
3.4.1.4.1	Monitor SNMP Information	G.1
	Upon request from a management station, the ASC shall return basic instrumentation and control information of the SNMP device.	
3.4.2	Manage Data Blocks Requirements	
3.4.2.1	Store Pre-Defined Compressed Data Blocks	

	Upon request from a management station, the ASC shall store pre-defined sequences (blocks) of configuration data. Each pre-defined block contains configuration parameters for a functional area associated with the operation and management of an ASC. The pre-defined blocks are used to reduce the upload and download times of data between a management station and the ASC or between an ASC and another device. Several pre-defined blocks are defined by this standard. Each block contains configuration parameters for a functional area associated with the operation and management of an ASC. These blocks allow a transportation manager to select what sets of configuration data need to be exchanged with the ASC in a bandwidth efficient manner, either because the data is exchanged often, or the set otherwise requires a large amount of bandwidth. For example, NTCIP 1202 may define a single block that is exchanged to fulfill all the Configure Phases Requirements found in Section 6, in addition to the individual design content defined by NTCIP 1202 to fulfill each requirement in the same section. It is assumed that the single block uses less bandwidth than the bandwidth required to fulfill each requirement in the same section separately.	
3.4.3	Support Logged Data Requirements	
3.4.4	Support Database Management	
3.4.5	Support Condition-based Exception Reporting Requirements	
3.5	Data Exchange and Operational Environment Requirements	
3.5.1	ASC Configuration Management Requirements	
3.5.1.1	Manage ASC Information Requirements	
3.5.1.1.1	Configure ASC Location - Antenna Offset	G.3

	If an external GNSS or similar geopositioning device is attached to the ASC, upon request from the management station, the ASC shall store the offset in elevation, in meters, between the antenna used by a GNSS or similar geopositioning device and the base of the structure for a permanent ASC. A geographic position provided by a GNSS (or similar) device is usually based on the location of the antenna. Generally, the longitude and latitude of the antenna is the same location as the ASC, but the height of the antenna will normally be higher than the base of the structure. This requirement corrects the GNSS reading, which includes the elevation of the antenna, for the base of the structure.	
3.5.1.1.2	Determine Supported Standards	G.1
	Upon request from a management station, the ASC shall return the NTCIP standards which it supports.	
3.5.1.2	Manage Communications Requirements	
3.5.1.2.1	Configure Communications Requirements	
3.5.1.2.1.1	Enable/Disable Communications Port	H.2.7
	Upon request from a management station, an ASC shall enable or disable a communications port on the ASC.	
3.5.1.2.2	Retrieve Communications Requirements	
3.5.1.2.2.1	Determine Number of ASC Communications Ports	G.1
	Upon request from a management station, an ASC shall enable or disable a communications port on the ASC.	
3.5.1.3	Manage Cabinet Environment Requirements	
3.5.1.4	Monitor Power Source Requirements	
3.5.1.5	Manage Operational Perforance Data Requirements	
3.5.1.6	Manage Auxiliary External Inputs/Outputs Requirements	
3.5.1.7	Manage Database Operations	
3.5.1.7.1	Determine Configuration Identifier Parameter Content	
3.5.1.7.2	Configure Parameters for Creation of an Alternate Device Configuration Identifier	4.2.2

	Upon request from a management station, the ASC shall store a set of configuration parameters that are used to create the value of an alternate device configuration identifier. This requirement allows an operator to select the configuration parameters used to generate the configuration identifier.	
3.5.1.8	Manage Signal Monitoring Unit Interface Requirementa	
3.5.1.8.1	Enable/Disable Monitoring of the Flash State from the Signal Monitoring Unit	
3.5.1.8.2	Enable/Disable Monitoring of the Channel Voltage from the Signal Monitoring Unit	
3.5.1.8.3	Enable/Disable Monitoring of the Channel Current from the Signal Monitoring Unit	
3.5.1.9	Manage ASC Clock Requirements	
3.5.1.10	Manage External Control Local Application State Requirements	
3.5.1.10.1	Manage ECLA Interface	
3.5.1.10.1.1	Enable / Disable ECLA	G.3
	Upon request from a management station, the ASC shall enable or disable exchanging information with an ECLA.	
3.5.1.10.1.2	Monitor ECLA Interface Data Input Time	G.1
	Upon request from a management station, the ASC shall return the most recent time that an ECLA provided data to the ASC. This may be used to verify that the ECLA is operating normally.	
3.5.2	Manage Signal Operations Management Requirements	
3.5.2.1	Manage Signal Configuration Requirements	
3.5.2.1.1	Manage Unit Configuration Requirements	
3.5.2.1.1.1	Manage Start-Up Flash Requirements	
3.5.2.1.1.1.1	Configure Start-Up Flash Mode	G.3
	The requirements to manage the ASC Start-Up Flash state follow. Note: The Fault Monitor and Voltage Monitor outputs shall be inactive during the Start-Up Flash state (See NEMA TS-2).	
3.5.2.1.1.1.2	Configure Start-Up Flash Time	G.3

	Upon request from a management station, the ASC shall store the Start-Up flash mode for the controller after restoration of a defined power interruption or activation of the external start input. By default, the Start-Up flash state for each signal indication is the state of a channel during Automatic Flash mode. Other options are all signal indications are flashing red via the load switch flash; and all signal indications are flashing red while overriding the Channel Flash settings. Note: MUTCD states that "Changes from (all-red) flashing mode to steady (stop-and-go) mode shall be made by changing the flashing red indications to steady red indications followed by appropriate green indications to begin the steady mode cycle" (see FHWA MUTCD 2023 Edition, Section 4G.04.A) and "The steady red clearance interval provided during the change from red-red flashing mode to steady (stop-and-go) mode should have a duration of 6 seconds." (see FHWA MUTCD 2023 Edition, Section 4G.04 02).	
3.5.2.1.1.2	Configure Backup Time Requirements	
3.5.2.1.1.2.1	Configure Backup Time	G.3
	Upon request from a management station, the ASC shall store the period of time, in seconds, the ASC remains in the Start-Up flash state after the power is restored following a power interruption. The period of time the ASC is allowed to be in the start-up state is 0 to 255 seconds.	
3.5.2.1.1.2.2	Configure Backup Time - User-Defined Functions	H.2.7
	Upon request from a management station, the ASC shall store the functions, which resets the backup timer, if any Deliver operations (e.g., SET) are received on any of the defined functions.	
3.5.2.1.1.2.3	Determine Maximum Number of Functions Supported for Backup Time	G.1
	Upon request from a management station, the ASC shall return the maximum number of functions that can be used to reset the user-defined backup timer in the ASC.	
3.5.2.1.2	Manage Phase Configuration Requirements	
3.5.2.1.2.1	Configure Phases Requirements	
3.5.2.1.2.1.1	Enable/Disable Phase	4.2.2
	Upon request from a management station, the ASC shall	

	Upon request from a management station, the ASC shall store if a phase is enabled or disabled for the current configuration. A disabled phase does not provide any outputs nor respond to any phase inputs.	
3.5.2.1.2.1.2	Configure Phase Minimum Green Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum amount of time, from 0 and 255 seconds, that the Green indication is to be displayed for a phase.	
3.5.2.1.2.1.3	Configure Phase Passage Time	H.2.7
	Upon request from a management station, the ASC shall store the extensible time of the Green indication for a phase in tenths of a second, between 0 and 25.5 seconds. The extensible time of the Green indication is the amount of time that the Green indication is extended after a vehicle actuation. The Green indication is extended until the passage timer is timed out.	
3.5.2.1.2.1.4	Configure Two Phase Maximum Green Times	H.2.7
	Upon request from a management station, the ASC shall store a default and one additional user-defined values for the maximum amount of time, from 0 and 999 seconds, for which the vehicle phase shows a Green indication. In the absence of a serviceable conflicting call, the ASC holds the Maximum Green timer in rest, which may be overridden by external input, coordMaximumMode, or another method defined in NTCIP 1202.	
3.5.2.1.2.1.5	Configure Three Maximum Green Times	H.2.7
	Upon request from a management station, the ASC shall store a default and two additional user-defined values for the maximum amount of time, from 0 and 999 seconds, for which the vehicle phase shows a Green indication. In the absence of a serviceable conflicting call, the ASC holds the Maximum Green timer in rest, which may be overridden by external input, coordMaximumMode, or another method defined in NTCIP 1202.	
3.5.2.1.2.1.6	Configure Phase Yellow Time	H.2.7
	Upon request from a management station, the ASC shall store the amount of time the Yellow indication is to be displayed for a phase in tenths of a second from 0 to 25.5 seconds.	
3.5.2.1.2.1.7	Configure Red Clearance Time	H.2.7

	Upon request from a management station, the ASC shall store the Red clearance interval for a phase in tenths of a second, from 0 to 25.5 seconds.	
3.5.2.1.2.1.8	Configure Phase Red Revert Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum amount of time a Red indication is to be displayed following a yellow change interval, prior to the next Green Interval for the same phase as provided in the request. The minimum red indication for this phase is in tenths of a second, from 0 to 25.5 seconds.	
3.5.2.1.2.1.9	Configure Unit Red Revert Time	G.3
	Upon request from a management station, the ASC shall store the minimum amount of time a Red indication is to be displayed following a yellow change interval, prior to the next Green Interval for the same phase as provided in the request. The minimum red indication for all phases defined in the ASC is in tenths of a second, from 0.0 to 25.5 seconds.	
3.5.2.1.2.1.10	Configure Added Initial Time	H.2.7
	Upon request from a management station, the ASC shall store the amount of time for a phase, in tenths of a second, by which the ASC is to increase the variable green time period (initial time period) based on the vehicle actuations detected during the associated phase's yellow and red indications. The possible amount of added initial time is between 0 to 25.5 seconds. The value is used in conjunction with the Volume Density operation that might be used within an ASC.	
3.5.2.1.2.1.11	Configure Maximum Initial Time	H.2.7
	Upon request from a management station, the ASC shall store the maximum amount of time, from 0 to 255 seconds, that the variable green time period (initial time period) of a phase can be increased, which cannot be less than the minimum green time of the phase.	
3.5.2.1.2.1.12	Configure Time Before Reduction	H.2.7

	Upon request from a management station, the ASC shall store the Time Before Reduction period for a phase from 0 to 255 seconds. The Time Before Reduction (TBR) period begins when the phase is Green, and there is a serviceable conflicting call. The linear reduction of the allowable gap from the Passage Time begins when the TBR period or the Cars Before Reduction (CBR) is satisfied, whatever occurs first. If the serviceable conflicting call is removed while timing the TBR period, the associated internal ASC timer is reset.	
3.5.2.1.2.1.13	Configure Phase Time to Reduce	H.2.7
	Upon request from a management station, the ASC shall store the time to reduce for a phase from 0 to 255 seconds. The time to reduce is used to control the linear rate of reduction between the Passage Time and the minimum gap, as defined by NEMA TS 1 and NEMA TS 2.	
3.5.2.1.2.1.14	Configure Cars Before Reduction	H.2.7
	Upon request from a management station, the ASC shall store the Cars Before Reduction (CBR) parameter for a phase in number of vehicles, from 0 to 255. The CBR begins counting when the phase is Green, and there is a serviceable conflicting call. The linear reduction of the allowable gap from the Passage Time begins when the CBR or Time Before Reduction (TBR) period is satisfied, whatever occurs first.	
3.5.2.1.2.1.15	Configure Phase Reduce By Time	H.2.7
	Upon request from a management station, the ASC shall store a parameter to control the rate of reduction for a phase in tenths of a second, from 0 to 25.5 seconds. This parameter allows the use of an alternate time to reduce algorithm other than the linear reduction defined by NEMA TS 1 and NEMA TS 2. However, the time to reduce remains the same.	
3.5.2.1.2.1.16	Configure Phase Minimum Gap Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum amount of time in tenths of seconds, from 0 to 25.5 seconds, to which the gap between vehicles	

	can be reduced with the purpose that the phase can be terminated, if the detected gap between subsequent detector actuations is greater than this value.	
3.5.2.1.2.1.17	Configure Phase Dynamic Maximum Limit	H.2.7
	Upon request from a management station, the ASC shall store the upper limit or lower limit of the maximum allowable time of the Green indication for a phase, from 0 to 255 seconds. If the Dynamic Maximum Limit is larger than the normal maximum time of the Green Indication, it becomes the upper limit. If the Dynamic Maximum Limit is lower than the normal maximum time of the Green indication, it becomes the lower limit. The ASC disables the use of this function, if the maximum recall time or a failed detector associated with the phase is active.	
3.5.2.1.2.1.18	Configure Phase Dynamic Maximum Step	H.2.7
	Upon request from a management station, the ASC shall store the step value for increasing or decreasing the allowable maximum time of the Green indication in tenths of a second, from 0 to 25.5 seconds. How the ASC decides when to adjust allowable time is not defined in this standard.	
3.5.2.1.2.1.19	Configure Phase Startup State	4.2.2

	Upon request from a management station, the ASC shall store the state for a phase after the termination of the Start-Up flash state (See Section 3.5.2.1.1.1.1). The valid phase Start-Up states are: a) phaseNotOn – the phase is not active and no intervals are timing. b) greenWalk – the phase starts at the beginning of the green and walk timing intervals. c) greenNoWalk – the phase starts at the beginning of the green interval with no walks. d) yellowChange – the phase starts at the beginning of the yellow change interval. e) redClear – the phase starts at the beginning of the red clearance interval Note: MUTCD states that "Changes from (all-red) flashing mode to steady (stop-and-go) mode shall be made by changing the flashing red indications to steady red indications followed by appropriate green indications to begin the steady mode cycle" (see FHWA MUTCD 2023 Edition, Section 4G.04.A) and "The steady red clearance interval provided during the change from red-red flashing mode to steady (stop-and-go) mode should have a duration of 6 seconds." (see FHWA MUTCD 2023 Edition, Section 4G.04 02). Thus if the Start-Up flash mode is all-red, then the phase Start-Up state must be redClear.	
3.5.2.1.2.1.20	Configure Automatic Flash Entry Phase	4.2.2
	Upon request from a management station, the ASC shall store which phases are serviced before initiating Automatic Flash when Automatic Flash is called.	
3.5.2.1.2.1.21	Configure Automatic Flash Exit Phase	4.2.2

	Upon request from a management station, the ASC shall store which phases are serviced when Automatic Flash terminates.	
3.5.2.1.2.1.22	Configure Call to Non-Actuated 1	4.2.2
	Upon request from a management station, the ASC shall store which phases respond if the Call to Nonactuated 1 input is active.	
3.5.2.1.2.1.23	Configure Call to Non-Actuated 2	4.2.2
	Upon request from a management station, the ASC shall store which phases respond if the Call to Nonactuated 2 input is active.	
3.5.2.1.2.1.24	Configure Non-Lock Detector Memory	4.2.2
	Upon request from a management station, the ASC shall store whether a call present at the beginning of a phase's yellow time is locked.	
3.5.2.1.2.1.25	Configure Minimum Vehicle Recall	4.2.2

	Upon request from a management station, the ASC shall store if a recurring call for vehicle service exists for a phase to be served for at least the phase's minimum Green time.	
3.5.2.1.2.1.26	Configure Maximum Vehicle Recall	4.2.2
	Upon request from a management station, the ASC shall store if a recurring call for service exists for a phase to be served for the maximum time that may be allocated to a phase.	
3.5.2.1.2.1.27	Configure Soft Vehicle Recall	4.2.2
	Upon request from a management station, the ASC shall store if a call is to be placed on a phase when all conflicting phases are in resting in green or red, and there are no serviceable conflicting calls.	
3.5.2.1.2.1.28	Configure Dual Phase Entry	4.2.2
	Upon request from a management station, the ASC shall store if a phase is to become active upon entry into a concurrency group, when no calls exist in its ring within its concurrency group. This is valid for multi-ring configurations only.	
3.5.2.1.2.1.29	Configure Simultaneous Gap Disable	4.2.2

	Upon request from a management station, the ASC shall store if a gapped-out phase is allowed to revert to the extensible portion of the phase. This is valid for multi-ring configurations only.	
3.5.2.1.2.1.30	Configure Guaranteed Passage	4.2.2
	Upon request from a management station, the ASC shall store if the phase operates in volume density mode. The volume density mode uses gap reduction to retain the right of way for the unexpired portion of the Passage time following the decision to terminate the green due to a reduced gap.	
3.5.2.1.2.1.31	Configure Actuated Rest-in-Walk	4.2.2
	Upon request from a management station, the ASC shall store if an actuated phase rests in Walk if there is no serviceable conflicting call at the end of the Walk time. This setting is also used to enable Rest-in-Walk when Max Vehicle Recall is enabled for this phase.	
3.5.2.1.2.1.32	Configure Conditional Service Enable	4.2.2
	Upon request from a management station, the ASC shall store if conditional service, as defined in NEMA TS 2 Section 3.5.3.9, is allowed. Conditional service provides an optional method for phase selection in multi-ring configurations.	

3.5.2.1.2.1.33	Configure Added Initial Calculation	4.2.2
	Upon request from a management station, the ASC shall store what detector values to use for the calculation of the variable portion of the green time (added initial time): a) the largest count value from all associated detectors; or b) the sum from all associated detectors.	
3.5.2.1.2.1.34	Configure Phase-to-Ring Association	4.2.2
	Upon request from a management station, the ASC shall store the ring (number), with which the phase is associated with or if the phase is disabled.	
3.5.2.1.2.1.35	Configure Phase Concurrency	4.2.2
	Upon request from a management station, the ASC shall store the phase numbers allowed to run concurrently with the phase. Phases within the same ring cannot run concurrently.	
3.5.2.1.2.1.36	Configure Pedestrian Clearance Time Allowed During Vehicle Clearance	H.2.7
	Upon request from a management station, an ASC shall store the amount of time in tenths of a second, from 0 to 25.5 seconds, the pedestrian clearance may extend into the vehicle clearance time (yellow and red) for a phase.	

3.5.2.1.2.1.37	Configure Pedestrian Walk Time	H.2.7
	Upon request from a management station, the ASC shall store the amount of time the pedestrian WALK indication is to be displayed for a pedestrian phase, between 0 and 255 seconds. Note: MUTCD states that the WALK indication should be at least 4 seconds with a normal minimum duration of 7 seconds (see FHWA MUTCD 2023 Edition, Figure 4I-4 and Section 4I-06 12).	
3.5.2.1.2.1.38	Configure Pedestrian Clearance Time	H.2.7
	Upon request from a management station, the ASC shall store the amount of time the first pedestrian clearance indication is to be displayed for a pedestrian phase in seconds, between 0 and 255 seconds. The first pedestrian clearance indication is the interval following a pedestrian WALK indication and is normally a Flashing Don’t Walk.	
3.5.2.1.2.1.39	Configure Ped Phase Walk Service Limit	H.2.7
	Upon request from a management station, an ASC shall store if the pedestrian Walk indication is allowed to be shown again within the same pedestrian phase (after the initial pedestrian Walk, Flashing Don't Walk, and minimum Don't Walk time).	
3.5.2.1.2.1.40	Configure Ped Phase Don't Walk Revert Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum amount of time a pedestrian Don't Walk indication is to be displayed following a Flashing Don't Walk time before it may indicate a Walk indication again. The minimum pedestrian Don't Walk time indication for this pedestrian phase is in tenths of a second, from 0 to 25.5 seconds.	
3.5.2.1.2.1.41	Configure Non-Lock Ped Detector Memory	4.2.2

	Upon request from a management station, the ASC shall store if a pedestrian call present at the beginning of the pedestrian phase's pedestrian clearance interval (Flashing Don't Walk) is locked.	
3.5.2.1.2.1.42	Configure Pedestrian Recall	4.2.2
	Upon request from a management station, the ASC shall store if a recurring call for pedestrian service exists for a pedestrian phase when that phase is not in its Walk interval. The ASC does not recycle the pedestrian service until a conflicting phase is serviced.	
3.5.2.1.2.1.43	Configure Alternate Pedestrian Clearance Time	H.2.7
	Upon request from a management station, the ASC shall store an alternate pedestrian clearance time for a pedestrian phase, from 0 to 255 seconds. This alternate time may be used to support an ADA pedestrian clearance time.	
3.5.2.1.2.1.44	Configure Alternate Pedestrian Walk Time	H.2.7
	Upon request from a management station, the ASC shall store the amount of time for a pedestrian phase, in seconds from 0 to 255 seconds. This alternate time may be used to support an extended Walk time period based on an ADA pedestrian detector input.	
3.5.2.1.2.1.45	Configure Vehicle Phase Walk Offset Time	H.2.7

	Upon request from a management station, an ASC shall store the amount of time, in tenths of a second, that a parallel pedestrian Walk indication starts before or after the start of the of the vehicle Green indication for the phase. For example, MUTCD states that the (leading) Pre-WALK indication should start at least 3 seconds prior to the start of Green.	
3.5.2.1.2.1.46	Configure Advanced Green Warning	H.2.7
	Upon request from a management station, an ASC shall store the amount of time in tenths of a second, from 0 to 12.8 seconds, that an Advanced Warning Green indication is displayed before the start of the phase Green. The warning signal indication, which may be a separate signal indication or device, is placed upstream of the phase's approach and indicates that the phase Green indication is about to start or has started.	
	Raise to 25.5?	
3.5.2.1.2.1.47	Configure Red Indication Advanced Warning	H.2.7
	Upon request from a management station, an ASC shall store the amount of time in tenths of a second, from 0.0 to 25.5 seconds, that an Advanced Warning Red indication is to be displayed before the start of the phase Red. The warning signal, which may be a separate signal indication or device, is placed upstream of the phase's approach and indicates that the phase Red is about to start or has started.	
3.5.2.1.2.1.48	Configure Flashing Yellow Arrow Associated Vehicle Phase	4.2.2
	Upon request from a management station, the ASC shall	

	store the associated phase for which the Flashing Yellow Arrow indication is displayed.	
3.5.2.1.2.1.49	Configure Flashing Red Arrow Associated Vehicle Phase	4.2.2
	Upon request from a management station, the ASC shall store the associated phase for which the Flashing Red Arrow indication is displayed.	
3.5.2.1.2.1.50	Configure Alternate Minimum Vehicle Green Time during Transition	H.2.7
	Upon request from a management station, the ASC shall store the alternate minimum green time for a phase, from 0 to 255 seconds, that is to be used if the correction mode has been set to Shortway or Subtract Only. The alternate minimum green cannot be less than minimum green for this phase. See 3.5.2.1.2.1.2 Configure Phase Minimum Green Time.	
3.5.2.1.2.1.51	Configure Alternate Minimum Pedestrian Walk Time during Transition	H.2.7
	Upon request from a management station, the ASC shall store the alternate minimum Walk time, from 0 to 255 seconds, that is to be used for a pedestrian phase, if the correction mode has been set to the Shortway or Subtract Only. The alternate minimum Walk cannot be less than minimum Walk for this phase. 3.5.2.1.2.1.37 Configure Pedestrian Walk Time	
3.5.2.1.2.2	Configure Multiple Phase Sets	

Upon request from a management station, the ASC shall store phase parameters for multiple sets of phases in a manner consistent with the following requirements as selected in the PRL.

a)3.5.2.1.2.1.2 Configure Phase Minimum Green Time
b)3.5.2.1.2.1.3 Configure Phase Passage Time
c)3.5.2.1.2.1.4 Configure Two Fixed Phase Maximum Green Times
d)3.5.2.1.2.1.5 Configure Three Fixed Phase Maximum Green Times
e)3.5.2.1.2.1.6 Configure Phase Yellow Time
f)3.5.2.1.2.1.7 Configure Red Clearance Time
g)3.5.2.1.2.1.8 Configure Phase Red Revert Time
h)3.5.2.1.2.1.10 Configure Added Initial Time
i)3.5.2.1.2.1.11 Configure Maximum Initial Time
j)3.5.2.1.2.1.12 Configure Time Before Reduction
k)3.5.2.1.2.1.13Configure Phase Time to Reduce
l)3.5.2.1.2.1.14 Configure Cars Before Reduction
m)3.5.2.1.2.1.15 Configure Phase Reduce By Time
n)3.5.2.1.2.1.16 Configure Phase Minimum Gap Time
o)3.5.2.1.2.1.17 Configure Phase Dynamic Maximum Limit
p)3.5.2.1.2.1.18 Configure Phase Dynamic Maximum Step
q)3.5.2.1.2.1.22 Configure Call to Nonactuated 1
r)3.5.2.1.2.1.23 Configure Call to Nonactuated 2
s)3.5.2.1.2.1.24 Configure Non-Lock Detector Memory
t)3.5.2.1.2.1.25 Configure Minimum Vehicle Recall
u)3.5.2.1.2.1.26 Configure Maximum Vehicle Recall
v)3.5.2.1.2.1.27 Configure Soft Vehicle Recall
w)3.5.2.1.2.1.28 Configure Dual Phase Entry
x)3.5.2.1.2.1.29 Configure Simultaneous Gap Disable
y)3.5.2.1.2.1.30 Configure Guaranteed Passage
z)3.5.2.1.2.1.31 Configure Actuated Rest-in-Walk
aa)3.5.2.1.2.1.32 Configure Conditional Service Enable
bb)3.5.2.1.2.1.33 Configure Added Initial Calculation
cc)3.5.2.1.2.1.36 Configure Phase-to-Ring Association
dd)3.5.2.1.2.1.37 Configure Pedestrian Walk Time
ee)3.5.2.1.2.1.38 Configure Pedestrian Clearance Time
ff)3.5.2.1.2.1.39 Configure Pedestrian Phase Service Limit
gg)3.5.2.1.2.1.40 Configure Pedestrian Phase Don't Walk Revert Time
hh)3.5.2.1.2.1.41 Configure Non-Lock Ped Detector Memory
ii)3.5.2.1.2.1.42 Configure Pedestrian Recall
jj)3.5.2.1.2.1.43 Configure Alternate Pedestrian

	jj)3.5.2.1.2.1.43 Configure Alternate Pedestrian Clearance Time kk)3.5.2.1.2.1.44 Configure Alternate Pedestrian Walk Time ll)3.5.2.1.2.1.45 Configure Vehicle Phase Walk Offset Time mm)3.5.2.1.2.1.46 Configure Advanced Green Warning nn)3.5.2.1.2.1.47 Configure Red Indication Advanced Warning oo)3.5.2.1.2.1.50 Configure Alternate Minimum Green Time during Transition pp)3.5.2.1.2.1.51 Configure Alternate Minimum Walk Time during Transition	
3.5.2.1.2.3	Retrieve Phase Configuration Requirements	
3.5.2.1.2.3.1	Determine Maximum Number of Phases	G.1
	Upon request from a management station, the ASC shall return the maximum number of phases in a single phase set as a number from 1 to 255 phases that can be configured within the ASC.	
3.5.2.1.2.3.2	Determine Maximum Number of Phase Sets	G.1
	Upon request from a management station, the ASC shall return the maximum number of phase sets as a number from 1 to 255 phase sets that can be configured within the ASC.	
3.5.2.1.3	Manage Coordination Configuration Requirements	
3.5.2.1.3.1	Configure Operational Mode for Coordination	G.3
	Upon request from a management station, the ASC shall set the operational mode for coordination. Valid values for operational modes are: a)'automatic', which provides for coordinated operation, free and flash to be determined automatically by the possible sources (i.e., system command, timebase schedule, or interconnect inputs). b)'manual pattern', which provides for coordinated operation running a manually selected pattern. c)'manual free', which provides for Free operation without coordination or Automatic Flash from any source. d)'manual flash', which provides for Automatic Flash without coordination or Free from any source. The operational mode for coordination remains in effect until it is set again by the management station.	
3.5.2.1.3.2	Configure Correction Mode for Coordination	G.3

	Upon request from a management station, the ASC shall set the coordination correction mode, which changes the offset for the coordination algorithm. Coordination corrections may be done using vendor-specific methods. Valid correction modes are: a)Dwell - the ASC dwells in the coordinated phase until the new offset is reached. b)Shortway - the ASC adds to or subtracts from the timing in a manner that limits the cycle change. c)Add Only - the ASC adds to the timing in a manner that limits the cycle change. d)Subtract Only - the ASC subtracts from the timing in a manner that limits the cycle change.	
3.5.2.1.3.3	Configure Maximum Mode for Coordination	G.3
	Upon request from a management station, the ASC shall store the default (unit) maximum mode for coordination. The valid maximum modes are: a)maxInhibit - the maximum timing settings are not used while coordination is running a pattern. b)maximum1 - the Maximum 1 timing is used while coordination is running a pattern. c)maximum2 - the Maximum 2 timing is used while coordination is running a pattern. d)maximum3 - the Maximum 3 timing is used while coordination is running a pattern. A user may define a Maximum Mode for Coordination for each pattern separately (See 3.5.2.1.4.1.5). If a maximum mode for coordination is defined for a pattern, the pattern maximum mode is used.	
3.5.2.1.3.4	Configure Force Mode for Coordination Requirements	
3.5.2.1.3.4.1	Configure Unit-Level Force Mode for Coordination	G.3
	Upon request from a management station, the ASC shall set the default (unit) coordination process force mode. Valid force modes are a)fixed. Each non-coordinated phase is limited to its split time value, allowing unused split time from to be reallocated to the coordinated phase. b)floating. Each non-coordinated phase is forced off at a fixed position in the cycle, allowing unused split time to be reallocated to the next phase.	
3.5.2.1.3.4.2	Configure Phase-Level Force Mode for Coordination	H.2.7

	Upon request from a management station, the ASC shall set the coordination process force mode for each non coordinated phase in a pattern. Valid force modes are a)unitCoordForceMode. The phase uses the default (unit) coordination process force mode. b)fixed. The phase is limited to its split time value, allowing unused split time phase to be reallocated to the next phase that is either coordinated or fixed. c)floating. The phase is forced off at a fixed position in the cycle. This allows unused split time from the phase to be reallocated to the next phase that is either coordinated or fixed. Additionally, this allows unused split time to be reallocated to the phase from a previous non-coordinated phase.	
3.5.2.1.3.5	Configure Coordination Point Requirements	
3.5.2.1.3.5.1	Configure Unit Coordination Point	G.3
	Upon request from a management station, an ASC shall store the default (unit) coordination point based on the first coordinated phase that turns on since the start of the timing pattern cycle or the last coordinated phase to turn on before the end of the timing pattern cycle. The valid default coordination points are: a)firstPhaseGreenBegin. The start of the Green indication of the first coordinated phase. b)lastPhaseGreenBegin. The start of the Green indication of the last coordinated phase. c)firstPhaseGreenEnd. The end of the Green indication of the first coordinated phase. d)lastPhaseGreenEnd. The end of the Green indication of the last coordinated phase. e)firstPhaseYellowEnd. The end of the Yellow indication of the first coordinated phase. f)lastPhaseYellowEnd. The end of the Yellow indication of the last coordinated phase. NOTE: If only one phase is coordinated, then it is considered the first coordinated phase.	
3.5.2.1.3.5.2	Configure Pattern Specific Coordination Point	H.2.7

	Upon request from a management station, an ASC shall store the specific coordination point for the timing pattern based on the first coordinated phase that turns on since the start of the timing pattern cycle or the last coordinated phase to turn on before the end of the timing pattern cycle. The valid coordination points are: a)unitCoordSyncPoint. The pattern uses the default (unit) coordination point. b)firstCoordPhsGrnBegin. The start of the Green indication of the first coordinated phase. c)lastCoordPhsGrnBegin. The start of the Green indication of the last coordinated phase. d)firstCoordPhsGrnEnd. The end of the Green indication of the first coordinated phase. e)lastCoordPhsGrnEnd. The end of the Green indication of the last coordinated phase. f)firstCoordPhsYelEnd. The end of the Yellow indication of the first coordinated phase. g)lastCoordPhsYelEnd. The end of the Yellow indication of the last coordinated phase. NOTE: If only one phase is coordinated, then it is considered the first coordinated phase.	
3.5.2.1.3.6	Configure Omit Phases During Transitions	H.2.7
	Upon request from a management station, an ASC shall store if a phase can be omitted from currently selected pattern when the controller is in transition.	
3.5.2.1.4	Manage Timing Patterns Requirements	
3.5.2.1.4.1	Configure Timing Patterns Requirements	
3.5.2.1.4.1.1	Configure Pattern Cycle Time	H.2.7

	Upon request from a management station, the ASC shall store the length of the pattern cycle in seconds, from 30 to 999 seconds. If the pattern cycle time is of insufficient length to service the minimum timing parameters (Minimum Green, Walk, Pedestrian Clearance, Yellow Clearance, Minimum Red, etc.) of all phases, the ASC automatically implements Free Mode and indicate this in the ASC's alarm status. If the pattern cycle time is configured to be zero, the ASC implements the split time values for each phase's maximum green time values, assuming that the associated split table contains values greater than zero.	
3.5.2.1.4.1.2	Configure Pattern Offset Time	H.2.7
	Upon request from a management station, the ASC shall store the time in seconds, from 0 to 998 seconds that the local time zero lags the system time zero for this pattern. This is the difference between the local cycle and the master cycle. If the Offset value is not less than the Pattern Cycle Time value, the ASC implements Free Mode.	
3.5.2.1.4.1.3	Configure Pattern Split Association	H.2.7
	Upon request from a management station, the ASC shall store the split associated with a traffic signal timing pattern.	
3.5.2.1.4.1.4	Configure Pattern Sequence Association	H.2.7
	Upon request from a management station, the ASC shall store the sequence associated with a traffic signal timing plan.	
3.5.2.1.4.1.5	Configure Pattern Maximum Mode	H.2.7

	Upon request from a management station, the ASC shall store the maximum mode for a pattern. The valid maximum modes are: a)coordMaximumMode. Use the default maximum mode defined by the ASC. b)maxInhibit. The maximum timing settings are not used while coordination is running this pattern. c)maximum1. The Maximum 1 timing is used while coordination is running this pattern. d)maximum2. The Maximum 2 timing is used while coordination is running this pattern. e)maximum3. The Maximum 3 timing is used while coordination is running this pattern.	
3.5.2.1.4.1.6	Configure Pattern Phase Set	H.2.7
	Upon request from a management station, the ASC shall store the phase set to be used for a traffic signal timing pattern.	
3.5.2.1.4.1.7	Configure Pattern Overlap Set	H.2.7
	Upon request from a management station, the ASC shall store the overlap set to be used for a traffic signal timing pattern.	
3.5.2.1.4.1.8	Configure Pattern Vehicle Detector Set	H.2.7
	Upon request from a management station, the ASC shall store the vehicle detector set to be used for a traffic signal timing pattern.	
3.5.2.1.4.2	Retrieve Phase-Based Timing Patterns Requirements	
3.5.2.1.4.2.1	Determine Maximum Number of Timing Patterns	G.1
	Upon request from a management station, the ASC shall return the maximum number of traffic signal plans / patterns that can be configured in the ASC.	
3.5.2.1.5	Manage Splits Configuration Requirements	
3.5.2.1.5.1	Configure Split Requirements	
3.5.2.1.5.1.1	Configure Phase Split Time	H.2.7

	Upon request from a management station, the ASC shall store the time, in seconds from 0 to 999 seconds that the split phase is allowed to receive, before the phase is terminated / forced off, when constant demand exists on all phases. The split time includes all phase clearance times for the associated phase. The ASC operates differently depending on the configuration of other parameters as follows: a)If the ASC is operating in floating coordination force mode, the split time parameter is equal to the maximum amount a time a non-coordinated parameter may receive. b)If the ASC is operating in fixed coordination force mode, the allowed time may be longer, if a previous phase gapped out. c)If the cycle time for a pattern is zero (i.e., the ASC is in Manual Free Mode), then the split time is used as a maximum time for the phase, as long as the split time is not zero. d)If the sum of split times for all phases of a pattern is less than the cycle time, the ASC allocates any extra time to the coordinated phase. If the sum of split times for all phases of a pattern is greater than the defined cycle time for a pattern, then the ASC places itself into the Manual Free mode. e)If the ASC operates in the Manual Free mode, the local override bit of the Short Alarm is enabled.	
3.5.2.1.5.1.2	Configure Phase Split Mode	H.2.7

	Upon request from a management station, the ASC shall store that the operational phase split mode of a phase. The valid split modes are: a)Other. The split mode in use is not specified by the standard. b)None. The split mode of the phase is not operated under split mode control. c)Minimum Recall. The split mode of the phase is operated using the minimum recall setting, where demand is placed for the phase when the phase is not in its Green interval. d)Maximum Recall. The split mode of the phase is operated using the maximum recall setting, where a constant demand is placed for the phase during all phases. This setting applies for phases with vehicle, transit-only or bicycle movements. e)Pedestrian Recall. The split mode of the phase is operated with a pedestrian recall, or a constant demand for pedestrian service during all other phases. The minimum recall settings also apply during pedestrian recall. f)Maximum and Pedestrian Recall. The split mode of the phase is operated using the larger of maximum vehicle recall setting and of the pedestrian recall setting. g)Phase Omitted. The split mode of the phase is operated with this phase omitted. h)Nonactuated. The split mode of the phase is operated using a fixed split time for this phase.	
3.5.2.1.5.1.3	Configure Split Coordination Phase	H.2.7
	Upon request from a management station, the ASC shall store if a given phase is designated as the coordinated phase.	
3.5.2.1.5.2	Retrieve Split Requirements	
3.5.2.1.5.2.1	Determine Maximum Number of Phase Splits	G.1
	Upon request from a management station, the ASC shall return the maximum number of phase splits, as a number from 1 to 255 splits that can be configured in the ASC.	
3.5.2.1.6	Manage Ring Configuration Requirements	
3.5.2.1.6.1	Configure Ring Requirements	
3.5.2.1.6.1.1	Configure Sequence Data	4.2.2

	Upon request from a management station, the ASC shall store the sequential listing of valid phases to be included in a sequence plan.	
3.5.2.1.6.2	Retrieve Rings Requirements	
3.5.2.1.6.2.1	Determine Maximum Number of Rings	G.1
	Upon request from a management station, the ASC shall return the maximum number of rings as a number from 1 to 255 rings that can be configured in the ASC.	
3.5.2.1.6.2.2	Determine Maximum Number of Sequences	G.1
	Upon request from a management station, the ASC shall return the maximum number of sequences as a number from 1 to 255 sequences that can be configured in the ASC.	
3.5.2.1.7	Manage Channel Configuration Requirements	
3.5.2.1.7.1	Configure Channel Requirements	
3.5.2.1.7.1.1	Configure Channel Control Source	4.2.2
	Upon request from a management station, the ASC shall store the phase or overlap which controls each channel.	
3.5.2.1.7.1.2	Configure Channel Control Type	4.2.2

	Upon request from a management station, the ASC shall store what type of signal head is controlled by the channel. Valid types are: a)phaseVehicle. The channel controls a vehicle signal head using a phase. This includes bicycle and transit signal heads. b)phasePedestrian. The channel controls a pedestrian signal head using a phase. c)Overlap. The channel controls a vehicle signal head using an overlap. This includes flashing yellow arrows, flashing red arrows, as well as bicycle and transit signal head. d)pedOverlap. The channel controls a pedestrian signal head using an overlap. Is the intent only for the overlapWalk parameter or does this cover overlaps using the phaseWalk parameter? e)queueJump. The channel controls a signal head for a queue jump, typically used in transit signal priority.	
3.5.2.1.7.1.3.1	Configure Channel Automatic Flash	H.2.7
	Upon request from a management station, the ASC shall store the state of the channel during Automatic Flash. Valid states are: a)Flash Yellow. Flash yellow signal indication. b)Flash Red. Flash red signal indication.	
3.5.2.1.7.1.3.3	Enable/Disable Channel Flash - Alternate Half Hertz	H.2.7
3.5.2.1.7.2	Retrieve Channel Requirements	
3.5.2.1.7.2.1	Determine Maximum Number of Channels	G.1

	Upon request from a management station, the ASC shall return the maximum number of channels supported by the ASC. Note: See the appropriate hardware reference such as NEMA TS2, Caltrans TEES, ATC 5201, or other to determine the hardware's maximum number of channels.	
3.5.2.1.8	Manage Overlap Configuration Requirements	
3.5.2.1.8.1	Configure Overlap Requirements	
3.5.2.1.8.1.1	Configure Overlap Type Requirements	
3.5.2.1.8.1.1.1	Configure Overlap Type - Vehicle Normal	4.2.2
3.5.2.1.8.1.1.2	Configure Overlap Type - Vehicle Minus Green and Yellow	4.2.2
3.5.2.1.8.1.1.3	Configure Overlap Type - Pedestrian Normal	4.2.2
3.5.2.1.8.1.1.4	Configure Overlap Type - Flashing Yellow Arrow - 3 Section Head	4.2.2

3.5.2.1.8.1.1.5	Configure Overlap Type - Flashing Yellow Arrow - 4 Section Head	4.2.2
3.5.2.1.8.1.1.6	Configure Overlap Type - Flashing Red Arrow - 3 Section Head	4.2.2
3.5.2.1.8.1.1.7	Configure Overlap Type - Flashing Red Arrow - 4 Section Head	4.2.2
3.5.2.1.8.1.1.8	Configure Overlap Type - 2 Section Transit Specific Signal Head	4.2.2

3.5.2.1.8.1.1.9	Configure Overlap Type - Minus Green Yellow Alternate	4.2.2
3.5.2.1.8.1.2	Configure Overlap Included Phases	4.2.2
	Upon request from a management station, the ASC shall store the phase numbers that are 'included phases' for the overlap.	
3.5.2.1.8.1.3	Configure Overlap Modifier Phases	4.2.2
	Upon request from a management station, the ASC shall store the phase numbers that are modifier phases for a vehicle overlap. The modifier phase, when present, affects how the overlap responds, based on the overlap control type. For example, an active modifier phase may exclude the operation of the overlap.	

3.5.2.1.8.1.4	Configure Pedestrian Modifier Phases	4.2.2
	Upon request from a management station, the ASC shall store the phase numbers that are pedestrian modifier phases for a vehicle overlap. The pedestrian modifier phase, when active, affects how the overlap responds, based on the overlap type.	
3.5.2.1.8.1.5	Configure Overlap Trailing Green	H.2.7
	Upon request from a management station, the ASC shall store the trailing green time, from 0 to 255 seconds, which is the time that an overlap green that would normally terminate might be extended. Note: this requirement also covers the use of a Flashing Yellow Arrow in lieu of or in addition to a Green.	
3.5.2.1.8.1.6	Configure Overlap Trailing Yellow	H.2.7
	Upon request from a management station, the ASC shall store the trailing yellow time in tenths of a second, from 0 to 25.5 seconds. When the overlap green time has been extended (see Overlap Trailing Green), then this value determines the overlap's yellow duration. Note: this requirement also covers the use of a Flashing Yellow Arrow in lieu of or in addition to a Yellow.	
3.5.2.1.8.1.7	Configure Overlap Trailing Red Clearance	H.2.7
	Upon request from a management station, the ASC shall store the trailing red time in tenths of a second, from 0 to 25.5 seconds. When the overlap green time has been extended (see Overlap Trailing Green), then this value determines the overlap's red clearance duration. Note: this requirement also covers the use of a Flashing Red Arrow in lieu of or in addition to a red clearance indication.	
3.5.2.1.8.1.8	Configure Overlap Walk	H.2.7

	Upon request from a management station, the ASC shall store the walk time for a pedestrian overlap from 0 to 255 seconds.	
	How should this work with recall	
3.5.2.1.8.1.9	Configure Overlap Pedestrian Clearance	H.2.7
	Upon request from a management station, the ASC shall store the duration of the pedestrian clearance from 0 to 255 seconds.	
3.5.2.1.8.2	Configure Multiple Overlap Sets	
	Upon request from a management station, the ASC shall store overlap parameters for multiple sets of overlaps in a manner consistent with the following requirements as selected in the PRL. a)3.5.2.1.8.1.2 Configure Overlap Included Phases b)3.5.2.1.8.1.3 Configure Overlap Modifier Phases c)3.5.2.1.8.1.4 Configure Pedestrian Modifier Phases d)3.5.2.1.8.1.5 Configure Overlap Trailing Green e)3.5.2.1.8.1.6 Configure Overlap Trailing Yellow f)3.5.2.1.8.1.7 Configure Overlap Trailing Red Clearance g)3.5.2.1.8.1.8 Configure Overlap Walk h)3.5.2.1.8.1.9 Configure Overlap Pedestrian Clearance	
3.5.2.1.8.3	Retrieve Overlaps Requirements	
3.5.2.1.8.3.1	Determine Maximum Number of Overlaps	G.1
	Upon request from a management station, the ASC shall return the maximum number of overlaps that can be configured within the ASC within a single set, from 1 to 255 overlaps.	
3.5.2.1.8.3.2	Determine Maximum Number of Overlap Sets	G.1
	Upon request from a management station, the ASC shall return the maximum number of overlap sets, from 1 to 255 overlap sets, that can be configured within the ASC.	
3.5.2.1.9	Manage Preempt Configuration Requirements	
3.5.2.1.9.1	Configure Preempts for Phase-based ASC Requirements	
3.5.2.1.9.1.1	Enable/Disable Preempt Inputs	H.2.7
	Upon request from a management station, an ASC shall store the enabling or disabling of a preemption input within the ASC.	

	Note: Disabling preempts should be done with extreme caution.	
3.5.2.1.9.1.2	Configure Preempt Control - Non-Locking Memory	H.2.7
	Upon request from a management station, the ASC shall store if operation is enabled that does not require detector memory, meaning that the preempt does not occur, if the preempt request terminates prior to the expiration of the preempt delay time.	
3.5.2.1.9.1.3	Configure Preempt Control - Override Automatic Flash	H.2.7
	Upon request from a management station, the ASC shall store if a preempt is allowed to override automatic flash.	
3.5.2.1.9.1.4	Configure Preempt Control - Override Preempt	H.2.7
	Upon request from a management station, the ASC shall store if a preempt is allowed to override the next higher numbered preempt definition. Normally, a lower number preempt may override a higher number preempt, e.g., preempt number 1 may override preempt 2. This requirement prevents the lower number preempt from over-riding the next higher numbered preempt. For example, if preempt 1 is NOT allowed to override the next higher numbered preempt, in this case 2, then a call on preempt 1 will not override a call on preempt 2.	
3.5.2.1.9.1.5	Configure Preempt Control - Flash Dwell	H.2.7
	Upon request from a management station, the ASC shall store if the phases identified as preempt dwell phases and the overlaps identified as preempt dwell overlaps, Flash Yellow during the Preempt Dwell interval. If the Flash Dwell feature is enabled, the ASC flashes all other phases and overlaps in a red indication.	
3.5.2.1.9.1.6	Configure Preempt Link	H.2.7
	Upon request from a management station, the ASC shall store the identity of a higher priority preempt (lower preempt number) to be combined with the current preempt. At the end of the preempt's Dwell Green time, the ASC automatically calls the linked preempt, which remains active until the preempt signal for the current preempt is removed. The ASC does not link a lower priority preempt	

	(higher preempt number) or a non-valid preempt with the current preempt.	
3.5.2.1.9.1.7	Configure Preempt Delay	H.2.7
	Upon request from a management station, the ASC shall store the time, from 0 to 600 seconds, that a preempt input might be active prior to initiating a preempt sequence. If a call for a non-locking preempt is removed prior to completion of this time, the ASC does not initiate the preempt sequence.	
3.5.2.1.9.1.8	Configure Preempt Minimum Duration	H.2.7
	Upon request from a management station, the ASC shall store the minimum duration, from 0 to 65535 seconds, that a preempt is active. The timing begins at the end of the preempt's delay time, if one is defined, otherwise the timing begins when the preempt input goes active, and prevents an exit from the preempt dwell interval until this time has elapsed.	
3.5.2.1.9.1.9	Preempt Entry Configuration Requirements	
3.5.2.1.9.1.9.1	Configure Preempt Enter Minimum Green Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum green duration for a preempt initiated transition, from 0 to 255 seconds. A preempt initiated transition does not cause the termination of an existing Green display prior to the lesser of the phase's Minimum Green Time or this preempt minimum green time. If the preempt minimum green time is set to zero, when the ASC immediately terminates the phase's Green display.	
3.5.2.1.9.1.9.2	Configure Preempt Enter Minimum Walk Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum walk time for a preempt initiated transition from 0 to 255 seconds. A preempt initiated transition does not cause the termination of an existing Walk display prior to the lesser of the phase's Pedestrian Green Time or this preempt minimum walk time. If the preempt minimum walk time is set to zero, the ASC immediately terminates the phase's Walk display.	
3.5.2.1.9.1.9.3	Configure Preempt Enter Pedestrian Clearance Time	H.2.7

	Upon request from a management station, the ASC shall store the pedestrian clearance time for a normal Walk display terminated by a preempt initiated transition, from 0 to 255 seconds. A preempt initiated transition does not cause the termination of an existing pedestrian clearance display prior to the lesser of the phase's pedestrian clearance time or this preempt pedestrian clearance time. If the preempt enter pedestrian clearance time is set to zero, the ASC immediately terminates the phase's pedestrian clearance (Flashing Don't Walk) display.	
3.5.2.1.9.1.9.4	Configure Preempt Enter Yellow Change Time	H.2.7
	Upon request from a management station, the ASC shall store the duration in tenths of a second, from 0 to 25.5 seconds, of the Enter Yellow interval terminated by a preempt initiated transition. A preempt initiated transition does not cause the termination of an existing Yellow indication prior to the lesser of the phase's Yellow time or this preempt Enter Yellow time. If the preempt enter Yellow Change time is set to zero, the ASC immediately terminates the phase's Yellow indication.	
3.5.2.1.9.1.9.5	Configure Preempt Enter Red Clearance Time	H.2.7
	Upon request from a management station, the ASC shall store the duration in tenths of a second, from 0 to 25.5 seconds, of the Enter Red Clearance interval for a normal Red Clearance interval terminated by a preempt initiated transition. A preempt initiated transition does not cause the termination of the Red Clearance time prior to the lesser of the phase's Red Clearance time or this preempt Enter Red Clearance time. If the preempt Enter Red Clearance time is set to zero, the ASC immediately terminates the phase's Red Clearance time.	
3.5.2.1.9.1.10	Preempt Track Clearance Configuration Requirements	
3.5.2.1.9.1.10.1	Configure Preempt Track Clearance Green Time	H.2.7
	Upon request from a management station, the ASC shall store the track clearance time for the defined preempt track phases, from 0 to 255 seconds. During this time, the selected Preempt Track Clearance Phases are green along with any overlaps driven by these phases. If the	

	preempt track clearance time is set to zero, the ASC omits the track clearance movement.	
3.5.2.1.9.1.10.2	Configure Preempt Track Yellow Change Time	H.2.7
	Upon request from a management station, the ASC shall store the duration of the Track Yellow change interval in tenths of a second, from 0 to 25.5 seconds. The lesser of the phase's Yellow Change time or this preempt Track Yellow Change time controls the yellow timing for the track clearance movement.	
3.5.2.1.9.1.10.3	Configure Preempt Track Red Clearance Interval Time	H.2.7
	Upon request from a management station, the ASC shall store the duration of the Track Red Clearance interval in tenths of a second, from 0 to 25.5 seconds. The lesser of the phase's Red Clearance time or this preempt Track Red Clearance time controls the Red Clearance timing for the track clearance movement.	
3.5.2.1.9.1.10.4	Configure Preempt Track Clearance Phases	4.2.2
	Upon request from a management station, the ASC shall store the phases to be active for the preempt during the preempt track clearance interval.	
3.5.2.1.9.1.10.5	Configure Preempt Track Clearance Overlap	4.2.2
	Upon request from a management station, the ASC shall store the overlaps to be active for a preempt during the preempt track clearance interval	
	Is this needed?	
	Are these needed?	

3.5.2.1.9.1.11	Configure Preempt Dwell Requirements	
3.5.2.1.9.1.11.1	Configure Preempt Minimum Green Dwell Time	H.2.7
	Upon request from a management station, the ASC shall store the minimum green time for a preempt to remain in a preempt dwell interval, from 0 to 255 seconds. The ASC determines the phases that are active during the dwell interval green time based on the settings for the preempt dwell phases. The preempt dwell interval green duration does not terminate prior to the completion of the preempt minimum duration and the preempt minimum green dwell time, and if the preempt call is no longer present / active.	
3.5.2.1.9.1.11.2	Configure Preempt Dwell Phases	4.2.2
	Upon request from a management station, the ASC shall store the phases to be serviced by a preempt during the preempt dwell interval.	
3.5.2.1.9.1.11.3	Configure Preempt Dwell Pedestrian Movements	4.2.2
	Upon request from a management station, the ASC shall store the phases that may have their pedestrian movement(s) served by a preempt during the preempt dwell interval, which is followed by the pedestrian movements defined in the preempt cycling pedestrian list.	
	Is this needed?	
3.5.2.1.9.1.11.4	Configure Preempt Dwell Overlap	4.2.2

	Upon request from a management station, the ASC shall store the overlaps to be active for a preempt during the preempt dwell interval.	
	Is this needed?	
	Are these needed?	
3.5.2.1.9.1.11.5	Configure Preempt Cycling Phases	4.2.2
	Upon request from a management station, the ASC shall store the phases to be allowed to cycle during the preempt dwell interval.	
3.5.2.1.9.1.11.6	Configure Preempt Cycling Pedestrian Movements	4.2.2
	Upon request from a management station, the ASC shall store the phases with pedestrian movements to be allowed to cycle during the preempt dwell interval.	
3.5.2.1.9.1.11.7	Configure Preempt Cycling Phases Sequence	4.2.2
	Upon request from a management station, an ASC shall store the sequence of the phases selected for cycling during the preempt dwell interval. If no sequence is specified, then the sequence is the one that was in effect when the preempt was activated.	
3.5.2.1.9.1.11.8	Configure Preempt Cycling Overlaps	4.2.2

	Upon request from a management station, the ASC shall store the overlaps to be allowed to cycle during the preempt dwell interval.	
	Is this needed?	
3.5.2.1.9.1.12	Configure Preempt Exit Requirements	
3.5.2.1.9.1.12.1	Configure Preempt Exit Phases	4.2.2
	Upon request from a management station, the ASC shall store the phases that are allowed to be active following the preempt dwell interval.	
3.5.2.1.9.1.12.2	Configure Preempt Exit Phase Strategy	H.2.7
	Upon request from a management station, an ASC shall store the exit strategy to be used following the end of the preempt dwell interval. The valid exit strategies are: a)Exit to Normal Operations. The ASC immediately enters the exit phases to be active as configured following the preempt dwell interval. b)Exit to Queue Delay Recovery. The ASC enters the phase with the highest demand or longest wait time, as determined by the Preempt Exit Priority Level. c)Return to Short Service Phase. The ASC goes to the first "short service phase", which is a phase where only the preempt minimum green time was serviced during the advanced preemption time or right-of-way transfer time (preemption entry intervals). d)Return to Coordination. The ASC immediately returns to the place in the coordinated cycle where the ASC would have been had there been no preempt.	
3.5.2.1.9.1.12.3	Configure Preempt Exit Priority Levels	H.2.7

	Upon request from a management station, an ASC shall store the relative weights for the priority level for each phase when the Queue Delay Recovery exit strategy is used following the end of the preempt dwell interval. The relative weights are in integers, and a higher number indicates a larger weight for the demand and wait time for that phase.	
3.5.2.1.9.1.13	Configure Preempt Max Presence Exceeded Requirements	
3.5.2.1.9.1.13.1	Configure Preempt Maximum Presence Time	H.2.7
	Upon request from a management station, the ASC shall store the maximum presence time, from 0 to 65535 seconds, for which a preempt can remain active. If this preempt presence time has elapsed, the call for preemption is considered invalid until a change of the preempt's state occurs (such as the preempt is no longer active). The timing begins at the end of the preempt's delay time, if one is defined, otherwise the timing begins when the preempt input goes active. If the preempt maximum presence time is set to zero, the ASC is to disable the preempt maximum presence time.	
3.5.2.1.9.1.13.2	Configure Preempt Max Presence Action	H.2.7
	Upon request from a management station, an ASC shall store how to exit preemption if the preempt maximum presence time has been exceeded. Valid exit sequences when the maximum presence time has been exceeded are: a)Preempt Exit phases. The ASC will use the exit strategy following the end of the preempt dwell interval (See 3.5.2.1.9.1.12.2). b)All-Red Flash. The ASC will go to all-red flash.	
3.5.2.1.9.1.14	Configure Preempt Gate Description	H.2.7
	Upon request from a management station, the ASC shall store a description for a gate that activates during preemption.	
3.5.2.1.9.2	Determine Maximum Number of Preempts	

	Upon request from a management station, the ASC shall return the maximum number of preempts, as a number from 1 to 255 preempts, that can be configured in the ASC.	
3.5.2.1.10	Manage ASC Scheduler Requirements	
3.5.2.1.10.1	Configure Timebase Pattern Synchronization Time	G.3
	Upon request from a management station, the ASC shall store the timebase pattern synchronization reference time, in minutes past midnight, from 0 to 65535 minutes. This is the time that the master cycle begins. If this value is 65535, the start or activation time (in hours and minutes since midnight of that day) of the timebase pattern is used as the Synchronization reference by the ASC.	
3.5.2.1.10.2	Configure Timebased Action - Pattern	H.2.7
	Upon request from a management station, the ASC shall store the identity of the timing pattern that is active when the Action is active. If the timebased action pattern is set to zero, the ASC reverts to a lower priority entity such as 'interconnect' (if available).	
3.5.2.1.10.3	Configure Timebased Action - Special Functions	H.2.7
	Upon request from a management station, the ASC shall configure up to eight special functions to be activated when the Action is active.	
3.5.2.1.10.4	Retrieve Timing Pattern Scheduler Requirements	
3.5.2.1.10.4.1	Determine Maximum Number of Timebased Actions	G.1
	Upon request from a management station, the ASC shall return the maximum number of timebased actions that can be configured in the ASC.	
3.5.2.1.10.4.2	Determine Action In Effect	G.1
	Upon request from a management station, the ASC shall return what action plan is currently in effect.	
3.5.2.1.11	Manage I/O Mapping Requirements	
3.5.2.1.11.1	Configure I/O Mapping Requirements	
3.5.2.1.11.1.1	Set Active I/O Map	4.2.5
	Upon request from a management station, an ASC shall change the Active I/O map currently being used. This change is required to be made as part of a database transaction, and only if the Activate Requirements specified in section 3.5.2.1.11.2.4 are satisfied for the new I/O map to take effect.	

3.5.2.1.11.1.2	Configure I/O Map Requirements	
3.5.2.1.11.1.2.1	Configure I/O Map Description	4.2.4
	Upon request from a management station, an ASC shall store the description for an I/O map. This description may be any text describing the I/O map such as the intended cabinet type, the intended intersection, etc.	
3.5.2.1.11.1.2.2	Configure I/O Map Input Requirements	
3.5.2.1.11.1.2.2.1	Configure I/O Map Input Device	4.2.4
	Upon request from a management station, an ASC shall store a value indicating the device for each input pin in an I/O map.	
3.5.2.1.11.1.2.2.2	Configure I/O Map Input Device Pin	4.2.4
	Upon request from a management station, an ASC shall store a value indicating the device pin number for each input pin in an I/O map.	

3.5.2.1.11.1.2.2.3	Configure I/O Map Input Function	4.2.4
	Upon request from a management station, an ASC shall store a value indicating the input function to be mapped to each input pin in an I/O map.	
3.5.2.1.11.1.2.3	Configure I/O Map Output Requirements	
3.5.2.1.11.1.2.3.1	Configure I/O Map Output Device	4.2.4
	Upon request from a management station, an ASC shall store a value indicating the device for each output pin in an I/O map.	
3.5.2.1.11.1.2.3.2	Configure I/O Map Output Device Pin	4.2.4
	Upon request from a management station, an ASC shall store a value indicating the device pin number for each output pin in an I/O map.	

3.5.2.1.11.1.2.3.3	Configure I/O Map Output Function	4.2.4
	Upon request from a management station, an ASC shall store a value indicating the output function to be mapped to each output pin in an I/O map.	
3.5.2.1.11.2	Determine I/O Mapping Requirements	
3.5.2.1.11.2.1	Retrieve Maximum Number of I/O Maps	G.1
	Upon request from a management station, an ASC shall return the maximum number of I/O maps supported by the ASC.	
3.5.2.1.11.2.2	Retrieve Maximum Number of I/O Map Inputs	G.1
	Upon request from a management station, an ASC shall return the maximum number of I/O map inputs supported by the ASC. This is the number of inputs that the ASC can support at any one time from all input devices.	
3.5.2.1.11.2.3	Retrieve Maximum Number of I/O Map Outputs	G.1
	Upon request from a management station, an ASC shall return the maximum number of I/O map outputs supported by the ASC. This is the number of inputs that the ASC can support at any one time from all input devices.	
3.5.2.1.11.2.4	Retrieve I/O Mapping Activate Conditions	G.1

	Upon request from a management station, an ASC shall return requirements to be fulfilled for a new I/O map to take effect. These requirements may include that a cabinet door be open (indicating that a technician is at the cabinet), that the cabinet be in any flash state, that the cabinet be in all red flash, that the cabinet be in cabinet (CVM) flash, or that the ASC be restarted.	
3.5.2.1.11.2.5	Retrieve I/O Mapping Input Functions	H.2.5
	Upon request from a management station, an ASC shall return a listing of the input functions that the ASC supports for I/O mapping.	
3.5.2.1.11.2.6	Retrieve I/O Mapping Output Functions	H.2.5
	Upon request from a management station, an ASC shall return a listing of the output function that the ASC supports for I/O mapping.	
3.5.2.1.11.2.7	Retrieve I/O Map Input Device Pin Status	H.2.5
	Upon request from a management station, an ASC shall return the status of each input in an I/O map.	
3.5.2.1.11.2.8	Retrieve I/O Map Output Device Pin Status	H.2.5
	Upon request from a management station, an ASC shall return the status of each output in an I/O map.	
3.5.2.1.11.2.9	Enumerate I/O Mapping Device Pin Requirements	
3.5.2.1.11.2.9.1	Enumerate I/O Map - FIO Inputs	
3.5.2.1.11.2.9.2	Enumerate I/O Map - FIO Outputs	
3.5.2.1.11.2.9.3	Enumerate I/O Map - TS1 Inputs	
3.5.2.1.11.2.9.4	Enumerate I/O Map - TS1 Outputs	
3.5.2.1.11.2.9.5	Enumerate I/O Map - TS2 BIU Inputs	

3.5.2.1.11.2.9.6	Enumerate I/O Map - TS2 BIU Outputs	
3.5.2.1.11.2.9.7	Enumerate I/O Map - ATC Cabinet SIU Inputs	
3.5.2.1.11.2.9.8	Enumerate I/O Map - ATC Cabinet SIU Outputs	
3.5.2.1.11.2.9.9	Enumerate I/O Map - Auxiliary Device Inputs	
3.5.2.1.11.2.9.10	Enumerate I/O Map - Auxiliary Device Outputs	
3.5.2.1.12	Manage Intra-Cabinet Communications Requirements	
3.5.2.1.12.1	Determine Serial Bus 1 Device Present	H.2.5
	Upon request from a management station, the ASC shall return if a device is present for a Serial Bus 1 address. The ASC only transmits command frames to those devices that are present as determined by this value.	
3.5.2.1.12.2	Retrieve Intra-Cabinet Communications Requirements - TS2	
3.5.2.1.12.2.1	Determine TS2 Port 1 Device Present	H.2.5
	Upon request from a management station, the ASC shall return if a device is present for a TS2 Port 1 address. The ASC only transmits command frames to those devices that are present as determined by this value.	
3.5.2.1.12.2.2	Determine TS2 Port 1 Frame 40 Enable	H.2.5
	Upon request from a management station, the ASC shall return if Frame 40 message to the device is enabled for a TS2 Port 1 address.	
3.5.2.1.13	Manage ADA Support Requirements	
3.5.2.1.13.1	Configure ADA Support Requirements	
3.5.2.1.13.1.1	Configure APS Push Button Minimum Press Time	H.2.7
	Upon request from a management station, the ASC shall store the time in tenths of seconds, from 0.0 to 25.5 seconds, that an Accessible Pedestrian Signal (APS) Push Button needs to be pressed as a minimum to actuate any APS features. This requirement enables the ASC to receive inputs from installed APS push buttons to actuate any APS features. MUTCD Section 4K.05, item 02 states that the push button should be pressed for 1.0 seconds or greater to actuate any APS features. A value of 0.0 indicates that the APS features are disabled.	
3.5.2.1.13.1.2	Configure APS Push Button to Phase Association	H.2.7
	Upon request from a management station, the ASC shall return a list of the phase identifiers with whom an APS push button is associated with	

	push button is associated with.	
3.5.2.1.13.1.3	Configure APS Extra Crossing Time	H.2.7
	Upon request from a management station, the ASC shall store the time in tenths of seconds, from 0.0 to 25.5 seconds, that the pedestrian clearance time is extended, if an APS push button has been pressed for equal to or greater than the APS push button minimum press time. A value of 0 indicates no additional crossing time.	
3.5.2.1.13.2	Determine Maximum Number of Pedestrian Buttons	G.1
3.5.2.1.14	Manage Block Object Requirements	
3.5.2.1.14.1	Configure Block Object Requirements	
3.5.2.1.14.1.1	Configure Block Object Get Control - Phase Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the phases sets within the ASC.	
3.5.2.1.14.1.2	Configure Block Object Get Control - Vehicle Detector Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the vehicle detector sets within the ASC.	
3.5.2.1.14.1.3	Configure Block Object Get Control - Pedestrian Detector Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the pedestrian detectors within the ASC.	
3.5.2.1.14.1.4	Configure Block Object Get Control - Pattern Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the timing patterns within the ASC.	

	the ASC.	
3.5.2.1.14.1.5	Configure Block Object Get Control - Split Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the phase split definitions within the ASC.	
3.5.2.1.14.1.6	Configure Block Object Get Control - Preempt Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the preempts within the ASC.	
3.5.2.1.14.1.7	Configure Block Object Get Control - Sequence Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the phase sequences within the ASC.	
3.5.2.1.14.1.9	Configure Block Object Get Control - Channel Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the channels within the ASC.	
3.5.2.1.14.1.10	Configure Block Object Get Control - Overlap Data	4.2.3
	Upon request from a management station, the ASC shall store the compressed data block object reference parameters needed to configure the phase overlaps sets within the ASC	

	within the ASC.	
3.5.2.1.14.2.3	Monitor Block Error Status Requirements	
3.5.2.1.14.2.3.1	Monitor Block Error Status - Set/Get Command Attempt	N.1
3.5.2.1.14.2.3.2	Monitor Block Error Status - Configuration Validity Check Error	N.2
3.5.2.1.14.2.3.3	Monitor Block Error Status - Value Set Validity Check Error	N.3
3.5.2.1.14.2.3.4	Monitor Block Error Status - Error-causing Data Element	N.3
3.5.2.2	Monitor Signal Operations Requirements	
3.5.2.2.1	Determine Controller Health Requirements	
3.5.2.2.1.1	Monitor Alarm Group State	H.2.5
	Upon request from a management station, the ASC shall return if a physical alarm input is active.	
3.5.2.2.1.2	Monitor Preempt Active	G.1
	Upon request from a management station, the ASC shall return an alarm value when any of the preemption inputs become active.	
3.5.2.2.1.3	Monitor Flash Active	G.1
	Upon request from a management station, the ASC shall return an alarm value when the intersection is in Flash.	
3.5.2.2.1.3	Monitor Terminal and Facilities Flash	G.1
	Upon request from a management station, the ASC shall return an alarm value when either the Local Flash or the Signal Monitoring Unit Flash input becomes active.	
3.5.2.2.1.4	Monitor Local Cycle Zero Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the ASC is in coordination mode and the currently active timing plan/pattern has passed through zero. The ASC does not clear this alarm value until the alarm is read by the management station	
3.5.2.2.1.5	Monitor Local Override	G.1

	Upon request from a management station, the ASC shall return an alarm value when any external input or ASC programming has prevented the device from responding to a system pattern command.	
3.5.2.2.1.6	Monitor Coordination Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the ASC is not running the called pattern without offset correction within a user-specified number of cycles from receiving the command (default = three cycles). The ASC does not cause an alarm to be set, if an offset correction requires less than the user-specified number of cycles (default = three) due to cycle overrun caused by servicing a pedestrian call. Within three cycles or leave to vendor?	
3.5.2.2.1.7	Monitor Detector Fault	G.1
	Upon request from a management station, the ASC shall return an alarm value when a detector alarm fault occurs.	
3.5.2.2.1.8	Monitor Non-Critical Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when a physical alarm input is active.	
3.5.2.2.1.9	Monitor Stop Time Input Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the stop time input is active.	
3.5.2.2.1.10	Monitor Cycle Fault Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the ASC is operating in the coordinated mode and cycling diagnostics indicate that a serviceable call exists that has not been serviced for two cycles.	
3.5.2.2.1.11	Monitor Coordination Fault	G.1
	Upon request from a management station, the ASC shall return an alarm value when a cycle fault is in effect and the serviceable call has been serviced within two cycles after the cycle fault alarm activating.	
3.5.2.2.1.12	Monitor Coordination Fail Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when a Coordination Fault is in effect and a Cycle Fault occurs again within two cycles of the coordination retry.	
3.5.2.2.1.13	Monitor Cycle Fail Alarm	G.1

	Upon request from a management station, the ASC shall return an alarm value when the ASC is operating in non-coordinated mode as the result of either a Cycle Fault or the ASC operating in Free mode, and cycling diagnostics indicate that a serviceable call exists that has not been serviced for two cycles.	
3.5.2.2.1.14	Monitor SMU Flash Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the Signal Monitoring Unit (e.g., Malfunction Management Unit) flash remains active for a period of time exceeding the Start-Up Flash time.	
3.5.2.2.1.15	Monitor Local Flash Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the local flash input becomes active, while the Malfunction Management Unit Flash input is not active and the Flash mode was not commanded.	
3.5.2.2.1.16	Monitor Local Free Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when any of the ASC's inputs and/or programming cause the ASC not to run coordination.	
3.5.2.2.1.17	Monitor Coordination Active Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when coordination is active and not preempted or overridden.	
3.5.2.2.1.18	Monitor Power Restart Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm when power returns after a power interruption. When enabled, the ASC does not clear this alarm until the alarm has been returned.	
3.5.2.2.1.19	Monitor Low Battery Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when any internal standby voltage drops below sustainable levels.	
3.5.2.2.1.20	Monitor Response Fault Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when a NEMA TS2 Port 1 or Serial Bus 1 monitor response frame fault occurs.	
3.5.2.2.1.21	Monitor External Start	G.1
	Upon request from a management station, the ASC shall return an alarm when the Controller Unit External Start becomes active.	
3.5.2.2.1.22	Monitor Stop Time Alarm	G.1
	Upon request from a management station, the ASC shall return an alarm value when the Controller Unit Stop Time input becomes active.	
3.5.2.2.1.23	Monitor Offset Transitioning Alarm	G.1

	Upon request from a management station, an ASC shall return if the ASC detects a process (task) failure.	
3.5.2.2.1.26	Monitor Process Failure	G.1
3.5.2.2.1.27	Monitor Communications Timeout	G.1
	Upon request from a management station, an ASC shall return if the ASC detects a communications timeout on an enabled communications port on the ASC. This is different than the backup timer in that the communications port timer is a communications layer function, while the backup timer is an ASC application timer.	
3.5.2.2.1.28	Monitor Power Problems	G.1
	Upon request from a management station, an ASC shall return if the ASC detects power problems such as brown-outs or brief blackouts (very short power failures), which do not lead to a shutdown of the ASC (complete power failures would lead to a restart of the ASC).	
3.5.2.2.1.27	Monitor UPS Errors	G.1
	Upon request from a management station, an ASC shall return if the communications link between the ASC and the UPS unit is failed (assuming that the ASC is configured to communicate with the UPS via an NTCIP-compliant interface), or if the UPS battery sends battery-specific alarms such as BatteryBad, BatteryLow, BatteryDepleted, or TemperatureBad (out of tolerance) to the ASC.	
3.5.2.2.1.28	Monitor Scheduler Errors	G.1
	An ASC shall return if the ASC is not implementing its scheduled pattern or scheduled action.	
3.5.2.2.1.29	Monitor Signal Monitor Communications Error	G.1
	Upon request from a management station, an ASC shall return if the ASC is configured to communicate with the MMU and the communications link is failed.	
3.5.2.2.1.30	Monitor Signal Monitor Unit Presence	G.1
	Upon request from a management station, an ASC shall return if an MMU is removed from the cabinet	
3.5.2.2.1.31	Monitor USB Memory Device	G.1
	Upon request from a management station, an ASC shall return if a USB memory device is present on the USB port of the ASC.	
3.5.2.2.1.32	Monitor Clock Failure	G.1
	Upon request from a management station, the ASC shall return an alarm value when an error is detected with the ASC's internal clock.	
3.5.2.2.1.33	Monitor Preempt Maximum Presence Alarm	G.1

	Upon request from a management station, the ASC shall return if the preempt maximum presence timer has been exceeded. This fault indicates that a preempt call has remained active for a time period greater than the maximum time configured.	
3.5.2.2.1.34	Monitor RSU Watchdog Timer	G.1
	Upon request from a management station, an ASC shall return if any RSU watchdog no activity timer fault is detected. This fault indicates that no activity has been detected across any the RSU interface for a period longer than a stored threshold	
3.5.2.2.1.35	Monitor CV Certificate Faults	G.1
	Upon request from a management station, the ASC shall return if faults pertaining to invalid CV certificates have been detected.	
3.5.2.2.2	Retrieve Mode of Operation Requirements	
3.5.2.2.2.1	Monitor Unit Control Status	G.1
	Upon request from a management station, the ASC shall return the control mode for the ASC. Valid ASC unit control states are: a)Other. The ASC is controlled by a source not specified by the standard. b)System Control. The ASC is controlled by master or central commands. c)System Standby. The ASC is controlled locally based on master or central command to use local control. d)Backup Mode. The ASC is in backup mode. e)Manual. The ASC is controlled by a manual selection of a timing pattern, manual free or manual flash. f)Timebase. The ASC is controlled by the local time base. g)Interconnect. The ASC is controlled by the local interconnect inputs. h)Interconnect Backup. The ASC is controlled by the local TBC due to invalid Interconnect inputs or loss of sync. i)Police Panel Control. The ASC is controlled via the police panel. j)System Control Remote Advance Control. The ASC is controlled by central command by issuing Holds on a Green Rest point in each phase or interval and then issues a Remote Advance Control command to advance to the next phase or interval. k)Manual Control. The ASC is controlled by manual advances issued by central to the next interval	
3.5.2.2.2.2	Monitor Unit Flash Status	G.1

	Upon request from a management station, the ASC shall return its flash status. Valid flash states are: a)Not in flash state b)An automatic flash state c)local flash input is active, SMU Flash is not active, and Flash is not commanded by the central system. d)Fault monitor state e)SMU flash input is active f)Startup flash input is active g)Timing the preempt flash h)Flash for a reason not specified by the standard Only one flash status can be active at a time.	
3.5.2.2.2.9	Monitor Current Timing Pattern Requirements	
3.5.2.2.2.9.1	Monitor Current Pattern Status	G.1
	Upon request from a management station, the ASC shall return the coordination pattern or mode currently operating in the ASC. Valid values are a)The signal timing pattern operating in Coordination mode. b)254. The ASC is operating in Free mode. c)255. The ASC is operating in Flash mode.	
3.5.2.2.2.9.2	Monitor Local Free Status	G.1

	Upon request from a management station, the ASC shall return one of the following states that led to the ASC operating in local free mode. a)The ASC is not running in free mode. b)The ASC has been commanded to free mode. c)The ASC has been commanded to free mode but is cycling to a point to begin coordination. d)The ASC is not responding to coordination due to one of the ASC inputs. e)The ASC programming for the called pattern is to operate in the Free mode. f)The ASC is running in Free mode because the called pattern is invalid. g)The ASC is running in Free mode because the pattern cycle time is less than the amount of time needed to serve the minimum requirements of all phases. h)The ASC is running in Free mode because the sum of the split times is greater than the pattern cycle time. i)The ASC is running in Free mode because of an invalid offset. j)The ASC is running in Free mode due to a request by the ASC's internal cycling diagnostics. k)The ASC is running in a Free mode for a reason not specified by the standard. The ASC can report only one state at a time.	
3.5.2.2.2.9.3	Monitor Current Mode of Operation	G.1
	Upon request from a management station, an ASC shall return the mode of operation in effect. Mode of operation includes a. Normal b. Manual c. Preemption d. Priority e. Traffic adaptive f. Traffic responsive g. Failure Free	
3.5.2.2.2.9.4	Monitor Pattern Command Source	

	Upon request from a management station, the ASC shall return the command source of the pattern or mode that is current in effect. Valid values are a)Remote. The pattern / mode was commanded remotely through NTCIP or another remote interface. b)Timebased. The pattern / mode was commanded from a schedule. c)Front Panel. The pattern / mode was commanded from the front panel. d)Backup Mode. The pattern / mode was caused by the ASC going into Backup mode or a failure. e)Other. The pattern / mode was commanded from a source not specified by the standard.	
3.5.2.2.2.4	Monitor Current Cycle Requirements	
3.5.2.2.2.4.1	Monitor Coordination Cycle Status	G.1
	Upon request from a management station, the ASC shall return the current position in the local coordination cycle of the running pattern in seconds, from 0 to 2x the maximum cycle length. This value counts down from the current pattern's cycle time to zero. This value may be greater than the current pattern's cycle time during a coordination cycle with offset correction by the amount of the correction.	
3.5.2.2.2.4.2	Monitor Coordination Synchronization Status	G.1
	Upon request from a management station, the ASC shall return the time since the system reference point for the running pattern in seconds, from 0 to 2x the maximum cycle length. This value counts from zero to current pattern's cycle time, but may exceed the current pattern's cycle time if the system reference point has changed.	
3.5.2.2.2.4.3	Monitor Current Offset	G.1
	Upon request from a management station, an ASC shall return the offset currently in effect, including during transition.	
3.5.2.2.3	Monitor Current Signal Indications Requirements	
3.5.2.2.3.1	Monitor Active Red Phases	H.2.5
	Upon request from a management station, the ASC shall return which phases currently have an active Red indication.	
3.5.2.2.3.2	Monitor Active Yellow Phases	H.2.5
	Upon request from a management station, the ASC shall return which phases currently have an active Yellow indication.	

3.5.2.2.3.3	Monitor Active Green Phases	H.2.5
	Upon request from a management station, the ASC shall return which phases currently have an active Green indication	
3.5.2.2.3.4	Monitor Active Don't Walk Phases	H.2.5
	Upon request from a management station, the ASC shall return which pedestrian phases currently have an active Don't Walk indication.	
3.5.2.2.3.5	Montiro Active Pedestrian Clearance Phases	H.2.5
	Upon request from a management station, the ASC shall return which pedestrian phases currently have an active Pedestrian Clearance indication.	
3.5.2.2.3.6	Monitor Active Walk Phases	H.2.5
	Upon request from a management station, the ASC shall return which pedestrian phases currently have an active Walk indication.	
3.5.2.2.4	Monitor Current Phase Requirements	
3.5.2.2.4.1	Monitor Active On Phases	H.2.5
	Upon request from a management station, the ASC shall return which phases are currently active. A phase is active during its Green, Yellow, Red Clearance, Walk, or Pedestrian Clearance intervals.	
3.5.2.2.4.2	Monitor Next Phases	H.2.5
	Upon request from a management station, the ASC shall return for which phases are currently committed to be active next (after the current Active Phase terminates). The ASC determines the next phase to be serviced at the end of the Green interval of the terminating phase, if possible. If the next phase to be serviced cannot be determined at the end of the Green interval, the ASC makes the determination after the end of all vehicle change and clearance intervals.	

3.5.2.2.4.3	Monitor Phase Calls	H.2.5
	Upon request from a management station, the ASC shall return which phases currently have an active vehicle call. This may include bicycles and transit vehicles.	
3.5.2.2.4.4	Monitor Phase Pedestrian Calls	H.2.5
	Upon request from a management station, the ASC shall return which phases currently have an active pedestrian call.	
3.5.2.2.5	Retrieve Current Ring Requirements	
3.5.2.2.5.1	Monitor Ring Status	H.2.5
	Upon request from a management station, the ASC shall return all of the current status indications, which are valid at the time this request was issued, for each configured ring. Valid ring states are: a)Minimum Green b)Extension c)Maximum d)Green Rest e)Yellow Change f)Red Clearance g)Red Rest h)Queue Jump i)Flashing Yellow Arrow j)Flashing Red Arrow k)Leading / Early ped Walk l)Delayed ped Walk m)Ped Minimum Walk n)Ped Walk outside of Min Walk o)Ped Clearance / Flash Don't Walk p)Ped Don't Walk q)Waiting for negative Overlap to end r)Waiting for Overlap to end s)Undefined	
3.5.2.2.5.2	Monitor Ring Termination Cause	H.2.5
	Upon request from a management station, the ASC shall return if the active phase in the ring was terminated by force off, maximum time out or gap out.	
3.5.2.2.5.3	Monitor Current Phase On Time	H.2.5

	Upon request from a management station, an ASC shall return the time into the current phase, in tenths of seconds, of the current cycle in effect for each ring.	
3.5.2.2.6	Retrieve Current Channel Status Requirements	
3.5.2.2.6.1	Monitor Active Red Channels	H.2.5
	Upon request from a management station, the ASC shall return for which channels currently have an active Red indication.	
3.5.2.2.6.2	Monitor Active Yellow Channels	H.2.5
	Upon request from a management station, the ASC shall return for which channels currently have an active Yellow indication.	
3.5.2.2.6.3	Monitor Active Green Channels	H.2.5
	Upon request from a management station, the ASC shall return for which channels currently have an active Green indication.	
3.5.2.2.7	Retrieve Current Overlap Status Requirements	
3.5.2.2.7.2	Monitor Active Red Overlaps	H.2.5
	Upon request from a management station, the ASC shall return which overlaps currently have an active Red indication.	
3.5.2.2.7.3	Monitor Active Yellow Overlaps	H.2.5
	Upon request from a management station, the ASC shall return which overlaps currently have an active Yellow indication.	
3.5.2.2.7.4	Monitor Active Green Overlaps	H.2.5
	Upon request from a management station, the ASC shall return which overlaps currently have an active Green indication.	

3.5.2.2.7.5	Monitor Active Overlap Flashing Yellow Arrows	H.2.5
	Upon request from a management station, the ASC shall return which overlaps currently have an active Flashing Yellow Arrow indication.	
	Ped overlaps?	
3.5.2.2.7.6	Monitor Active Overlap Flashing Red Arrows	H.2.5
	Upon request from a management station, the ASC shall return which overlaps currently have an active Flashing Red Arrow indication.	
3.5.2.2.8	Retrieve Current Preempt Status Requirements	
3.5.2.2.8.1	Monitor Currently Active Preempt	G.1
	Upon request from a management station, the ASC shall return the identifier of the preempts that are currently being serviced, if any.	
3.5.2.2.8.2	Monitor Current Preempt Inputs	H.2.5
	Upon request from a management station, an ASC shall return the input state for each preempt input configured in the ASC. Valid input states include: a) no preempt input signal detected b) preempt input signal is detected	
3.5.2.2.8.3	Monitor Current Preempt State	H.2.5
	Upon request from a management station, the ASC shall	

	Upon request from a management station, the ASC shall return the preempt status of the current active preempt. Valid preempt states are: a)Not Active - the preemption input is not active, and this preemption is not active b)Not Active With Call - the preemption input is active, but the preemption service has not initiated (Delay Interval or higher preempt service). This state is mutually exclusive to the 'Advanced Preemption' status. c)Entry Started - the preemption service is timing the entry intervals d)Track Service - the preemption service is timing the track clearance intervals e)Dwell - the preemption service is timing the dwell intervals f)Link Active - the preemption service is performing the linked operation g)Exit Strategy in Effect - the preemption service is timing the exit strategy h)Maximum Presence - the preempt input has exceeded the preempt's maximum presence time i)Advanced Preemption - the preemption service is timing the advanced preemption time. This state is mutually exclusive to the 'Not Active With Call' status. j)Other - preempt service is not specified in NTCIP 1202.	
3.5.2.2.8.4	Monitor Current Gate Status	H.2.5
	Upon request from a management station, the ASC shall return whether each of the gates are fully lowered.	
3.5.2.2.9	Retrieve Special Function Outputs Requirements	
3.5.2.2.9.1	Determine Maximum Number of Special Functions	G.1
	Upon request from a management station, the ASC shall return the maximum number of special functions, as a number from 1 to 255 special functions, which can be configured in the ASC.	
3.5.2.2.9.2	Monitor Special Function Status	H.2.5
	Upon request from a management station, the ASC shall return an indication whether a special function, regardless if it is a physical or logical function, is on or off.	
3.5.2.2.9.3	Monitor Special Function Control Source	H.2.5

	Upon request from a management station, the ASC shall return the source that activated a special function, regardless if it is a physical or logical function. Valid Values are: a)Remote. A management station activated the special function b)Timebased. The Action Scheduler activated the special function c)Front Panel. The special function was activated via the front panel d)Other. The special function was activated by a source not specified by the standard.	
3.5.2.2.10.1	Monitor TS2 Port 1 Status	H.2.5
	Upon request from a management station, the ASC shall return the communications status with the device on a TS2 Port 1 address. Valid TS2 Port 1 States are: a)Online. Indicates that at least five of the most recent ten response transfers were received correctly. b)Response Fault. Indicates that more than five of the most recent ten response transfers were received incorrectly. c)Other. Indicates a state not specified by this standard.	
3.5.2.2.10.2	Monitor TS2 Port 1 Fault Frame	H.2.5
	Upon request from a management station, the ASC shall return the frame number that caused the most recent fault for a TS2 Port 1 address.	
3.5.2.2.10.3	Monitor Serial Bus 1 Status	H.2.5
	Upon request from a management station, the ASC shall return the communications status with the device on a Serial Bus 1 address. Valid Serial Bus 1 States are: a)Online. Indicates that at least five of the most recent ten response transfers were received correctly. b)Response Fault. Indicates that more than five of the most recent ten response transfers were received incorrectly. c)Other. Indicates a state not specified by the standard.	
3.5.2.2.11	Monitor Signal Monitoring Unit Requirements	
3.5.2.2.11.1	Monitor Signal Monitoring Cabinet Flash State	H.2.5

3.5.2.2.11.2	Monitor Signal Monitoring Unit Channel Voltage	H.2.5
3.5.2.2.11.2	Monitor Signal Monitoring Unit Channel Current	H.2.5
3.5.2.2.11.4	Retrive Programmed Conflicts from the Signal Monitoring Unit	
3.5.2.3	Manage Signal Operations Control Requirements	
3.5.2.3.1	Control ASC Function Requirements	
3.5.2.3.1.1	Control External Minimum Recall	G.3
	Upon request from a management station, the ASC shall store if a recurring demand is to exist on all phases for minimum vehicle service.	
3.5.2.3.1.2	Control Call to Non-Actuated 1	G.3
	Upon request from a management station, the ASC shall store if all phases programmed to respond to a Call To Nonactuated 1 input should operate in nonactuated mode	
3.5.2.3.1.3	Control Call to Non-Actuated 2	G.3
	Upon request from a management station, the ASC shall store if all phases programmed to respond to a Call To Nonactuated 2 input should operate in nonactuated mode.	
3.5.2.3.1.4	Control Walk Rest Modifier	G.3
	Upon request from a management station, the ASC shall store if any nonactuated phases remain in the timed-out Walk state (Rest in Walk) in the absence of a serviceable conflicting call. IS THIS NEEDED or does phaseOptions do this?	
3.5.2.3.1.5	Control Interconnect	G.3
	Upon request from a management station, the ASC shall store if the interconnect inputs operate at a higher priority than the timebase control.	
3.5.2.3.1.7	Control Disable Remote Commands	G.3
	Upon request from a management station, the ASC shall store if the ASC may not accept remote commands from a master or from central. This requirement allows a maintenance worker at the ASC cabinet to perform maintenance without interference from a management station.	
3.5.2.3.1.8	Acknowledge Local Cycle Zero Alarm	G.1

	Upon request from a management station, the ASC shall return the alarm value for passing the Local Cycle Zero point. If the alarm value is on (enabled), then upon returning the alarm value, the ASC shall reset the alarm value to off.	
3.5.2.3.2	Command Timing Pattern Requirements	
3.5.2.3.2.1	Command System Timing Pattern	G.3
	Upon request from a management station, the ASC shall allow a management station to select the coordinated timing pattern or operational mode for the ASC while allowing the setting the be overridden by Backup Mode. This allows the ASC to revert to its previous coordinated timing pattern or operational mode in the event that communication from the management station is lost. Valid patterns/modes that can be commanded are: a)Standby. Allows the ASC to select the pattern or mode based on the local timebase schedule or interconnect inputs. b)Pattern Number. Commands the ASC to a specific timing pattern. Timing patterns are identified by an identifier from 1 to 253. c)Free. Commands the ASC to operate in free mode without coordination. d)Flash. Commands the ASC to operate in automatic flash.	
3.5.2.3.2.2	Command System Timing Pattern System Reference Point	G.3
	Upon request from a management station, the ASC shall store the System Reference Point for the called system pattern by defining a point in the system pattern cycle in seconds, from 0 to 998 seconds. This System Reference Point is established to the next System Reference Point. If the System Reference Point is set to 999, the ASC references the system reference point to the local timebase.	
3.5.2.3.3	Control Phases Requirements	
3.5.2.3.3.1	Control Phase Omits	H.2.7
	Upon request from a management station, the ASC shall store which phases are to be prevented from being active. The ASC removes the omit command for all phases if the ASC is placed into backup mode. If a phase is omitted remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.3.2	Control Pedestrian Phase Omits	H.2.7

	Upon request from a management station, the ASC shall store which phases are to have their corresponding pedestrian movements prevented from being active. The ASC removes the omit command for all pedestrian movements in the control group if the ASC is placed into backup mode. If a pedestrian movement is omitted remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.3.3	Control Phase Holds	H.2.7
	Upon request from a management station, the ASC shall activate/deactivate a hold command for a phase, which is equivalent to energizing the Hold input (See NEMA TS-2, Section 3.5.3.11.1). The ASC removes the phase hold command for all phases if the ASC is placed into backup mode. If a phase is put into hold state remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.3.4	Control Phase Force Offs	H.2.7
Upon request from a management station, the ASC shall activate/deactivate a Force Off command for a phase, which is equivalent to energizing the Force Off input (See NEMA TS-2, Section 3.5.4.1.1). The ASC removes the phase force off command for all phases if the ASC is placed into backup mode. If a phase is forced off remotely, the ASC resets the backup timer to zero seconds.		
3.5.2.3.3.5	Control Phase Vehicle Calls	H.2.7
	Upon request from a management station, the ASC shall place vehicle calls on a phase. The ASC removes the phase vehicle call command for all phases if the ASC is placed into backup mode. If a vehicle call for a phase is placed remotely, the ASC resets the backup timer to zero seconds. This requirement is applicable to bicycle calls and transit vehicle calls also.	
3.5.2.3.3.6	Control Phase Pedestrian Calls	H.2.7

	Upon request from a management station, the ASC shall place pedestrian calls on a phase. The ASC removes the phase pedestrian call command for all phases if the ASC is placed into backup mode. If a pedestrian call for a phase is placed remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.4	Control Preempt Requirements	
3.5.2.3.4.1	Command Preempt Remote Activation	H.2.7
	Upon request from a management station, the ASC shall manually activate a preempt. If the preemption action has already been started by a preemption input, the ASC keeps that already-started preemption action. When manually activating a preempt, the ASC remains in preemption until it completes the preemption sequence or until the management station removes the preempt. The ASC resets the preempt control state to zero when the ASC goes into Backup Mode. If the ASC is commanded to change the preempt control state remotely, the ASC resets the backup timer to zero	
3.5.2.3.5	Control Ring Requirements	
3.5.2.3.5.1	Control Ring Stop Time	H.2.7
	Upon request from a management station, the ASC shall activate/deactivate the stop timing input for a ring. The ASC removes the stop timing input when the ASC goes into Backup Mode. If the ASC is commanded to change the ring control stop time settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.2	Control Ring Force Offs	H.2.7
	Upon request from a management station, the ASC shall activate/deactivate a Force Off input for a ring. The ASC removes the ring control force off input when the ASC goes into Backup Mode. If the ASC is commanded to change the ring control force off settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.3	Control Ring Maximum 2 Time Settings	H.2.7

	Upon request from a management station, the ASC shall store if the Maximum 2 Time setting is enabled for each ring. The ASC resets the ring Maximum 2 Time settings to zero, when the ASC goes into Backup Mode. If the ASC is commanded to change the ring Maximum 2 Time settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.4	Control Ring Maximum 3 Time Settings	H.2.7
	Upon request from a management station, the ASC shall store if the Maximum 3 Time setting is enabled for each ring. The ASC resets the ring Maximum 3 Time settings to zero, when the ASC goes into Backup Mode. If the ASC is commanded to change the ring Maximum 3 Time settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.5	Control Ring Maximum Inhibit Settings	H.2.7
	Upon request from a management station, the ASC shall store if the Maximum time setting is inhibited for each ring. The ASC resets the ring control maximum time inhibit settings to zero, when the ASC goes into Backup Mode. If the ASC is commanded to change the ring control maximum time inhibit settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.6	Control Ring Pedestrian Recycle Settings	H.2.7
	Upon request from a management station, the ASC shall store if the pedestrian recycle setting is active for each ring. The ASC resets the ring control pedestrian recycle settings to zero, when the ASC goes into Backup Mode. If the ASC is commanded to change the ring control pedestrian recycle settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.7	Control Ring Red Rest Settings	H.2.7

	Upon request from a management station, the ASC shall store if the Red rest setting is active for each ring. The ASC resets the ring control Red rest settings to zero, when the ASC goes into Backup Mode. If the ASC is commanded to change the ring control Red rest settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.8	Control Ring Red Clearance Omit Settings	H.2.7
	Upon request from a management station, the ASC shall store if the Red clearance setting is omitted for each ring. The ASC resets the ring control Red clearance omit settings to zero, when the ASC goes into Backup Mode. If the ASC is commanded to change the ring control Red clearance omit settings remotely, the ASC resets the backup timer to zero seconds.	
3.5.2.3.5.9	Determine Maximum Number of Ring Control Groups	G.1
	Upon request from a management station, the ASC shall return the maximum number of ring control groups supported by the device. Each ring control group contains 8 unique rings, for example, ring control group 1 contains rings 1-8, while ring control group 2 contains rings 9-16.	
3.5.2.3.6	Special Functions Control Requirements	
3.5.2.3.6.1	Activate Special Function	H.2.7
	Upon request from a management station, the ASC shall store if the special function, regardless if it is a physical or logical function, is turned on or off. The ASC sets this value to zero, when the ASC is in backup mode.	
3.5.2.3.7	Control Frame 40 Requirements	
3.5.2.3.7.1	Control TS2 Port 1 Frame 40 Messages	H.2.7
	Upon request from a management station, the ASC shall enable or disable the Frame 40 messages for each Port 1 address. Frame 40 is used to poll the secondary stations for a secondary-to-secondary message exchange. The ASC only transmits Command 40 series frames to those devices that are enabled, as determined by this value.	
3.5.2.3.8	Activate Action Plan	G.3

	Upon request from a management station, the ASC shall activate a configured action plan. This requirement allows a management station to activate or override a timebased action plan entry, even if the timing pattern the action plan is associated with is not in effect.	
3.5.2.3.9	Remote Manual Control Requirements	
3.5.2.3.9.1	Enable Manual Control	G.3
	Upon request from a management station, the ASC shall enable or disable remote manual control mode. While in remote manual control mode, the ASC advances to the next interval only upon receiving an advance command from a management station.	
3.5.2.3.9.2	Remote Manual Control Advance Command	G.3
	Upon request from a management station, the ASC shall allow a management station to command the signal controller to advance to the next interval. Under remote manual control mode, the ASC behaves as if the manual control input was active. The ASC will not time phases, such as when using a coordinated timing pattern, but instead will advance to the next interval when remotely commanded to by a management station.	
3.5.2.3.9.3	Configure Manual Control Timeout	G.3
	Upon request from a management station, the ASC shall store a timeout value, from 1 to 255 seconds, as a failsafe in case of a loss of communications. When the ASC is in remote manual control mode, the remote manual control timer will decrement once per second until it reaches zero, at which time the ASC will disable remote manual control and revert back to normal signal operation. This forces a management station to continually reset the remote manual control timer to maintain remote manual control.	
3.5.2.3.9.4	Enable/Disable Automatic Pedestrian Clearance Setting	G.3
	Upon request from a management station, the ASC shall set the Pedestrian Clearance interval to be protected from being terminated by an Interval Advance input when Manual Control Enable is active. NOTE: NEMA TS-2 does not allow a Yellow interval to be terminated by the Interval Advance input. timer, if any Deliver operations (e.g., SET) are received on any of the defined functions.	
3.5.3	Detector Management Requirements	
3.5.3.1	Manage Detector Configuration Requirements	
3.5.3.1.1	Configure Detectors Requirements	
3.5.3.1.1.1	Configure Vehicle Detectors Requirements	
3.5.3.1.1.1	Configure Vehicle Travel Mode	H.2.7

	Upon request from a management station, the ASC shall store the travel mode identified for the detector. The travel mode shall be one of general (not otherwise assigned), transit or bicycle. Pedestrian detectors are managed separately.	
3.5.3.1.1.2	Configure Vehicle Detector Yellow Lock Call Enabled	H.2.7
	Upon request from a management station, the ASC shall store if a vehicle detector is instructed to lock a call to the assigned phase if an actuation occurs while the phase is not timing the Green interval. If the Yellow Lock Call and Red Lock Call are both enabled for a given phase, the ASC shall keep the yellow lock call enabled.	
3.5.3.1.1.3	Configure Vehicle Detector Red Lock Call Enabled	H.2.7
	Upon request from a management station, the ASC shall store if a vehicle detector is instructed to lock a call to the assigned phase if an actuation occurs while the phase is not timing Green or Yellow intervals. If the Yellow Lock Call and Red Lock Call are both enabled for a given phase, the ASC shall disable the red lock call.	
3.5.3.1.1.4	Configure Vehicle Detector Passage Enabled	H.2.7
	Upon request from a management station, the ASC shall store if the associated phase passage timer remains reset for the duration of a vehicle detector actuation if the Phase is in the Green interval.	
3.5.3.1.1.5	Configure Vehicle Detector Added Initial Time Enabled	H.2.7
	Upon request from a management station, the ASC shall store if detector actuation counts for a vehicle detector are accumulated for use in the added initial calculations. If enabled, counts are accumulated starting at the beginning of the Yellow interval and terminating at the beginning of the Green interval.	
3.5.3.1.1.6	Configure Vehicle Detector Queue Enabled	H.2.7

	Upon request from a management station, the ASC shall store if the Green interval of the assigned phase for a vehicle detector is extended upon actuation until either a gap occurs or the Green has been active longer than the Vehicle Detector Queue Limit Time.	
3.5.3.1.1.7	Configure Vehicle Detector Call Enabled	H.2.7
	Upon request from a management station, the ASC shall store if a call is placed for vehicle service upon actuation of a vehicle detector while the phase is not timing the Green interval.	
3.5.3.1.1.8	Configure Vehicle Detector Call Phase	H.2.7
	Upon request from a management station, the ASC shall store the assigned phase associated with a vehicle detector. If no phase is assigned, the ASC disables the ability of the detector to call a phase.	
3.5.3.1.1.9	Configure Vehicle Detector Switch Phase	H.2.7
	Upon request from a management station, the ASC shall store the programmed (switch) phase to which actuation of a vehicle detector is switched when the current (extend) phase is Yellow or Red and the programmed (switch) phase is Green. Detector switching allows the detector to call and extend the current phase and send calls to the switch phase once the current phase ends.	
3.5.3.1.1.10	Configure Vehicle Detector Delay Time	H.2.7
	Upon request from a management station, the ASC shall store the time, in tenths of a second, from 0 to 255.0 seconds, that an actuation for a vehicle detector is delayed when the phase is not Green.	
3.5.3.1.1.11	Configure Vehicle Detector Extend Time	H.2.7
	Upon request from a management station, the ASC shall store the time, in tenths of a second, from 0 to 25.5 seconds, that an actuation for a vehicle detector is	

	extended from the point of termination, when the phase is Green.	
3.5.3.1.1.12	Configure Vehicle Detector Queue Limit Time	H.2.7
	Upon request from a management station, the ASC shall store the length of time in seconds, from 0 to 255 seconds, that an actuation from a vehicle queue detector may continue into the Green phase. This time commences when the phase becomes Green and when the time expires, the ASC ignores any associated actuations / detector inputs. The ASC might shorten this time due to other overriding parameters such as Maximum Green time or Force Off commands.	
3.5.3.1.1.13	Configure Vehicle Detector No Activity Time	H.2.7
	Upon request from a management station, the ASC shall store the time period in minutes, from 0 to 999 minutes, before the ASC declares the absence of any actuations for a vehicle detector to be a fault and the vehicle detector is classified as failed. The ASC disables the diagnostics for this detector if the No Activity Time value for this vehicle detector is set to zero.	
3.5.3.1.1.14	Configure Vehicle Detector Maximum Presence Time	H.2.7
	Upon request from a management station, the ASC shall store the time period in minutes, from 0 to 255 minutes, before the ASC declares the presence of a continuous actuation of a vehicle detector to be a fault and the vehicle detector is classified as failed. The ASC disables the diagnostics for this detector if the Maximum Presence Time value for this vehicle detector is set to zero.	
3.5.3.1.1.15	Configure Vehicle Detector Erratic Counts	H.2.7
	Upon request from a management station, the ASC shall store the number of actuations for a vehicle detector, from 0 to 255 counts per minute, above which the ASC declares the vehicle detector to be a fault and the vehicle detector is classified as failed. The ASC disables the diagnostics for this detector if the Erratic Count value for this vehicle detector is set to zero.	

3.5.3.1.1.16	Configure Vehicle Detector Fail Time	H.2.7
	Upon request from a management station, the ASC shall store the amount of time, in seconds, that the ASC holds a call for the associated phase during all non-Green intervals for a failed vehicle detector. The ASC places a constant call on the phase (maximum recall) if the vehicle detector fail time is set to the maximum of 255 seconds. The ASC does not place a call on this detector if the Fail Time value for this vehicle detector is set to zero.	
3.5.3.1.2	Configure Multiple Vehicle Detector Sets for Actuation	H.2.7
	Upon request from a management station, the ASC shall store parameters for multiple sets of vehicle detectors to be used actuations in a manner consistent with the following requirements as selected in the PRL. a)3.5.3.1.1.1 Configure Vehicle Travel Mode b)3.5.3.1.1.2 Configure Vehicle Detector Yellow Lock Call Enabled c)3.5.3.1.1.3 Configure Vehicle Detector Red Lock Call Enabled d)3.5.3.1.1.4 Configure Vehicle Detector Passage Enabled e)3.5.3.1.1.5 Configure Vehicle Detector Added Initial Time Enabled f)3.5.3.1.1.6 Configure Vehicle Detector Queue Enabled g)3.5.3.1.1.7 Configure Vehicle Detector Call Enabled h)3.5.3.1.1.8 Configure Vehicle Detector Call Phase i)3.5.3.1.1.9 Configure Vehicle Detector Switch Phase j)3.5.3.1.1.10 Configure Vehicle Detector Delay Time k)3.5.3.1.1.11 Configure Vehicle Detector Extend Time l)3.5.3.1.1.12 Configure Vehicle Detector Queue Limit Time m)3.5.3.1.1.13 Configure Vehicle Detector No Activity Fault Time n)3.5.3.1.1.14 Configure Vehicle Detector Maximum Presence Fault Time o)3.5.3.1.1.15 Configure Vehicle Detector Erratic Counts p)3.5.3.1.1.16 Configure Vehicle Detector Fail Time	

3.5.3.1.3	Configure Pedestrian Detectors Requirements	
3.5.3.1.3.1	Configure Pedestrian Detector Call Phase	H.2.7
	Upon request from a management station, the ASC shall store the assigned phase associated with a pedestrian detector. If no phase is assigned, the ASC disables the ability of the pedestrian detector to call a phase.	
3.5.3.1.3.2	Configure Pedestrian Detector No Activity Time	H.2.7
	Upon request from a management station, the ASC shall store the time period in minutes, from 0 to 999 minutes, when the ASC declares the absence of any actuations for a pedestrian detector to be a fault, and the pedestrian detector is classified as failed. The ASC disables the diagnostics for this detector, if the No Activity Time for this pedestrian detector is set to zero.	
3.5.3.1.3.3	Configure Pedestrian Detector Maximum Presence Time	H.2.7
	Upon request from a management station, the ASC shall store the time period in minutes, from 0 to 255 minutes, when the ASC will declare the presence of a continuous actuation of a pedestrian detector to be a fault, and the pedestrian detector is classified as failed. The ASC disables the diagnostics for this detector if the Maximum Presence Time for this pedestrian detector is set to zero.	
3.5.3.1.3.4	Configure Pedestrian Detector Erratic Counts	H.2.7

	Upon request from a management station, the ASC shall store the number of actuations for a pedestrian detector, from 0 to 255 counts per minute, above which the ASC declares the pedestrian detector to be a fault and the pedestrian detector is classified as failed. The ASC disables the diagnostics for this detector, if the Erratic Count value for this pedestrian detector is set to zero.	
3.5.3.1.1.5	Configure Pedestrian Detector Non-Lock Calls	H.2.7
	Upon request from a management station, the ASC shall store if a pedestrian detector is used to place non-locked calls for pedestrian timings.	
3.5.3.1.1.6	Configure Pedestrian Detector Alternate Pedestrian Timing Setting	H.2.7
	Upon request from a management station, the ASC shall store if a pedestrian detector is used to place calls for alternate pedestrian timing.	
3.5.3.1.1.7	Configure Pedestrian Presence Detection Setting	H.2.7
	Upon request from a management station, the ASC shall store if a pedestrian detector is used to detect the presence of a pedestrian in the pedestrian crosswalk instead of detecting a pedestrian call for service.	
3.5.3.1.4	Retrieve Detector Configuration Requirements	
3.5.3.1.4.1	Determine Maximum Number of Vehicle Detectors	G.1
	Upon request from a management station, the ASC shall return the maximum number of vehicle detectors that can be configured within the ASC.	
3.5.3.1.4.2	Determine Maximum Number of Pedestrian Detectors	G.1
	Upon request from a management station, the ASC shall return the maximum number of pedestrian detectors that can be configured within the ASC.	
3.5.3.2	Retrieve Detector Status Requirements	
3.5.3.2.1	Determine Number of Active Vehicle Detectors	G.1
	Upon request from a management station, the ASC shall return the number of vehicle detectors configured for this ASC.	
3.5.3.2.2	Monitor Active Vehicle Detector Actuations	H.2.5

	Upon request from a management station, the ASC shall return which vehicle detectors are currently actuated (vehicle presence detected).	
	From Detector or through Remote or both	
3.5.3.2.3	Determine Number of Active Pedestrian Detectors	G.1
	Upon request from a management station, the ASC shall return the number the pedestrian detectors configured for the ASC.	
3.5.3.2.4	Monitor Active Pedestrian Detector Actuations	H.2.5
	Upon request from a management station, the ASC shall return which pedestrian detectors are currently actuated (pedestrian presence detected or actuated by a pedestrian).	
	From Detector or through Remote or both	
3.5.3.3	Retrieve Detector Health Requirements	
3.5.3.3.1	Retrieve Vehicle Detector Health Requirements	
3.5.3.3.1.1	Monitor Vehicle Detector Alarm Presence	H.2.5
	Upon request from a management station, the ASC shall return which vehicle detectors currently have an active alarm. The ASC clears any alarm that is not currently active.	
3.5.3.3.1.2	Monitor Vehicle Detector No Activity Fault	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle detector has been flagged as non-operational / failed due to the absence of any actuations for a user-defined time period (no activity time).	
3.5.3.3.1.3	Monitor Vehicle Detector Max Presence Fault	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle detector has been flagged as non-operational / failed due to the continuous actuations for a user-defined time period (maximum presence time).	
3.5.3.3.1.4	Monitor Vehicle Detector Erratic Output Fault	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle detector has been flagged as non-operational / failed due to a higher number of actuations per minute than the user-defined threshold (erratic counts).	
3.5.3.3.1.5	Monitor Vehicle Detector Communications Fault	H.2.5

	Upon request from a management station, the ASC shall return if communications with a vehicle detector have failed.	
3.5.3.3.1.6	Monitor Vehicle Detector Configuration Fault	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle detector is assigned but is not supported.	
3.5.3.3.1.7	Retrieve Vehicle Loop Detector Health Requirements	
3.5.3.3.1.7.1	Monitor Loop Detector Watchdog Failure	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle loop detector has been flagged as non-operational / failed due to a watchdog failure.	
3.5.3.3.1.7.2	Monitor Loop Detector Open Loop Failure	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle loop detector has been flagged as non-operational / failed due to an open loop (broken wire).	
3.5.3.3.1.7.3	Monitor Loop Detector Shorted Loop Fault	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle loop detector has been flagged as non-operational / failed due to a shorted loop wire.	
3.5.3.3.1.7.4	Monitor Loop Detector Excessive Change Fault	H.2.5
	Upon request from a management station, the ASC shall return if a vehicle loop detector has been flagged as non-operational / failed due to an inductance change that exceed expected values.	
3.5.3.3.2	Retrieve Pedestrian Detector Health Requirements	
3.5.3.3.2.1	Monitor Pedestrian Detector Alarm Status	H.2.5
	Upon request from a management station, the ASC shall	

	return which pedestrian detectors have an active alarm. The ASC clears any alarm that is not currently active.	
3.5.3.3.2.2	Monitor Pedestrian Detector No Activity Fault	H.2.5
	Upon request from a management station, the ASC shall return if a pedestrian detector has been flagged as non-operational / failed due to the absence of any actuations for a user-defined time period (no activity time).	
3.5.3.3.2.3	Monitor Pedestrian Detector Max Presence Fault	H.2.5
	Upon request from a management station, the ASC shall return if a pedestrian detector has been flagged as non-operational / failed due to the continuous actuations for a user-defined time period (maximum presence time).	
3.5.3.3.2.4	Monitor Pedestrian Detector Erratic Output Fault	H.2.5
	Upon request from a management station, the ASC shall return if a pedestrian detector has been flagged as non-operational / failed due to a higher number of actuations per minute than the user-defined threshold (erratic counts).	
3.5.3.3.2.5	Monitor Pedestrian Detector Communications Fault	H.2.5
	Upon request from a management station, the ASC shall return if communications with a pedestrian detector have failed.	
3.5.3.3.2.6	Monitor Pedestrian Detector Configuration Fault	H.2.5
	Upon request from a management station, the ASC shall return if a pedestrian detector is assigned but is not supported.	
3.5.3.4	Control Detector Requirements	
3.5.3.4.1	Control Vehicle Detector Reset	H.2.7
	Upon request from a management station, the ASC shall reset a vehicle detector. The ASC automatically returns a	

	detector reset to a non-reset state after the ASC has executed the reset command.	
3.5.3.4.2	Control Pedestrian Detector Reset	H.2.7
	Upon request from a management station, the ASC shall reset a pedestrian detector. The ASC automatically returns a detector reset to a non-reset state after the ASC has executed the reset command.	
3.5.3.4.3	Control Vehicle Detector Actuation	H.2.7
	Upon request from a management station, the ASC shall place an actuation on a vehicle detector.	
3.5.3.4.4	Control Pedestrian Detector Actuation	H.2.7
	Upon request from a management station, the ASC shall place an actuation on a pedestrian detector.	
3.5.3.5	Manage Detector Data Collection Requirements	
3.5.3.5.1	Monitor Vehicle Detector Data Requirements	
3.5.3.5.1.1	Monitor Vehicle Detector Data Sequence	G.1
	Upon request from a management station, the ASC shall return a sequence number, from 0 to 255, for detector data reported. The ASC increments the detector data sequence number by 1 at the end of the sample period. The sequence number is used by the management station to determine if the detector data reported is duplicated or if there is detector data missing.	
3.5.3.5.1.2	Monitor Vehicle Volume Data	H.2.5
	Upon request from a management station, the ASC shall return the vehicle count, in numbers of vehicles from 0 to 255 vehicles, measured by each of those vehicle detectors assigned to collect volume data during the sample period. The ASC resets the volume count number at the end of the sample period and restarts the count at the beginning of the new sample period.	

3.5.3.5.1.3	Monitor Vehicle Occupancy Data	H.2.5
	Upon request from a management station, the ASC shall return occupancy rates in 0.5% increments, from 0 to 100%, from those detectors assigned to collect occupancy data during the sample period. The ASC resets the occupancy rate number at the end of the sample period and restarts the occupancy calculation at the beginning of the new sample period.	
3.5.3.5.1.4	Monitor Vehicle Average Speed	H.2.5
	Upon request from a management station, the ASC shall return the average speed, in kilometers per hour, measured by each of those vehicle detectors assigned to collect average speed data during the sample period. The ASC resets the average speed value at the end of the sample period. Valid average speed values are from 0 to 255 kilometers per hour.	
3.5.3.5.1.5	Monitor Vehicle Detector Data Sample Time	G.1
	Upon request from a management station, the ASC shall return the end time in controller local time of the vehicle detector data collection period (sample period).	
3.5.3.5.1.6	Monitor Vehicle Detector Data Sample Duration	G.1
	Upon request from a management station, the ASC shall return the duration of the data collection period in effect in seconds. There are various ways to configure the data collection period (i.e., a duration specifically set by the user or a duration set to that of the cycle time). This requirement refers to the sample period that is in effect when the data is collected.	
3.5.3.5.2	Monitor Pedestrian Detector Data Requirements	
3.5.3.5.2.1	Monitor Pedestrian Detector Data Sequence	G.1
	Upon request from a management station, the ASC shall return a sequence number, from 0 to 255, for pedestrian detector data reported. The ASC increments the pedestrian detector data sequence number by 1 at the end of the sample period. The sequence number is used by the management station to determine if the pedestrian detector data reported is duplicated or if there is pedestrian detector data missing.	
3.5.3.5.2.2	Monitor Pedestrian Counts	H.2.5

	Upon request from a management station, the ASC shall return the number of pedestrians currently detected within the detection zone during the defined sample period.	
3.5.3.5.2.3	Monitor Pedestrian Actuations	H.2.5
	Upon request from a management station, the ASC shall return the number of pedestrian actuations during the defined sample period.	
3.5.3.5.2.4	Monitor Pedestrian Services	H.2.5
	Upon request from a management station, the ASC shall return the number of pedestrian services (the number of times the pedestrian transitioned from don't walk to walk) during the defined sample period.	
3.5.3.5.2.5	Monitor Pedestrian Detector Data Sample Time	G.1
	Upon request from a management station, the ASC shall return the end time in controller local time of the pedestrian detector data collection period (sample period).	
3.5.3.5.2.6	Monitor Pedestrian Detector Data Sample Duration	G.1
	Upon request from a management station, the ASC shall return the duration of the data collection period in effect in seconds from 1 to 3600 for the pedestrian detectors. There are various ways to configure the data collection period (i.e., a duration specifically set by the user, a duration set to the vehicle data collection period, or a duration set to that of the cycle time). This requirement refers to the sample period that is in effect when the data is collected.	
3.5.3.5.3	Configure Detector Data Collection Requirements	
3.5.3.5.3.1	Configure Vehicle Detector Data Sample Period	G.3
	Upon request from a management station, the ASC shall store the sample period for collecting detector data in seconds, from 0 to 3600 seconds. The ASC stores the collected detector data in the ASC's database at the end of the sample period and resets the detector data timer.	
3.5.3.5.3.2	Configure Pedestrian Data Collection Sample Period	G.3

	Upon request from a management station, the ASC shall store the sample period for collecting pedestrian detector data as follows: a value of 0 indicates that no sampling is to be performed, a value of 1 to 3600 is the number of seconds for the sample period, and a value of 65535 indicates that the sample period should be the same as the sample period for the vehicle detectors	
3.5.3.5.3.3	Configure Vehicle Volume Detectors	H.2.7
	Upon request from a management station, the ASC shall store if a vehicle detector is instructed to collect volume data.	
3.5.3.5.3.4	Configure Vehicle Occupancy Detectors	H.2.7
	Upon request from a management station, the ASC shall store if a vehicle detector is instructed to collect occupancy data.	
3.5.3.5.3.5	Configure Vehicle Speed Detectors	H.2.7
	Upon request from a management station, the ASC shall store if a vehicle detector is instructed to collect speed data.	
3.5.3.5.3.6	Configure Single Detector Speed Mode	H.2.7
	Upon request from a management station, the ASC shall store the single detector speed mode. It identifies how the ASC should calculate speed without a paired detector. If the speed detector is a paired detector, this option is used when there is an error on one or more of the paired detectors.	
3.5.3.5.3.7	Configure Paired Detector	H.2.7

	Upon request from a management station, the ASC shall store the vehicle detector identifier of the paired detector. A value of 0 is the default, indicating that the detector is not paired. Paired detectors may be used for calculating speed, wrong way travel, or other conditions. Note: It is the responsibility of the implementers of this feature to ensure that the detector pairs make logical sense, they are located in the same lane, the paired detectors reference each other, and they are properly identified detector placements.	
3.5.3.5.3.8	Configure Paired Detector Placement	H.2.7
	Upon request from a management station, the ASC shall store whether a paired detector is the leading or trailing detector of the detector pair.	
3.5.3.5.3.9	Configure Paired Detector Spacing	H.2.7
	Upon request from a management station, the ASC shall store the distance between the detector pair measured from leading edge to leading edge of each of the two vehicle detectors measured in centimeters from 0 to 65,535 centimeters.	
3.5.3.5.3.10	Configure Average Vehicle Length	H.2.7
	Upon request from a management station, the ASC shall store the average vehicle length for the detection zone in a range from .01 to 40 meters.	
3.5.3.5.3.11	Configure Vehicle Detection Zone Length	H.2.7
	Upon request from a management station, the ASC shall store the vehicle detector's detection zone length measured from leading edge to trailing edge of the detection zone in centimeters from 0.00 to 40.00 meters.	
3.3.3.5.4	Configure Multiple Vehicle Detector Sets for Data Collection	

	Upon request from a management station, the ASC shall store parameters for multiple sets of vehicle detectors to be used data collection over a serial communications interface in a manner consistent with the following requirements as selected in the PRL. a.3.5.3.5.3.3 Configure Vehicle Volume Detectors b.3.5.3.5.3.4 Configure Vehicle Occupancy Detectors c.3.5.3.5.3.5 Configure Vehicle Speed Detectors d.3.5.3.5.3.6 Configure Single Detector Speed Mode e.3.5.3.5.3.10 Configure Average Vehicle Length	
3.5.4	Connected Vehicles Interface Management	
3.5.4.1	Manage Management Station - ASC Interface Requirements	
3.5.4.1.1	Manage RSU Interface Requirements	
3.5.4.1.1.1	Configure RSU Interface	G.3
	Upon request from a management station, the ASC shall store which communications port is used to exchange data with an RSU.	
3.5.4.1.1.2	Configure Logical RSU Ports	H.2.7
	Upon request from a management station, the ASC shall store the name and network address of each RSU that the ASC will exchange data with. An ASC may communicate with up to 16 RSUs as part of the connected vehicle environment.	
3.5.4.1.1.3	Configure RSU Interface Polling Period	H.2.7
	Upon request from a management station, the ASC shall store the period, from 1 to 65535 milliseconds, that the ASC exchanges data with an RSU for connected vehicle data	

	data.	
3.5.4.1.2	Manage RSU Interface Watchdog Requirements	
3.5.4.1.2.1	Configure RSU Interface Watchdog	H.2.7
	Upon request from a management station, the ASC shall store the maximum time duration, in milliseconds, for an RSU watchdog timer in the ASC. The RSU watchdog timer is used to track activity across a RSU interface. If no activity is detected across the RSU interface for a period longer than the maximum time duration a RSU watchdog not activity fault is reported. The RSU watchdog timer is a value from 1 to 65535 milliseconds and includes a value to disable the watchdog timer.	
3.5.4.1.2.2	Monitor RSU Interface Watchdog Timer	H.2.5
	Upon request from a management station, the ASC shall return the RSU watchdog time, from 0 to 65535 milliseconds, for a specific logical RSU port as provided in the request. The RSU watchdog time represents the amount of time that has elapsed since activity was last detected across the specified logical RSU port interface.	
3.5.4.1.3	Manage Signal Phase and Timing Requirements	
	Some of the key applications that have been developed for the connected vehicle environment are related to intersection safety. For signalized intersections, this involves an RSU broadcasting SPaT (Signal Phase and Timing) messages, as defined by SAE J2735, to connected vehicles in the vicinity. The source of the SPaT data broadcasted by an RSU comes from the ASC, so the ASC has to exchange this data with the CV Application Process in an RSU. However, a management station, such as one in a traffic management center, needs to monitor what data is being broadcasted to connected vehicles. The requirements that allow a management station to configure and retrieve signal phase and timing data from an ASC follow.	
3.5.4.1.3.1	Enable Signal Phase and Timing Data	G.3
	Upon request from a management station, the ASC shall store if the controller is to generate signal phase and timing data for the intersection(s).	
3.5.4.1.3.2	Retrieve Signal Phase and Timing Generation Time	G.1

	Upon request from a management station, the ASC shall return the time when the signal phase and timing data was generated by the ASC. This timestamp is represented in hours, minutes, seconds and milliseconds of the time of day. This requirement is for testing purposes only. This requirement allows the operator at a TMC to view when the controller generates the SPaT data. Note it is not used by the RSU to generate the SAE J2735 SPaT message, though it may be a need in the future. The timestamp in the SAE J2735 SPaT message is the time the message is generated and signed.	
3.5.4.1.3.3	Exchange Movement Status Requirements	
	The SPaT message that is broadcasted by an RSU to connected vehicles includes information about what vehicle (and pedestrian) movements are permitted at a signalized intersection. To provide this information the RSU needs movement data from the ASC. These requirements allow a management station to monitor the movement data that an ASC is exchanging with the CV Application Process. The requirements to retrieve the movement data that an ASC is exchanging with a CV Application Process are defined as follows.	
3.5.4.1.3.3.1	Retrieve Movement Timing Requirements	
	The requirements to provide the timing of a movement at the intersection are defined as follows. NOTE: it is required that an ASC system time be synchronized with an accurate and reliable UTC time source before providing these time points.	
3.5.4.1.3.3.1.1	Monitor Movement Minimum End Time	H.2.5
	Upon request from a management station, the ASC shall return the time point of earliest end time for the current movement state (e.g., at the end of a permissive green or at the end of a permissive yellow) of a movement at an intersection. If the duration of the current state of a movement is fixed, this value indicates the end time (and is equal to the Movement Maximum End Time). This value can be viewed as the earliest possible time pint at which the current interval could change, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour.	
3.5.4.1.3.3.1.2	Monitor Movement Maximum End Time	H.2.5

	Upon request from a management station, the ASC shall return the latest possible end time point of the current movement state (e.g., at the end of a protected green or end of a steady red) of a movement at an intersection. This value can be viewed as the latest possible time point at which the current interval could change, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the duration of the current state of a movement is fixed, this value indicates the end time (and is equal to the Movement Minimum End Time).	
3.5.4.1.3.3.1.3	Monitor Movement Likely End Time	H.2.5
	Upon request from a management station, the ASC shall return the time point when the current movement state of a movement will most likely end (e.g., at the end of a protected green or end of a steady red) at an intersection. The likely end time point may be predicted based on data available to the ASC. The time point is measured in tenths of a second in the current or next hour. A value of undefined is returned when the time point cannot be estimated with a high level of confidence	
3.5.4.1.3.3.1.4	Monitor Movement Likely End Time Confidence	H.2.5
	Upon request from a management station, the ASC shall return the statistical confidence that the reported likely end time for the current movement state (e.g., at the end of a protected green or end of a permissive clearance time) of a movement at an intersection is accurate. The confidence value is measured as a probability class, as defined by DE_TimeIntervalConfidence in SAE J2735.	
3.5.4.1.3.3.1.5	Monitor Movement Next Occurrence	H.2.5

	Upon request from a management station, the ASC shall return the estimated time point when a movement at an intersection is next allowed to proceed (i.e., the movement phase state will be permissive-Movement-Allowed or protected-Movement-Allowed). The time point is measured in tenths of a second in the current or next hour. This value can be viewed as the estimated time point at which the movement is next allowed to proceed, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. A value of undefined is returned when the time point cannot be estimated with a high level of confidence. This requirement is used to support ECO-driving applications.	
3.5.4.1.3.3.1.6	Monitor Movement Start Time	
	Upon request from a management station, the ASC shall return a value of unknown for the start (time) of the current movement state. Note: Start time is always a future time (See CTI 4501, Section 3.3.3.3.5.6 and 3.3.3.3.5.7). Thus, the start time of the current interval is always unknown.	
3.5.4.1.3.3.1.7	Monitor Next Movement Minimum End Time	H.2.5
	Upon request from a management station, the ASC shall return the time point of the earliest possible end of the movement state immediately after the current movement state at the intersection. If the end time of the current movement state is known (maximum end time equals	

	minimum end time) and the interval duration of the next movement state is fixed, this value indicates the end time point of the next movement state. This value can be viewed as the earliest possible time point at which the next interval could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the next movement state is unknown, the time point of the earliest possible end time is also unknown. NOTE: The minimum end time of the next movement will be the minimum end time of the current movement plus the minimum amount of time that the next movement state could time.	
3.5.4.1.3.3.1.8	Monitor Next Movement Maximum End Time	H.2.5
	Upon request from a management station, the ASC shall return the time point of the latest possible end of the movement state immediately after the current movement state at the intersection. This value can be viewed as the latest possible time point at which the next movement state could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the next movement state is unknown, the time point of the latest possible end time is also unknown. When the end time of the current movement state is known (maximum end time equals minimum end time) and the duration of the next movement state is fixed, such as when the ASC is operating in fixed time or the yellow interval duration, the minimum end time of the next movement state will equal the maximum end time of the next movement state.	
3.5.4.1.3.3.1.9	Monitor Next Movement Start Time	H.2.5

	Upon request from a management station, the ASC return the time point, in tenths of a second in the current or next hour, of the start time of the next (future) movement state to follow the current movement state for a signal group. If the start time is unknown, a value of unknown is used. If the next movement state is unknown, the start time will also be unknown. If the next movement state is known, the start time is equal to the movement minimum end time of the current interval. Note: Start time is always a future time (See CTI 4501, Section 3.3.3.3.5.6 and 3.3.3.3.5.7). Thus, the start time of the current interval is always unknown.	
3.5.4.1.3.3.1.10	Determine Maximum Number of Movement Events	G.1
	Upon request from a management station, the ASC return the number of movement events for each signal group supported. CTI 4501 requires that at least two movement events be supported – the first movement event represents the current interval and the second movement event represents the next interval (after the current interval). The SAE J2735 SPaT message supports up to 16 movement events for each signal group.	
3.5.4.1.3.3.2	Configure Movement Assistance Requirements	
	The SPaT message in SAE J2735 can also provide potential pedestrian or bicyclist conflicts and queuing information to travelers. The requirements to configure detectors to provide this information to travelers wishing to traverse through the intersection are defined as follows.	
3.5.4.1.3.3.2.1	Configure Queue Detectors for Movement Assistance	H.2.7
	Upon request from a management station, the ASC shall store the identifiers of the vehicle detectors that provide queue information for a specific movement through the intersection. This queue information, measured in meters, is provided so connected vehicles are aware of how many vehicles are queued, if any, for a specific movement through the intersection	

	through the intersection.	
3.5.4.1.3.3.2.2	Configure Pedestrian Detectors for Movement Assistance	H.2.7
	Upon request from a management station, the ASC shall store the identifiers of the pedestrian (presence) detectors indicating the potential presence of pedestrians that conflict with a specific vehicle movement through the intersection. This information is provided so connected vehicles are aware of the potential presence of a pedestrian may conflict with its movement through the intersection.	
3.5.4.1.3.3.2.3	Configure Bicycle Detectors for Movement Assistance	H.2.7
	Upon request from a management station, the ASC shall store the identifiers of the detectors that determine the presence of bicyclists that conflict with a specific vehicle movement through the intersection. This information is provided so connected vehicles are aware of the potential presence of a bicyclist may conflict with its movement through the intersection.	
3.5.4.1.3.3.3	Retrieve Movement Assistance Requirements	
	The requirements to provide potential pedestrian or bicyclist conflicts and queuing information to assist connected vehicles traversing through the intersection are defined as follows.	
3.5.4.1.3.3.3.3.1	Monitor Lane Connection Queue Length	H.2.5
	Upon request from a management station, the ASC shall return the distance, in meters, from the stop line of the approach movement to the back edge of the last vehicle in the queue, as measured along the center line of the lane for a specific movement maneuver through the intersection. Valid values are 0 to 10000 meters, where 0 indicates no queue or the queue distance is unknown, and 10000 represents all distance ≥ 10000 meters. The detectors that provide this queue information is configured in Section 3.5.4.1.3.3.2.1.	

	in Section 3.5.4.1.3.3.2.1.	
3.5.4.1.3.3.3.3.2	Monitor Lane Connection Traveler Detection	H.2.5
	Upon request from a management station, the ASC shall return if any conflicting pedestrians or bicycles are detected for a specific movement maneuver through the intersection. This value is either on or off, with off indicating a high certainty that there is no pedestrian or bicycle present. The presence inputs that indicate if a conflicting pedestrian or bicyclist may be present is configured in Sections 3.5.4.1.3.3.2.2 and 3.5.4.1.3.3.2.3.	
3.5.4.1.3.3.4	Manage Advisory Speed Requirements	
	The SPaT message in SAE J2735 can also provide speed advisories for specific movements and specific vehicle types. The requirements to provide advisory speed information for a movement through the intersection are defined as follows.	
3.5.4.1.3.3.4.1	Configure Advisory Speed Type	H.2.7
	Upon request from a management station, the ASC shall store the type of speed advisory for a specific movement traversing the intersection. Valid types of speed advisories are defined by DE_AdvisorySpeedType in SAE J2735. Speed advisories may also be configured for specific vehicle types as defined in the MAP message for the intersection.	
3.5.4.1.3.3.4.2	Configure Advisory Speed	H.2.7
	Upon request from a management station, the ASC shall store the advisory speed, in tenths of a meter per second, provided for a specific movement traversing the intersection. Speed advisories may be configured for specific advisory speed types (See 3.5.4.1.3.3.4.1) or vehicle types as defined in the MAP message for the intersection.	
3.5.4.1.3.3.4.3	Configure Advisory Speed Zone	H.2.7

	Upon request from a management station, the ASC shall store the distance, in meters, upstream from the stop bar that a speed advisory is recommended for a movement traversing the intersection. A value of 10000 indicates that the distance is 10,000 meters or greater. A value of 0 represents unknown.	
3.5.4.1.3.3.4.4	Configure Advisory Speed Vehicle Type	H.2.7
	Upon request from a management station, the ASC shall store the vehicle type that a speed advisory is recommended for a specific movement traversing the intersection. The vehicle type(s) is identified in the associated MAP message for the intersection. If no vehicle type is identified, then the advisory speed applies to all vehicles.	
3.5.4.1.3.3.5	Monitor Movement State	H.2.5
	Upon request from a management station, the ASC shall return the current movement phase state of a movement at the intersection. The valid states are defined by DE_MovementPhaseState in SAE J2735. If the movement state is not known with a high level of confidence, a value of unavailable is used.	
3.5.4.1.3.3.6	Monitor Next Movement State	H.2.5
	Upon request from a management station, the ASC shall return the movement state immediately after the current movement state of a movement at the intersection. The valid states are defined by DE_MovementPhaseState in SAE J2735. If the next movement state is not known with a high level of confidence, a value of unavailable is used.	
3.5.4.1.3.3.7	Monitor Movement Status	G.1

	Upon request from a management station, the ASC shall return the movement data containing what vehicle (or pedestrian) movements are permitted and when at an intersection in a compressed manner. The connected vehicle environment is expected to have limitations in the data rates and data capacity. This requirement allows the ASC to group sets of data so that the data can be transmitted more efficiently.	
3.5.4.1.3.4	Manage Enabled Lane Requirements	
	The SPaT message in SAE J2735 can also indicate to travelers traversing across the intersection which revocable lanes at the intersection are currently active (enabled). Each lane defined for a roadway geometry plan can be defined as a revocable lane—that is, the lane is not always active for a specific use. For example, a shoulder lane may be used by vehicles during rush hours and closed to vehicle traffic during all other times. In the roadway geometry (MAP) plan for the intersection, that shoulder lane can be defined as a vehicle lane and as revocable. During rush hours, the SPAT message would then indicate that the shoulder lane is active (Enabled) by including the lane identifier (of the shoulder lane). During non-rush hours, the SPAT message would not include the lane identifier of the shoulder lane, indicating that the shoulder lane is not active (enabled). The requirements to configure and command enabled (revocable) lanes are defined as follows.	
3.5.4.1.3.4.1	Configure Concurrent Enabled Lanes	H.2.7
	Upon request from a management station, the ASC shall store what revocable lanes are allowed to be active (enabled) concurrently. This requirement allows the management station to set which revocable lane(s) may be active (enabled) at the same time, thereby preventing the enabling of conflicting revocable lanes.	
3.5.4.1.3.4.2	Configure Enabled Lanes by Time of Day	H.2.7
	Upon request from a management station, the ASC shall store if a revocable lane is active (enabled) or inactive based on a time base schedule. This requirement allows a management station to set a group of enabled lanes based on a schedule.	

3.5.4.1.3.4.3	Determine Lanes Enabled	G.1
	Upon request from a management station, the ASC shall return the revocable lanes that are currently enabled (active).	
3.5.4.1.3.4.4	Command Enabled Lanes	4.2.13
	Upon request from a management station, the ASC shall store if a set of revocable lanes is active (enabled) or inactive. This requirement allows a management station to remotely command if the signal phase and timing data provided to a CV Application Process to indicate which revocable lane(s) are enabled or not. The set of revocable lanes is defined in Section 3.5.4.1.3.4.1, Configure Concurrent Enabled Lanes. This command may override the set of enabled lanes in the schedule.	
3.5.4.1.3.5	Enable Signal Phase and Timing Data Exchange	H.2.7
	Upon request from a management station, the ASC shall store if the controller unit can exchange signal phase and timing data for the intersection(s) with an RSU port. An ASC may provide SPAT data to more than one RSU (or CV Application Process). This requirement allows a management station to control which RSU port(s) can the ASC share SPAT data with.	
3.5.4.1.3.6	Configure Road Authority Identifier	G.3
	Upon request from a management station, the ASC shall store the unique identifier of the agency that operates and/or maintains the intersection or the ASC. The unique identifier is an object identifier as defined by DF_RoadAuthorityID in SAE J2735. In the US, this object identifier allows use consisting of the Geographic Names Information System (GNIS) codes maintained by the US Geological Survey (USGS).	
3.5.4.1.3.7	Retrieve Signal Phase and Timing Intersection Status Requirements	

	Upon request from a management station, the ASC shall return the status of the ASC as part of the signal phase and timing data broadcasted to connected devices. The intersection status values are defined by DE_IntersectionStatusObject in SAE J2735.	
3.5.4.1.3.7.1	Monitor Manual Control Indication	G.1
	Upon request from a management station, the ASC shall return if the intersection is operating under manual control. Manual Control indicates to the receiver of this information that the controller is "not in control", thus the controller generally does not know when the movement phase state will change. The ASC is under manual control when it receives a Manual Control Enabled (MCE) command or Manual Advance input (e.g., from a police pickle). Whether the ASC is under manual control is updated accordingly to be consistent with the current set of possible dwell/advance options. The Minimum End Time and Maximum End Time are adjusted accordingly.	
3.5.4.1.3.7.2	Monitor Stop Indication	G.1
	Upon request from a management station, the ASC shall return if the intersection is operating under stop time. Stop Time indicates to the receiver of this information that all counting/timing by the controller has stopped, thus most TimeChangeDetails are unknown. The ASC is under stop time when it receives a stop time input. The active (frozen) controller state on the affected (stopped) ring remains the basis to determine the MovementPhaseState for each movement and the TimeChangeDetails. When in stop time, the stop time duration is unknown, however, the TimeChangeDetails will remain consistent to the current phase timers. If the form of stop time input allows continuation of countdown timers for clearance intervals or other timers, the TimeChangeDetails are adjusted accordingly.	
3.5.4.1.3.7.3	Monitor Failure Flash Indication	G.1

	Upon request from a management station, the ASC shall return if the intersection is in a failure flash condition. Stop Time indicates to the receiver of this information that all counting/timing by the controller has stopped, thus most TimeChangeDetails are unknown. A failure flash condition is any type of flash that must be terminated by a source external to the controller. There are three types of failure flash. •"Monitor Flash" is a Flash controlled by the monitor in the following two scenarios: •When resuming operation after a power loss or interruption, the monitor keeps the Flash Bus energized for a minimum of 6 seconds before energizing the Signal Bus and transferring control to the controller. •When a fault is detected by the monitor, it energizes the Flash Bus until either the fault is cleared by pressing the Reset button on the monitor (latching fault) or, with certain types of faults, when the condition that caused the fault is no longer present (non-latching fault). •"Fault Monitor Flash" occurs when the controller detects an anomaly in the TSC Infrastructure, such as a mismatch between its copy of the permissive channels and the monitor's copy of the permissive channels. •"Local Flash" is a flash controlled by human-operated switches in the cabinet, typically labeled "AUTO/FLASH", that is used by technicians to flash the signals when performing maintenance on the controller (Tech Flash) or by police during unusual traffic conditions or situations (Police Flash). The end of Failure Flash is indeterminate because the ASC does not know when the monitor is going to be reset or when the flash switch is going to be moved from "FLASH" to "AUTO". Therefore, the TimeChangeDetails during Failure Flash cannot be supplied. Note: It is more important for SPaT to match the roadway signalization rather than internal controller logic. Some cabinet variations do not have flash sense inputs. The ASC Working Group recommends agencies to ensure flash sense inputs are mapped into the ASC. ASCs that cannot determine if cabinet flash is active are PROHIBITED from providing any SPaT data to the RSU. See Section F.3.3.4.3 for additional notes about a Failure Flash Indication	
3.5.4.1.3.7.4	Monitor Preemption Operation Indication	G.1

	Upon request from a management station, the ASC shall return if the intersection is operating in Active Premption Control. Preempt Control indicates to the receiver of this information that the controller is actively servicing a preemption request. The TimeChangeDetails are generated under assumption that any inactive preemption, NTCIP 1211, or SRM requests remain inactive and any active priority requests remain active until served.	
3.5.4.1.3.7.5	Monitor Priority Operation Indication	G.1
	Upon request from a management station, the ASC shall return if the intersection is operating in Active Priority Control. Priority Control indicates to the receiver of this information that the controller is actively servicing a priority request and thus, the TimeChangeDetails for the intersection may suddenly change as the controller changes from "normal" operations to servicing a priority request as the controller transitions to serve the movement requested. The TimeChangeDetails are generated under assumption that any inactive priority, NTCIP 1211, or SRM requests remain inactive and any active priority requests remain active until served.	
3.5.4.1.3.7.6	Monitor Fixed Time Control Indication	G.1
	Upon request from a management station, the ASC shall return if the intersection is operating under fixed time control. Fixed Time Operation indicates to the receiver of this information that the controller is operating in fixed time and thus the values in TimeChangeDetails are not dynamically changing cycle by cycle.	
3.5.4.1.3.7.7	Monitor Non-Fixed Time Control Indication	G.1

	Upon request from a management station, the ASC shall return if the intersection is operating under Active Demand. Active Demand, also called traffic dependent operation indicates to the receiver of this information that the controller is operating based on different levels of traffic parameters (requests, duration of gaps or more complex parameters), and not a fixed time mode. The TimeChangeDetails are generated under assumption of any active demand for phase or pedestrian service. This demand can be sourced from cabinet inputs, central system commands, controller configuration, internal logic, or various other means. The TimeChangeDetails are generated upon current demand (Phase/Pedestrian calls) and updated within one second upon changes to this demand. NOTE: Demand need not be actively serviceable to be considered in the SPaT message. For example, a coordinator may omit a phase until its permissive window opens, however SPaT is to consider this phase to have serviceable demand with expectation of future opening of this permissive window.	
3.5.4.1.3.7.8	Monitor Standby Operation Indication	G.1
	Upon request from a management station, the ASC shall return if the intersection is operating in a soft flash operation (flash through phase loadswitch), and the end of the flash condition is determinate at some point by the controller. StandbyOperation indicates that the controller is in a flashing condition but the controller will be aware of when the controller will exit the flashing condition. Standby operations include startup flash, automatic flash, and preempt flash. See Section F.3.3.4.8 for additional notes about a Standby Operation Indication.	
3.5.4.1.3.7.9	Monitor Controller Failure	G.1
	Upon request from a management station, the ASC shall return if the intersection is in a failure mode. Failure Mode indicates to the receiver of this information that the controller is not operating properly or has failed. Examples of a controller failure mode includes a process in the controller that is not be operating properly, a memory data error was detected, or an internal voltage failure was detected. Most failures will be fatal and would not result in this bit being SET, but for non-catastrophic failures, this bit can be set and the controller would likely activate cabinet flash.	
3.5.4.1.3.7.10	Monitor MAP Message Validity	G.1

	Upon request from a management station, the ASC shall return if the controller is indicating that the MAP message for this intersection should be marked as valid or invalid. The controller may allow an authorized user to indicate that the MAP message for the intersection is invalid because the signalized intersection is under test, or because there is temporary work at the signalized intersection, such as lane closures, that may make the MAP message invalid.	
3.5.4.1.3.7.11	Monitor SPaT Data Validity	G.1
	Upon request from a management station, the ASC shall return if the controller is providing valid or invalid SPaT data for the intersection. The controller may be providing invalid SPaT data that is not to be used if the signalized intersection is under test, or if there is temporary work at the signalized intersection, such as lane closures, that may make the SPaT data invalid.	
3.5.4.1.3.8	Mark SPaT Invalid - Controller	G.3
	Upon request from a management station, the ASC shall store an indication if the SPaT data being provided by the controller is valid or not, i.e., whether the SPaT data to be used or not. Situations when the SPaT data may be invalid include when the signalized intersection is under test, or if there is temporary construction at the signalized intersection such that the SPaT data should be ignored.	
3.5.4.1.3.9	Mark SPaT Invalid - Port	H.2.7
	Upon request from a management station, the ASC shall store an indication if the SPaT data being provided by the controller to a specific RSU port is valid or not, i.e., whether the SPaT data to be used or not. Situations when the SPaT data may be invalid include when the signalized intersection is under test. Unlike 3.5.4.1.3.8, Mark SPaT Invalid - Controller, this requirement allows the SPaT data to be marked invalid for a specific CV Application Process (e.g., RSU).	
3.5.4.1.3.10	Mark MAP Message Invalid - Controller	G.3

	Upon request from a management station, the ASC shall store an indication if the MAP message associated with the signalized intersection controlled by the controller is valid or not, i.e., whether the MAP message to be used or not. Situations when the MAP message may be invalid include when the signalized intersection is under test, or if there is temporary construction at the signalized intersection such that the MAP message should be ignored. The MAP message is generally broadcasted by the CV Application Process but the indication on whether a MAP message is valid is contained in the SPaT message and the controller is the primary source of the data for the SPaT message. From a field maintenance perspective, the field maintenance personnel generally have easier access to the traffic controller than the RSU, and are likely to indicate the SPaT data is valid or invalid also. Thus, this requirement allows the field maintenance personnel to indicate whether the SPaT and MAP messages as valid or invalid from the same device (the controller).	
3.5.4.1.3.11	Mark MAP Message Invalid - Port	H.2.7
	Upon request from a management station, the ASC shall store an indication if the MAP message broadcasted by a specific CV Application Process data is valid or invalid, i.e., whether the MAP message is to be used or not. Situations when the MAP message may be invalid include when the signalized intersection is under test. Unlike 3.5.4.1.3.10, Mark MAP Message Invalid - Controller, this requirement allows the MAP message to be marked invalid for a specific CV Application Process (e.g., RSU).	
3.5.4.1.3.12	Manage Signal Group Requirements	
	The following requirements are for managing signal groups for use in connected intersections. The signalGroupID is used in SAE J2735 to associate every active movement in a given intersection to a designated collection of one or more lanes of a common type (defined in a MAP message).	
3.5.4.1.3.12.1	Determine Maximum Number of Signal Groups	G.1
	Upon request from a management station, the ASC shall return the maximum number of signal groups that can be configured by the ASC.	
3.5.4.1.3.12.2	Configure Signal Groups Intersection Mapping	H.2.7

	Upon request from a management station, the ASC shall store the signal groups and intersection identifiers in use for the intersection. This allows an ASC that controls multiple intersections to map signal groups to intersections for ASC purposes.	
3.5.4.1.3.12.3	Configure Signal Group Control Source	H.2.7
	Upon request from a management station, the ASC shall store the phase or overlap that controls the signal group.	
3.5.4.1.3.12.4	Configure Signal Group Indication Types	H.2.7
	Upon request from a management station, the ASC shall store the type of Green (includes WALK), Red (includes DON'T WALK), Flashing Yellow, and Dark movements to be indicated for the signal group in a SPaT message. Valid values are defined by DE_MovementPhaseState in SAE J2735.	
3.5.4.1.3.12.5	Configure Signal Group Permissive Control	H.2.7
	Upon request from a management station, the ASC shall store the phase or overlap that determines if the signal group indication is a protected or permissive movement. If the green type for the signal group is not protected-or-permissive, then this requirement is ignored.	
3.5.4.1.3.12.6	Configure Signal Group Revocable Lanes	H.2.7
	Upon request from a management station, the ASC shall store the set of revocable lane(s) that activates a signal group when the set of revocable lane(s) is enabled and deactivates a signal group when revoked. The set of revocable lanes is defined in Section 3.5.4.1.3.4.1, Configure Concurrent Enabled Lanes. If the signal group is enabled, then the movement state for the signal group is included in the SPaT data provided to a CV Application	

	Process.	
3.5.4.1.3.12.7	Determine Maximum Number of Signal State Entries	G.1
	Upon request from a management station, the ASC shall return the number of signal state entries supported by the ASC.	
3.5.4.1.3.12.8	Configure Signal State Parameters	H.2.7
	Upon request from a management station, the ASC shall store parameters to determine what signal state as defined by DE_MovementPhaseState in SAE J2725 shall be indicated in a SPaT message.	
3.5.4.1.4	Manage Assured Green Period Requirements	
3.5.4.1.4.1	Configure Assured Green Period	
3.5.4.1.4.2	Configure RLVW Detection Zone Detector Input	
3.5.4.2	ASC - CV Roadside Process Interface Requirements	
	The second interface for managing an ASC in a connected vehicle environment is between the ASC Process (ASC) and the CV Application Process. These requirements allow the ASC to deliver signal phase and timing data to the CV Application Process. From an SNMP standpoint, the ASC is the SNMP manager, and the CV Application Process is the agent. The sub-requirements to manage the data exchanges between the ASC Process and the CV Application Process are: a)Exchange Current and Next Movement Information Requirements b)Exchange Next Occurrence of a Movement Requirements c)Exchange Presence of Connected Devices Requirements d)Exchange Roadway Geometrics Information Requirements The requirements to manage the data exchanges between an ASC and a CV Application Process follow.	
3.5.4.2.1	Exchange Current and Next Movement Information Requirements	

	The following requirements allow an ASC to exchange current and next movement data with a CV Application Process. The CV Application Process can then use this data to generate SPaT messages, as defined by SAE J2735, to connected devices in the vicinity of the RSU.	
3.5.4.2.1.1	Provide Current and Next Movement Information Requirements	
	The SPaT message that is broadcasted by an RSU to connected vehicles includes information about what vehicle (or pedestrian) movements are permitted and when at a signalized intersection. To provide this information the CV Application Process needs movement data from the ASC. The requirements for an ASC to provide current and next movement information to a CV Application Process are as follows. There are two options addressed in the following requirements. a)The CV Application Process is physically part of the ASC (Physical Architecture 1), and thus the ASC provides data is in the form of UPER-encoded SAE J2735 messages. b)The ASC is providing SPaT data in a data format to be defined because the CV Application Process will then generate the UPER-encoded SAE J2735 messages.	
3.5.4.2.1.1.1	Provide UPER-encoded SPaT Message	1218
	Upon request from an ASC, a CV Application Process shall store the UPER-encoded SPaT Message as defined in SAE J2735. The SPaT message contains the following information: •Timestamp •Intersection Status •Enabled Lanes •For each Signal Group (both current followed by the next movement): oMovement State oMinimum End Time oMaximum End Time oNextTime oStartTime This requirement applies only for ASCs where the CV Application Process is physically part of the ASC (Physical Architecture 1).	

3.5.4.2.1.1.2	Provide Movement Time Point	1218
3.5.4.2.1.1.2	Provide Movement State	1218
	Upon request from an ASC, a CV Application Process shall store the overall current state of a movement (for a signal group) at the intersection. The valid states are defined by DE_MovementPhaseState in SAE J2735. If the movement state is not known with a high level of confidence, a value of unavailable is used.	
3.5.4.2.1.1.4	Provide Movement Minimum End Time	1218
	Upon request from an ASC, a CV Application Process shall store the time point of the earliest possible end of the current movement state (e.g., at the end of a permissive green or at the end of a permissive yellow) of a movement at an intersection, as defined by DE_Timemark in SAE J2735. If the duration of the current state is fixed, this value indicates the end time. This value can be viewed as the earliest possible time point at which the current interval could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour.	
3.5.4.2.1.1.5	Provide Movement Maximum End Time	1218
	Upon request from an ASC, a CV Application Process shall store the time point of the latest possible end of the current movement state (e.g., at the end of a protected green or end of a steady red) of a movement at an intersection, as defined by DE_Timemark in SAE J2735. This value can be viewed as the latest possible time point at which the current interval could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the ASC can calculate the maximum end time, then the ASC is to provide that time point, otherwise, the ASC is to provide a value of unknown.	
3.5.4.2.1.1.6	Provide Movement Likely End Time	1218

	Upon request from an ASC, a CV Application Process shall store the time point when the current movement state will most likely end (e.g., at the end of a protected green or end of a steady red) at an intersection, as defined by DE_Timemark in SAE J2735. The likely end time point may be predicted based on data available to the ASC. The time point is measured in tenths of a second in the current or next hour.	
3.5.4.2.1.1.7	Provide Movement Likely End Time Confidence	1218
	Upon request from an ASC, a CV Application Process shall store the statistical confidence that the reported likely end time point of the current movement (e.g., at the end of a protected green or end of a permissive clearance time) at an intersection is accurate. The confidence value is measured as a probability class, as defined by DE_TimeIntervalConfidence in SAE J2735.	
3.5.4.2.1.1.8	Provide Next Movement State	1218
	Upon request from an ASC, a CV Application Process shall store the movement state immediately after the current movement state (for a signal group) at the intersection. The valid states are defined by DE_MovementPhaseState in SAE J2735. If the next movement state is not known with a high level of confidence, a value of unavailable is used.	
3.5.4.2.1.1.9	Provide Next Movement Minimum End Time	1218
	Upon request from an ASC, a CV Application Process shall store the time point of the earliest possible end of the movement state immediately after the current movement state at the intersection, as defined by DE_Timemark in SAE J2735. If the end time of the current movement state is known (maximum end time equals minimum end time) and the duration of the next movement state is fixed, this value indicates the end time point of the next movement state. This value can be viewed as the earliest possible time point at which the next interval could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the next movement state is unknown, the time point of the earliest possible end time is also unknown. NOTE: The minimum end time of the next movement will be the minimum end time of the current movement plus the minimum amount of time that the next movement state could time.	

3.5.4.2.1.1.10	Provide Next Movement Maximum End Time	1218
	Upon request from an ASC, a CV Application Process shall store the time point of the latest possible end of the movement state immediately after the current movement state at the intersection, as defined by DE_Timemark in SAE J2735. This value can be viewed as the latest possible time point at which the next movement state could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the next movement state is unknown, the time point of the latest possible end time is also unknown. When the end time of the current movement state is known (maximum end time equals minimum end time) and the duration of the next movement state is fixed, such as when the ASC is operating in fixed time or the yellow interval duration, the minimum end time of the next movement state will equal the maximum end time of the next movement state.	
3.5.4.2.1.1.11	Provide Next Movement Start Time	1218
	Upon request from an ASC, a CV Application Process shall store the time point when the next movement state immediately after the current movement state at the intersection will start, as defined by DE_Timemark in SAE J2735. If the next movement state is unknown, the time point of the next movement start time is also unknown. If the start time is unknown, a value of unknown is used. If the next movement state is unknown, the start time will also be unknown. If the next movement state is known, the start time is equal to the movement minimum end time of the current interval. Note: Start time is always a future time (See CTI 4501, Section 3.3.3.3.5.6 and 3.3.3.3.5.7). Thus, the start time of the current interval is always unknown.	
3.5.4.2.1.2	Provide Movement Assistance Requirements	

	The SPaT message in SAE J2735 can also provide potential pedestrian or bicyclist conflicts and queuing information to travelers. The requirements for an ASC to provide this data to an RSU so it can broadcast this information to travelers wishing to traverse through the intersection are defined as follows.	
3.5.4.2.1.2.1	Provide Lane Connection Queue Length	1218
	Upon request from an ASC, a CV Application Process shall store the distance, in meters, from the stop line of the approach movement to the back edge of the last vehicle in the queue, as measured along the center line of the lane, for a specific movement through the intersection. Valid values are 0 to 10000 meters, where 0 indicates no queue or the queue distance is unknown, and 10000 represents all distance ≥ 10000 meters.	
3.5.4.2.1.2.2	Provide Lane Connection Traveler Detection	1218
	Upon request from an ASC, a CV Application Process shall store if any conflicting pedestrians or bicycles are detected for a specific movement through the intersection. This value is either on or off, with off indicating a high certainty that there is no pedestrian or bicycle present.	
3.5.4.2.1.3	Provide Advisory Speed Requirements	
	The SPaT message in SAE J2735 can also provide speed advisories for specific movements and specific vehicle types. The requirements for an ASC to provide a CV Application Process with advisory speed information for a movement through the intersection are defined as follows.	
3.5.4.2.1.3.1	Provide Advisory Speed Type	1218
	Upon request from an ASC, a CV Application Process shall store the speed advisory type for a specific movement traversing the intersection. Valid types of speed advisories are defined by DE_AdvisorySpeedType in SAE J2735. Speed advisories may be configured for specific vehicle types as defined in the MAP message for the same intersection.	

3.5.4.2.1.3.2	Provide Advisory Speed	1218
	Upon request from an ASC, a CV Application Process shall store the advisory speed, in tenths of a meter per second, provided for a specific movement traversing the intersection. Speed advisories may be configured for specific speed advisory types (See 3.5.4.2.1.3.2) or vehicle types as defined in the MAP message for the intersection.	
3.5.4.2.1.3.3	Provide Advisory Speed Zone	1218
	Upon request from an ASC, a CV Application Process shall store the distance, in meters, upstream from the stop bar that a speed advisory is recommended for a movement traversing the intersection. A value of 10000 indicates that the distance is 10,000 meters or greater.	
3.5.4.2.1.3.4	Provide Advisory Speed Vehicle Type	1218
	For a specific movement traversing the intersection, upon request from an ASC, a CV Application Process shall store the vehicle type that a speed advisory is intended for. The vehicle type(s) is identified in the MAP message for the intersection. If no vehicle type is identified, then the advisory speed applies to all vehicles.	
3.5.4.2.1.4	Provide Road Authority ID	1218
	Upon request from an ASC, a CV Application Process shall store the Road Authority ID for an intersection. The Road Authority ID is a unique identifier of the agency that operates and/or maintains the intersection or the ASC. The unique identifier in the US is an object identifier consisting of the Geographic Names Information System (GNIS) codes maintained by the US Geological Survey (USGS). The Road Authority ID is defined by DF_RoadAuthorityID in SAE J2735	

3.5.4.2.1.5	Provide Signal Phase and Timing Intersection Status V2	1218
	Upon request from an ASC, a CV Application Process shall store the status of the ASC as part of the signal phase and timing data. The intersection status values are defined by DE_IntersectionStatusObject in SAE J2735.	
3.5.4.2.1.6	Provide SPaT Information to a CV Roadside Process	1218
	Upon request from an ASC, a CV Application Process shall store the mandatory SPaT information needed to generate a J2735 SPaT message. This data is provided by the ASC in a compressed manner so that the data can be transmitted more efficiently. The connected vehicle environment is expected to have limitations in the data rates and data capacity. This requirement allows the ASC to group sets of data so that the data can be transmitted more efficiently.	
3.5.4.2.2	Exchange Next Occurrence of a Movement Requirements	
3.5.4.2.2.1	Provide Movement Next Occurrence	1218
	Upon request from an ASC, a CV Application Process shall store the estimated time point when the current movement at an intersection is next allowed to proceed (i.e., the movement phase state will be permissive-Movement-Allowed or protected-Movement-Allowed), as defined by DE_Timemark in SAE J2735. The time point is measured in tenths of a second in the current or next hour. This requirement is used to support ECO-driving applications. For fixed time and coordinated signals, next time can be estimated by the ASC, subject to unpredictable events such as signal preemptions, or failures such as a watchdog failure or a conflict monitor. If next time cannot be determined, a value of unknown is used.	
3.5.4.2.3	Exchange Presence of Connected Device Requirements	
3.5.4.2.3.1	Retrieve BSMs	
3.5.4.2.3.2	Retrieve PSMs	
3.5.4.2.3.3	Retrieve Actuation Report	H.2.5
	Upon request from an ASC, a CV Application Process shall provide the actuation report for connected device detectors configured by the CV Application Process. An actuation report indicates the connected device detectors that are actuated at the time, based on if any BSMs or PSMs are detected within the detection zone and if the BSM or PSM satisfies the configuration criteria.	

3.5.4.2.3.4	Retrieve Detection Report	H.2.5
	Upon request from an ASC, a CV Application Process shall provide the detection report for connected device detectors configured by the CV Application Process. The processed data that can be provided by in a detection report are volume, average speed, average travel time, queue length, average gap, and platoon length.	
3.5.4.2.4	Exchange Roadway Geometrics Information Requirements	
3.5.4.2.4.1	Retrieve MAP Plan in Effect	G.1
	Upon request from an ASC, a CV Application Process shall provide the MAP plan currently being broadcasted by the RSU. The ASC may use this information to determine if the signal pattern in effect is compatible with the roadway geometry data broadcasted by the RSU.	
3.5.4.2.4.2	Confirm MAP Plan Compatibility	4.2.12
	An ASC shall confirm that the MAP plan broadcasted by an RSU is compatible with the SPAT data generated. An ASC generates SPAT data for consumption by travelers, however, this SPAT data has limited value unless it is broadcast in conjunction with roadway geometry data, relating the movement information with a lane. Thus, it is important that the SPAT data broadcasted by an RSU is compatible with the MAP plan also broadcasted by the RSU. If the SPAT data is not compatible with the MAP plan currently broadcasted, the SPAT data should not be broadcasted by the RSU.	
3.5.4.3	ASC-ECLA Interface Requirements	

	In some scenarios, the signal timing is determined by an external device called the ECLA (See Section 2.3.4.c), which sends commands to the ASC to advance the phase at specific times determined by the ECLA. In this environment, the ASC requires the information below to forward accurate SPaT data to a CV Application Process so a SPaT message can be broadcasted by an RSU in an CV environment. The requirements for an ASC to receive signal timing durations and movement states from an ECLA follow so the data can be shared with a management station follows. At minimum, the ECLA must send commands to an ASC when the information it is able to share to an ASC changes. An ECLA may send these commands at a user defined frequency but must send updated commands as soon as it is able to. Note: the ASC is the final arbiter of the signal timing durations and state for each movement. The ASC is to provide the AGP if necessary – the ECLA is not expected to provide the AGP.	
3.5.4.3.1	Receive Current Phase Minimum End Time from an ECLA	
	Upon request from an ECLA, the ASC shall store the time point of the earliest possible end of the current Active Phases' green indications as defined by DE_Timemark in SAE J2735. If the duration of the current state is fixed, this value indicates the end time. This value can be viewed as the earliest possible time point at which the current interval could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the ECLA is unable to provide a time point nor a phase, the ECLA is to provide a value of unknown. This time is provided by an ECLA for informational purposes and may be ignored by an ASC process.	
3.5.4.3.2	Receive Current Phase Maximum End Time from an ECLA	

	Upon request from an ECLA, the ASC shall store the time point of the latest possible end of the current Active Phases' green indications as defined by DE_Timemark in SAE J2735. This value can be viewed as the latest possible time point at which the current interval could end, except when unpredictable events relating to a preemption or priority call come into play and disrupt a currently active timing plan. The time point is measured in tenths of a second in the current or next hour. If the ECLA is unable to provide a time point nor a phase, the ECLA is to provide a value of unknown. This time is provided by an ECLA for informational purposes and may be ignored by an ASC process.	
3.5.4.3.3	Receive Current Phase Likely End Time from an ECLA	
	Upon request from an ECLA, the ASC shall store the time point when the current Active Phases' green indications will likely end as defined by DE_Timemark in SAE J2735. The likely end time point may be predicted based on data available to the ASC. The time point is measured in tenths of a second in the current or next hour. If the ECLA is unable to provide a time point nor a phase, the ECLA is to provide a value of unknown. This time is provided by an ECLA for informational purposes and may be ignored by an ASC process.	
3.5.4.3.4	Receive Current Phase Likely End Time Confidence from an ECLA	
	Upon request from an ECLA, an ASC shall store the statistical confidence that the reported likely end time points of the current Active Phases' green indications are accurate. The confidence value is measured as a probability class, as defined by DE_TimeIntervalConfidence in SAE J2735. This value is provided by an ECLA for informational purposes and may be ignored by an ASC process.	
3.5.4.3.5	Receive Next Phase from an ECLA	

	Upon request from an ECLA, an ASC shall store the next phase that an ECLA expects to be committed to be active next (after the current Active Phase terminates). If the ECLA is unable to indicate what phases are next, the ECLA is to provide a value of unknown. This value is provided by an ECLA for informational purposes and may be ignored by an ASC process.	
3.5.4.3.6	Receive Compressed ECLA Input Data	
	Upon request from an ECLA, an ASC shall store the most recent transmission time from an ECLA, the expected end time information for the current Active Phases from an ECLA, and what the expected Next Phases are from an ECLA in a compressed format. This data is provided by an ECLA for informational purposes and may be ignored by an ASC process.	
3.5.5	Backward Compatibility Requirements	
3.6	Supplemental Non-communications Requirements	
3.6.1	Response Time for Requests	
3.6.2	Atomic Operations	
3.6.3	Supplemental Requirements for Event Logging	
3.6.3.1	Detect Events Related to an Atomic Object	
3.6.3.2	Reporting an Atomic Object	
3.6.4	Condition-based Maximum Start Time	
3.6.5	Signal Phase and Timing Data Performance Requirements	
3.6.5.1	SPaT Maximum Transmission Start Time	
3.6.5.2	Movement Time Point Minimum Transmission Rate	
3.6.5.3	SPaT Maximum Transmission Rate	
3.6.5.4	SPaT Time Accuracy	

ments Traceability Matrix (RTM)

Object ID	Object Name
	CLICK HERE TO VIEW OBJECT DETAILS
RFC 3418	snmpInPkts
RFC 3418	snmpInBadVersions
RFC 3418	snmpInBadCommunityNames
RFC 3418	snmpInBadCommunityUses
RFC 3418	snmpInASNParseErrs
RFC 3418	snmpSilentDrops
RFC 3418	snmpProxyDrops
RFC 1213 mib2	snmpInPkts
RFC 1213 mib2	snmpOutPkts
RFC 1213 mib2	snmpInBadVersions
RFC 1213 mib2	snmpInBadCommunityNames
RFC 1213 mib2	snmpInBadCommunityUses
RFC 1213 mib2	snmpInASNParseErrs
RFC 1213 mib2	snmpInTooBigs
RFC 1213 mib2	snmpInNoSuchNames
RFC 1213 mib2	snmpInBadValues
RFC 1213 mib2	snmpInReadOnlys
RFC 1213 mib2	snmpInGenErrs
RFC 1213 mib2	snmpInGetRequests
RFC 1213 mib2	snmpInGetNexts
RFC 1213 mib2	snmpInSetRequests
RFC 1213 mib2	snmpInGetResponses
RFC 1213 mib2	snmpInTraps
RFC 1213 mib2	snmpOutTooBigs
RFC 1213 mib2	snmpOutNoSuchNames
RFC 1213 mib2	snmpOutBadValues
RFC 1213 mib2	snmpOutGenErrs
RFC 1213 mib2	snmpOutGetRequests
RFC 1213 mib2	snmpOutGetNexts
RFC 1213 mib2	snmpOutSetRequests
RFC 1213 mib2	snmpOutGetResponses
1103v01 - A.3.1	snmpMaxPacketSize

5.4.17	ascElevationOffset
1201v03 - 2.2.4	controllerBaseStandards
5.4.23.1	maxCommPorts
5.4.23.2	commPortsTable
5.4.23.2.1	commPortType
5.4.23.2.3	commPortEnable
RFC 1213 mib2	ifNumber
2103v02 - A.4.3.4 if.2	ifTable
2103v02 - A.4.3.4 if.2.1	ifIndex
2103v02 - A.4.3.4 if.2.3	ifType
5.4.23.1	maxCommPorts
ISO26048-1-Transaction	fdTransactionMode

ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.4.24	maxGlobalSetIds
5.4.25	globalSetIdTable
5.4.25.1	globalSetIdNumber
5.4.25.2	globalSetIdOID
5.4.10	unitControl
5.4.10	unitControl
5.4.10	unitControl
	eclaCommEnable
	eclaDataTimestamp
5.4.18	unitStartUpFlashMode

5.4.1	unitStartUpFlash
5.4.3	unitBackupTime
5.4.20	maxUserDefinedBackupTimeContent
5.4.21	unitUserDefinedBackupTimeContentTable
5.4.21.1	unitUserDefinedBackupTimeContentNumber
5.4.21.2	unitUserDefinedBackupTimeContentOID
5.4.21.3	unitUserDefinedBackupTimeContentDescription
5.4.20	maxUserDefinedBackupTimeContent
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus

ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.4	phaseMinimumGreen
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.5	phasePassage
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.6	phaseMaximum1
5.2.2.7	phaseMaximum2
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.6	phaseMaximum1
5.2.2.7	phaseMaximum2
5.2.2.24	phaseMaximum3
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.8	phaseYellowChange

5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.9	phaseRedClear
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.10	phaseRedRevert
5.4.4	unitRedRevert
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.11	phaseAddedInitial
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.12	phaseMaximumInitial

5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.13	phaseTimeBeforeReduction
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.15	phaseTimeToReduce
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.14	phaseCarsBeforeReduction
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.16	phaseReduceBy
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber

5.2.2.17	phaseMinimumGap
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.18	phaseDynamicMaxLimit
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.19	phaseDynamicMaxStep

ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.20	phaseStartup
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode

ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus

ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode

ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber

5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.22	phaseRing
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.23	phaseConcurrency
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.25	phasePedClearDuringVehicleClear

5.2.2.25	phaseYellowandRedChangeTimeBeforeEndPedClear
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.2	phaseWalk
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.3	phasePedestrianClear
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.26	phasePedServiceLimit
5.2.2.26	phasePedWalkService
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.27	phaseDontWalkRevert

ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.21	phaseOptions
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.28	phasePedAlternateClearance
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.29	phasePedAlternateWalk

5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.35	phasePedStartOffset
5.2.2.30	phasePedAdvanceWalkTime
5.2.2.31	phasePedDelayTime
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.32	phaseAdvWarnGrnStartTime
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.33	phaseAdvWarnRedStartTime
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError

5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
5.10.2.3	overlapIncludedPhases
5.10.2.4	overlapModifierPhases
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
5.10.2.3	overlapIncludedPhases
5.10.2.4	overlapModifierPhases
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.34	phaseAltMinTimeTransition
5.2.1	maxPhases
5.2.2	phaseTable
5.2.2.1	phaseNumber
5.2.2.34	phaseAltMinTimeTransition

5.2.1	maxPhases
5.2.6	maxPhaseSets
5.2.7	phaseSetTable
5.2.7.1	phaseSetIndex
5.2.1.1	phaseNumber
5.2.7.2	phaseSetWalk
5.2.7.3	phaseSetPedestrianClear
5.2.7.4	phaseSetMinimumGreen
5.2.7.5	phaseSetPassage
5.2.7.6	phaseSetMaximum1
5.2.7.7	phaseSetMaximum2
5.2.7.8	phaseSetYellowChange
5.2.7.9	phaseSetRedClear
5.2.7.10	phaseSetRedRevert
5.2.7.11	phaseSetAddedInitial
5.2.7.12	phaseSetMaximumInitial
5.2.7.13	phaseSetTimeBeforeReduction
5.2.7.14	phaseSetCarsBeforeReduction

5.2.7.15	phaseSetTimeToReduce
5.2.7.16	phaseSetReduceBy
5.2.7.17	phaseSetMinimumGap
5.2.7.18	phaseSetDynamicMaxLimit
5.2.7.19	phaseSetDynamicMaxStep
5.2.7.21	phaseSetOptions
5.2.7.24	phaseSetMaximum3
5.2.7.25	phaseSetPedClearDuringVehicleClear
5.2.7.26	phaseSetPedServiceLimit
5.2.7.27	phaseSetDontWalkRevert
5.2.7.28	phaseSetPedAlternateClearance
5.2.7.29	phaseSetPedAlternateWalk
5.2.7.30	phaseSetAdvWarnGrnStartTime
5.2.7.31	phaseSetAdvWarnRedStartTime
5.2.7.32	phaseSetAltMinTimeTransition
5.2.7.33	phaseSetPedStartOffset
5.2.1	maxPhases
5.2.6	maxPhaseSets
5.5.1	coordOperationalMode

5.5.2	coordCorrectionMode
5.5.3	coordMaximumMode
5.5.4	unitCoordForceMode

5.2.1	maxPhases
5.5.8	maxSplits
5.5.9	splitTable
5.5.9.1	splitNumber
5.5.9.2	splitPhase
5.5.9.7	splitCoordForceMode
5.5.16	unitCoordSyncPoint

5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.6	patternCoordSyncPoint
5.2.1	maxPhases
5.5.8	maxSplits
5.5.9	splitTable
5.5.9.1	splitNumber
5.5.9.2	splitPhase
5.5.9.6	splitOptions

5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.2	patternCycleTime
5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.3	patternOffsetTime
5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.4	patternSplitNumber
5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.5	patternSequenceNumber

5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.7	patternMaximumMode
5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.9	patternPhaseSet
5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.10	patternOverlapSet
5.5.5	maxPatterns
5.5.7	patternTable
5.5.7.1	patternNumber
5.5.7.11	patternVehicleDetectorSet
5.5.5	maxPatterns

5.2.1	maxPhases
5.5.8	maxSplits
5.5.9	splitTable
5.5.9.1	splitNumber
5.5.9.2	splitPhase
5.5.9.3	splitTime

5.2.1	maxPhases
5.5.8	maxSplits
5.5.9	splitTable
5.5.9.1	splitNumber
5.5.9.2	splitPhase
5.5.9.4	splitMode
5.2.1	maxPhases
5.5.8	maxSplits
5.5.9	splitTable
5.5.9.1	splitNumber
5.5.9.2	splitPhase
5.5.9.5	splitCoordPhase
5.5.8	maxSplits

ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
2.8.1	maxRings
5.8.2	maxSequences
5.8.3	sequenceTable
5.8.3.1	sequenceNumber
5.8.3.2	sequenceRingNumber
5.8.3.3	sequenceData
5.8.1	maxRings
5.8.2	maxSequences
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.9.1	maxChannels
5.9.2	channelTable
5.9.2.1	channelNumber
5.9.2.2	channelControlSource
5.9.2.3	channelControlType

ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.9.1	maxChannels
5.9.2	channelTable
5.9.2.1	channelNumber
5.9.2.3	channelControlType
5.9.1	maxChannels
5.9.2	channelTable
5.9.2.1	channelNumber
5.9.2.4	channelFlash
5.9.1	maxChannels
5.9.2	channelTable
5.9.2.1	channelNumber
5.9.2.4	channelFlash

5.9.1	maxChannels
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType

ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType
ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
5.10.2.2	overlapType

ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
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5.10.2.1	overlapNumber
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ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
ISO26048-1-Transaction	fdTransactionError
5.10.1	maxOverlaps
5.10.2	overlapTable
5.10.2.1	overlapNumber
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ISO26048-1-Transaction	fdTransactionMode
ISO26048-1-Transaction	fdTransactionStatus
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5.10.1	maxOverlaps
5.10.2	overlapTable
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ISO26048-1-Transaction	fdTransactionStatus
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5.10.1	maxOverlaps
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5.10.2.1	overlapNumber
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5.10.2	overlapTable
5.10.2.1	overlapNumber
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5.10.1	maxOverlaps
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5.2.5	phaseControlGroupTable
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5.2.3	maxPhaseGroups
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5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
5.3.2.2	vehicleDetectorOptions
5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
5.3.2.2	vehicleDetectorOptions
5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
5.3.2.2	vehicleDetectorOptions

5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
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5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
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5.3.1	maxVehicleDetectors
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5.3.6	maxPedestrianDetectors
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5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
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5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
5.3.2.12	vehicleDetectorAlarms

5.3.1	maxVehicleDetectors
5.3.2	vehicleDetectorTable
5.3.2.1	vehicleDetectorNumber
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5.3.7.1	pedestrianDetectorNumber
5.3.7.6	pedestrianDetectorAlarms
5.3.6	maxPedestrianDetectors
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5.17.10.3	signalGroupID
5.17.9	maxSignalGroups
5.17.10	signalGroupEntryTable
5.17.10.1	signalGroupEntryNumber
5.17.10.3	signalGroupID
5.17.10.4	signalGroupControlSource
5.17.10.5	signalGroupControlType
5.17.9	maxSignalGroups
5.17.10	signalGroupEntryTable
5.17.10.1	signalGroupEntryNumber
5.17.10.3	signalGroupID
5.17.10.6	signalGroupGreenType
5.17.10.7	signalGroupRedType
5.17.9	maxSignalGroups
5.17.10	signalGroupEntryTable
5.17.10.1	signalGroupEntryNumber
5.17.10.3	signalGroupID
5.17.10.8	signalGroupPermissiveControlSource
5.17.10.9	signalGroupPermissiveControlType
5.17.9	maxSignalGroups
5.17.10	signalGroupEntryTable

5.17.10.1	signalGroupEntryNumber
5.17.10.3	signalGroupID
5.17.10.10	signalGroupLane
5.17.11	maxAgencySignalStates
5.17.11	maxAgencySignalStates
5.17.12	agencySignalStateTable
5.17.12.1	agencySignalStateNumber
5.17.12.2	agencySignalStateColor
5.17.12.3	agencySignalStateControlType
5.17.12.4	agencySignalStateOptions
5.17.12.5	agencySignalStateValue

1218v01A - 5.5.1	maxRsuIFMs
1218v01A - 5.5.2	rsuIFMStatusTable
1218v01A - 5.5.2.1	rsuIFMIndex
1218v01A - 5.5.2.2	rsuIFMPsid
1218v01A - 5.5.2.3	rsuIFMTxChannel
1218v01A - 5.5.2.4	rsuIFMEnable

1218v01A - 5.5.2.5	rsuIFMStatus
1218v01A - 5.5.2.6	rsuIFMPriority
1218v01A - 5.5.2.7	rsuIFMOptions
1218v01A - 5.5.2.8	rsuIFMPayload
1218v01A - 5.22.1	rsuAscCurrentTick
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.5	rsuSignalState
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.6	rsuSignalStateMinEndTick
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.7	rsuSignalStateMaxEndTick

1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.8	rsuSignalStateLikelyEndTick
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.9	rsuSignalStateTickConfidence
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.5	rsuSignalState
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.6	rsuSignalStateMinEndTick

1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.7	rsuSignalStateMaxEndTick
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.11	rsuSignalStateStartTick

1218v01A - 5.22.5	maxRsuMovementManeuver
1218v01A - 5.22.6	rsuMovementManeuverTable
1218v01A - 5.22.6.1	rsuMovementManeuverIndex
1218v01A - 5.22.6.2	rsuMovementManeuverIntersection
1218v01A - 5.22.6.3	rsuMovementManeuverSignalGroupID
1218v01A - 5.22.6.4	rsuMovementManeuverQueue
1218v01A - 5.22.5	maxRsuMovementManeuver
1218v01A - 5.22.6	rsuMovementManeuverTable
1218v01A - 5.22.6.1	rsuMovementManeuverIndex
1218v01A - 5.22.6.2	rsuMovementManeuverIntersection
1218v01A - 5.22.6.3	rsuMovementManeuverSignalGroupID
1218v01A - 5.22.6.5	rsuMovementManeuverStatus
1218v01A - 5.22.7	maxRsuAdvisorySpeeds
1218v01A - 5.22.8	rsuAdvisorySpeedTable
1218v01A - 5.22.8.1	rsuAdvisorySpeedIndex

1218v01A - 5.22.8.2	rsuAdvisorySpeedIntersection
1218v01A - 5.22.8.3	rsuAdvisorySpeedSignalGroupID
1218v01A - 5.22.8.4	rsuAdvisorySpeedType
1218v01A - 5.22.7	maxRsuAdvisorySpeeds
1218v01A - 5.22.8	rsuAdvisorySpeedTable
1218v01A - 5.22.8.1	rsuAdvisorySpeedIndex
1218v01A - 5.22.8.2	rsuAdvisorySpeedIntersection
1218v01A - 5.22.8.3	rsuAdvisorySpeedSignalGroupID
1218v01A - 5.22.8.5	rsuAdvisorySpeedAdvice
1218v01A - 5.22.7	maxRsuAdvisorySpeeds
1218v01A - 5.22.8	rsuAdvisorySpeedTable
1218v01A - 5.22.8.1	rsuAdvisorySpeedIndex
1218v01A - 5.22.8.2	rsuAdvisorySpeedIntersection
1218v01A - 5.22.8.3	rsuAdvisorySpeedSignalGroupID
1218v01A - 5.22.8.6	rsuAdvisorySpeedZoneLength
1218v01A - 5.22.7	maxRsuAdvisorySpeeds
1218v01A - 5.22.8	rsuAdvisorySpeedTable
1218v01A - 5.22.8.1	rsuAdvisorySpeedIndex
1218v01A - 5.22.8.2	rsuAdvisorySpeedIntersection
1218v01A - 5.22.8.3	rsuAdvisorySpeedSignalGroupID
1218v01A - 5.22.8.7	rsuAdvisorySpeedZoneClass
1218v01A - 5.22.10	rsuSpatRoadAuthorityID

1218v01A - 5.22.9	rsuSpatStatus
1218v01A - 5.22.12	rsuSignalStatusBlock
1218v01A - 5.22.2	maxRsuSignalGroups
1218v01A - 5.22.3	maxRsuMovementEvents
1218v01A - 5.22.4	rsuSignalStatusTable
1218v01A - 5.22.4.1	rsuSignalGroupEntryNumber
1218v01A - 5.22.4.2	rsuMovementIndex
1218v01A - 5.22.4.3	rsuSignalGroupIntersection
1218v01A - 5.22.4.4	rsuSignalGroupID
1218v01A - 5.22.4.9	rsuSignalStateTickConfidence
5.18.2.7	maxCvDetectionGroups
5.18.2.8	cvDetectionGroupTable

5.18.2.8.1	cvDetectionGroupNumber
5.18.2.8.2	cvDetectionGroupActuations
5.18.2.10	activeCvDetectors
5.18.2.11	detectionReportSequence
5.18.2.12	detectionReportTable
5.18.2.3.1	ascCvDetectorNumber
5.18.2.12.1	detectionReportTime
5.18.2.12.2	detectionReportVolume
5.18.2.12.3	detectionReportSpeed
5.18.2.12.4	detectionReportTravelTime
5.18.2.12.5	detectionReportQueue
5.18.2.12.6	detectionReportGap
5.18.2.12.7	detectionReportPlatoon
5.18.1.4	mapActivatePlan
5.16.2	maxRsuPorts
5.16.3.1	rsuPortIndex
5.17.5	spatPortTable
5.17.5.3	spatPortMapActivationCode
5.18.1.4	mapActivatePlan

5.8.1	maxRings
	eclaInputTable
5.8.3.2	sequenceRingNumber
	eclaRingCurrentPhase
	eclaRingCurrentMinEndTime

5.8.1	maxRings
	eclaInputTable
5.8.3.2	sequenceRingNumber
	eclaRingCurrentPhase
	eclaRingCurrentMaxEndTime
5.8.1	maxRings
	eclaInputTable
5.8.3.2	sequenceRingNumber
	eclaRingCurrentPhase
	eclaRingCurrentLikelyEndTime
5.8.1	maxRings
	eclaInputTable
5.8.3.2	sequenceRingNumber
	eclaRingCurrentEndTimeConfidence

5.8.1	maxRings
	eclaInputTable
5.8.3.2	sequenceRingNumber
	eclaRingNextPhase
	eclaInputBlock

Additional Specifications

See ISO 26048-1 Section 8.9 & Section 8.10
See ISO 26048-1 Section 8.21
See ISO 26048-1 Section 8.11
See ISO 26048-1 Section 8.2 & Section 8.6 & Section 8.11

ISO supports fdGnssLatitude, fdGnssLongitude, fdGnssElevation
ISO?
Max Value = maxCommPorts
ISO?
See ISO 26048-1 Section 8.8
See ISO 26048-1 Section 8.8
See ISO 26048-1 Section 8.13
See ISO 26048-1 Section 8.8
See ISO 26048-1 Section 8.21
See ISO 26048-1 Section 8.5.2.14

Max Value = maxGlobalSetIds

See ISO 26048-1 Section 8.2

Max Value = maxUserDefinedBackupTimeContent

Max Value = maxPhases

Bit = 0

Max Value = maxPhases

Max Value = maxPhases

Max Value = maxPhases

Max Value = maxPhases

Max Value = maxPhases

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Max Value = maxPhases

Bit = 1

Max Value = maxPhases
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Bit = 4
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Bit = 5

Max Value = maxPhases
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Bit = 7
Max Value = maxPhases
Bit = 9
Max Value = maxPhases
Bit = 10

Max Value = maxPhases
Bit = 11
Max Value = maxPhases
Bit = 12
Max Value = maxPhases
Bit = 13
Max Value = maxPhases

Bit = 14
Max Value = maxPhases
Bit = 15
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Max Value = maxPhases

Max Value = maxPhases

Max Value = maxPhases
Bit = 5
Max Value = maxPhases
Bit = 8
Max Value = maxPhases
Max Value = maxPhases

Max Value = maxPhases
See Requirement 3.5.2.1.11.1.2.3.3, Object ID 5.14.10, ascIOmapOutputFunctions - advWarnGrn (4)
Max Value = maxPhases
See Requirement 3.5.2.1.11.1.2.3.3, Object ID 5.14.10, ascIOmapOutputFunctions - advWarnRed (5)
Max Value = maxPhases

Max Value = maxOverlaps
Max Value = maxOverlaps
Max Value = maxPhases
Max Value = maxPhases

Max Value = maxPatterns
Max Value = maxSplits
Max Value = maxPhases
Bit = 0

Max Value = maxPatterns

Max Value = maxPatterns

Max Value = maxPatterns
Max Value = maxSplits

Max Value = maxPatterns

Max Value = maxPatterns
Max Value = maxPatterns
Max Value = maxPhaseSets
Max Value = maxPatterns
Max Value = maxOverlapSets
Max Value = maxPatterns
Max Value = maxVehicleDetectorSets

Max Value = maxSplits
Max Value = maxPhases

Max Value = maxSplits
Max Value = maxPhases
Max Value = maxSplits
Max Value = maxPhases

Max Value = maxSequences
Max Value = maxRings
Max Value = maxPhases
Max Value = maxChannels
Max Value = maxPhases; Max Value = maxOverlaps

Max Value = maxChannels
Max Value = maxChannels
Max Value = maxChannels
Bit = 3

Max Values = maxOverlaps
Value = normal (2)
Max Value = maxOverlaps
Value = minusGreenYellow (3)
Max Value = maxOverlaps
Value = pedestrianNormal (4)

Max Value = maxOverlaps
Value = fYAThreeSection (5)
Max Value = maxOverlaps
Value = fYAFourSection (6)
Max Value = maxOverlaps
Value = fRAThreeSection (7)
Max Value = maxOverlaps
Value = fRAFourSection (8)

Max Value = maxOverlaps
Value = transit-2 (9)
Max Value = maxOverlaps
Value = minusGreenYellowAlternate (10)
Max Value = maxOverlaps
Max Value = maxPhases
Max Value = maxOverlaps
Max Value = maxPhases

Max Value = maxOverlaps

Max Value = maxPhases

Max Value = maxOverlaps

Max Value = maxOverlaps

Max Value = maxOverlaps

Max Value = maxOverlaps

Max Value = maxOverlaps

Max Value = maxPreempts
Bit = 4

Max Value = maxPreempts
Bit = 0

Max Value = maxPreempts
Bit = 1

Max Value = maxPreempts
Bit = 2

Max Value = maxPreempts

Bit = 3

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPreempts
Max Value = maxPreempts
Max Value = maxPreempts
Max Value = maxPreempts
Max Value = maxPhases
Max Value = maxPreempts
Max Value = maxOverlaps
Max Value = maxPhases

Max Value = maxPhases

Max Value = maxPreempts

Max Value = maxPreempts

Max Value = maxPhases

Max Value = maxPreempts

Max Value = maxPhases

Max Value = maxPhases

Max Value = maxPreempts
Max Value = maxOverlaps
Max Value = maxPhases
Max Value = maxPhases
Max Value = maxPreempts
Max Value = maxPhases
Max Value = maxPreempts
Max Value = maxPhases

Max Value = maxPreempts
Max Value = maxSequences

Max Value = maxPreempts
Max Value = maxOverlaps
Max Value = maxPreempts
Max Value = maxPhases
Max Value = maxPreempts

Max Value = maxPreempts
Max Value = maxVehicleDetectors

Max Value = maxPreempts
Max Value = maxPreempts
Bit = 5
Max Value = maxPreemptGates

See ISO 26048-1 Section 8.1 & 8.6
Max Value = maxTimebaseAscActions
Max Value = maxPatterns
Max Value = maxTimebaseAscActions

Max Value = ascIOmaxMaps
Max Value = ascIOmaxMaps
Max Value = ascIOmapMaxInputs
Max Value = ascIOmaxMaps
Max Value = ascIOmapMaxInputs

Max Value = asclOmaxMaps
Max Value = asclOmapMaxInputs

Max Value = asclOmaxMaps
Max Value = asclOmapMaxOutputs

Max Value = ascIOmaxMaps
Max Value = ascIOmapMaxOutputs
Max Value = ascIOmaxMaps
Max Value = ascIOmapMaxOutputs

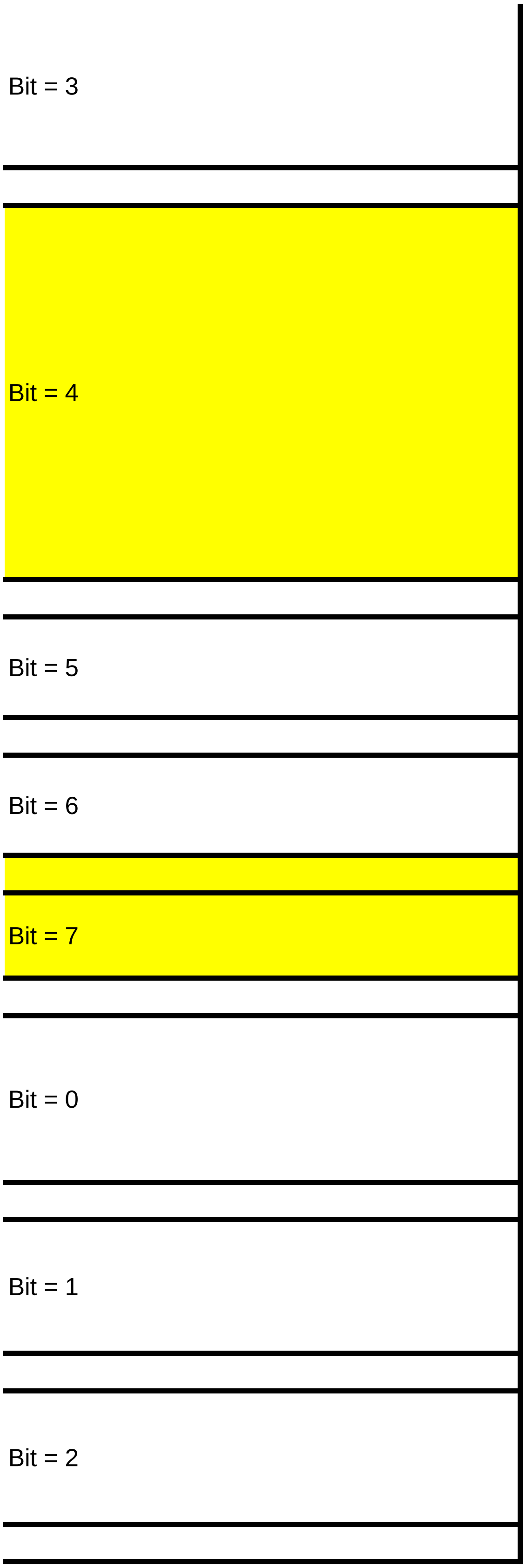
Max Value = ascIOmapMaxInputFunctions
Max Value = ascIOmapMaxOutputFunctions
Max Value = ascIOmaxMaps
Max Value = ascIOmapMaxInputs
Max Value = ascIOmaxMaps
Max Value = ascIOmapMaxOutputs
5.14.11.1 - AscIOmapFIOinputs
5.14.11.2 - AscIOmapFIOoutputs
5.14.12.1 - AscIOmapTS1inputs
5.14.12.2 - AscIOmapTS1outputs
5.14.13.1 - AscIOmapBIUinputs

5.14.13.2 - AscIOmapBIUoutputs
5.14.14.1 - AscIOmapSIUinputs
5.14.14.2 - AscIOmapSIUoutputs
5.14.15.1 - AscIOmapAUXinputs
5.14.15.2 - AscIOmapAUXoutputs
Max Value = maxSIUPort1Addresses
Max Value = maxPort1Addresses
Max Value = maxPort1Addresses
Max Value = maxPedestrianDetectors

Max Value = maxPedestrianDetectors
Max Value = maxPhases
Max Value = maxPhases
6.2 - AscPhaseBlock
6.3 - AscVehDetectorBlock
6.4 - AscPedDetectorBlock

6.5 - AscPatternBlock
6.6 - AscSplitBlock
6.8 - AscPreemptBlock
6.9 - AscSequenceBlock
6.10 - AscChannelBlock

6.11 - AscOverlapBlock
See ISO Section 8.6.2
Max Value = maxAlarmGroups
Bit = 0
Bit = 1
Bit = 1
Bit = 2


Bit = 3
Bit = 4
Bit = 5
Bit = 6
Bit = 7
Bit = 0
Bit = 1
Bit = 2

Bit = 3

Bit = 4

Bit = 5

Bit = 0

Bit = 1

What about ATC?

VAUGHN

Bit = 4

Bit = 7	VAUGHN
Bit = 0	VAUGHN
Bit = 5	VAUGHN
Bit = 3	VAUGHN
Bit = 4	VAUGHN
Same Bit?	
Bit = 5	VAUGHN
Bit = 3	VAUGHN

Max Value = maxPhaseGroups
Max Value = maxPhaseGroups

Max Value = maxPhaseGroups
Max Value = maxPhaseGroups
Max Value = maxPhaseGroups
Max Value = maxPhaseGroups
Max Value = maxPhaseGroups
Max Value = maxPhaseGroups

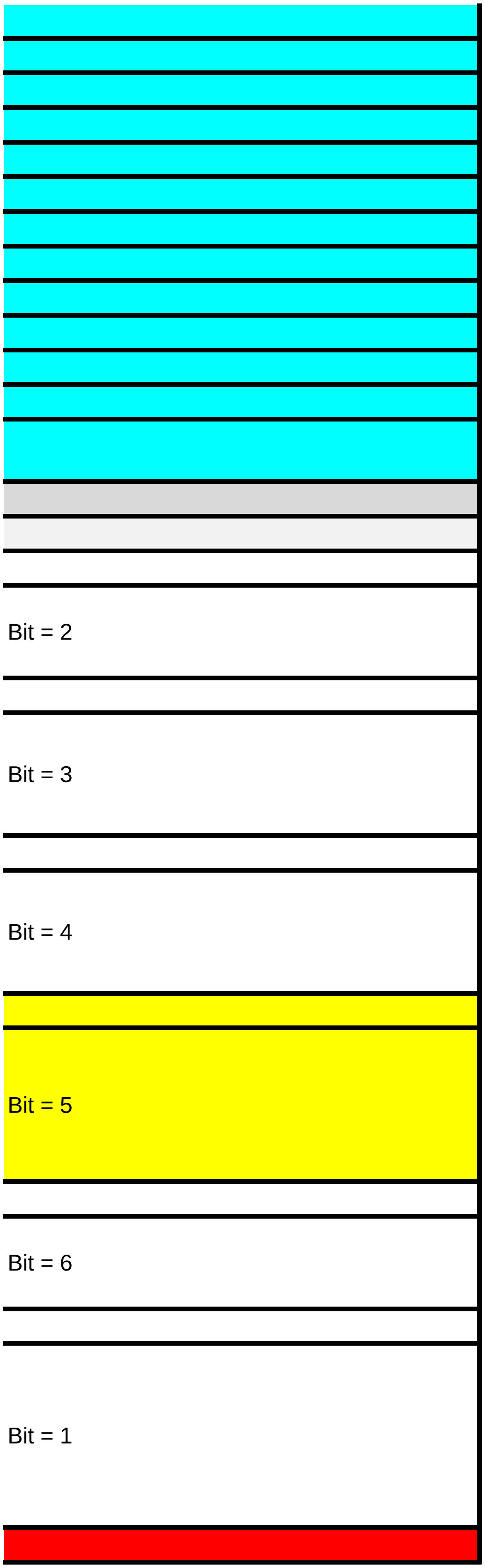
Max Value = maxPhaseGroups
Max Value = maxPhaseGroups
Max Value = maxRings
Max Value = maxRings

Max Value = maxRings
Max Value = maxChannelStatusGroups
Max Value = maxChannelStatusGroups
Max Value = maxChannelStatusGroups
Max Value = maxOverlapStatusGroups
Max Value = maxOverlapStatusGroups
Max Value = maxOverlapStatusGroups

Max Value = maxOverlapStatusGroups
Note: whether this object or overlapStatusGroupGreens is used is dependent on where the FYA is wired.
Max Value = maxOverlapStatusGroups
Note: whether this object or overlapStatusGroupGreens is used is dependent on where the FRA is wired.
Max Value = maxPreemptGroups
Max Value = maxPreempts

Max Value = maxPreemptGates
Max Value = maxSpecialFunctionOutputs

Max Value = maxSpecialFunctionOutputs
Max Value = maxPort1Addresses
Max Value = maxPort1Addresses
Max Value = maxSIUPort1Addresses


Bit = 2
Bit = 3
Bit = 4
Bit = 5
Bit = 6
Bit = 1

Bit = 2
Max Value = maxPhaseGroups

Max Value = maxPhaseGroups

Max Value = maxPhaseGroups

Max Value = maxPhaseGroups

Max Value = maxPhaseGroups

Max Value = maxPhaseGroups

Max Value = maxPreempts

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxRingControlGroups

Max Value = maxSpecialFunctionOutputs

Max Value = maxPort1Addresses

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors
Bit = 2

Max Value = maxVehicleDetectors
Bit = 3

Max Value = maxVehicleDetectors
Bit = 4

Max Value = maxVehicleDetectors
Bit = 5

Max Value = maxVehicleDetectors
Bit = 6
Max Value = maxVehicleDetectors
Bit = 7
Max Value = maxVehicleDetectors
Max Value = maxPhases
Max Value = maxVehicleDetectors
Max Value = maxPhases
Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors

Max Value = maxPedestrianDetectors
Max Value = maxPhases
Max Value = maxPedestrianDetectors
Max Value = maxPedestrianDetectors

Max Value = maxPedestrianDetectors
Max Value = maxPedestrianDetectors
Bit = 2
Max Value = maxPedestrianDetectors
Bit = 1
Max Value = maxPedestrianDetectors
Bit = 0

Note: definition slightly changed.

Max Value = maxVehicleDetectorStatusGroups
Max Value = maxPedestrianDetectorGroups
Max Value = maxVehicleDetectorStatusGroups
Max Value = maxVehicleDetectors
Bit = 0
Max Value = maxVehicleDetectors
Bit = 1
Max Value = maxVehicleDetectors
Bit = 2

Max Value = maxVehicleDetectors
Bit = 3
Max Value = maxVehicleDetectors
Bit = 4
Max Value = maxVehicleDetectors
Bit = 1
Max Value = maxVehicleDetectors
Bit = 2
Max Value = maxVehicleDetectors
Bit = 3
Max Value = maxVehicleDetectors
Bit = 4

Max Value = maxPedestrianDetectorGroups
Max Value = maxPedestrianDetectors
Bit = 0
Max Value = maxPedestrianDetectors
Bit = 1
Max Value = maxPedestrianDetectors
Bit = 2
Max Value = maxPedestrianDetectors
Bit = 3
Max Value = maxPedestrianDetectors
Bit = 4

Max Value = maxVehicleDetectors

Max Value = maxPedestrianDetectors

Max Value = maxVehicleDetectorControlGroups

Max Value = maxPedestrianDetectorGroups

Max Value = maxVehicleDetectors

Max Value = maxVehicleDetectors
Max Value = maxVehicleDetectors

Max Value = maxPedestrianDetectors

Max Value = maxPedestrianDetectors

Max Value = maxPedestrianDetectors

Max Value = maxVehicleDetectors
Bit = 0
Max Value = maxVehicleDetectors
Bit = 1
Max Value = maxVehicleDetectors
Bit = 0
Max Value = maxVehicleDetectors
Bit = 2

Max Value = maxVehicleDetectors
Max Value = maxVehicleDetectors
Bit = 1
Max Value = maxVehicleDetectors
Max Value = maxVehicleDetectors
Max Value = maxVehicleDetectors

Max Value = maxCommPorts
Max Value = maxRsuPorts
Max Value = logicalNameTranslationTableMaxEntries

Max Value = maxRsuPorts

Max Value = maxRsuPorts

Max Value = maxRsuPorts

Bit = 0

Row = 1

Row = 1

Row = 1

Row = 1

Row = 1

Row = 1
Value = 36111
Row = 2

Row = 2

Row = 2

Max Value = maxMovementManeuvers2

Max Value = maxMovementManeuvers2

Max Value = maxMovementManeuvers2

Max Value = maxMovementManeuvers2

Max Value = maxMovementManeuvers2

Bit = 1

Max Value = maxAdvisorySpeeds2

Max Value = maxAdvisorySpeeds2

Max Value = maxAdvisorySpeeds2

Max Value = maxAdvisorySpeeds2

Max Value = maxSignalGroups
Row = 1

Max Value = maxSignalGroups
Row = 2

Max Value = maxEnabledLanesConcurrency

Max Value = maxTimebaseAscActions

Max Value = maxRsuPorts

Max Value = maxRsuPorts

Bit = 0

Bit = 0

Bit = 1

Bit = 2

Bit = 3

Bit = 4

Bit = 5

Bit = 6

Bit = 7

Bit = 8

Bit = 12

Bit = 13

Bit = 1

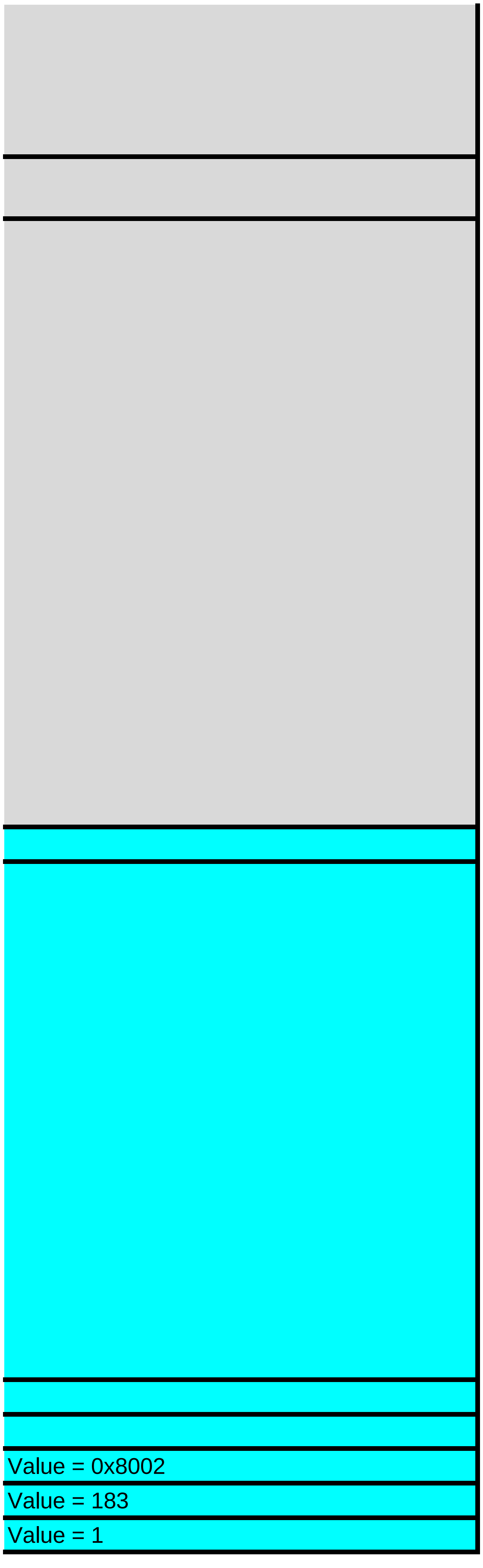
Bit = 1

Bit = 2

Bit = 2

Max Value = maxSignalGroups
Max Value = maxSignalGroups
Value = 2..6
Max Value = maxSignalGroups
Value = 2..5
Value = 2..3
Max Value = maxSignalGroups
Value = 2..7

Max Value = maxSignalGroups
New objects in 1202v03B
New objects in 1202v03B
Max Value = AgencySignalStates
Value = 2..8
Value = 2..3
Value = 2..11


Value = 0x8002
Value = 183
Value = 1

Value = 4

Row = 1

Row = 1

Row = 1

Row = 1

Row = 1

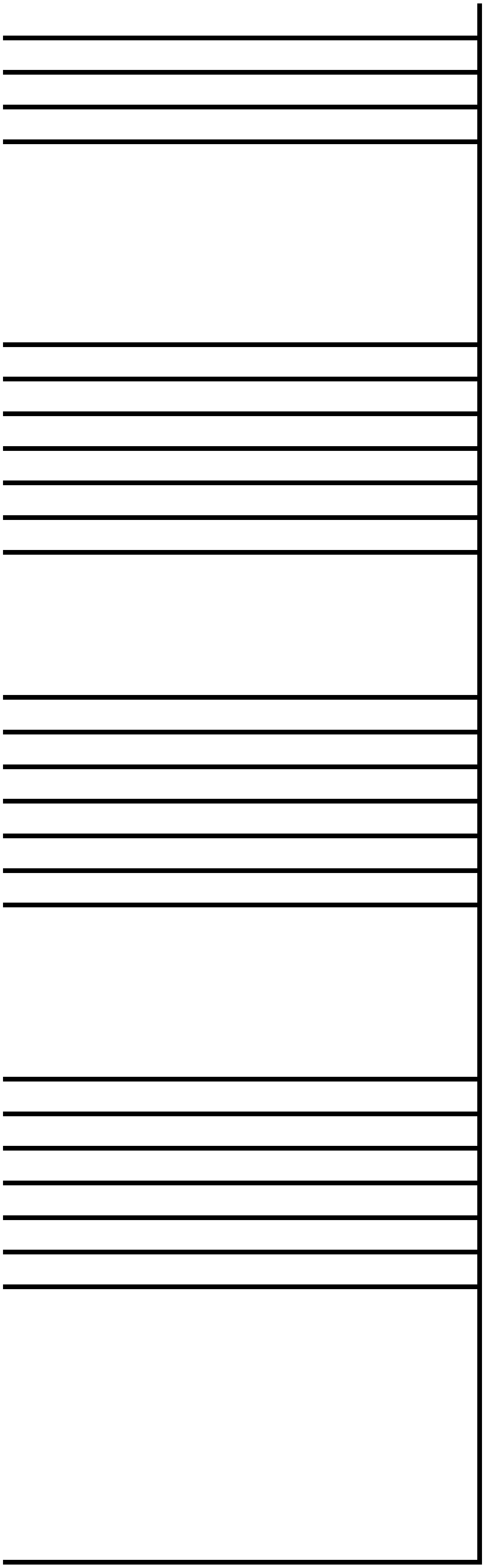
Row = 2

Row = 2

Row = 2

Row = 2

Bit = 1



Max Value = maxCvDetectionGroups
Max Value = activeCvDetectors
Max Value = maxRsuPorts

Max Value = maxRings
Max Value = maxPhases

Max Value = maxRings
Max Value = maxPhases
Max Value = maxRings
Max Value = maxPhases
Max Value = maxRings

Max Value = maxRings
Max Value = maxPhases
See Requirement 3.6.1 in the PRL
See Requirement 3.6.3.1 in the PRL
See Requirement 3.6.3.2 in the PRL