NTCIP 1201:1996

National Transportation Communications for ITS Protocol (NTCIP) Global Object Definitions

Joint Standard of AASHTO, ITE, and NEMA

formerly numbered **NEMA TS 3.4-1996**

NTCIP Standards Publication

A Joint Publication of
American Association of State Highway and Transportation Officials (AASHTO)
Institute of Transportation Engineers (ITE)
National Electrical Manufacturers Association (NEMA)

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NEMA Standards Publication TS 3.4-1996

NATIONAL TRANSPORTATION COMMUNICATIONS FOR ITS PROTOCOL (NTCIP) GLOBAL OBJECT DEFINITIONS

Version 96.01.7 April 7, 1997

Published by

National Electrical Manufacturers Association
1300 N. 17th Street
Rosslyn, Virginia 22209

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Foreword

The purpose of this publication is to identify and define the common object definitions that may be supported by devices that are NTCIP compliant.

User inputs are solicited by canvass on each NEMA standards proposal for Transportation Management and Associated Control Equipment. This procedure provides guidance before industry action. Every comment recieved is acknowledged and the action taken reported to the submitter. Comments should be submitted to:

Vice President, Engineering Department
National Electrical Manufacturers Association
1300 N. 17th Street
Rosslyn, Virginia 22209

This standards publication was developed by the Transportation Management Systems and Associated Control Devices section of the National Electrical Manufacturers Association. Section approval of the standard does not necessarily imply that all section members voted for its approval or participated in its development. At the time it was approved, the Transportation Management Systems and Associated Control Devices section had the following members.

ADDCO Manufacturing Co.—St. Paul, MN
American Electronic Sign—Spokane, WA
Automatic Signal/Eagle Signal Corporation—Austin, TX
BI Tran Systems, Inc.—Sacramento, CA
Cylink Corporation—Sunnyvale, CA
Eberle Design, Inc.—Phoenix, AZ
Econolite Control Products, Inc.—Anaheim, CA
Fiberoptic Display Systems, Inc.—Smithfield, RI
Gardner-Rowe Systems, Inc.—Walnut Creek, CA
Information Station Specialists, Inc.—Zeeland, MI
Intersection Development Corp.—Fullerton, CA
ITS Product Group—Ormond Beach, FL
McCain Traffic Supply, Inc.—Vista, CA
P B Farradyne Inc.—Rockville, MD
Peek Traffic - Transyt Corp.—Tallahassee, FL
Rockwell Automation—Mayfield Heights, OH
Safetran Traffic Systems, Inc.—Colorado Springs, CO
Skyline Products, Inc.—Colorado Springs, CO
3M Intelligent Transportation Systems—St. Paul, MN
Traffic Sensor Corp.—Corona, CA
Viggen Corp.—McLean, VA
Vultron, Inc.—Rochester Hills, MI

The Joint AASHTO/ITE/NEMA Committee on the NTCIP has recommended this standards publication for adoption to both the American Association of State Highway and Transportation Officials (AASHTO) and the Institute of Transportation Engineers (ITE). After adoption is approved by AASHTO and ITE, future printings of this publication will have a Joint AASHTO/ITE/NEMA Standard cover, and will appear different from this publication. Unless noted, the content of the publications will be the same.

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Section 1
GENERAL

1.1 SCOPE

The messaging between Transportation Management and field devices is accomplished by using the NTCIP Application Layer services to convey requests to access or modify values stored in a given device; these values are referred to as objects. The purpose of this publication is to identify and define these objects definitions that may be supported by multiple device types (e.g. actuated signal controllers and variable message signs). The grouping of objects for a given device type is performed in the device-type-specific object definition standard.

1.2 REFERENCES

For approved errata sheets, contact:

NTCIP Coordinator
National Electrical Manufacturers Association
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209-3801
email: ntcip@nema.org

Information on proposed errata, which are under discussion by the relevant NTCIP Working Group, is available on the World Wide Web at http://www.ntcip.org.

The following standards (normative references) contain provisions which, through reference in this text, constitute provisions of this Standard. Other documents and standards (other references) are referenced in these documents, which might provide a complete understanding of the entire protocol and the relations between all parts of the protocol. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standard listed below.

1.2.1 Normative References

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

ISO/IEC 8824-1:1995 *Information Technology—Abstract Syntax Notation One (ASN.1): Specification of Basic Notation*

ISO/IEC 8824-2:1995 *Information Technology—Abstract Syntax Notation One (ASN.1): Information Object Specification*

DDN Network Information Center
14200 Park Meadow Drive
Suite 200
Chantilly, VA 22021

Electronic copies of RFC documents may be obtained using "anonymous FTP" to the host <nic.ddn.mil> or <ds.internic.net>. Printed copies are available from: (800) 365-3642 or (703) 802-4535.

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RFC1155 *Structure and Identification of Management Information for TCP/IP-based Internets.* K. McCloghrie; M. Rose; 05/10/1990

RFC1212 *Concise MIB Definitions.* K. McCloghrie; M. Rose; 03/26/1991

1.2.2 Other References

National Electrical Manufacturers Association
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209

TS 2-1992 *Traffic Controller Assemblies*

TS 3.1-1996 *National Transportation Communications for ITS Protocol - Overview*

TS 3.2-1996 *National Transportation Communications for ITS Protocol - Simple Transportation Management Framework*

TS 3.3-1996 *National Transportation Communications for ITS Protocol - Class B Profile*

ANSI
11 West 42nd Street, 13th Floor
New York, New York 10036
(212) 642-4900

ISO/IEC 8824-3:1995 *Information Technology—Abstract Syntax Notation One (ASN.1): Constraint Specification*

ISO/IEC 8824-4:1995 *Information Technology—Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 Specifications*

ISO/IEC 8825-1:1995 *Information Technology—ASN.1 Encoding Rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*

DDN Network Information Center
14200 Park Meadow Drive
Suite 200
Chantilly, VA 22021

RFC1213 *Management Information Base for Network Management of TCP/IP-based Internets:* MIB-II. K. McCloghrie; M. Rose; CP/IP-base

RFC1157 *A Simple Network Management Protocol (SNMP).* M. Schoffstall; M. Feder; J. Davin; J. Case; 05/10/1990

1.3 TERMS

Conformance level: Each of the defined Profiles have one or more layers specifying the protocols that must be implemented in a device to correspond to a particular level of NTCIP support.

Profile: Refers to a set of protocols, each of which operates independently on one of the seven (7) OSI Layers, if this layer is utilized. Different protocols are utilized at the same layer within different profiles.

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1.4 ABBREVIATIONS

The abbreviations used in this Standard Publication are defined as follows:

CRC—Cyclic Redundancy Check; polynominal algorithm performed on a specified range of data resulting in a 16 or 32 bit value.

MIB—Management Information Base; a collection of objects defined using Abstract Syntax Notation One (ASN.1) that can be accessed via a network management protocol.

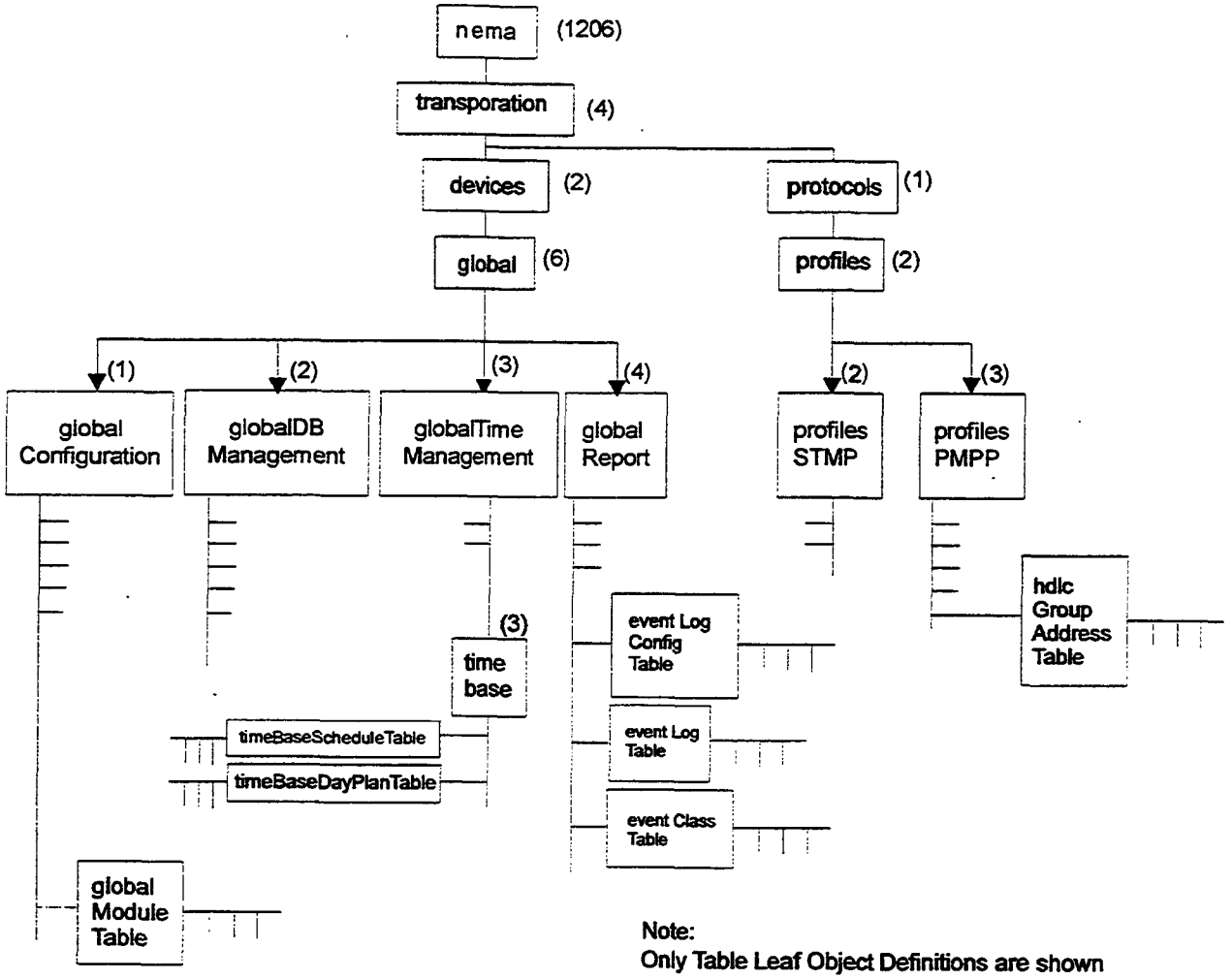
NVT-ASCII—Network Virtual Terminal - American Standard Code for Information Interchange as defined in RFC 854

PMPP—Point-to-MultiPoint Protocol, a new protocol under development that will enable the standardized, simultaneous communications between multiple devices on the same communications line/channel.

STMP—Simple Transportation Management Protocol, part of the newly developed NEMA standard called Simple Transportation Management Framework (STMF) that used the well known Simple Network Management Protocol (SNMP) besides the STMP.

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1.5 OBJECT TREE



Note:
Only Table Leaf Object Definitions are shown

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Section 2
OBJECT DEFINITIONS

This section defines those objects which are expected to be used by different device types such as actuated traffic signal controllers, variable message signs, ramp meter controllers. The objects are defined in OJBECT-TYPE macro defined in RFC 1212, layed out in ASN.1 format as defined in ISO/IEC 8824-1, ISO/IEC 8824-2, ISO/IEC 8824-3, and ISO/IEC 8824-4. The OBJECT-TYPE macro used in this document is defined in RFC 1212. The text provided from Clause 2.1 through the end of the section (except the clause headings) constitutes the NEMA Standard Global MIB.

The clauses below present the objects in lexigraphical order of their OBJECT IDENTIFIERS which correspond to their physical location within the global naming tree. All of the objects defined in this document reside under the "global" node of the global naming tree. To aid in object management, the "global" node has been subdivided into logical categories, each defined by a node under the "global" node. The individual objects are then located under the appropriate node.

Nodes should not be confused with conformance groups, which are defined in Section 3. A conformance group is a logical grouping of objects which is used for conformance statements. While conformance groups will frequently correspond to the nodal structure, a conformance group may contain objects which are not lexigraphically ordered. For example, a schedule conformance group may contain both "global" and "asc" specific objects.

Text preceded by a double hyphen in the MIB definitions represent normative text for this standard.

2.1 NTCIP OBJECTS

```
--NTCIP OBJECTS
GLOBAL DEFINITIONS ::= BEGIN

--For the purpose of this section, the following OBJECT IDENTIFIERS are used:
IMPORTS
    OBJECT-TYPE
    FROM RFC-1212
    transportation
    FROM NEMA_SMI
    devices, protocols, profiles
    FROM TMIB
    Opaque, Counter
    FROM RFC1155-SMI;

    global OBJECT IDENTIFIER ::= { devices 6 }
```

2.2 GLOBAL CONFIGURATION NODE

```
globalConfiguration OBJECT IDENTIFIER
::= { global 1 }

--This node is an identifier used to group all objects for support of configuration functions
-- that are common to most device types.
```

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2.2.1 Global Set ID Parameter

```
globalSetIDParameter OBJECT-TYPE
    SYNTAX    INTEGER
    ACCESS    read-only
    STATUS    optional
    DESCRIPTION "Specifies a relatively unique ID for all user-changable parameters of the particular
    device-type currently implemented in the device.  Often this ID is calculated using a CRC algorithm."
    ::= { globalConfiguration 1}
```

2.2.2 Maximum Modules Parameter

```
globalMaxModules  OBJECT-TYPE
    SYNTAX    INTEGER (0..255)
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "The number of rows that are listed in the Global Module Table."
    ::= { globalConfiguration 2 }
```

2.2.3 Module Table

```
globalModuleTable  OBJECT-TYPE
    SYNTAX    SEQUENCE OF ModuleTableEntry
    ACCESS    not-accessible
    STATUS    mandatory
    DESCRIPTION
    " A table containing information regarding manufacturer of software and hardware and the associated
    module models and version numbers as well as an indicator if the module is hardware or software
    related. The number of rows in this table shall equal the value of the globalMaxModule object."
    ::= { globalConfiguration 3 }

moduleTableEntry OBJECT-TYPE
    SYNTAX    ModuleTableEntry
    ACCESS    not-accessible
    STATUS    mandatory
    DESCRIPTION
    "This object defines an entry in the module table."
    INDEX { moduleNumber }
    ::= { globalModuleTable 1 }

ModuleTableEntry ::= SEQUENCE {
    moduleNumber            INTEGER,
    moduleDeviceNode        OBJECT IDENTIFIER,
    moduleMake              OCTET STRING,
    moduleModel             OCTET STRING,
    moduleVersion           OCTET STRING,
    moduleType              INTEGER }
```

2.2.3.1 Module Number Parameter

```
moduleNumber OBJECT-TYPE
    SYNTAX    INTEGER (1..255)
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "This object contains the row number (1..255) within this table for the associated module."
    ::= { moduleTableEntry 1 }
```

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2.2.3.2 Module Device Node Parameter

```
moduleDeviceNode  OBJECT-TYPE
    SYNTAX    OBJECT IDENTIFIER
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "This object contains the device node number of the device-type."
    ::= { moduleTableEntry 2 }
```

2.2.3.3 Module Make Parameter

```
moduleMake  OBJECT-TYPE
    SYNTAX    OCTET STRING
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "This object specifies the manufacturer of the associated module. A null-string shall be transmitted if
    this object has no entry."
    ::= { moduleTableEntry 3 }
```

2.2.3.4 Module Model Parameter

```
moduleModel  OBJECT-TYPE
    SYNTAX    OCTET STRING
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "This object specifies the model number (hardware) or firmware reference (software) of the
    associated module. A null-string shall be transmitted if this object has no entry."
    ::= { moduleTableEntry 4 }
```

2.2.3.5 Module Version Parameter

```
moduleVersion OBJECT-TYPE
    SYNTAX    OCTET STRING
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "This object specifies the version of the associated module. A null-string shall be transmitted if this
    object has no entry."
    ::= { moduleTableEntry 5 }
```

2.2.3.6 Module Type Parameter

```
moduleType  OBJECT-TYPE
    SYNTAX    INTEGER {
          other (1),
          hardware (2),
          software (3) }
    ACCESS    read-only
    STATUS    mandatory
    DESCRIPTION
    "This object specifies if the associated module is a hardware or software module."
    ::= { moduleTableEntry 6 }
```

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2.3 GLOBAL DATABASE MANAGEMENT NODE

globalDBManagement OBJECT IDENTIFIER
::= { global 2 }

-- This node is an identifier used to group all objects for support of database
-- functions that are common to most device types.

2.3.1 Database Creation Transaction

dbCreateTransaction OBJECT-TYPE
SYNTAX INTEGER { normal (1),
transaction (2),
verifying (3),
updating (4),
error (5),
done (6),
startCmd (7),
commitCmd (8),
abortCmd (9),
completeCmd (10) }
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object provides transaction control for device configuration. This object will modify the behavior of the agent by causing all SET commands to be buffered and the editing and validation of the SET operations to be postponed until a commit command is issued. SETNoReply commands shall be ignored. The Get and GetNext commands shall be acted upon as within normal SNMP operations. The values this object can support are of two types, state values and command values. State values can only be read, they can not be written to the object. Command values can be written, and will cause a state change if accepted, but can not be read back via this object.

The states and commands are defined as:

NORMAL: This is a state value. When in this state all SET operations behave as normal STMP/SNMP set's. All editing and validation operations are performed when the SET is received, and the response to the set indicates either a normal completion or an error completion. This is the default state of this object. The only valid value that may be written to this object while in this state is a startCmd. Any other values written to this object shall have an error response of 'genError' returned.

TRANSACTION: This is a state value. When in this state all SET operations that have the correct dbTransactionID as the first object in the set will be buffered by the agent device for later editing and verification. A transaction may consist of one or more set operations. This state is entered when a SET operation containing a startCmd and a dbTransactionID is received. The dbTransactionID shall be used in all subsequent SET commands as the first object in the SET. This is necessary to ensure that only transactions from the management station controlling this transaction are buffered.

These SET operations shall have a 'noError' response if they have the correct dbTransactionID in them and the agent has room left in the buffer to hold the operations. If an incorrect dbTransactionID value is detected, or no SET to dbTransactionID is contained in the SET operation, or there is no space left to store more operations then an error response of 'genError' shall be returned by the agent.

The only valid values that may be written to this object while in this state are abortCmd or commitCmd An abortCmd (with a valid dbTransactionID) will cause the Normal state to be entered and all buffered objects are flushed and not implemented.

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A commitCmd (with a valid dbTransactionID) will cause the Verifying state to be entered.

Any other values written to this object shall have an error response of 'genError' returned.

VERIFYING: This is a state value. When in this state all SET operations that have been buffered are checked for edit and verification errors. If any objects cause an error to occur then the agent shall change the state to error. If no errors are detected (all SET operations verify without error) then the agent shall set the state to updating. Since this process may take some time (depending on the number of buffered objects). The management station may poll this object to determine when it transitions from verifying state to done or error states.

When in this state only SET commands with the value of abortCmd (with valid dbTransactionID) are allowed. When an abortCmd is written the agent shall clear the transaction buffer and set the state to Normal. None of the buffered SET operations shall occur.

Any other values written to this object shall have an error response of 'genError' returned while in this state.

UPDATING: This is a state value. This state indicates that the buffered SET operations are being implemented. Upon successful completion of the update state, the agent shall change the state to DONE.

If any error occurs, the agent shall change the state to ERROR. The implementation of the SET command is undetermined if an error occurs.

If an agent has started updating the buffered objects, then all commands shall have a genError response return.

ERROR: This is a state value. This state indicates that the buffered SET operations were NOT performed due to an error in one or more of the objects. The dbErrorType and dbErrorID indicate the error code and object ID of the first object that caused an error. When in this state only SET commands with values of abortCmd or startCmd are allowed.

When an abortCmd (with valid dbTransactionID's) is written the agent shall clear the transaction buffer and set the state to Normal.

When a startCmd (with valid dbTransactionID's) is written the agent shall clear the transaction buffer and set the state to Transaction (uses the same dbTransactionID value). Any other values written to this object shall have an error response of 'genError' returned.

DONE: This is a state value. This state indicates that the buffered SET operations completed successfully. The dbErrorType will be set to noError and the dbErrorID shall be undefined. When in this state only SET commands with values of completeCmd or startCmd (with valid dbTransactionID's) are allowed.

When a completeCmd is written the agent shall clear the transaction buffer and set the state to Normal. When a startCmd is written the agents shall not implement the object values contained in the transaction buffer, but clear the transaction buffer and set the state to Transaction.

Any other values written to this object shall have an error response of 'genError' returned.

STARTCMD: This is a command value. This command is used in the Normal, Error and Done states to cause a transition to the Transaction state. A write of this command value while in any state other than Normal, Error or Done shall have an error response of 'genError' returned by the agent. When writing the startCmd value to this object the SET operation shall also write a new value to the 'dbTransactionID'

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object. This value is used to verify that subsequent SET operations are from the management station that is performing this transaction.

COMMITCMD: This is a command value. This command is used only in the Transaction state to cause a transition to the Verifying state. A write of this value in any other state than Transaction shall have an error response of 'genError' returned by the agent. When writing the commitCmd value to this object the SET operation shall also write the current value of the dbTransactionID object to the 'dbTransactionID' object. This is done to verify that the SET is from the management station performing the transaction.

ABORTCMD: This is a command value. The command may be used in the Transaction, Verifying, and Error states to cause a transition to the normal state. A write of this value in any other state shall have an error response of 'genError' returned by the agent. When writing the abortCmd value to this object the SET operation shall also write the current value of dbTransactionID to the dbTransactionID object to verify that the SET operation is from the management station performing the transaction.

COMPLETECMD: This is a command value. The command may be used in the Done state only to cause a transition to the normal state. A write of this value in any other state shall have an error response of 'genError' returned by the agent.

When writing the completeCmd value to this object the SET operation shall also write the current value of dbTransactionID object to verify that the SET operation is from the management station performing the transaction."

::= { globalDBManagement 1 }

2.3.2 Database Error Type Parameter

```
dbErrorType OBJECT-TYPE
SYNTAX      INTEGER { tooBig (1),
                      noSuchName (2),
                      badValue (3),
                      readOnly (4),
                      genError (5),
                      updateError (6),
                      noError (7)}
ACCESS      read-only
STATUS      mandatory
DESCRIPTION
"This object returns the current error status of the transaction. The value of this
object is only valid when the dbCreateTransaction object is in the Done or Error state."
::= { globalDBManagement 2 }
```

2.3.3 Database Error ID Parameter

```
dbErrorID  OBJECT-TYPE
SYNTAX      OBJECT IDENTIFIER
ACCESS      read-only
STATUS      mandatory
DESCRIPTION
"This object contains the object identifier of the first object in the transaction buffer that caused an error
while dbCreateTransaction object was in the Verifying or Updating state. The value of this object is only
valid when the dbCreateTransaction object is in the Error state. It is undefined when the
dbCreateTransaction object is in other states."
::= { globalDBManagement 3 }
```

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2.3.4 Database Transaction ID Parameter

dbTransactionID OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object contains the transaction ID value that is to be contained in all SET operation writes while the dbCreateTransaction object is not in the Normal state. During transaction operations every SET command shall begin with a write to this object with the current value of this object. If a SET operation is performed without writing to this object, or with a value that does not match the current value, then an error response of 'genError' shall be returned. This mechanism is used to determine that the same management station that started the transaction is performing the SET operations that are being buffered or modifying the state of dbCreateTransaction."
::= { globalDBManagement 4 }

2.3.5 Database Make ID Parameter

dbMakeID OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-only
STATUS optional
DESCRIPTION
"This object is used to create unique transaction ID's for management stations to use when starting transactions using the dbCreateTransaction object. This object will be incremented by one every time it is read, so that different values will be returned for each read. Management stations wishing to start a transaction should first read the dbCreateTransaction object to verify that it is in the Normal state. If so then the management shall GET dbMakeID to obtain a transaction ID to use, then SET dbCreateTransaction to startCmd and dbTransactionID to the value just received. If the response to the SET operation is 'noError' then the management station has started a transaction. If the response to the SET operation is 'genError' then the management station should read the dbCreateTransaction and dbTransactionID objects to ensure that the error was not due to a communications retry. If the dbCreateTransaction is in the Transaction state, and the dbTransactionID is the same value returned by the read of this object, then the management station is the owner of the transaction. If the dbTransactionID does not match the value originally returned by this object, then the management station is not the owner of the transaction and must wait until the dbCreateTransaction object returns to the Normal state before attempting to start the transaction."
::= { globalDBManagement 5 }

2.4 GLOBAL TIME MANAGEMENT NODE

globalTimeManagement OBJECT IDENTIFIER
::= { global 3 }

-- This node is an identifier used to organize all objects for support of time-related
-- functions that are common to most device types.

2.4.1 Global Time Parameter

globalTime OBJECT-TYPE
SYNTAX Counter
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The current time in seconds since the epoch of 00:00:00 (midnight) January 1, 1970."
::= { globalTimeManagement 1 }

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2.4.2 Global Daylight Savings Parameter

```
globalDaylightSaving  OBJECT-TYPE
SYNTAX  INTEGER {       other (1),
                        disableDST (2),
                        enableUSDST (3) }
ACCESS      read-write
STATUS      mandatory
DESCRIPTION "This object specifies if the Daylight Savings Time (DST) is enabled, disabled or some
other form of daylight savings time is active.
            disableDST - DST clock adjustments shall NOT occur.
            enableUSDST -  DST clock adjustments shall occur. In accordance with USA practice, DST
                shall begin the first Sunday in April and shall end the last Sunday on October.  All
                changes of time occur at 2:00AM."
REFERENCE
        "NEMA TS 2  Clause 3.8.2"
::= { globalTimeManagement 2 }
```

2.4.3 TimeBase Event Scheduler Node

```
timebase OBJECT IDENTIFIER
::= { globalTimeManagement 3 }

-- This node is an identifier used to organize the main objects for event scheduling.
-- Device type-specific objects (tables) pointed to are defined within the appropriate MIB.
```

2.4.3.1 Maximum Number of Time Base Schedule Entries Parameter

```
maxTimeBaseScheduleEntries  OBJECT-TYPE
SYNTAX      INTEGER (0..65535)
ACCESS      read-only
STATUS      mandatory
DESCRIPTION
"The value of this object specifies the maximum number of different entries supported by the device as
shown by the number of rows in the timeBaseScheduleTable."
::= { timebase 1 }
```

2.4.3.2 Time Base Schedule Table

```
timeBaseScheduleTable  OBJECT-TYPE
SYNTAX      SEQUENCE OF TimeBaseScheduleEntry
ACCESS      not-accessible
STATUS      mandatory
DESCRIPTION
"A table containing the time base schedule parameters for the device.  The number of rows in this table
might be equal but is not allowed to exceed the value of the maxTimeBaseScheduleEntries object.  The
table references the appropriate day plan for the device.  The plan is determined by comparing the current
month (MONTH), day of week (DOW) and date of month (DOM) to the appropriate fields. The settings for
MONTH, DOW and DOM are connected with a logical AND.  In order to determine which timebased event
to select, determine the event which has the most specific date specified.  Select the more specific event
based on their MONTH settings; if the same, select the most specific DOW; if that is still the same, select
the most specific DOM;  if that's still the same, it is not determined how the field device is going react.
More specific means the least number of bits set within an object."
::= { timebase 2 }

timeBaseScheduleEntry  OBJECT-TYPE
SYNTAX      TimeBaseScheduleEntry
ACCESS      not-accessible
```

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STATUS mandatory .
DESCRIPTION
"Event Parameters for the time based schedule programming of the device."
INDEX { timeBaseScheduleNumber }
::= { timeBaseScheduleTable 1 }

TimeBaseScheduleEntry ::= SEQUENCE {
timeBaseScheduleNumber INTEGER,
timeBaseScheduleMonth INTEGER,
timeBaseScheduleDay INTEGER,
timeBaseScheduleDate INTEGER,
timeBaseScheduleDayPlan INTEGER }

2.4.3.2.1 Time Base Schedule Number Parameter

timeBaseScheduleNumber OBJECT-TYPE
SYNTAX INTEGER (1..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The time base schedule number for objects in this row. The value of this object shall not exceed the value of the maxTimeBaseScheduleEntries object. The activation of a scheduled entry shall occur whenever allowed by all other objects within this table."
::= { timeBaseScheduleEntry 1 }

2.4.3.2.2 Time Base Schedule Month Of Year Parameter

timeBaseScheduleMonth OBJECT-TYPE
SYNTAX INTEGER (0..65535)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The Month(s) Of the Year that the schedule entry shall be allowed. Each bit represents a specific month. If the bit is set to one (1), then the scheduled entry shall be allowed during the associated month. If the bit is zero (0), then the scheduled entry shall not be allowed during the associated month. The bits are defined as:

Bit	Month of Year
0	Reserved
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
10	October
11	November
12	December
13 - 15	Reserved"

::= { timeBaseScheduleEntry 2 }

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2.4.3.2.3 Time Base Schedule Day Of Week Parameter

timeBaseScheduleDay OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The Day(s) Of Week that the schedule entry shall be allowed. Each bit represents a specific day of the week. If the bit is set to one (1), then the scheduled entry shall be allowed during the associated DOW. If the bit is set to zero (0), then the scheduled entry shall not be allowed during the associated DOW. The bits are defined as:

Bit	Day of Week
0	Reserved
1	Sunday
2	Monday
3	Tuesday
4	Wednesday
5	Thursday
6	Friday
7	Saturday"

::= { timeBaseScheduleEntry 3 }

2.4.3.2.4 Time Base Schedule Date Parameter

timeBaseScheduleDate OBJECT-TYPE
SYNTAX INTEGER (0..4294967295)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The Day(s) Of a month that the schedule entry shall be allowed. Each bit represents a specific date of the month. If the bit is set to one (1), then the scheduled entry shall be allowed during the associated date. If the bit is set to zero (0), then the scheduled entry shall not be allowed during the associated date. The bits are defined as:

Bit	Day Number
0	Reserved
1	Day 1
2	Day 2
‖	
31	Day 31"

::= { timeBaseScheduleEntry 4 }

2.4.3.2.5 Time Base Schedule Day Plan Parameter

timeBaseScheduleDayPlan OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object specifies what Plan number shall be associated with this timeBaseScheduleDayPlan-object."
::= { timeBaseScheduleEntry 5 }

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2.4.4 Day Plan Parameters

2.4.4.1 Maximum Number of Day Plans- Parameter

maxDayPlans OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object specifies the maximum, fixed number of different timebased Day Plans supported by the device. The value of this object represents the number of day plans (primary key into the table) available in the timeBaseDayPlanTable."
::= { timebase 3 }

2.4.4.2 Maximum Number of Day Plan Events - Parameter

maxDayPlanEvents OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object specifies the maximum, fixed number of different timebased Day Plan Events within each Day Plan supported by the device. The value of this object represents the number of rows (secondary key into the table) available within each of the day plans that are available in the timeBaseDayPlanTable."
::= { timebase 4 }

2.4.4.3 Day Plan Table

timeBaseDayPlanTable OBJECT-TYPE
SYNTAX SEQUENCE OF TimeBaseDayPlanEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A table containing day plan numbers, the times when to implement them and the associated actions. The number of rows in this table shall not exceed the value of the maxDayPlans object. This table is always used in association with device-type specific objects specifying device-type specific actions such as activating a message on a VMS sign or initiating a pattern for a signal controller. The device-type specific action will only be initiated when the specific DayPlan has been activated and at the indicated time."
::= { timebase 5 }

timeBaseDayPlanEntry OBJECT-TYPE
SYNTAX TimeBaseDayPlanEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A table containing the timebased day plan parameters of a device."
INDEX { dayPlanNumber, dayPlanEventNumber }
::= { timeBaseDayPlanTable 1 }

```
TimeBaseDayPlanEntry ::= SEQUENCE {
        dayPlanNumber           INTEGER,
        dayPlanEventNumber      INTEGER,
        dayPlanHour             INTEGER,
        dayPlanMinute           INTEGER,
        dayPlanActionNumberOID  OBJECT IDENTIFIER}
```

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2.4.4.3.1 Day Plan Number

dayPlanNumber OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"This object specifies the day plan number for objects in this row. The value shall not exceed the value of the maxDayPlans object. Day plan numbers are used in the TimeBase Event Table to specify day plan numbers to be implemented on specific days of the year or as part of the week plans."
::= { timeBaseDayPlanEntry 1 }

2.4.4.3.2 Day Plan Event Number

dayPlanEventNumber OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"This object identifies day plan event number(s) to be scheduled on a specific day plan number. Several different events can be scheduled to take place during a day, and each of these events is one entry or row within a specified day plan number. The total number of events for one day plan shall not exceed the value of the maxDayPlanEvents-object."
::= { timeBaseDayPlanEntry 2 }

2.4.4.3.3 Day Plan Hour Parameter

dayPlanHour OBJECT-TYPE
SYNTAX INTEGER (0..23)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The Hour of day that the associated event shall become active. Valid values for this object are 0 - 23 as the time shall be transmitted in military time."
::= { timeBaseDayPlanEntry 3 }

2.4.4.3.4 Day Plan Minute Parameter

dayPlanMinute OBJECT-TYPE
SYNTAX INTEGER (0..59)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The Minute of the hour (defined in the dayPlanHour) object that the associated event shall become active. Valid values for this object are 0 - 59 since there are only 0 - 59 minutes in an hour."
::= { timeBaseDayPlanEntry 4 }

2.4.4.3.5 Day Plan Action Number OID Parameter

dayPlanActionNumberOID OBJECT-TYPE
SYNTAX OBJECT IDENTIFIER
ACCESS read-write
STATUS mandatory

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DESCRIPTION
"This object specifies the first index-column (if multi indexed tables are pointed to, all indices have to be specified within the OID) within a device-type specific action table that contains the actions (specified in the associated columns within the table) that shall be executed if the time indicated within the dayPlanTable and the timeBaseEventSchedule Table is the current time."
::= { timeBaseDayPlanEntry 5 }

2.4.4.4 Day Plan Status Parameter

dayPlanStatus OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"This object indicates the current value of the active day PlanNumber-object. A value of zero (0) indicates that there is no dayPlanNumber that is currently active."
::= {timebase 6 }

2.5 REPORT PARAMETER NODE

globalReport OBJECT IDENTIFIER
::= { global 4 }

-- This node is an identifier used to organize all objects for support of report functions
-- that are common to most device types.

2.5.1 Maximum Event Log Configurations Parameter

maxEventLogConfigs OBJECT-TYPE
SYNTAX INTEGER (0..65535)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of rows that exist in the static eventLogConfig table for this device."
::= { globalReport 1 }

2.5.2 Event Log Configuration Table

eventLogConfigTable OBJECT-TYPE
SYNTAX SEQUENCE OF EventLogConfigEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A table containing Event Log Configuration information. The number of rows in this table is equal to the maxEventLogConfigs object."
::= { globalReport 2 }

eventLogConfigEntry OBJECT-TYPE
SYNTAX EventLogConfigEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"This object defines an entry in the event log configuration table."
INDEX { eventConfigID }
::= { eventLogConfigTable 1 }

--`,,`,,`-`-`,,`,,`,`,,`---

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```
EventLogConfigEntry ::= SEQUENCE {
        eventConfigID                   INTEGER,
        eventConfigClass                INTEGER,
        eventConfigMode                 INTEGER,
        eventConfigCompareValue         INTEGER,
        eventConfigCompareValue2        INTEGER,
        eventConfigCompareOID           OBJECT IDENTIFIER,
        eventConfigLogOID               OBJECT IDENTIFIER,
        eventConfigAction               INTEGER }
```

2.5.2.1 Event Log Configuration ID Parameter

```
eventConfigID OBJECT-TYPE
SYNTAX        INTEGER (1..65535)
ACCESS        read-only
STATUS        mandatory
DESCRIPTION
"This object contains the row number which is used to identify the event associated with this row in the
eventLogConfigTable. The number of event IDs shall not exceed the value indicated in the
maxEventLogConfigs object. The value zero (0) is not allowed."
::= { eventLogConfigEntry 1 }
```

2.5.2.2 Event Log Configuration Class Parameter

```
eventConfigClass OBJECT-TYPE
SYNTAX        INTEGER (1..255)
ACCESS        read-write
STATUS        mandatory
DESCRIPTION
"This object contains the class value to assign to the event associated with this row in the event
configuration table. This value is used in the event log table to organize various events defined in this
table into logical groupings."
::= { eventLogConfigEntry 2 }
```

2.5.2.3 Event Log Configuration Mode Parameter

```
eventConfigMode OBJECT-TYPE
SYNTAX        INTEGER { other (1),
                        onChange (2),
                        greaterThanValue (3),
                        smallerThanValue (4),
                        hysteresisBound (5) }
ACCESS        read-write
STATUS        mandatory
DESCRIPTION
"This object specifies the mode of operation for this event. All checks and entries to the table must occur
within one second of the condition becoming true. The modes are defined as follows:
```

VALUE	DESCRIPTION
onChange	create a log entry when value referenced by the eventTypeOID changes
greaterThanValue	create a log entry when the object value becomes greater than the value referenced to by the eventCompareValue object, if this value is exceeded for the amount of time specified in the eventConfigCompareValue2 object (in tenth of seconds) and this value is greater than zero (0). A value of zero (0) for eventConfigCompareValue2 indicates immediate logging.

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smallerThanValue create a log entry when the object value becomes less than the value referenced to by the eventCompareValue object, if this value is exceeded for the amount of time specified in the eventConfigCompareValue2 object (in tenth of seconds) and this value is greater than zero (0). A value of zero (0) for eventConfigCompareValue2 indicates immediate logging.

hysteresisBound creates a log entry when the object value becomes either less than the lowerbound value or greater than the upperbound value. The lowerbound value is the lower value of the eventConfigCompareValue- and the eventConfigCompareValue2-objects, the upperbound is the other value."

::= { eventLogConfigEntry 3 }

2.5.2.4 Event Log Configuration Compare Value Parameter

eventConfigCompareValue OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object contains the comparision value to use with eventConfigMode values (greaterThanValue, smallerThanValue, hysteresisBound). No value within this object is necessary when the eventConfigMode-object has the "value onChange (2)."
::= { eventLogConfigEntry 4 }

2.5.2.5 Event Log Configuration Compare Value 2 Parameter

eventConfigCompareValue2 OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object specifies the second comparision value for the hysteresis mode of the eventConfigMode object; it specifies the time (in tenth of seconds) when used in association with the greaterThanValue mode or the smallerThanValue mode of the eventConfigMode object; it shall be ignored (no value is necessary) when used in association with the onChange mode of the eventConfigMode object."
::= { eventLogConfigEntry 5 }

2.5.2.6 Event Log Configuration Compare Object Identifier Parameter

eventConfigCompareOID OBJECT-TYPE
SYNTAX OBJECT IDENTIFIER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object contains the object identifier which points to the value that is to be used to compare it to the detected value for this event."
::= { eventLogConfigEntry 6 }

2.5.2.7 Event Log Configuration Object Identifier Parameter

eventConfigLogOID OBJECT-TYPE
SYNTAX OBJECT IDENTIFIER
ACCESS read-write
STATUS optional
DESCRIPTION
"This object contains the object identifier which indicates what value to log when a condition or event occurs (e.g., log the phase display when the watchdog alarm status changes)."
::= { eventLogConfigEntry 7 }

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2.5.2.8 Event Log Configuration Action Parameter

```
eventConfigAction  OBJECT-TYPE
SYNTAX          INTEGER { other (1),
                          disabled (2),
                          log (3) }
ACCESS          read-write
STATUS          optional
DESCRIPTION
"This value of this object indicates the action that will take place when the event described in this row of
the event configuration table occurs.
    disabled  - no entry will be recorded due to this event.
    log - an entry will be recorded in the event log table when this event occurs."
::= { eventLogConfigEntry 8 }
```

2.5.3 Maximum Event Log Size Parameter

```
maxEventLogSize   OBJECT-TYPE
SYNTAX          INTEGER (0..65535)
ACCESS          read-only
STATUS          mandatory
DESCRIPTION
"The maximum, fixed number of rows that can be utilized within the Event Log Table."
::= { globalReport 3 }
```

2.5.4 Event Log Table

```
eventLogTable  OBJECT-TYPE
SYNTAX          SEQUENCE OF EventLogEntry
ACCESS          not-accessible
STATUS          mandatory
DESCRIPTION
"A table containing Event History data collected."
::= { globalReport 4 }

eventLogEntry OBJECT-TYPE
SYNTAX          EventLogEntry
ACCESS          not-accessible
STATUS          mandatory
DESCRIPTION
"This object defines an entry in the event log table"
INDEX { eventLogClass, eventLogNumber }
::= { eventLogTable 1 }

EventLogEntry ::= SEQUENCE {
        eventLogClass       INTEGER,
        eventLogNumber      INTEGER,
        eventLogID          INTEGER,
        eventLogTime        INTEGER,
        eventLogValue       Opaque }
```

2.5.4.1 Event Log Class Parameter

```
eventLogClass OBJECT-TYPE
SYNTAX          INTEGER (0..255)
ACCESS          read-only
STATUS          mandatory
DESCRIPTION
```

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"This object contains the class of the associated event as defined in the eventLogConfig Table."
::= { eventLogEntry 1 }

2.5.4.2 Event Log Number Parameter

eventLogNumber OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The event number within this class for this event. Event numbers shall be assigned starting at 1 and shall increase to the value specified by the associated eventClassLimit for the class associated with the rows. Events shall maintain a chronological ordering in the table with the oldest event of a class occupying the row with eventNumber = 1, and subsequent events filling subsequent rows. This ordering shall be maintained when events are cleared."
::= { eventLogEntry 2 }

2.5.4.3 Event Log ID Parameter

eventLogID OBJECT-TYPE
SYNTAX INTEGER (0..65535)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object contains the event configuration ID (from the eventLogConfigTable) that caused this table entry. It indicates the row in the eventLogConfig table reponsible for this event entry. If this object is set to zero (0) then the associated row (in the eventLogTable) is cleared and the following rows shall be renumbered to maintain a sequential eventNumber sequence."
::= { eventLogEntry 3 }

2.5.4.4 Event Log Time Parameter

eventLogTime OBJECT-TYPE
SYNTAX Counter
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The time that the event occurred in seconds since the epoch of 00:00:00 (midnight) January 1, 1970 per the device's globalTime object. If the device does not have valid date and time information, then this shall be the time in seconds since the device powered up."
::= { eventLogEntry 4 }

2.5.4.5 Event Log Value Parameter

eventLogValue OBJECT-TYPE
SYNTAX Opaque
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The value of this object is set to the value pointed to by the eventLogOID of the associated eventLogID when the event was logged. Its length is variable."
::= { eventLogEntry 5 }

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2.5.5 Maximum Event Classes Parameter

maxEventClasses OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object defines the maximum, fixed number of rows in the eventClassTable that this device supports. This places an upper limit on the number of classes that may be defined for events in this device."
::= { globalReport 5 }

2.5.6 Event Class Table

eventClassTable OBJECT-TYPE
SYNTAX SEQUENCE OF EventClassEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"This table is used to configure event logging limits and log table maintenance."
::= { globalReport 6 }

eventClassEntry OBJECT-TYPE
SYNTAX EventClassEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"This defines a row in the Event Class Table."
INDEX { eventClassNumber }
::= { eventClassTable 1 }

EventClassEntry ::= SEQUENCE {
    eventClassNumber INTEGER,
    eventClassLimit INTEGER,
    eventClassClearTime INTEGER,
    eventClassDescription OCTET STRING,
    eventClassNumRowsInLog INTEGER }

2.5.6.1 Event Class Number Parameter

eventClassNumber OBJECT-TYPE
SYNTAX INTEGER (1..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"This is a class value that is to be configured."
::= { eventClassEntry 1 }

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2.5.6.2 Event Class Limit Parameter

eventClassLimit OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object specifies the maximum number of events of the associated class to store in the log. Once the limit is reached, the oldest entry of the matching class will be overwritten by any new entry of the same class. If the value of this object is set to a number smaller than the current number of rows within this class in the eventLogTable, then the oldest entries shall be lost/deleted."
::= { eventClassEntry 2 }

2.5.6.3 Event Class Clear Time Parameter

eventClassClearTime OBJECT-TYPE
SYNTAX Counter
ACCESS read-write
STATUS mandatory
DESCRIPTION
"This object is used to clear multiple event log entries from the event log table. Setting this value shall cause all events of this class that have an eventTime equal to or less than this object to be cleared from the eventLog table. The time is the number of seconds since the epoch of 00:00:00 (midnight) January 1, 1970."
::= { eventClassEntry 3 }

2.5.6.4 Event Class Description Parameter

eventClassDescription OBJECT-TYPE
SYNTAX OCTET STRING
ACCESS read-write
STATUS optional
DESCRIPTION
"This object specifies a description of the class in ASCII characters."
::= { eventClassEntry 4 }

2.5.6.5 Event Class Number of Rows in Event Log Table Parameter

eventClassNumRowsInLog OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of rows for this class that currently exist in the eventLogTable."
::= { eventClassEntry 5 }

2.6 STMP OBJECT NODE

profilesSTMP OBJECT IDENTIFIER
::= { profiles 2 }

--This node is an identifier used to group all objects for support of configuration functions
-- that are common to device types that support the STMP protocol. The objects under this node are
-- placed under the Protocols\Profiles\STMP subtree within the NEMA node, but they have been listed
-- here due to the lack of a separate document that lists these objects.

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2.6.1 Dynamic Object Persistence Parameter

dynamicObjectPersistence OBJECT-TYPE
SYNTAX INTEGER (0..65535)
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The maximum power outage time in minutes that may occur before all STMP dynamic object definitions in a device shall be invalidated.
If this object is set to zero then existing dynamic object definintions shall be invalidated on device power up.
If this object is set to its maximum value (65535) the existing dynamic object definitions shall not be invalidated due to power outages of any duration.

A device that supports STMP dynamic objects shall support this object."
REFERENCE
"NEMA TS 3.2 Clause 4.2.1.1"
::= { profilesSTMP 1 }

2.7 PMPP OBJECT NODE

profilesPMPP OBJECT IDENTIFIER
::= { profiles 3 }

-- This node is an identifier used to group all objects for support of the PMPP function that
-- are common to all device types. The objects under this node are placed under the
-- Protocols\Profiles\PMPP subtree within the NEMA node, but they have been listed here due to the lack
-- of a separate document that lists these objects.

2.7.1 Maximum HDLC Group Address Parameter

maxGroupAddresses OBJECT-TYPE
SYNTAX INTEGER (0..255)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The maximum number of group addresses this device supports. This object indicates the maximum number of rows in the Data Link Layer group address table."
::= { profilesPMPP 1 }

2.7.2 HDLC Group Address Table

hdlcGroupAddressTable OBJECT-TYPE
SYNTAX SEQUENCE OF HdlcGroupAddressEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"A table containing group addresses at which a device may receive frames."
::= { profilesPMPP 2 }

hdlcGroupAddressEntry OBJECT-TYPE
SYNTAX HdlcGroupAddressEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"An entry in the group address table that contains a device's data link layer group address at which it will accept frames."

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```
INDEX { hdlcGroupAddressIndex }
::= { hdlcGroupAddressTable 1 }

HdlcGroupAddressEntry ::= SEQUENCE {
    hdlcGroupAddressIndex     INTEGER,
    hdlcGroupAddress          INTEGER }
```

2.7.2.1 HDLC Group Address Index Parameter

```
hdlcGroupAddressIndex     OBJECT-TYPE
SYNTAX          INTEGER (0..255)
ACCESS          read-only
STATUS          mandatory
DESCRIPTION
"The index number for the group address in this row."
::= { hdlcGroupAddressEntry 1 }
```

2.7.2.2 HDLC Group Address Parameter

```
hdlcGroupAddress      OBJECT-TYPE
SYNTAX          INTEGER
ACCESS          read-write
STATUS          mandatory
DESCRIPTION
"A group addresss for the data link layer. For PMPP, the syntax is an 8 or 16 bit entry with the second low
order bit set to a one indicating that this is a group address."
REFERENCE
"NEMA TS 3.3 Clause 3.3.3.1"
::= { hdlcGroupAddressEntry 2 }

END
```

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Section 3
GROUP DEFINITIONS

A conformance group is defined in TS 3.2 - Simple Transportation Management Network (STMF), Clause 3.3.5.

Conformance groups are defined as either mandatory or optional. If a conformance group is mandatory, all of the objects and subgroups with STATUS "mandatory" that are part of the conformance group shall be present for a device to claim conformance to the MIB defining the Conformance group. If a Conformance group is optional, all of the objects and subgroups with the STATUS "mandatory" that are part of the conformance group shall be present if the device supports the Conformance group. Optional objects with the STATUS "optional" may be supported.

When a table is included in a conformance group, all objects contained in the table are included by reference. This is because a table is defined as a SEQUENCE OF {SEQUENCE}. Thus, all objects listed in the sequence are defined as an integral part of the table. Tables are defined as either mandatory or optional. If a table is mandatory, all of the objects with STATUS "mandatory" shall be present. If a table is optional, all of the objects with the STATUS "mandatory" shall be present if the device supports the table. Objects within a table with the STATUS "optional" may be supported.

Table 3-1
OBJECT SUPPORT REQUIREMENTS

Object Status	Table Status	Conformance Group Status	Object Support
mandatory	mandatory	mandatory	mandatory
mandatory	mandatory	optional	mandatory, if conformance group is supported
mandatory	optional	mandatory	mandatory, if table is supported
mandatory	optional	optional	mandatory, if both the conformance group and table are supported
optional	mandatory	mandatory	optional
optional	mandatory	optional	optional
optional	optional	mandatory	optional
optional	optional	optional	optional

The conformance group definitions for specific device-types such as signal controllers or VMS signs are usually defined in this section but since the Global Object Definitions define the setup of objects (or functions) common to multiple device-types, it cannot and should not be prohibited that a special device-type uses these objects in different logical groupings then defined within this document.

Each conformance group defines a certain function, which has been seen as a logical grouping. The following conformance group definitions are guidelines.

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3.1 CONFIGURATION CONFORMANCE GROUP

The Global Configuration Conformance group consists of a variety of global objects related to general configuration information. The Global Configuration Conformance group shall consist of the following objects and tables:

Object or Table Name	Reference
globalSetIDParameter	TS 3.4
globalMaxModules	TS 3.4
globalModuleTable	TS 3.4
moduleNumber	TS 3.4
moduleDeviceNode	TS 3.4
moduleMake	TS 3.4
moduleModel	TS 3.4
moduleVersion	TS 3.4
moduleType	TS 3.4

3.2 DATABASE MANAGEMENT CONFORMANCE GROUP

The Global Database Management Conformance group consists of global objects related to database management functions. The Global Database Management Conformance group shall consist of the following objects:

Object or Group Name	Reference
dBCreationTransaction	TS 3.4
dBErrorType	TS 3.4
dBErrorID	TS 3.4
dBTransactionID	TS 3.4
dBMakeID	TS 3.4

3.3 TIME MANAGEMENT CONFORMANCE GROUP

The Global Time Management Conformance group consists of global objects related to time management functions. The Time Database Management Conformance group shall consist of the following objects:

Object or Group Name	Reference
globalTime	TS 3.4
globalDaylightSaving	TS 3.4

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3.4 TIME BASE EVENT SCHEDULE CONFORMANCE GROUP

The Time Base Conformance group consists of the global schedule table objects related to time base operation. Other device-type specific objects are defined in the appropriate device-type specific documents. The Time Base Conformance group shall consist of the following objects:

Object or Conformance Group Name	Reference
maxTimeBaseScheduleEntries	TS 3.4
timeBaseScheduleTable	TS 3.4
timeBaseScheduleNumber	TS 3.4
timeBaseScheduleMonth	TS 3.4
timeBaseScheduleDay	TS 3.4
timeBaseScheduleDate	TS 3.4
timeBaseScheduleDayPlan	TS 3.4
maxDayPlans	TS 3.4
maxDayPlanEvents	TS 3.4
timeBaseDayPlanTable	TS 3.4
dayPlanNumber	TS 3.4
dayPlanEventNumber	TS 3.4
dayPlanHour	TS 3.4
dayPlanMinute	TS 3.4
dayPlanActionNumberOID	TS 3.4
dayPlanStatus	TS 3.4

3.5 REPORT CONFORMANCE GROUP

The Report Conformance group consists of those global objects related to event logging. The Report Conformance group shall consist of the following objects:

Object or Group Name	Reference
maxEventLogConfigs	TS 3.4
eventLogConfigTable	TS 3.4
eventConfigID	TS 3.4
eventConfigClass	TS 3.4
eventConfigMode	TS 3.4
eventConfigCompareValue	TS 3.4
eventConfigCompareValue2	TS 3.4
eventConfigCompareOID	TS 3.4
eventConfigLogOID	TS 3.4
eventConfigAction	TS 3.4
maxEventLogSize	TS 3.4
eventLogTable	TS 3.4
eventLogClass	TS 3.4
eventLogNumber	TS 3.4
eventLogID	TS 3.4
eventLogTime	TS 3.4
eventLogValue	TS 3.4
maxEventClasses	TS 3.4
eventClassTable	TS 3.4
eventClassNumber	TS 3.4
eventClassLimit	TS 3.4
eventClassClearTime	TS 3.4
eventClassDescription	TS 3.4
eventClassNumRowsInLog	TS 3.4

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3.6 STMP CONFORMANCE GROUP

The STMP Group consists of those objects related to STMP parameters. The STMP Group shall consist of the following objects:

Object or Group Name	Reference
dynamicObjectPersistence	TS 3.4

3.7 PMPP CONFORMANCE GROUP

The PMPP Group consists of those optional global objects related to PMPP parameters. The PMPP Group shall consist of the following objects:

Object or Group Name	Reference
maxGroupAddresses	TS 3.4
hdlcGroupAddressTable	TS 3.4
hdlcGroupAddressIndex	TS 3.4
hdlcGroupAddress	TS 3.4

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Section 4
CONFORMANCE STATEMENTS

In addition to the device-type specific conformance requirements stated in the appropriate documents, all transportation related device types shall adhere to the conformance requirements specified in Table 4-1 as a minimum to claim compliance to this standard. Additional objects or groups may be supported without being non-compliant with NTCIP.

Minimum and maximum ranges of objects that differ from the values of the object's SYNTAX field may be enforced by an application running on a device.

A device which enforces range limits within the bounds specified by the values of the object's SYNTAX field shall not be categorized as being non-compliant with NTCIP.

A device which supports a subset of objects with enumerated values shall not be categorized as being non-compliant with NTCIP.

Table 4-1
CONFORMANCE TABLE

Conformance Group	Reference	Conformance Requirement
Configuration	TS 3.4	mandatory
Database Management	TS 3.4	optional
Time Management	TS 3.4	optional
Timebase Event Schedule	TS 3.4	optional
Report	TS 3.4	optional
STMP	TS 3.4	optional
PMPP	TS 3.4	optional

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Report	TS 3.4	optional
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Report	TS 3.4	optional
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A joint publication of:

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