

*A Joint Standard of AASHTO, ITE, and NEMA*

# NTCIP 8005 version v01

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## National Transportation Communications for ITS Protocol Procedures for Creating Management Information Base (MIB) Files

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## ACKNOWLEDGEMENTS

NTCIP 8005 v01 was prepared by the NTCIP Base Standards and Profiles 2 (BSP2) Working Group (WG), which is a subdivision of the Joint Committee on the NTCIP. The Joint Committee is organized under a Memorandum of Understanding among the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the National Electrical Manufacturers Association (NEMA). The Joint Committee on the NTCIP consists of six representatives from each of the standards organizations, and provides guidance for NTCIP development.

At the time that NTCIP 8005 v01 was prepared, the following individuals were members of the NTCIP BSP2 WG:

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- Quixote Traffic Corporation
- Robert De Roche Consulting
- Siemens ITS
- SNMPInfo
- SubCarrier Systems Corp.
- Telvent Farradyne Inc.
- Texas Transportation Institute
- TKstds Management
- Transcore, Inc.
- Trevilon Corp.
- URS Corp.
- Washington State DOT

## FOREWORD

NTCIP 8005 v01 provides the policies and procedures for development and maintenance of NTCIP Management Information Base (MIB) files. NTCIP 8005 v01 defines requirements that are applicable to all NTCIP WGs that develop NTCIP standards containing MIBs, including NTCIP device data dictionary standards. NTCIP 8005 v01 also defines requirements that are applicable to NTCIP Data Stewards in checking MIBs, in coordinating all NTCIP device data dictionaries, and in liaison with other outside groups or entities using NTCIP MIBs. NTCIP 8005 v01 uses only metric units.

NTCIP 8005 v01 is also an NTCIP Process, Control, and Information Management document, which defines the practices and policies used by the NTCIP Joint Committee in developing and maintaining NTCIP standards publications.

The following keywords apply to this document: AASHTO, ITE, NEMA, NTCIP, policies, procedures, and MIB.

### User Comment Instructions

The term "User Comment" includes any type of written inquiry, comment, question, or proposed revision, from an individual person or organization, about any part of this standards publication's content. A "Request for Interpretation" of this standards publication is also classified as a User Comment. User Comments are solicited at any time. In preparation of this NTCIP standards publication, input of users and other interested parties was sought and evaluated.

All User Comments are referred to the committee responsible for developing and/or maintaining this standards publication. The committee chairperson, or their designee, may contact the submitter for clarification of the User Comment. When the committee chairperson or designee reports the committee's consensus opinion related to the User Comment, that opinion is forwarded to the submitter. The committee chairperson may report that action on the User Comment may be deferred to a future committee meeting and/or a future revision of the standards publication. Previous User Comments and their disposition may be available for reference and information at [www.ntcip.org](http://www.ntcip.org).

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A User Comment should be submitted in the following form:

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**Page:**  
**Section, Paragraph, or Clause:**  
**Comment:**  
**Editorial or Substantive?:**  
**Suggested Alternative Language:**

Please include your name, organization, and address in your correspondence.

## Approvals

NTCIP 8005 v01 was separately balloted and approved by AASHTO, ITE, and NEMA after recommendation by the Joint Committee on the NTCIP. Each organization has approved NTCIP 8005 v01 as the following standard type, as of the date:

AASHTO—Standard Specification; May 2010  
ITE—Software Standard; June 2010  
NEMA—Standard; December 2009

## History

In 1992, the NEMA 3-TS Transportation Management Systems and Associated Control Devices Section began the effort to develop the NTCIP. The Transportation Section's purpose was to respond to user needs to include standardized systems communication in the NEMA TS 2 standard, *Traffic Controller Assemblies*. Under the guidance of the Federal Highway Administration's NTCIP Steering Group, the NEMA effort was expanded to include the development of communications standards for all transportation field devices that could be used in an Intelligent Transportation Systems (ITS) network.

In 1996, AASHTO, ITE, and NEMA executed an agreement to jointly develop, approve, and maintain the NTCIP standards. The Joint Committee on the NTCIP has directed the development of a number of standards that define device data dictionaries. During the NTCIP data dictionary development, similar efforts were underway within SAE, ASTM, and IEEE to develop data dictionaries pertinent to their domains.

In 1998, the ITS standards SDOs agreed to coordinate and develop a central repository for all ITS data concepts. NTCIP Data Stewards were appointed to coordinate the NTCIP data dictionaries and to interface the NTCIP data dictionaries with the ITS Data Registry and Functional Area Data Dictionary.

In September 2004, U.S. DOT support for the ITS Data Registry was discontinued. In February 2008, a user need could not be identified to define and maintain a Functional Area Data Dictionary, and therefore a decision was made to delete references to a Functional Area Data Dictionary.

Work on NTCIP 8005 v01 started in January 2000. Early versions addressed requirements for an IEEE ITS Data Registry based on IEEE 1488 and 1489. In 2003, reference to the IEEE ITS Data Registry was removed from NTCIP 8005. In an NTCIP 8005 second User Comment Draft, similar, but different, requirements were based on reference to ISO 14817. Subsequently, all references were removed to other data dictionaries and to ISO 14817.

NTCIP 8005 v01.09, September 2000—Accepted as a User Comment Draft by the Joint Committee on the NTCIP. NTCIP 8005 v01.10, June 2001—NTCIP Standards Bulletin B0060 sent 8005 v01.10 to AASHTO, ITE, and NEMA for review and comment.

NTCIP 8005 v01.21, May 2006—Accepted as a Second User Comment Draft, to reflect reference to ISO 14817, by the Joint Committee on the NTCIP. NTCIP 8005 v01.21, January 2007—NTCIP Standards Bulletin B0119 sent NTCIP 8005 v01.21 to AASHTO, ITE, and NEMA for second review and comment.

NTCIP 8005 v01.25, August 2008—Accepted as a Recommended Standard Policy by the Joint Committee on the NTCIP.

NTCIP 8005 v01.27, October 2009—Standards Bulletin B0135 sent Recommended Standard Policy to AASHTO, ITE, and NEMA for ballot and approval.

NTCIP 8005 v01.28, June 2010—Prepared standard for publication; edited format, front matter, and style.

### **Compatibility of Versions**

To distinguish NTCIP 8005 v01 (as published) from previous drafts, NTCIP 8005 v01 also includes NTCIP 8005 v01.28 on each page header. All NTCIP Standards Publications have a major and minor version number for configuration management. The version number syntax is "v00.00a," with the major version number before the period, and the minor version number and edition letter (if any) after the period.

NTCIP 8005 v01 is designated, and should be cited as, NTCIP 8005 v01. Anyone using NTCIP 8005 v01 should seek information about the version number that is of interest to them in any given circumstance. The MIB, the PRL, and the PICS should all reference the version number of the standards publication that was the source of the excerpted material.

Compliant systems based on later, or higher, version numbers MAY NOT be compatible with compliant systems based on earlier, or lower, version numbers. Anyone using NTCIP 8005 v01 should also consult NTCIP 8004 v02 for specific guidelines on compatibility.

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## Section 1 GENERAL

### 1.1 SCOPE

NTCIP 8005 v01 defines processes to verify the correctness of a Management Information Base (MIB) in NTCIP data dictionary standards, and to prepare a stand-alone version of the MIB. These processes are used by the Joint Committee on the NTCIP, its Working Groups, and NTCIP Data Stewards.

NOTE—NTCIP 8005 v01 changes the environment in which NTCIP data dictionary standards are created and MIBs are checked. MIBs created prior to NTCIP 8005 v01 may have been developed using a different syntax checker and compilation switch settings.

### 1.2 REFERENCES

Normative references contain provisions that, through reference in this text, constitute provisions of NTCIP 8005 v01. Other references in NTCIP 8005 v01 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.

#### 1.2.1 Normative References

There are no normative references cited in NTCIP 8005 v01.

#### 1.2.2 Other References

AASHTO / ITE / NEMA NTCIP 8004 v02	<i>Structure and Identification of Management Information (SMI)</i> published June 2010
IAB STD 16	(RFC 1155: 1990, <i>Structure and Identification of Management Information for TCP/IP-based Internets</i> , RFC 1212: 1991, <i>Concise MIB Definitions</i> )
RFC 1215	<i>Convention for defining traps for use with the SNMP</i> , March 1991

#### 1.2.3 Contact Information

##### 1.2.3.1 NTCIP Standards

For revision information on NTCIP 8005 v01, contact:

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For draft revisions to NTCIP 8005 v01, and recommended revisions of the NTCIP Joint Committee, visit [www.ntcip.org](http://www.ntcip.org).

### 1.2.3.2 IAB Documents

For Internet Advisory Board (IAB) documents, contact:

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[www.rfc-editor.org](http://www.rfc-editor.org)  
[www.rfc-editor.org/repositories.html](http://www.rfc-editor.org/repositories.html)

## 1.3 TERMS

For a better understanding of this standard, here are some terms and definitions.

<b>Data Steward</b>	An organizational element of the ITS community responsible for ensuring that the information in the MIB portion of any NTCIP data dictionary standard is accurate and does not duplicate information in other standards.
<b>Management Information Base (MIB)</b>	In the strictest sense, a MIB is the representation of all the SNMP information available in a device. However, the term MIB is also used to refer to a module containing related object definitions.

## 1.4 ACRONYMS

<b>CWA</b>	Committee Work Area
<b>IEEE</b>	Institute of Electrical and Electronics Engineers, Inc.
<b>OID</b>	Object Identifier
<b>SMIC</b>	SNMP Management Information Compiler
<b>SMICng</b>	SNMP Management Information Compiler—next generation
<b>SNMP</b>	Simple Network Management Protocol
<b>RFC</b>	Request For Comment
<b>WG</b>	Working Group

## **Section 2 DEVELOPMENT PROCESS**

### **2.1 PROCESS FLOW**

There are actions defined for NTCIP MIB creation and maintenance at specific stages of the NTCIP standardization procedures for the standards development and maintenance process. Transitions to the following stages shall trigger actions of the Data Steward. The actions are defined in Section 2 for stages:

- a) User Comment Draft
- b) Recommended
- c) Jointly Approved
- d) Amended or Revised
- e) Rescinded

#### **2.1.1 User Comment Draft**

Before an NTCIP WG submits a proposed User Comment Draft to the NTCIP Joint Committee, any NTCIP standard containing a MIB shall have the syntax checked as defined in NTCIP 8005 v01 Section 3. The NTCIP WG shall make the text version of the MIB available to the Data Stewards.

The MIB shall be assigned to one of the Data Stewards. The Data Steward shall prepare a "MIB Include File" and re-check the syntax of the MIB in the context of other NTCIP MIBs. The Data Steward shall also review the MIB as to possible duplication of Object Definitions within other NTCIP standards. The Data Steward shall submit a User Comment to the NTCIP Coordinator and WG chair and/or document editor, reporting on the Data Steward's compilation of the MIB. The User Comment shall be logged and filed, and any MIB revisions made during the disposition of User Comments and revision of the draft standard identified.

The Data Steward shall post a User Comment Draft version of the MIB at the NTCIP MIB FTP site hosted by NEMA.

#### **2.1.2 Recommended**

Before submission of a proposed Recommended Standard, any draft NTCIP standard containing a MIB shall be syntax checked again. The text version of the MIB shall be made available to the Data Stewards, and the Data Stewards shall perform a syntax check in the context of other MIBs. One of the Data Stewards shall provide a summary of the syntax check, and the summary of the syntax check shall be included in the ITE Standards Development Report.

The Data Steward shall post a Recommended Standard version of the MIB at the NTCIP MIB FTP site, and delete the UCD version.

#### **2.1.3 Jointly Approved**

Upon approval by all three NTCIP SDOs (AASHTO, ITE, and NEMA), a Data Steward shall update the MIB text file to indicate the three SDO Jointly Approved status of the NTCIP standard.

The Data Steward shall post the updated text file (mibFileName.mib) of the Jointly Approved MIB at the NTCIP MIB FTP site. The Data Steward shall not remove the Recommended Standard version of the MIB.

#### **2.1.4 Amended or Revised**

When an NTCIP standard is amended, or revised to a higher major version number, the same procedures as used for the User Comment Drafts and Recommended Standards shall be followed.

### **2.1.5 Rescinded**

If an NTCIP standard containing a MIB is rescinded, the Data Steward shall “retire” the applicable MIB. “Retiring” shall consist of adding a "Rescinded" label to the affected MIB and removing the name of the MIB from checking lists.

The Data Steward shall revise the text of the MIB, but shall not remove the MIB from the NTCIP MIB NEMA FTP site.

## **2.2 INTELLECTUAL PROPERTY RIGHTS**

The intellectual property rights of AASHTO, ITE, and/or NEMA, regarding the NTCIP standards publications, and the included works known as the MIBs, are claimed in the front matter notices of the standards publications, and in the header of the MIB text files. AASHTO, ITE, and NEMA also extend certain MIB distribution permission. All MIB users shall follow the instructions in the MIB Distribution Permission notice, found under “Notices” in those NTCIP standards that contain a MIB. This includes the derivation citation.

## Section 3 MANAGEMENT INFORMATION BASES (MIBs)

### 3.1 SYNTAX CHECKER

The standard compiler for checking the syntax of an SNMP MIB is SMICng Version 2.2.07 (Book). Setup of the environment in which the standard compiler is run shall conform to procedures as described in the SMICng Documentation (dated 11/25/98).

NOTE—A public domain compiler, SMIC Version 1.0.9, July 23, 1992, may be useful for WGs for initial MIB checking. A copy of the compiler program is available from [www.ntcip.org](http://www.ntcip.org), from the web-enabled FTP Committee Work Area, in the BSP2 WG shared directory. The SMIC Version 1.0.9 compiler and the NTCIP MIBs published by the Data Steward can also be downloaded from the NEMA-hosted FTP site. Contact the NTCIP Coordinator at [ntcip@nema.org](mailto:ntcip@nema.org) for access to either the CWA or NEMA FTP sites. The command line for the least restrictive syntax is shown in the SMIC User's Guide [July 1992] Section 6.2, "Command Line Example." The SMIC User's Guide is also available from the FTP sites.

NOTE—SMIC Version 1.0.9 has some known problems and does not handle all syntaxes correctly. SMIC Version 1.0.9 should only be used for initial checking.

### 3.2 SYNTAX CHECKING

#### 3.2.1 Compilation Switches

SMICng has the capacity to check MIBs at varying levels of syntax strictness. The level of strictness is controlled by command line switches, compiler directives, and options specified in an environment string. MIBs shall be syntax checked to a least restrictive form as defined by the following command line switches:

- a) -N Output an OID Tree (only fully licensed version)
- b) -C5 Allow a value of "optional" for status
- c) -C6 Relax rules for naming conventions of suffixes "Table" and "Entry" in table definitions
- d) -CG Allow unused IMPORTs and textural conventions
- e) -CJ Allow DEFVAL on counters

In limited circumstances, it may be appropriate to relax syntax strictness to accommodate specific needs, at the discretion of the Data Steward. In those limited circumstances, the MIB shall contain a justification for any deviation from these command line switches. In all cases, the list of command line switches used for syntax checking shall be published with the MIB.

NOTE—MIBs developed prior to NTCIP 8005 v01 used different compilation switches, and may produce different results.

#### 3.2.2 Output

For acceptance, a MIB shall result in no "Errors" when syntax checked. An output may contain "Warnings". The Data Stewards shall use the -N switch to produce a listing of the OID numbers. That list shall be compared against the OID in the <Object Identifier> field of the objects to ensure that they have not changed.

### 3.3 INPUT FILE

The MIB input file to SMICng shall be an "ASCII (Text Only)" file that is consistent with RFC 1155, RFC 1212, and RFC 1215.

To convert a Word document to an ASCII file suitable for compilation, follow these steps:

- a) Convert the font within the MIB to a non-proportional type such as Courier New.
- b) Replace all tabs with the appropriate number of spaces.
- c) Delete any tables or graphics or convert them to ASCII underscore, dashes, or vertical bars.
- d) While file viewers with line wrap format the text in the Description Field, users may prefer to add <CR> and <LF>s to format the Description Field, as preferred.
- e) Strip all text before the "]:= BEGIN" and after the "END" statement. This can be done manually or by using the "mstrip.exe" program that comes with the SMIC software.
- f) Customize the header numbering so that entries are preceded by "dash dash."
- g) Renumber the header page numbering so the page number starts at the same page number as the MIB in the NTCIP standards publication Word document.
- h) Select "Save As" but change the file type to "Plain Text." When the file conversion window appears, leave "Text Encoding" as Windows (default).

### 3.3.1 MIB Meta Data File

An NTCIP standard may define more than one MIB module. Each MIB module shall be defined in its own separate file. Each file shall contain a header in the form of comments. The header shall include information corresponding to the following:

- a) File Name
- b) Description
- c) Source
- d) MIB Revision History
- e) Copyright Statement
- f) MIB Distribution Notice

The File Name shall be the computer file name of the text file itself. The File Name shall not include any path information. The File Name shall follow the naming conventions defined in Section 3.3.2.

The Description shall describe what this MIB represents.

The Source shall be the name of the document containing the MIB. Amendments shall also be listed. Relevant information as to status, version, and date should also be included.

The MIB Revision History shall show the date of any changes to the MIB followed by a statement about what revisions were made. The date shall use the form MM/DD/YY.

The text of the Copyright Statement and MIB Distribution Notice from the current version of NTCIP 8002 shall be included. The coverage year of the copyright shall be updated to the year in which the MIB text file was created or modified.

Annex A contains a sample header and the preferred header formatting style.

### 3.3.2 Naming Conventions

NTCIP MIB file and module names shall be used in multiple applications and for purposes of cross-referencing. Therefore, the following naming convention shall apply.

The File Names for files containing a MIB shall be of the form:

<Standard Number> <Version> <Module>.mib

If the NTCIP standard designation contains a year of publication, the year of publication shall be dropped and the specific version number should be used. Module names are optional; however, when a standard contains more than one MIB module, module names are required. These examples serve as illustrations:

1103v0212 LogicalNames.mib  
1103v0212 Report.mib  
1103v0212 Security.mib  
1103v0212 SFMP.mib  
1103v0212 SNMP.mib  
1103v0212 STMP.mib  
1103v0212 STMP-Config.mib  
1103v0212 STMP-Stats.mib  
1201v0307 Main.mib  
1201v0307 AuxIO1.mib  
1202v0218.mib  
2103v0206 CHAP.mib  
2103v0206 MOD.mib

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## ANNEX A MIB HEADER FORMAT [INFORMATIVE]

The following is an example of MIB header text, formatted appropriately for inclusion in any MIB.

```
-- *****
-- Filename:      1201v0307 Main.mib
-- Description:   This MIB defines various globally applicable objects
-- Source:       NTCIP 1201 v03.07
-- MIB Revision History:
-- 09/27/04      Created file from Word .Doc file.
--               Changed name of file
--               Removed global report, logicalNameTranslation and communityName
--               nodes per NTCIP 1103v0124
--               Removed state transition diagram form 2.3.1
--               Changed "FROM NTCIP8004-A" to "FROM NTCIP8004v01.mib"
--               Added space before INTEGER in timeBaseScheduleNumber INTEGER,
--               Changes status of moduleNumber, timeBaseScheduleNumber,
--               dayPlanNumber, dayPlanEventNumber, eventClassNumber,
--               eventConfigID and their associated Entry to mandatory to
--               eliminate incompatible status errors
--               Checked with -CJ switch to eliminate gratuitous default value
--               warnings on globalTime and eventClassLimit.
--               Restructured IMPORTS around NTCIP8004-A-2004
-- 11/20/06      Added new beginning and end of DST objects. Revised Source
--               information
--               Added header and created standalone MIB without AuxIO objects
-- 07/02/07      Revised new beginning and end of DST objects.
-- 09/18/07      Further revisions of DST objects and updates to this Header.
-- 02/12/08      Addressed user comments. Again, modified UCD-defined DST
--               objects. Updated header. Created standalone MIBs for the
--               2 different versions of AuxIO objects.
-- 03/24/08      Addressed JC comments pertaining to the DST objects, minor
--               changes. Updated header.
-- 10/06/09      Revised the MIB header Distribution Permission for SYNTAX.
--
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