A Joint Standard of AASHTO, ITE, and NEMA

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National Transportation Communications for ITS Protocol

Object Definitions for Data Collection and Monitoring (DCM) Devices

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FOREWORD

This document references both imperial and metric units; however, all objects are defined using metric units.

This document defines the management information for a Data Collection and Monitoring (DCM) unit. The term DCM includes a range of devices — from traditional traffic counters on the simple end, to more complicated devices such as weigh-in-motion field units. This document defines individual parameters that represent the configuration, status, and control information that are unique to DCMs. This document also defines specific groupings of these parameters and others to address the operational configuration, monitoring, and control of the device in a baseline system configuration.

There are four annexes to this document. Annex A is normative; all other annexes are informative.

This document is an NTCIP Device Data Dictionary Standard. Device Data Dictionaries Standards define management information in terms of objects (data elements, data frames, and messages) for use within NTCIP systems. A Joint NTCIP Device Data Dictionary standards publication is equivalent to these document types at the standards organizations:

AASHTO – Standard Specification
ITE – Software Standard
NEMA – Standard

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Approvals

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

AASHTO – Standard Specification; October 2004
ITE – Software Standard; May 2005
NEMA – Standard; November 2004

History

From 1997 to 1999, this document was referenced as TS 3.DCM. However, to provide an organized numbering scheme for the NTCIP documents, this document is now referenced as NTCIP 1206. The technical specifications of NTCIP 1206 are identical to the former reference, except as noted in the development history below:

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NTCIP 1206:2005 v01.23. November 2005 – Edited document for publication; revised front matter.

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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 this document should also consult NTCIP 8004 for specific guidelines on compatibility.

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INTRODUCTION

This publication defines management information related to a Data Collection and Monitoring device. DCM management information includes individual parameters that represent the configuration, status, and control information of such a device. The objects are defined using several ASN.1 Macros that were initially developed for use with Internet information management. The macros have been modified to include additional information specific to NTCIP and ITS Data Dictionaries and Message Sets.

This standard defines requirements that are applicable to an NTCIP environment that involves the control of roadside-bound devices. While the term 'data collection and monitoring unit' implies some type of physical device, many of the data concepts are applicable to any logical implementation. By definition, a DCM operates in the context of a "system" that includes roadside devices that are capable of communicating and office-based transportation management center software. The standard, therefore, imposes requirements on both of these "system" components.

The following ***keywords*** apply to this document: *AASHTO, ITE, NEMA, NTCIP, DCM, weigh-in-motion, WIM, traffic counters, vehicle classification, data binning*

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

In September 1996, an agreement was executed among AASHTO, ITE, and NEMA to jointly develop, approve, and maintain the NTCIP standards. The NTCIP Joint Committee established the Data Collection and Monitoring Working Group (DCM WG) in order to define a common set of management information related to roadside devices that collect traffic information on a non-real-time basis. The first meeting of the working group was held in May 1998.

After considering all functionality that could be considered appropriate to a data collection and monitoring device, the WG developed a work plan based on two phases. The initial phase sought to address the information and operational requirements of configuring and monitoring DCM devices. Within the second phase, the file structures to retrieve the collected and compounded data will be developed. This current version of this standard includes the results of the both phases.

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Section 1

GENERAL

1.1 SCOPE

The messaging between central control entities and Data Collection and Monitoring (DCM) devices is accomplished using the NTCIP Application Layer services to convey requests to access or modify values of DCM object definitions resident in the devices via an NTCIP network. An NTCIP message consists of a specific Application Layer service and a set of data objects.

DCM devices usually record data over a period of time and transmit this data in the form of a file to a central entity. The DCM object definitions defined in Section 2 of this standard are used to configure the device. An NTCIP message using these object definitions should be compatible with the Simple Transportation Management Framework (STMF).

The methodology defined in Section 3 may be used to transmit files using the AP-TFTP or AP-FTP profiles. Section 3 describes how to setup files in such a way that it allows any central system to 'parse' and process the contents of the data files.

The scope of this document is limited to the functionality related to DCMs used within a transportation environment. The limits and descriptions of the parameters are established to give the user maximum flexibility to operate devices that either exist at the time this document was authored or may exist in the future. This publication defines object definitions which are specific to DCM units and also defines standardized conformance groups (Section 4) that may be used for conformance statements.

This standard includes four (4) Annexes. **Annex A is normative** and defines the organization of object definitions into conformance groups. **Informative Annex B** provides all SNMP tables defined in Section 2 as real tables to provide the user of this document with a better overview as well as with a guidance annex. **Informative Annex C** provides examples of configuring different types of studies as well as encoding tables using the SNMP/BER encoding. **Informative Annex D** provides a list of typical Communications Profiles for use with DCM equipment utilizing the object definitions and file transfer mechanism defined in this standard.

In order to achieve the desired DCM functionality, some of the object definitions described in other standards (see Normative References) such as TS 3.4 - Global Object Definitions may need to be utilized. Object definitions from other standards that are required to be used in conjunction with this standard are not re-defined in this standard, but are referenced in conformance group definitions (Annex A) within this standard.

1.2 REFERENCES

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Rosslyn, VA 22209-3806
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For draft amendments of this document, which are under discussion by the relevant NTCIP Working Group, and recommended amendments of the NTCIP Joint Committee, visit the World Wide Web at http://www.ntcip.org.

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

1.2.1 Normative References

IEEE Std	1488-2000	*IEEE Trial-Use Standard for Message Set Template for Intelligent Transportation Systems*
IEEE Std	1489-1999	*Standard for Data Dictionaries for Intelligent Transportation Systems*
NTCIP	8004	*Structure and Identification of Management Information.*
NTCIP	1201	*NTCIP Global Object Definitions*
NTCIP	1201-Amendment 1	*NTCIP Global Object Definitions - Amendment 1*
NTCIP	2303	*NTCIP Application Profile - File Transfer Protocol (AP-FTP)*

1.2.2 Other References

NTCIP	1101	*STMF*
NTCIP	1102 v01.11	*Octet Encoding Rules (OER) Base Protocol*
NTCIP	210N	*other applicable NTCIP Subnetwork Profiles*
NTCIP	2202 v99.01.04	*Transport Profile for Internet (TCP/IP and UDP/IP)*
NTCIP	2201	*Transportation Transport Profile (T2)*
NTCIP	2301 v99.01.07	*Application Profile for Simple Transportation Management Framework*
NTCIP	230N	*other applicable NTCIP Application Profiles*
NTCIP	7001	*Assigned Numbers - Part 1*
NTCIP	8003 v99.01.06	*Framework and Classification of Profiles*
NTCIP	9001 v99.02.05	*NTCIP Guide*
IAB STD	3	*(RFC 1122: 1989, Requirements For Internet Hosts - Communication Layers, RFC 1123: 1989, Requirements For Internet Hosts - Application and Support)*

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IAB STD	9	*(RFC 959) File Transfer Protocol - FTP*
IAB STD	15	(RFC 1157) *Simple Network Management Protocol,* J. Case, M. Fedor, M. Schoffstall, J. Davin, May 1990
IAB STD	16	(RFC 1155) *Structure and Identification of Management Information for TCP/IP based Internets,* M. Rose, K. McCloghrie, May 1990, (RFC 1212) *Concise MIB Definitions*, M. Rose and K. McCloghrie, March 1991
RFC	1215	*A Convention for Defining Traps for use with the SNMP*, M. Rose, March 1991
ISO/IEC	8824-1:1998	*Information technology -- Abstract Syntax Notation One (ASN.1):* Specification of basic notation
ISO/IEC	8824-2:1998	*Information technology -- Abstract Syntax Notation One (ASN.1):* Information object specification
ISO/IEC	8824-3:1998	*Information technology -- Abstract Syntax Notation One (ASN.1):* Constraint specification
ISO/IEC	8824-4:1998	*Information technology -- Abstract Syntax Notation One (ASN.1):* Parameterization of ASN.1 specification
HPMS Field Manual		Highway Performance Monitoring System
FHWA Traffic Monitoring Guide		
ASTM E1318-2002		Standard Specification for Highway Weigh-in-Motion (WIM) Systems with User Requirements and Test Method.

1.3 CONTACT INFORMATION

1.3.1 ISO/IEC Standards

Members of the ISO maintain registers of currently valid ISO/IEC International Standards. For the USA, the American National Standards Institute (ANSI) is the member of the ISO, which may be contacted as follows:

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

1.3.2 RFC Documents

Obtain Request for Comment (RFC) electronic documents from several repositories on the WWW, or by "anonymous" File Transfer Protocol (FTP) with several hosts. Browse or FTP to:

http://www.rfc-editor.org/
http://www.rfc-editor.org/repositories.html
for FTP sites, read ftp://ftp.isi.edu/in-notes/rfc-retrieval.txt

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1.4 GENERAL STATEMENTS

For all bitmapped objects, if a bit is zero (0), then the referenced function is not supported or disabled, and if a bit is one (1), then the referenced function is supported or enabled.

This document is managed by the NTCIP DCM Working Group. Proprietary features should be defined through vendor/agency specific nodes or vendor/agency-specific extensions to this MIB.

1.5 HOW TO USE THIS DOCUMENT

This section describes a recommended path to work through the sections of this document.

1. Print the “Table of Contents” and “Table of Figures” to use as a high-level map guide to all the sections of this document.
2. Browse the TERMS AND ABBREVIATIONS, see Section 1.6.
3. Read the Operational Description to get familiar with dcm applications, see Section 1.7.
4. Review the “HOW TO CONFIGURE A DCM DEVICE” section which describes a recommended order to configure a dcm device, see Annex C.1.
5. Look at the diagram that shows the breakdown of the dcm nodes and objects (DCM Node – tree structure, section 1.8). The nodes have been structured into functional areas (device setup, site setup, general study setup, detailed study setup, data file setup), Refer to Section 2 in the Table of Contents.
6. Browse through the objects to get familiar with them. Each defined table will have a graphical representation, see Annex B.1.
7. Look at the Table ER Diagram to see how the tables are related, see Annex B.9.
8. Review the included examples for configuring the various types of studies (binned, pvr and event). The examples also describe how the data is stored in data files, see Annex C.3.
9. Review the dcm Data File Structure in Annex C.2.
10. Try to work through a new example using the graphical representations of the table structures as worksheets. It is recommended to continually refer to the ”How to configure a DCM Device”, Annex C.1, which describes the recommended order to configure a unit and the Operational Description (Section 1.7) to remain focused on the typical applications.
11. Review the provided PICS example (A.20).
12. Review the Typical Communications Profiles List for guidance in selecting the appropriate NTCIP Profiles for your communications infrastructure, see Annex D.1.

1.6 TERMS AND ABBREVIATIONS

cm	Centimeter
DCM	Data Collection and Monitoring devices
ISO	International Standards Organization
ITS	Intelligent Transportation Systems
KIPS	One thousand pounds
km/h	Kilometers per hour

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m	Meter
mm	Millimeter
MIB	Management Information Base
Mph	miles per hour
NTCIP	National Transportation Communications for ITS Protocol
PICS	Profile Implementation Conformance Specification
PVR	Per Vehicle Record
s	Second
TMG	Traffic Monitoring Guide (FHWA Publication)
WIM	Weigh In Motion

1.7 OPERATIONAL DESCRIPTION

The NTCIP DCM Working Group in developing this standard decided after several discussions that first a description of the operations of a DCM device was needed to describe the basic operations. That resulted in this annex which was used as the basis for the object definitions shown in Section 2.

1. DCM equipment processes sensor signals into information about the traffic passing over a sensor array. This information is stored on the equipment in one or more formats for future retrieval. The equipment may be portable so it can be set up at a site for a data collection period as short as a day or it may be installed permanently for continuous monitoring of a site.
2. Three main types of data can be processed and stored by DCM equipment either individually or in some combination. The three types are time stamped sensor events, time stamped individual vehicle data and aggregate data summaries or bin counts.

   2.1 Time stamped sensor events are a collection of the record of the events of each sensor connected to the equipment with each event marked with a time stamp. These events include such things as:

   - Vehicle detector loop 7 turned on at 08:59:53.07 28/10/1998
   - Vehicle detector loop 7 turned off at 08:59:53.37 28/10/1998

   This mode of data collection is usually referred to as sensor, event or raw mode.

   2.2 Time stamped individual vehicle data (or per vehicle record PVR) is a record that results from processing the time stamped sensor events into information about a particular vehicle. The individual vehicle data could include such things as speed, length, number of axles, spacing between the axles, wheel weights, axle weights, gross vehicle weight and vehicle class. (Vehicle class is a typing or classification of vehicles usually according to the number of axles and the spacing between axles. It can also be based on other vehicle parameters such as vehicle length, vehicle gross weight,…) Each PVR record may contain as few or as much of the vehicle information as the user desires (e.g. you may only want to collect speed information for each vehicle or you may want to collect speed and weight for each vehicle). This mode of data collection is often referred to as per vehicle record or PVR mode.

   2.3 The aggregate data summaries bin the individual vehicle records by one or more of their characteristics. A simple (single dimensional) binning might be the traffic volume over a set time interval such as how many vehicles passed over the sensors in each 15 minute interval during

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the time period from 00:00 25/10/1998 to 24:00 31/10/1998. A complex binning (multi-dimensional) might be to group the data by vehicle class and vehicle speed by each lane of travel on a daily basis for the month of January 1998. Additional processing of the individual vehicle information may be performed to create traffic information such as gap, headway, and traffic platoon characteristics that may then be used as part of the binning criteria. The summarization of the data usually takes place over a given interval such as 15 or 60 minutes. This mode of operation is usually referred to as binned mode.

3. The DCM equipment is usually set up to collect any combination of the above three data types in a recording study. This study could be limited to a fixed length of time such as 24 hours, a week or the study could be continuous. The equipment is configured for the recording study with parameters such as the start and end time of the study, which traffic lanes to collect data from, which mode(s) the data is to be collected in and how the sensors are configured in each lane (sensor array).

4. As mentioned above, the data is stored in the equipment. The equipment is polled on a regular basis for downloading of the data at an interval of not usually less than daily and quite often weekly or monthly depending on the storage capability of the equipment and the expected amount of data being collected.

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5. One of the main features of DCM equipment is the ability to combine traffic information from the sensors. In general, the equipment is able to combine the sensor information with great flexibility to produce the types of information as described above. The following diagram demonstrates this flexibility.

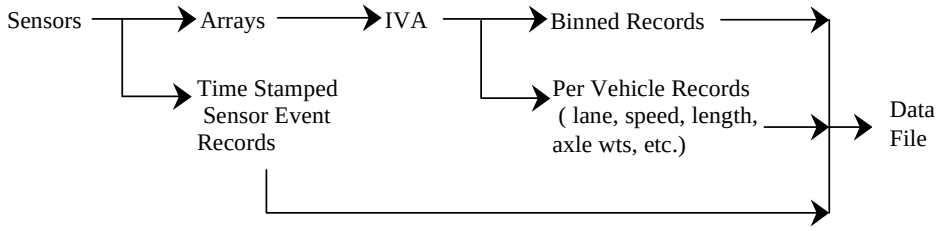


Figure 1: Sensor/Array/PVR/Binned/Data File Relationship

Sensors are a source of input to the DCM equipment. Within the equipment, the sensors are logically grouped into arrays (an array can be a combination of one or more sensors, typically located in the same lane). A sequence of sensor activations in an array are analyzed by an Individual Vehicle Algorithm (IVA) to convert them to vehicle data (determines characteristics of the vehicle such as sensor array number, speed, length, and axle spacings). The vehicle information determined by the IVA is then grouped into bins. Any one or combination of the Sensor Event Records, PVR records or Binned Records can then be written to a data file.

The physical description of a data collection location is frequently described by the terms station and site. A station is a location description of one or more arrays. A site is a grouping of one or more stations.

6. As an example, consider the following figure with four vehicle detector loops installed in two lanes of traffic.

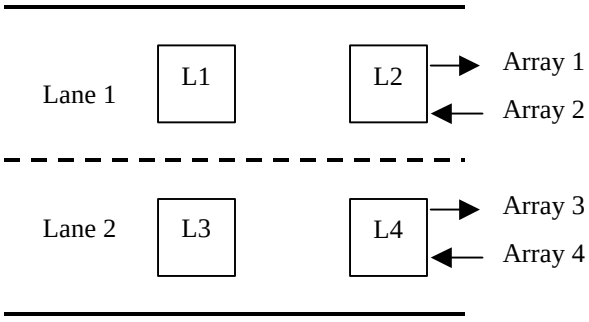


Figure 2: Array Layout

Sensors L1 to L2 are combined to form sensor array 1. Sensors L2 to L1 are combined to form sensor array 2. Sensors L3 to L4 are combined to form sensor array 3. Sensors L4 to L3 are combined to form sensor array 4. The IVA receives the information from each sensor array and converts it to vehicle data. The sensor arrays can be combined, or binned, in various manners to create different groupings of the information. Sensor arrays 1 and 3 could be combined into the same bin (binned into a directional data bin). Similarly, sensor arrays 2 and 4 could be combined into the another bin for the other direction. Optionally, sensor arrays 1 and 2 could be binned for all vehicles in lane 1 and sensor arrays 3 and 4 for all vehicles in lane 2.

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7. After data collected by dcm equipment is downloaded, it is usually analyzed and reviewed for validity. Purposes for the data collection are wide and varied. Some examples are:
    - traffic volume forecasts,
    - highway geometry design,
    - highway pavement design,
    - bridge design,
    - speed studies for evaluating speed zones and enforcement effectiveness,
    - weight enforcement planning,
    - long range transportation system planning and,
    - highway performance monitoring.

1.8 SUPPLEMENTAL FIGURES

Two figures are shown in this section.

Figure 3 depicts the DCM node in relationship to the global naming tree in general and in relationship to the NEMA node in particular. The *Object Definitions for Data Collection and Monitoring (DCM) units* uses the ISO global naming tree to uniquely identify all management information (object definitions). It also references numerous objects in the Global subtree of the global naming tree. The organization of the DCM node is shown in Figure 4.
For the purpose of the DCM equipment, the following OBJECT IDENTIFIERS are used:
dcm OBJECT IDENTIFIER ::= {iso(1) org(3) dod(6) internet(1) private(4) enterprises(1) nema(1206) transportation(4) devices(2) 9 }

Figure 4 provides a pictorial representation of the Data Collection and Monitoring (DCM) unit tree structure. This tree structure identifies how the object definitions are combined under specific nodes.

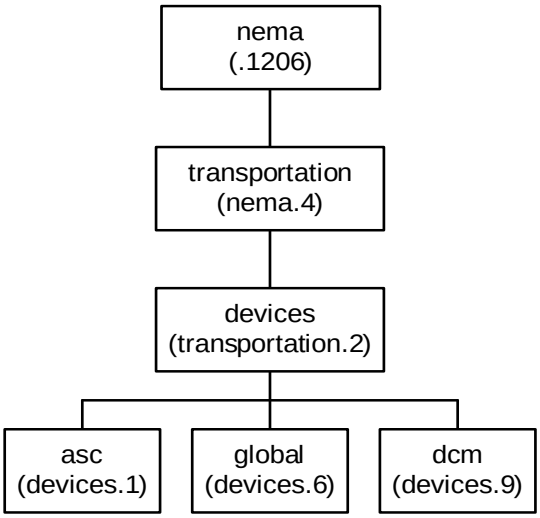


Figure 3: DCM Node – Organizational Chart

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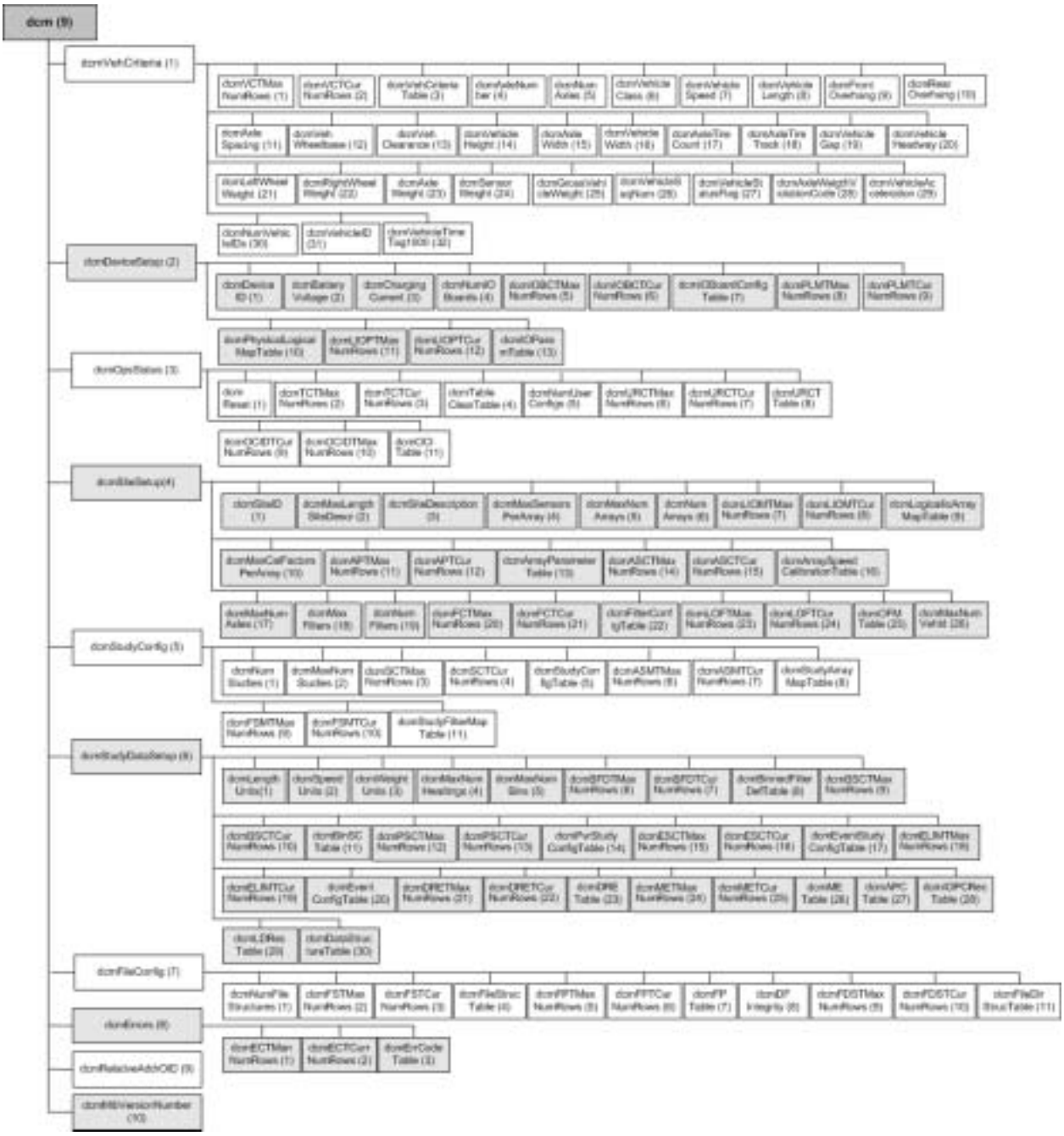


Figure 4: DCM Node – tree structure

Section 2

DCM OBJECT DEFINITIONS

This section defines those objects, which are specifically used by Data Collection and Monitoring (DCM) devices. The objects are defined using the OBJECT-TYPE macro as specified in RFC 1212. The text provided from Section 2.1 through the end of the section (except the section headings) constitutes the standard DCM-MIB1.

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

Nodes should not be confused with Conformance Groups, which are defined in Annex A. 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 lexicographically ordered or which might not even be defined in this standard.

An object Status of Optional should not be confused with a conformance status of optional or mandatory as defined in Annex A. The object Status of Optional in the MIB means that the object and object definition is current. The status of optional or mandatory in Annex A dictates whether the object is required or not.

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

All management applications shall reference the specific device MIB as provided by the device manufacturer for support and constraints (sub-ranges).

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2.1 DATA COLLECTION AND MONITORING (DCM) MIB HEADER INFORMATION

```
-- Use the following 'SMICng' command from DOS command line to compile:
--  'SMICng -0 -C4 -C5 -C6 -CG -CK -CU -F 1206.dat 1206.mib'
--
-- Use the following 'SMIC' command from DOS command line to compile
--  and create an OID listing (based on OID number ordering of objects):
-- 'SMIC /N /0 /3 /4 /5 /E /F 1206.dat 1206.mib
--
-- Use the following 'SMIC' command from DOS command line to compile
--  and create an OID listing (based on alphabetical ordering of objects):
-- 'SMIC /L /0 /3 /4 /5 /E /F 1206.dat 1206.mib


--Uncomment out the following statements to compile this MIB from a
-- DOS command line.
-- only uncomment for SMICng #SNMPv1
-- uncomment for SMIC/SMICng #include "rfc1155.smi"
-- uncomment for SMIC/SMICng #include "rfc1212.smi"
-- uncomment for SMIC/SMICng #include "nema.smi"
-- uncomment for SMIC/SMICng #include "tmib-II.smi"
--Uncomment out the following statements down to here

--Data Collection and Monitoring MIB
DCM-MIB1 DEFINITIONS ::= BEGIN

--Import statements
IMPORTS
  Counter
  --, IpAddress
 FROM RFC1155-SMI
   OBJECT-TYPE
  FROM RFC-1212
   --DisplayString    -need to be REMed out when using with SMIC compiler
  --  FROM RFC-1213-MIB -need to be REMed when using with SMIC compiler
   --TRAP-TYPE
  -- FROM RFC-1215
   devices
  FROM TMIB-II
   --EntryStatus, OwnerString, OerString,
   --Byte, UByte, Short, Ushort, Long, Ulong
  --FROM NEMA-SMI
  --controller-localTime
 -- FROM GLOBAL-MIB;
;

--SMI OBJECT-TYPE
--DisplayString ::= OCTET STRING (SIZE(0..127))

--DCM-related Object Definitions
dcm OBJECT IDENTIFIER ::= {devices 9}
```

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2.2 DCM SYNTAX DEFINITIONS (TYPE ASSIGNMENTS)

```
-- This section contains SNMPv1 'Type Assignments'.  It provides a mechanism
-- to define a 'Type' once and allows for referencing of that defined type
-- in other object/table definitions.
```

2.2.1 Table Row Maintenance (DcmRowStatus)

```
DcmRowStatus ::= INTEGER
{
 active (1),
 notInService (2),
 notReady (3),
 createAndGo (4),
 createAndWait (5),
 destroy (6)
}
--This object is intended to provide the same functionality as the RowStatus
-- object defined in SNMPV2.  It shall operate in the same manner as defined
-- in SNMPV2.
--
--The 'action' states can be written, but not read:
--createAndGo: indicates that the agent should accept the row values
-- specified,create items within the row and place the row into service (or
-- activate it)
--
--createAndWait: indicates that the agent should accept the values specified
-- (if any) and, create items within the row, but not place the row
-- in service.
--
--destroy:  indicates that the agent should remove the row from service and
-- then delete it.
--
--The 'desired' states can be written and read:
--notInService: indicates that the row has been suspended. That is, the
-- row does not exist.
--
--active: indicates that the row exists and can be used.
--
--The 'current' state can only be read:
--notReady: indicates that the row does not contain values for all columnar
-- objects in the row that are needed for an agent to act upon.
```

2.2.2 Time Tag Index (DcmTimeTagIndex)

```
DcmTimeTagIndex ::= INTEGER (0..4294967295)
--SMIC compiler will not allow using 'counter' as an index for tables.
--  There are table structures defined as not-accessible solely for
--  the purposes of data file storage.  DcmTimeTagIndex should be the exact
--  definition as 'counter' from RFC1155.smi.
```

2.2.3 Maximum Number Of Rows (DcmMaxNumRows)

```
DcmMaxNumRows ::= INTEGER

--This value represents the maximum number of rows a table is allowed to have.
```

2.2.4 Current Number Of Rows (DcmMaxNumRows)

```
DcmCurNumRows ::= INTEGER
```

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```
--This value represents the current number of rows existing in a table.
```

2.2.5 IO Board Number (DcmIOBoardNum)

```
DcmIOBoardNum ::= INTEGER (1..255)

--This value represents a unique number from the ‘dcm IO Board Configuration
-- Table’ for each IO Board that has been installed within the dcm device.
-- This number is assigned by the device and must be sequential.
```

2.2.6 IO Board Function (DcmIOBoardFtn)

```
DcmIOBoardFtn ::= INTEGER (1..255)

--This value represents the function of each specified IO board in the
-- IO Board Configuration Table.
-- This number is assigned by the device.
```

2.2.7 Logical IO Number (DcmLogIONum)

```
DcmLogIONum ::= INTEGER (1..255)

--Indicates a unique number assigned to each physical IO channel in the ‘dcm
-- Physical To Logical IO Mapping Table.  It provides a link to this IO
-- channel for other objects/tables within this MIB as required.  This is
-- assigned by the device (it is strongly recommended that it is assigned
-- sequentially).
```

2.2.8 IO Parameter Type (DcmIOParamType)

```
DcmIOParamType ::= INTEGER
{
 other (1),
 debounce (2),
 deadtime (3),
 sensitivityGain (4),
 onThreshold (5),
 offThreshold (6),
 onHysteresis (7),
 offHysteresis (8),
 minOnTime (9),
 minOffTime (10),
 maxOnTime (11),
 maxOffTime (12),
 adOffset (13),
 scanTime (14),
 sensorLength (15),
 sensorWidth (16),
 sensorHeight (17),
 sensorDepth (18),
 sensorAngle (19),
 ioCal (20),
 frequency (21),
 memoryWrap (22),
 dataStorageMediaAvailable (23),
 dataStorageMediaUsed (24)
}
--An enumeration used to identify a type of IO Parameter.  Refer to
-- DcmIOParamValue for a description of each.
```

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2.2.9 IO Parameter Value (DcmIOParamValue)

```
DcmIOParamValue ::= INTEGER

--Indicates the value for the selected IO parameter. These parameters are
--typically used to help process and make adjustments to an IO.    If an
--application tries to set an invalid value for a particular IO parameter, an
--application error code of 'Out of range' shall be set.

--The following further defines each parameter:
-- (ms=milliseconds, us=microseconds, mm=millimeters, Mhz=megahertz)
--other(1)=not defined below.
--debounce(2)= (0-65535ms) the amount of time that input transitions shall be
-- ignored relative to the last transition of the IO.
--deadtime(3)= (0-65535ms) the amount of time that input transitions shall be
-- ignored relative to the first transition of the IO.
--sensitivityGain(4)= (0-100%) the percent of full-scale to set an IO gain or
-- sensitivity adjustment
--onThreshold(5)= (0-100%) the percent of full-scale to set a level at which
-- an IO shall be considered active
--offThreshold(6)= (0-100%) the percent of full-scale to set a level at which
-- an IO shall be considered inactive
--onHysteresis(7), (0-100%) the percent of full-scale which sets a threshold
-- level above the 'off' point to trigger another 'on' to prevent an IO from
-- continuously turning on-off
--offHysteresis(8)= (0-100%) the percent of full-scale which sets a threshold
-- level below the 'on' point to trigger another 'off' to prevent an IO from
-- continuously turning on-off
--minOnTime(9)= (0-65535ms) the minimum amount of time an input must remain on
-- to be considered a valid on
--minOffTime(10)= (0-65535ms) the minimum amount of time an input must remain
-- off to be considered a valid off
--maxOnTime(11)= (0-16777215ms) the maximum amount of time an IO is allowed to
-- remain on before triggering an action (sensor input stuck on)
--maxOffTime(12)= (0-16777215ms) the maximum amount of time an IO is allowed
-- to remain off before triggering an action (sensor input stuck off)
--adOffset(13)= (0-100%) the percent of full-scale to set an analog to digital
-- converter's offset voltage
--scanTime(14)= (0-3600000000us) the time frequency in which an IO channel is
-- sampled
--sensorLength(15)= (0-65535mm) the length of the active portion of an IO
-- oriented in the same direction as vehicles traverse the array
--sensorWidth(16)= (0-65535mm) the width of the active portion of an IO
-- oriented perpendicular to the direction of vehicles traversing the array
--sensorHeight(17)= (0-65535mm) the height above the roadway in which an IO is
-- mounted
--sensorDepth(18)= (0-65535mm) the depth below the roadway in which an IO is
-- mounted
--sensorAngle(19)=  (0-1296000seconds) the angle in seconds (up to 360degrees)
-- which defines the angle of an IO
--ioCal(20), (0-100000) a multiplier in .001 between 0 and 100.000 used to
-- scale an IO
--frequency(21), (0-4294967295hz, 4 octets) the frequency assigned to an IO
--channel
--memoryWrap(22), (0=off, 1=on) enables/disables 'memory wrap' for the
-- specified storage media (memory wrap is defined as the process in which
-- older files are deleted or wrapped out from a storage media to make room
-- for newer files)
--dataStorageMediaAvailable(23)= (0-4294967295) indicates the number of bytes
```

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```
-- available on this storage media.  This is a read-only parameter, writes to
-- this parameter shall be ignored (a dcm error code of readOnly shall be
set).
--dataStorageMediaUsed(24)= (0-4294967295) indicates the number of bytes used
-- on this storage media.  This is a read-only parameter, writes to this
-- parameter shall be ignored (a dcm error code of readOnly shall be set).

--On % full scale values, the “GET” value may not be same as the requested
--“SET” value since the implemented scale is IO and device-specific.  ”
```

2.2.10 Array Number (DcmArrayNum)

```
DcmArrayNum ::= INTEGER (1..255)

--This object represents a unique number for each sensor array that is defined
-- within the device in the ‘dcm Logical IO To Array Mapping Table’.  It is
-- strongly suggested that the array numbers are assigned sequentially.
```

2.2.11 Array Parameter Type (DcmArrayParamType)

```
DcmArrayParamType ::= INTEGER
{
 other (1),
 maxAxleSpacing (2),
 vehicleAxleRatio (3),
 singleAxleTimeout (4),
 maxVehicleLength (5),
 wimCalFactor (6),
 calFilePointer (7),
 arraySpeedCal (8)
}
--Indicates the type of parameter associated with an array. One or more types
--can be associated with an array.  The values are:
-- other (1),= not defined below.
-- maxAxleSpacing (2),= The longest axle spacing (in millimeters) that would
-- be expected on any vehicle to traverse the array.  This parameter is
-- typically used to end a vehicle if there is no presence sensor used in the
-- array.
--  vehicleAxleRatio (3),= The number of detected axles which shall be
considered to
--  constitute a vehicle.  This parameter is typically used in arrays that can
--  only detect axles.
-- singleAxleTimeout (4)= The amount of time from the last axle strike (in
--  milliseconds) that must elapse before another axle strike to end a
--  vehicle.  This parameter is typically used with arrays that do not use a
--  presence sensor to separate vehicles or cannot calculate a speed to use
--  the maxAxleSpacing parameter.
-- maxVehicleLength (5),= This parameter defines the maximum expected vehicle
--  length (in mm) to traverse the sensor array.  It is typically used to end
--  a vehicle in a situation where  the sensor used to calculate vehicle
--  length may be stuck on.
-- wimCalFactor (6),= This parameter defines a multiplier (0.000 to 65.535) to
--  be applied to weights calculated by an array.  This is a discrete number
--  and has no units.
-- calFilePointer (7)= The file name specified in the dcmParameterFileName
--  points to a file containing implementation-specific calibration parameters
-- (e.g. classification scheme, WIM autocalibration scheme).  object. The
--  value of the dcmParameterValue shall be ignored.
-- arraySpeedCal (8) = this enumeration was added to allow encoding of an
```

```
--  array speed calibration change (refer to dcmArraySpeedCalFactor in the
--  'Array Speed Calibration Table') to be encoded into the 'Array Parmater
--  Change Record Table' and written to a dcm data file. It shall not be used
--  in this table."
```

2.2.12 Array Parameter Value (DcmArrayParamValue)

```
 DcmArrayParamValue ::= INTEGER (0..16777215)

--Indicates the value associated with an array parameter type as
-- specified by a DcmArrayParamType object.  The acceptable value ranges and
-- units differ depending on the value of the dcmParameterType object value.
-- The acceptable values and UNITs per parameter type are:
-- maxAxleSpacing = 0 to 65535 in millimeter
-- vehicleAxleRatio = 1.00 to 655.35 as a divisor (e.g., 2.00 specifies that 2
--  axles constitute 1 vehicle)
-- singleAxleTimeout = 0 to 65535 in milliseconds
-- maxVehicleLength = 0 to 65535 in millimeters
-- wimCalFactor = 0.000 to 100.000 as a multiplier
-- calFilePointer = The DcmArrayParamValue is meaningless when the
--  DcmArrayParamType object is set to 'calFilePointer'.  The
--  DcmArrayParamFileName object should be read to obtain an octet string
--  identifying the name of a file which contains implementation-specific
--  calibration factors.
-- arraySpeedCal= Refer to dcmArraySpeedCalFactor in the 'Array Speed
--  Calibration Table'
```

2.2.13 Array Parameter File Name (DcmArrayParamFileName)

```
DcmArrayParamFileName ::= OCTET STRING (SIZE (0..255))

--Indicates a file name that contains array parameter calibration information.
-- This information is most likely implementation-specific.  The value of this
-- object is only meaningful, if the value of the Array Parameter Type
-- (dcmAPType) object is set to 'calFilePointer', otherwise this value shall
-- be ignored.
```

2.2.14 Filter Number (DcmFilterNum)

```
DcmFilterNum ::= INTEGER (1..255)

--This object indicates a filter number assigned to filters defined within
-- this dcm device from the 'dcm Filter Configuration Table'.
```

2.2.15 Study Number (DcmStudyNum)

```
DcmStudyNum ::= INTEGER (1..255)

--This object represents a unique number for each study that is defined within
-- the dcm device in the 'dcm Study Configuration Table'.  It is recommended
-- to assign this value sequentially, however when studies are deleted, there
-- could be gaps in the indexes.  It is recommended to use the deleted study
-- number as the next one to assign as an attempt to keep these indexes
-- sequential.
```

2.2.16 File Study Index (DcmFileStudyIndex)

```
DcmFileStudyIndex ::= INTEGER (0..255)

--Identifies a file structure number defined within the 'dcm File Structure
-- Table'.  A value of zero (0) indicates that no data shall be recorded and
```

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```
-- the study is to be used for Monitor Modes.
```

2.2.17 File Structure Number (DcmFileStrucNum)

```
DcmFileStrucNum ::= INTEGER (1..255)

--This object points to a defined file structure in the ‘dcm File Structure
-- Table’.  It is highly recommended that the application try to keep this
-- number sequential (reuse numbers that have been deleted).
```

2.2.18 Binned Filter Number (DcmBinnedFilterNum)

```
DcmBinnedFilterNum ::= INTEGER (1..255)

--This object represents a unique number for each binned filter that has been
-- defined in the ‘dcm Binned Filter Definition Table) within the device.  It
-- is strongly suggested that the numbering is assigned sequentially.  This
-- number can never exceed the maximum number of bins for all studies object
-- (dcmMaxNumBins).
```

2.3 VEHICLE CRITERIA NODE

```
--DCM Vehicle Criteria Node
dcmVehCriteria OBJECT IDENTIFIER ::= {dcm 1}

-- This node identifies the parameters that are used to define vehicle
--  criteria that can be used to configure Binned Studies, PVR Studies and
--  Filters.

-- These parameters are not intended to be  manipulated directly by an
--  application.  They are defined to allow assignment of an OID to reference
--  them in other places.  They are defined in this section because they were
--  not required to be defined as regular objects elsewhere in this standard.

-- Objects defined as an Integer can be used in the Filter Config Table and
--  the Binned Filter Definition Table.  Objects of any type can be used
--  in the PVR Study Configuration Table.

-- Even though an object is defined in this node, a device may not allow
--  using that object in one of the stated tables (as it may not be sensible).
--  The device shall return a dcm application error code of ‘invalidOption’
--  for any object not allowed in one of the tables.
-- The Vehicle Criteria Table shall indicate which vehicle parameters
--  (both within this MIB and externalto this MIB) are supported and for
--  what application (Binned Studies, PVR Studies or filters).

-- Note that objects that are only defined as elements of a table
--  (e.g. Array Number (DcmArrayNum)) may also be used within the
--  Vehicle Criteria Table.  The OID’s for these type of objects should
--  be taken from the table from which that object is first defined
--  (e.g. Array Number is first defined in the Logical IO To Array Map Table
--   as dcmIOAMArrNum).  Therefore if Array Number is supported by this
--  device, then the OID for dcmIOAMArrNum should be used in the
--  Vehicle Criteria Table.  Other objects (within this standard) included
--  in this category are dcmPLMLogIONum and dcmFCFilterNum. The controller
--  local time zone object from the Global Objects (1201-2.4.7,
--  controller-localTime) is also included in this category.

-- Each object defined in this section can be either a single-occurrence or
--  multi-occurrence object when used to configure a PVR Study.
```

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```
-- A single-occurrence object has only one instance when stored in the PVR
--  data (such as vehicle speed).
-- A multi-occurrence object shall consist of multiple occurrences of
--  the object (such as axle weights).
-- Unless otherwise specified, all objects shall be defined as a
--  single-occurrence object.

-- A single-occurrence object  has only one instance of the
--  defined parameter in the PVR structure, it shall be encoded as [(value)].
--  The length of the 'value' is specified by the  definition of the object.
--  (e.g. if an object is defined as INTEGER (1..65535), it must always be
--  stored using two octets). There must always be that number of octets
--  used to store this parameter (even if the value can be represeneted
--  in less octets).
-- A multi-occurrence object  may have more than one instance
--  of the defined parameter in the PVR structure.  This encoding shall always
--  start with a single octet to specify the number of occurrences for
--  this parameter (cannot exceed 255 occurrences of any parameter).
--  The multiple occurrences for this parameter must
--  be stored sequentially (e.g. if axle spacings then axsp1, axsp2, axsp3 …).
--  The length of each value is specified in the definition of the object
--   and all occurrences of this parameter must be the same length.
--   The number of occurrences octet may be set to 0 to indicate that
--   there are no parameters of this type stored.  This encoding allows
--   Pvr Record 1 to specify 5 axle weights for a truck and Pvr Record 2
--   to only specify 2 axle weights for a car.  The encoding becomes:
--   [(# of occurrences=n)(value 1)(value 2)…(value n)].

-- For either single or multi-occurrence objects, if the specified object
--  is an integer, the value field shall only consist of the data without
--  a tag or length field as defined in BER encoding.  If the specified
--  object is an octet string, it shall be stored with a tag and length field
--  as defined by BER encoding for octet strings.  A BER "NULL" may be
--  used in place of any octet string object that could not be determined
--  by the device.  This allows for specifying multiple instances of octet
--  strings of varying sizes.  A "NULL" is used as opposed to specifying
--  an OCTET STRING of size 0 octets because an OCTET STRING of size 0
--  octets may be a valid value for the specified parameter.
```

2.3.1 Maximum Number Of Vehicle Criteria Table Rows

```
dcmVCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Vehicle Criteria
Table."
::= {dcmVehCriteria 1}
```

2.3.2 Current Number Of Vehicle Criteria Table Rows

```
dcmVCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Vehicle Criteria
Table."
```

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```
::= {dcmVehCriteria 2}
```

2.3.3 Vehicle Criteria Table

```
dcmVehCriteriaTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmVehCriteriaEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This is a single-indexed table.  It contains all the OID's (from this MIB
and also can contain OID's from other MIBS) of all objects that this dcm
device shall support for vehicle criteria to be used in configuring binned
studies, pvr studies and filters."
::= {dcmVehCriteria 3}

dcmVehCriteriaEntry OBJECT-TYPE
 SYNTAX   DcmVehCriteriaEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX {dcmVCIndex}
::= {dcmVehCriteriaTable 1}

DcmVehCriteriaEntry  ::= SEQUENCE
{
 dcmVCIndex    INTEGER,
 dcmVCOID      OBJECT IDENTIFIER,
 dcmVCBitMap   INTEGER
}
```

2.3.3.1 Vehicle Criteria Index

```
dcmVCIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the only index into this table. It represents a unique sequential
number for each row in this table."
::= {dcmVehCriteriaEntry 1}
```

2.3.3.2 Vehicle Criteria OID

```
dcmVCOID OBJECT-TYPE
 SYNTAX   OBJECT IDENTIFIER
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "This field contains the OID of a Vehicle Criteria object that is supported
by this device.  The OID specified must be a full OID from the root of the iso
tree, relative OID's cannot be used.  This allows referring to objects outside
of this MIB.  The specified OID can also be an OID from a table (if the object
is only defined within a table (e.g. Array Number), but it shall be the OID of
the object from the table in which the specified object is defined (e.g. if
Array Number is to be used, the OID shall be taken from the Logical IO To
Array Map Table"
::= {dcmVehCriteriaEntry 2}
```

2.3.3.3 Vehicle Criteria Support BitMap

```
dcmVCBitMap OBJECT-TYPE
```

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```
 SYNTAX  INTEGER (0..255)  --Bitmap
 ACCESS  read-only
 STATUS  mandatory
 DESCRIPTION
 “This bitmap indicates which set of functionality for each specified OID (dcmVCOID) this device supports.  Setting a bit to one (1) indicates that the associated functionality is supported.  All unused bits shall be reserved.
Note that the options pvrStudySingle and pvrStudyMulti are included to specifically address any objects that are supported by the device for PVR Studies, but do not specify if it is a single-occurrence or multi-occurrence object in it’s definition.
The values are:
bit 0 – other
bit 1 – binnedStudy, the object specified by dcmVCOID is supported to configure binned studies.
bit 2 – pvrStudySingle, the object specified by dcmVCOID is supported to configure pvr studies and is a single-occurrence object. Note that both pvrStudySingle and pvrStudyMulti cannot be selected for the same object.  Only one of the two options may be selected for the specified object.
bit 3 – pvrStudyMulti, the object specified by dcmVCOID is supported to configure pvr studies and is a multi-occurrence object.  Note that both pvrStudySingle and pvrStudyMulti cannot be selected for the same object.  Only one of the two options may be selected for the specified object.
bit 4 – filters, the object specified by dcmVCOID is supported to configure filters.“
::= {dcmVehCriteriaEntry 3}
```

2.3.4 Axle Number

```
dcmAxleNumber OBJECT-TYPE
 SYNTAX  INTEGER (1..255)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the axle number of a vehicle that is being referenced. This is a discrete number and has no units.  A value of one (1) indicates the first axle of a vehicle detected by the sensor array.  The highest value that this object can reference is defined by the value of the dcmMaxNumAxles object.”
::= {dcmVehCriteria 4}
```

2.3.5 Number of Axles

```
dcmNumAxles OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 " Indicates the number of axles on a vehicle. This is a discrete number and has no units. A value of zero (0) indicates that no axles were detected. The highest value that this object can reference is defined by the value of the dcmMaxNumAxles object.”
::= {dcmVehCriteria 5}
```

2.3.6 Vehicle Class

```
dcmVehicleClass OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
```

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```
 "Indicates a system-wide unique classification of a vehicle. Any or all
vehicle parameters (such as vehicle length, axle spacings,…) can be used to
derive this classification. This is a discrete number and has no units."
::= {dcmVehCriteria 6}
```

2.3.7 Vehicle Speed

```
dcmVehicleSpeed OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the vehicle speed, in cm/sec.”
::= {dcmVehCriteria 7}
```

2.3.8 Vehicle Length

```
dcmVehicleLength OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the overall length of a vehicle, in cm, from the physical start to
the physical end of the vehicle.”
::= {dcmVehCriteria 8}
```

2.3.9 Vehicle Front Overhang

```
dcmFrontOverhang OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the front overhang of a vehicle which is measured from the
physical start of a vehicle to its first axle (center), units are cm.”
::= {dcmVehCriteria 9}
```

2.3.10 Vehicle Rear Overhang

```
dcmRearOverhang OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
"Indicates the rear overhang of a vehicle which is measured from last
axle(center) of a vehicle to it the physical end, units are cm.”
::= {dcmVehCriteria 10}
```

2.3.11 Axle Spacing

```
dcmAxleSpacing OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the spacing between adjacent axles (from the center of one axle to
the center of the next axle), measured in cm.  This is a multiple-occurrence
object where the number of occurrences is one less than the number of axles
detected for this vehicle.
A value of zero (0) shall be recorded for any axle spacings that cannot be
determined.“
```

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```
::= {dcmVehCriteria 11}
```

2.3.12 Vehicle Wheelbase

```
dcmVehWheelbase OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the distance from the first to the last axle (center to center) of
a vehicle.  Units are cm.
A value of zero (0) shall be recorded if the vehicle wheelbase cannot be
determined."
::= {dcmVehCriteria 12}
```

2.3.13 Vehicle Clearance

```
dcmVehClearance OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the clearance of the vehicle above ground measured from the lowest
point of the vehicle excluding tire and wheel, in cm.
A value of zero (0) shall be recorded if the vehicle clearance cannot be
determined."
::= {dcmVehCriteria 13}
```

2.3.14 Vehicle Height

```
dcmVehicleHeight OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the overall height of the vehicle from the ground to its highest
point including load, measured in cm.
A value of zero (0) shall be recorded if the vehicle height cannot be
determined."
::= {dcmVehCriteria 14}
```

2.3.15 Axle Width

```
dcmAxleWidth OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the overall width of an axle from outside edge to outside edge of
the outer tires on a vehicle, measured in cm.  This is a multiple occurrence
object where the number of occurrences is equal to the number of axles
detected for this vehicle.
A value of zero (0) shall be recorded for any axle widths that cannot be
determined."
::= {dcmVehCriteria 15}
```

2.3.16 Vehicle Width

```
dcmVehicleWidth OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
```

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```
 STATUS  optional
 DESCRIPTION
 "Indicates the width of the vehicle at the widest point including load. Units
are cm.
A value of zero (0) shall be recorded if the vehicle width cannot be
determined."
::= {dcmVehCriteria 16}
```

2.3.17 Axle Tire Count

```
dcmAxleTireCount OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the total number of tires per axle.  Note that for dual-tire
axles, this value shall be 4.
This is a multiple occurrence object where the number of occurrences is equal
to the number of axles detected for this vehicle.
A value of zero (0) shall be recorded for any tire counts per axle that cannot
be determined."
::= {dcmVehCriteria 17}
```

2.3.18 Axle Tire Track

```
dcmAxleTireTrack OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the distance from the right-most edge of the sensor array to the
right-most tire per axle.  Units are in cm.
This is a multiple occurrence object where the number of occurrences is equal
to the number of axles detected for this vehicle.
A value of zero (0) shall be recorded for any axle tire track that cannot be
determined."
::= {dcmVehCriteria 18}
```

2.3.19 Vehicle Gap

```
dcmVehicleGap OBJECT-TYPE
 SYNTAX  INTEGER (0..16711425)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the time separation between 2 vehicles, measured in milliseconds.
This value is measured from the physical end of the preceding vehicle to the
physical start of the current vehicle.  A value of zero (0) is used where the
gap cannot be determined.  If the detected value exceeds the maximum value of
this object, the maximum value shall be used."
::= {dcmVehCriteria 19}
```

2.3.20 Vehicle Headway

```
dcmVehicleHeadway OBJECT-TYPE
 SYNTAX  INTEGER (0..1671142)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the time separation between 2 vehicles, measured in milliseconds.
This value is measured from the physical start of the preceding vehicle to the
```

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```
physical start of the current vehicle.  A value of zero (0) is used where the
gap cannot be determined.  If the detected value exceeds the maximum value of
this object, the maximum value shall be used.”
::= {dcmVehCriteria 20}
```

2.3.21 Left Wheel Weight

```
dcmLeftWheelWeight OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the weight of the left wheel (left group of one or more tires on
the same axle relative to the direction of travel), measured in kilograms.
This is a multiple occurrence object where the number of occurrences is equal
to the number of axles detected for this vehicle.
A value of zero (0) shall be recorded for any axle wheel weights that cannot
be determined."
::= {dcmVehCriteria 21}
```

2.3.22 Right Wheel Weight

```
dcmRightWheelWeight OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the weight of the right wheel (right group of one or more tires on
the same axle relative to the direction of travel), measured in kilograms.
This is a multiple occurrence object where the number of occurrences is equal
to the number of axles detected for this vehicle.
A value of zero (0) shall be recorded for any axle wheel weights that cannot
be determined."
::= {dcmVehCriteria 22}
```

2.3.23 Axle Weight

```
dcmAxleWeight OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the weight of an axle, measured in kilograms.
This is a multiple occurrence object where the number of occurrences is equal
to the number of axles detected for this vehicle.
A value of zero (0) shall be recorded for any axle weights that cannot be
determined."
::= {dcmVehCriteria 23}
```

2.3.24 Sensor Weights

```
dcmSensorWeight OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the weight calculated by a WIM sensor, measured in kilograms.
This is a multiple occurrence object where the number of occurrences is equal
to the number of axles detected for this vehicle multiplied by the number of
WIM sensors in the array. The number of WIM sensors in the array is defined in
the logicalIoArrayMappingTable.  The sequence of sensorWeight values within
```

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```
the data collection file is logicalIoNumber value and then axleNumber value
(e.g., a 3-axle vehicle crosses a 2-sensor WIM array, it would be recorded as
logicalIoNumber1-axleNumber1-sensorWeight value, logicalIoNumber1-axleNumber2-
sensorWeight    value,    logicalIoNumber1-axleNumber3-sensorWeight    value,
logicalIoNumber2-axleNumber1-sensorWeight value, logicalIoNumber2-axleNumber2-
sensorWeight value, logicalIoNumber2-axleNumber3-sensorWeight value).  The WIM
logicalIoNumbers shall be listed in ascending order.
A value of zero (0) shall be recorded for any sensor weights that cannot be
determined."
::= {dcmVehCriteria 24}
```

2.3.25 Gross Vehicle Weight

```
dcmGrossVehicleWeight OBJECT-TYPE
 SYNTAX  INTEGER (0..16711425)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the gross weight of a vehicle (the sum of all axle weights),
measured in kilograms. A value of zero (0) shall be recorded, if the gross
vehicle weight cannot be determined."
::= {dcmVehCriteria 25}
```

2.3.26 Vehicle Sequence Number

```
dcmVehicleSeqNum OBJECT-TYPE
 SYNTAX  INTEGER (0..65535)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "A number assigned to each vehicle that traverses a sensor array.  The
numbers are assigned sequentially over all sensor arrays. The value shall roll
over to a value of 1 (1-65535). If a sequential number cannot be assigned, a
value of zero (0) shall be used.      This number along with a time tag
(controller-localTime) is used to uniquely identify vehicles.  For example, if
a vehicle traverses sensor array 1 and is assigned sequence number 1, the next
vehicle (regardless of which sensor array it traverses will be assigned
sequence number 2."
::= {dcmVehCriteria 26}
```

2.3.27 Vehicle Status Flag

```
dcmVehicleStatusFlag OBJECT-TYPE
 SYNTAX  INTEGER (0..4294967295)  --Bitmap
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates a vehicle-specific status and warning information (e.g. unbalanced
axle hits) for the specified vehicle.  Setting a bit to one (1) indicates that
the associated condition is true.  The values are:
bit 0 – other
bit 1 – off/onScale – physical off scale sensor is triggered or the on scale
sensor was NOT triggered.
bit 2 – overHeight – physical overheight sensor was triggered
bit 3 – speedChange – too much speed change detected between adjacent axles
for this vehicle
bit 4 – partialAxle – something went wrong in the middle of processing an axle
bit 5 – unequalAxleCount – number of axles detected on each axle sensor is not
the same.
bit 6 – tailgating – this vehicle follows the preceding vehicle too closely
```

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```
bit 7 – wrongLane – this vehicle is in the wrong lane
bit 8 – runningScale – this vehicle bypassed the weigh-station incorrectly
bit 9 – notWimLane – this class of vehicle should not be in this lane
bit 10 – overlength – vehicle exceeds length threshold
bit 11 – overGVW – vehicle exceeds GVW weight threshold
bit 12 – randomSafety – vehicle randomly selected for Safety check
bit 13 – overSpeed - vehicle exceeds the speed threshold
bit 14 – late – vehicle arrives late at the next sensor array; used in
conjunction with bits 18, 19, 20.
bit 15 – unexpected – vehicle arrives unexpectedly at the next sensor array
bit 16 – pastDue – vehicle didn't arrive at the next sensor array within the
arrival threshold
bit 17 – noMatch – no vehicle match was found for this vehicle at this sensor
array
bit 18 – badLateralPosition – error computing vehicle position (tire tracking)
bit 19 – noCompliance – no vehicle compliance structure found for this class
of vehicle
bit 20 – overrideFail – failed to adjust the direction signs in time
bit 21 – wrongWay – vehicle went over the sensor array in an unexpected
direction
bit 22- MinSpeed – too slow for data processing purposes
bit 23 – AxleProcessingError – internal error inside the vehicle processing
software
bit 24 - MaxSpeed – too fast for data processing purposes
bit 25 - TooManyAxles – the value indicated in the dcmMaxAxles object has been
exceeded
bit 26 - SensorOrderError – at least one of the sensors within the array was
not activated in the expected order, e.g., only the upstream sensor, or only
the downstream sensor was activated, or a sensor was activated by another lane
movement
bit 27 – MinAxleSpacing – the detected value for the axle spacing was below
the threshold for minAxleSpacing
bit 28 – MinFirstAxleSpacing - the detected value for the first axle spacing
was below the threshold for minFirstAxleSpacing
All unused bits are reserved."
::= {dcmVehCriteria 27}
```

2.3.28 Axle Weight Violation Code

```
dcmAxleWeightViolationCode OBJECT-TYPE
 SYNTAX  INTEGER (0..16711425)  -- bitmap
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates axle-specific violations (e.g., axle overweight) for the specified
vehicle.  Setting a bit to one (1) indicates that the associated condition is
true.  This object is a bitmap.
The bit assignments are:
OtherWeightViolation (bit 0) – if a weight violation not defined below has
been detected.
SteeringViolation (bit 1) – if the allowable steering axle weight has been
exceeded and if this axle is part of a steering axle group.
SingleAxleViolation (bit 2) – if the allowable single axle weight has been
exceeded and if this axle is a single axle.
TandemAxleViolation (bit 3) - if the allowable tandem axle weight has been
exceeded and if this axle is part of a tandem axle group.
TridemAxleViolation (bit 4) - if the allowable tridem axle weight has been
exceeded and if this axle is part of a tridem axle group.
```

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```
QuadremAxleViolation (bit 5) - if the allowable quadrem axle weight has been
exceeded and if this axle is part of a quadrem axle group.
AxleBalanceViolation (bit 6) – if the difference between axle weights within
an axle group exceeds a pre-defined threshold.
AxleGroupIndividualViolation (bit 7) – if the maximum weight 'individual axle'
threshold for an individual axle within an axle group has been exceeded.
BridgeViolation (bit 8) –if this axle is part of any combination of axles
which exceed the maximum bridge weight threshold.
WheelViolation (bit 9) -  if the allowable wheel weight for any single wheel
(group of tires) on an axle has been exceeded.
WheelImbalanceViolation (bit 10) – if the imbalance between wheel weights on
an axle exceeds a pre-defined threshold.
The definition of what constitutes a violation is NOT defined by this
standard.  If a violation has been detected the corresponding bit shall be set
to 1.  Thus, if no violation has been detected, the value of this object is
zero (0).
This object is a multiple-occurrence object where the number of occurrences is
equal to the number of axles detected for this vehicle.
All unused bits are reserved."
::= {dcmVehCriteria 28}
```

2.3.29 Vehicle Acceleration

```
dcmVehicleAcceleration OBJECT-TYPE
 SYNTAX  INTEGER (-32768..32767)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the acceleration/deceleration of a vehicle, measured in cm/s².
Deceleration is defined as negative acceleration.  A value of -32768 shall be
recorded, if the acceleration of a vehicle cannot be determined."
::= {dcmVehCriteria 29}
```

2.3.30 Number of Vehicle IDs

```
dcmNumVehicleIDs OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates the total number of vehicle IDs associated with a vehicle."
::= {dcmVehCriteria 30}
```

2.3.31 Vehicle ID

```
dcmVehicleID OBJECT-TYPE
 SYNTAX  OCTET STRING
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "Indicates a vehicle ID, typically read from the vehicle using an AVI
(Automatic Vehicle Identification) device such as a tag.  This object can only
be used in the PVR Study Configuration Table.  Since it is not an Integer, it
cannot be used in the Filter Configuration Table.
This is a multiple-occurrence object where the number of occurrences is equal
to the number of vehicle ID's associated with this vehicle.
A NULL shall be recorded for any vehicle IDs that cannot be determined.
When this object is used in a PVR study, the value shall be stored using BER
encoding (TLV) since it is an Octet String."
```

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```
::= {dcmVehCriteria 31}
```

2.3.32 Vehicle Time Tag in 1000th Seconds

```
dcmVehicleTimeTag1000 OBJECT-TYPE
 SYNTAX  INTEGER (0..999)
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
 "The time expressed in 1000th of a second (milliseconds). This object is only
used when a higher resolution than 1 sec is required for a vehicle time tag.
This value is used in conjunction with the 'controller-localTime' object in
that this counter rolls over every second.  The DCM device shall record this
value with its highest resolution which may be less than 100th of a second."
::= {dcmVehCriteria 32}
```

2.4 DEVICE SETUP NODE

```
--DCM Device Setup Node
dcmDeviceSetup OBJECT IDENTIFIER ::= {dcm 2}
-- This node is an identifier used to group all objects for configuring of the
-- device setup parameters that are common to data collection and monitoring
-- devices.
```

2.4.1 Unique Device ID

```
dcmDeviceId OBJECT-TYPE
 SYNTAX  OCTET STRING (SIZE (0..16))
 ACCESS  read-write
 STATUS  optional
 DESCRIPTION
 "Indicates a user-assigned unique number or string of characters that
identifies the overall DCM device.  This is not to be confused with the
dcmSiteID object value."
::= {dcmDeviceSetup 1}
```

2.4.2 Battery Voltage

```
dcmBatteryVoltage OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "Indicates the voltage of the battery at the time of the request. The value
range shall be 00.0-25.5V in 0.1 increments."
::= {dcmDeviceSetup 2}
```

2.4.3 Charging Current

```
dcmChargingCurrent OBJECT-TYPE
 SYNTAX  INTEGER(-100000..100000)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "Indicates the charging current in milliAmperes at the time of the request.
The value range shall be +/- 100000 mA in 1 mA increments."
::= {dcmDeviceSetup 3}
```

2.4.4 Current Number Of IO Boards

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```
dcmNumIoBoards OBJECT-TYPE
 SYNTAX  INTEGER(0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "Indicates the current number of IO Boards configured in the
dcmIOBoardConfigTable."
::= {dcmDeviceSetup 4}
```

2.4.5 Maximum Number Of IO Board Configuration Table Rows

```
dcmIOBCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the IO Board Configuration
Table."
::= {dcmDeviceSetup 5}
```

2.4.6 Current Number Of IO Board Configuration Table Rows

```
dcmIOBCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the IO Board Config Table."
::= {dcmDeviceSetup 6}
```

2.4.7 IO Board Configuration Table

```
dcmIOBoardConfigTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmIOBoardConfigEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table defines the configuration parameters for each IO Board installed
in the DCM device. Rows are created/deleted only through the insertion or
removal of boards within the device.  There may be one or more entries for
each IO board in the device (e.g. a single IO board may support multiple
functions such as cpu and storageMedia).  This is a double-indexed table."
::= {dcmDeviceSetup 7}

dcmIOBoardConfigEntry OBJECT-TYPE
 SYNTAX   DcmIOBoardConfigEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmIOBCBoardNum, dcmIOBoardFunction}
::= {dcmIOBoardConfigTable 1}

DcmIOBoardConfigEntry  ::= SEQUENCE
{
 dcmIOBCBoardNum       DcmIOBoardNum,
 dcmIOBoardFunction    DcmIOBoardFtn,
 dcmIOBCNumIO          INTEGER,
 dcmIOBoardType        INTEGER,
 dcmIOBoardDescription OCTET STRING,
 dcmIOBoardStatus      INTEGER,
```

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```
 dcmIOBoardControl     INTEGER
}
```

2.4.7.1 IO Board Number

```
dcmIOBCBoardNum OBJECT-TYPE
 SYNTAX   DcmIOBoardNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the first index into this table.  It represents a unique number
for each IO Board that has been installed within the device.  This index is
assigned by the device and must be sequential.”
::= {dcmIOBoardConfigEntry 1}
```

2.4.7.2 IO Board Function

```
dcmIOBoardFunction OBJECT-TYPE
 SYNTAX   DcmIOBoardFtn
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Since an IO board can have multiple functions, this index allows the
capability to define multiple IO Board Function Types for the same board. For
instance a CPU board might have roadtube inputs and storage media available.
Although the IO Board Function Type could be used for the 2nd index, it would
probably end up in a table that had non-sequential indexes.  This secondary
index is assigned by the device and must be sequential."
::= {dcmIOBoardConfigEntry 2}
```

2.4.7.3 IO Board Number Of IO

```
dcmIOBCNumIO OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "This is the number of IO’s of the type specified by IO Board Function Type
for this board number specified by IO Board # in this row."
::= {dcmIOBoardConfigEntry 3}
```

2.4.7.4 IO Board Function Type

```
dcmIOBoardType OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  cpu (2),
  storageMedia (3),
  inputNonSensor (4),
  output (5),
  comms (6),
  keyboard (7),
  display (8),
  roadTube (9),
  piezo (10),
  loop (11),
  wimPiezo (12),
  bendingPlate (13),
  contactClosure (14),
  acoustic (15),
```

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```
  radar (16),
  microwave (17),
  infrared (18),
  laser (19),
  optoIsolated (20),
  fiberOptic (21),
  contactRelay (22),
  quartz (23),
  lightcurtain (24),
  video (25),
  timer (26),
  fiberOpticWim (27),
  ultrasound (28)
 }
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the main functional type of this IO board.  The values are:
other – not defined below
cpu – main processor
storageMedia – board provides data storage area (e.g. FLASH, SRAM, Hard
Disk,…)
inputNonSensor – board provides input from a non-sensor (e.g. contact input
controlled by an external software application)
output – board provides output functionality (e.g. solid state relay)
comms – board provides communications functionality (e.g. rs232, Ethernet,…)
keyboard - board provides key inputs
display – board provides display capability (e.g. LCD…)
roadTube – IO sensor
piezo – IO sensor
loop – IO sensor
wimPiezo – IO sensor
bendingPlate – IO sensor
contactClosure – IO sensor
acoustic – IO sensor
radar – IO sensor
microwave – IO sensor
infrared – IO sensor
laser – IO sensor
optoIsolated – IO sensor
fiberOptic – IO sensor
contactRelay – IO sensor
quartz – IO sensor
lightcurtain – IO sensor
video – IO sensor
timer – IO sensor
fiberOpticWim – IO sensor
ultrasound – IO sensor”
::= {dcmIOBoardConfigEntry 4}
```

2.4.7.5 IO Board Description

```
dcmIOBoardDescription OBJECT-TYPE
 SYNTAX   OCTET STRING
 ACCESS   read-only
 STATUS   optional
 DESCRIPTION
 "Indicates a device-provided description of the board.  It is suggested that
this string contain information such as board slot/address in device, firmware
```

version, hardware version, model #, serial #, vendor name, # of IO ports on this board, storage media type (sram, flash,…), storage media size. Note that all listed information may not be applicable to each type of IO board. This object is only used to identify more information regarding the IO board. It is not used to configure the board. Some of the information in this object may be dynamic."
::= {dcmIOBoardConfigEntry 5}

2.4.7.6 IO Board Status

```
dcmIOBoardStatus OBJECT-TYPE
 SYNTAX INTEGER
 {
  enabled (1),
  disabled (2),
  fault (3),
  resetting (4),
  suspended (5)
 }
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "indicates whether this IO Board is currently active.  The values are:
enabled (1) – the board is required for the current study configuration and is in use.
disabled (2) – the board is required for the current study configuration but has been disabled.
fault (3), - At least one of the IO channels on this board is in fault. The dcmPhysicalLogicalMapTable can be interrogated to determine which specific channels are in fault.
resetting (4) – this indicates that the IO board is currently being reset. After the reset has completed, it shall be modified to (enabled), (suspended) or (fault).
suspended (5) - the board has been disabled by the device because it is not required for the current study configuration."
::= {dcmIOBoardConfigEntry 6}
```

2.4.7.7 IO Board Control

```
dcmIOBoardControl OBJECT-TYPE
 SYNTAX INTEGER
 {
  notSupported (1),
  enable (2),
  disable (3),
  reset (4),
  suspend (5)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows a user to enable, disable, reset, or suspend this IO Board. The value of this object represents the last user-selected control.  If this board is disabled or enabled, then any entry in the dcmPhysicalLogicalMapTable which corresponds to this board shall set the IO Status Entry in that table appropriately.  For example, a user may want to temporarily disable a sensor board to make it easier to debug which sensor inputs may be causing problems in the field.  If the requested operation is not supported by the specified IO board, this field shal be set to 'notSupported'.  Performing a reset of a storage media shall result in the formatting of that media."
```

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```
::= {dcmIOBoardConfigEntry 7}
```

2.4.8 Maximum Number Of Physical To Logical Mapping Table Rows

```
dcmPLMTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Physical To Logical
Mapping Table.”
::= {dcmDeviceSetup 8}
```

2.4.9 Current Number Of Physical To Logical Table Rows

```
dcmPLMTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Physical To Logical
Table.”
::= {dcmDeviceSetup 9}
```

2.4.10 Physical to Logical Mapping Table

```
dcmPhysicalLogicalMapTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmPhysicalLogicalMapEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table maps a physical IO to a unique logical IO number.  The logical IO
number will then be used as a reference by the other objects/tables within
this mib to manipulate the physical IO.  This is a double-indexed table."
::= {dcmDeviceSetup 10}

dcmPhysicalLogicalMapEntry OBJECT-TYPE
 SYNTAX   DcmPhysicalLogicalMapEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX {dcmPLMIOBoardNum, dcmPhysicalIONumber}
::= {dcmPhysicalLogicalMapTable 1}

DcmPhysicalLogicalMapEntry  ::= SEQUENCE
{
 dcmPLMIOBoardNum            DcmIOBoardNum,
 dcmPLMIOBoardFunction       DcmIOBoardFtn,
 dcmPhysicalIONumber         INTEGER,
 dcmPLMLogIONum              DcmLogIONum,
 dcmPhysicalLogicalIOStatus  INTEGER,
 dcmPhysicalLogicalIOControl INTEGER
}
```

2.4.10.1 IO Board Number

```
dcmPLMIOBoardNum OBJECT-TYPE
 SYNTAX   DcmIOBoardNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
```

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```
 "Indicates the first index into this table. Refer to DcmIOBoardNum for a more
detailed description.”
::= {dcmPhysicalLogicalMapEntry 1}
```

2.4.10.2

2.4.10.3 IO Board Function

```
dcmPLMIOBoardFunction OBJECT-TYPE
 SYNTAX   DcmIOBoardFtn
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Since an IO board can have multiple functions, this index identifies the
function of the IO within the IO Board Number specified by dcmPLMIOBoardNum
for this row."
::= {dcmPhysicalLogicalMapEntry 2}
```

2.4.10.4 Physical IO Number

```
dcmPhysicalIONumber OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the second index into this table.  This index refers to a channel
within an IO board (e.g. IO board 1 may have 4 inputs which would result in 4
entries in this table to map each of the 4 inputs 1-1, 1-2, 1-3, 1-4). This
index is assigned by the device and must be sequential.”
::= {dcmPhysicalLogicalMapEntry 3}
```

2.4.10.5 Logical IO Number

```
dcmPLMLogIONum OBJECT-TYPE
 SYNTAX   DcmLogIONum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "See DcmLogIONum description”
::= {dcmPhysicalLogicalMapEntry 4}
```

2.4.10.6 Physical IO Status

```
dcmPhysicalLogicalIOStatus OBJECT-TYPE
 SYNTAX INTEGER
 {
  enabled (1),
  disabled (2),
  fault (3),
  resetting (4),
  suspended (5)
 }
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the current status for this IO channel. The values are:
- enabled (1) – the IO is required by the current study configuration and is
in use.
- disabled (2) – the IO is required for the current study configuration but
has been disabled.
- fault (3), - This IO channel is in fault.
```

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```
- resetting (4) – this indicates that the IO is currently being reset.  After
the reset has completed, it shall be modified to (enabled), (suspended) or
(fault).
- suspended (5) – the IO has been disabled by the device because it is not
required for the current study configuration."
::= {dcmPhysicalLogicalMapEntry 5}
```

2.4.10.7 Physical IO Control

```
dcmPhysicalLogicalIOControl OBJECT-TYPE
 SYNTAX   INTEGER
 {
  notSupported (1),
  enable (2),
  disable (3),
  reset (4),
  suspend (5)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows an application to enable, disable,reset or suspend a physical IO
channel.  The value of this object represents the last user-selected control.
An application may want to enable/disable an IO channel for diagnostic
purposes.  If the requested operation is not supported by the specified IO
channel, this value shall be set to ‘notSupported’.“
::= {dcmPhysicalLogicalMapEntry 6}
```

2.4.11 Maximum Number Of Logical IO Parmater Table Rows

```
dcmLIOPTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Logical IO Parameter
Table.”
::= {dcmDeviceSetup 11}
```

2.4.12 Current Number Of Logical IO Parameter Table Rows

```
dcmLIOPTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Logical IO Parameter
Table.”
::= {dcmDeviceSetup 12}
```

2.4.13 Logical IO Parameter Table

```
dcmIOParamTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmIOParamEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table defines parameters that can be applied to each IO channel to
allow processing and adjustment of that IO channel.  There can be multiple
rows within this table for each logical IO.  The indexing of this table will
not be sequential.  If an application tries to define more rows than the
```

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```
device will allow, an application error code of ‘exceeded max number of rows
allowed’ shall be set.  This is a double-indexed table.  The table can be
managed thru dcmIOParamRowAdmin object.
If an attempt is made to set a parameter of an IO channel and the IO board
associated with the IO channel can only set the parameter at a board level,
all IO channels of that type (which have been entered into this table) on that
IO board will be set to the specified value.  It is up to the application to
re-read this table to determine if any of the requested parameters have been
changed.

Conversely, if it is possible to access each IO channel within a board then
each IO channel has to be set individually.  Note that all IO channels may not
require any parameters set and some IO channels may require multiple
parameters set."
::= {dcmDeviceSetup 13}

dcmIOParamEntry OBJECT-TYPE
 SYNTAX   DcmIOParamEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX   {dcmIOPNum, dcmIOPTyp}
::= {dcmIOParamTable 1}

DcmIOParamEntry  ::= SEQUENCE
{
 dcmIOPNum          DcmLogIONum,
 dcmIOPTyp          DcmIOParamType,
 dcmIOPVal          DcmIOParamValue,
 dcmIOParamRowAdmin DcmRowStatus
}
```

2.4.13.1 IO Parameter Logical IO Number

```
dcmIOPNum OBJECT-TYPE
 SYNTAX   DcmLogIONum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "First  index  into  this  table.    Refer  to  DcmLogIONum  for  detailed
description.”
::= {dcmIOParamEntry 1}
```

2.4.13.2

2.4.13.3 IO Parameter Type

```
dcmIOPTyp OBJECT-TYPE
 SYNTAX DcmIOParamType
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the second index into this table.  A second index is required to
allow assigning multiple parameters for any IO channel. The indexes will most
likely not be assigned sequentially.  If an application tries to set a
parameter on an IO channel that is invalid, an application error of ‘invalid
option’ shall be set.”
::= {dcmIOParamEntry 2}
```

2.4.13.4 IO Parameter Value

```
dcmIOPVal OBJECT-TYPE
```

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```
 SYNTAX   DcmIOParamValue
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the value for the selected IO parameter. Refer to DcmIOParamValue
a detailed description of the allowed values.“
::= {dcmIOParamEntry 3}
```

2.4.13.5 IO Parameter Row Admin

```
dcmIOParamRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the associated ‘logical IO/parameter combination’ (this
row of this table).  The SYNTAX definition allows to create, delete, disable,
or edit the row."
::= {dcmIOParamEntry 4}
```

2.5 OPERATING STATUS CONFIGURATION NODE

```
--DCM Operating Status Configuration Node
dcmOpsStatus OBJECT IDENTIFIER ::= {dcm 3}
-- This node is an identifier used to group all objects indicating the
-- operating status in ways that are common to data collection and
-- monitoring devices.

-- objects addressing current date and current time are defined in NTCIP 1201
--(plus amendment 1, which are referenced in Annex A.
```

2.5.1 dcm Resets

```
dcmReset OBJECT-TYPE
 SYNTAX  INTEGER
 {
  other (1),
  hardReset (2),
  softReset (3),
  commReset (4),
  factoryReset (5),
  userReset (6),
  tableClear (7)
 }
 ACCESS  read-write
 STATUS  optional
 DESCRIPTION
 "indicates the different types of resets that may be issued to the dcm
device.  The values and their meaning are:
1=Other
2=Hard Reset
         -  (restart program, reset comms, clear all user settings, reset
            sensor boards, reset keyboard/display, reset cpu program memory,
            does not clear data files, resets to all factory defaults, stops
            current recording study)
3=Soft Reset
            -  (restart program, does not reset comms, does not change user
               settings, does not reset sensor boards, resets
               keyboard/display, resets cpu program memory, does not clear
```

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```
               data files, does not reset to factory defaults, stops  current
               recording study)
4=Comms Reset
            -  Resets the comms channel used to communicate with the field
               unit to user defaults.
            -  It is recommended that all required elements are resynched by
               the dcm device to ensure that communications is not lost with
               the dcm unit (e.g. modem).
5=Factory Reset
            -  User settings consist of all structures that can be written to.
            -  Resets all user settings to factory defaults.
6=User Reset
            -  Which objects/tables to reset and the values to reset them to
               is  configured by the dcmURCTTable
7=Table Clear
            -  The clear operation is based on the dcmTableClearTable
"
::= {dcmOpsStatus 1}
```

2.5.2 Maximum Number Of Table Clear Table Rows

```
dcmTCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Table Clear Table.”
::= {dcmOpsStatus 2}
```

2.5.3 Current Number Of Table Clear Table Rows

```
dcmTCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Table Clear Table.”
::= {dcmOpsStatus 3}
```

2.5.4 Table Clear Table

```
dcmTableClearTable OBJECT-TYPE
 SYNTAX  SEQUENCE OF DcmTableClearEntry
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION
“This table indicates which tables to perform a clear on.  Multiple tables or
multiple rows within a table can be specified to be cleared by configuring
multiple rows within this table.  The clear can be defined to clear the whole
table or just a row within the table. This is a singly-indexed table.  All
entries must be sequentially indexed.  The OID of this table shall not be
allowed as a valid OID entry in this table."
::= {dcmOpsStatus 4}

dcmTableClearEntry OBJECT-TYPE
 SYNTAX DcmTableClearEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION “...”
```

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```
 INDEX {dcmTableClearIndex}
::={dcmTableClearTable 1}

DcmTableClearEntry ::= SEQUENCE
{
 dcmTableClearIndex INTEGER,
 dcmTCTOID          OBJECT IDENTIFIER,
 dcmTCTAction       INTEGER,
 dcmTCTRowAdmin     DcmRowStatus
}
```

2.5.4.1 Table Clear Index

```
dcmTableClearIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “indicates the only index into this table.”
::= {dcmTableClearEntry 1}
```

2.5.4.2 Table Clear Object Identifier

```
dcmTCTOID OBJECT-TYPE
 SYNTAX OBJECT IDENTIFIER
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 “this value points to the OID of a table.  The value of the next object
(dcmTCTAction) then points to the rows that are to be cleared.  An error
(noSuchName) shall be returned, if the OID pointed to within this object
instance is not supported by the device.”
::= {dcmTableClearEntry 2}
```

2.5.4.3 Table Clear Action

```
dcmTCTAction OBJECT-TYPE
 SYNTAX INTEGER (0..255)
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 “Setting this to zero (0) shall remove the whole table specified by
dcmTCTOID.  Any other value refers to the row number (relative to the first
index of the specified table) to clear.  (e.g. if doubly-indexed table, 1-1,1-
2,2-1,2-2, setting this to a 2 would clear out all rows with the first
index=2, 2-1 and 2-2).  This action will occur when the dcmReset object is set
to tableClear.  If the row or table can not be deleted, then the row or table
shall go to factory default settings.  If removing the row or table will
result in an invalid device configuration, the device shall return an error
and not perform the requested action.”
::= {dcmTableClearEntry 3}
```

2.5.4.4 Table Clear Row Admin

```
dcmTCTRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of this row of this table.  The SYNTAX definition allows
to create, delete, disable, or edit the row."
```

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```
::= {dcmTableClearEntry 4}
```

2.5.5 Current Number Of User Configuration Settings

```
dcmNumUserConfigs OBJECT-TYPE
 SYNTAX  INTEGER(0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "Indicates the current number of objects configured for a user reset. Objects can be configured for a User Reset through the User Reset Config Table (dcmURCTTable).  Note that this is different than the Current Number of User Reset Config Table Rows object.  For example a user may configure two rows (two objects) in the User Reset Config Table and then configure 1 more row (one object) in the User Reset Config Table.  The dcmNumUserConfigs object will indicate that three objects have been configured for a User Reset, but the Current Number of User Reset Config Table Rows will only indicate one as the most recent value (since only one row in the User Reset Config table would be currently configured)."
::= {dcmOpsStatus 5}
```

2.5.6 Maximum Number Of User Reset Config Table Rows

```
dcmURCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the User Reset Config Table.”
::= {dcmOpsStatus 6}
```

2.5.7 Current Number Of User Reset Config Table Rows

```
dcmURCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the User Reset Config Table.”
::= {dcmOpsStatus 7}
```

2.5.8 User Reset Config Table

```
dcmURCTTable OBJECT-TYPE
 SYNTAX  SEQUENCE OF DcmURCTEntry
 ACCESS  not-accessible
 STATUS  optional
 DESCRIPTION "Allows a user to define the current settings of an existing structure to be used as User Default settings for a User Reset.  Multiple structures can be saved as user defaults by specifying multiple row entries in this table (or each structure can be saved as a user default one at a time (only specifying one row in this table)).  The OID of this table shall not be allowed as a valid OID entry in this table. This table has a single index. The index must be assigned sequentially by the device."
::= {dcmOpsStatus 8}

dcmURCTEntry OBJECT-TYPE
 SYNTAX DcmURCTEntry
 ACCESS not-accessible
```

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```
 STATUS mandatory
 DESCRIPTION "..."
 INDEX {dcmUserResetConfigIndex}
::={dcmURCTTable 1}

DcmURCTEntry ::= SEQUENCE
{
 dcmUserResetConfigIndex INTEGER,
 dcmURCTOID              OBJECT IDENTIFIER,
 dcmURCTAction           INTEGER,
 dcmURCTRowAdmin         DcmRowStatus
}
```

2.5.8.1 User Reset Configuration Index

```
dcmUserResetConfigIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "indicates the only index into this table."
::= {dcmURCTEntry 1}
```

2.5.8.2 User Reset Table Object Identifier

```
dcmURCTOID OBJECT-TYPE
 SYNTAX OBJECT IDENTIFIER
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "this value points to an OID, which may be a leaf OID or a table OID.  The
value of the next object (dcmURCTAction) then points to the action that is to
be performed on the referenced OID.  An error of (noSuchName) shall be
returned, if the OID pointed to is not supported by the device."
::= {dcmURCTEntry 2}
```

2.5.8.3 User Reset Config Table Action

```
dcmURCTAction OBJECT-TYPE
 SYNTAX INTEGER
 {
  clearAllUserDefaults (1),
  clearUserDefsFromOID (2),
  saveUserDefsFromOID (3)
 }
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "Setting this to one (1) shall remove all previously-defined user reset
settings (it ignores the setting of dcmURCTOID).
Setting this to two (2) shall remove only the structure referenced by
dcmURCTOID from the user reset settings defaults.
Setting this to three (3) shall save the current settings of the structure
referenced by dcmURCTOID as a user reset setting default for that structure.

The only way to read what the user settings have been set to is to perform a
User Reset.  It is left up to the controlling application to keep track of
what has been configured as User Default Settings. The OID of this table can
be added to the 'Object Change ID Table' to allow tracking if the User Default
Settings have been modified."
```

```
::= {dcmURCTEntry 3}
```

2.5.8.4 User Reset Config Row Admin

```
dcmURCTRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of this row of this table.  The SYNTAX definition allows
to create, delete, disable, or edit the row."
::= {dcmURCTEntry 4}
```

2.5.9 Maximum Number Of Object Change ID Table Rows

```
dcmOCIDTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Object Change ID
Table.”
::= {dcmOpsStatus 9}
```

2.5.10 Current Number Of Object Change ID Table Rows

```
dcmOCIDTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Object Change ID
Table.”
::= {dcmOpsStatus 10}
```

2.5.11 Object Change ID Table

```
dcmOCITable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmOCIEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This table allows a user to configure which objects to monitor.  The row
entry is updated by the device if the parameter value of the referenced object
or the value of any of the objects ‘below’ the referenced object node have
changed. It is used to give an external application visibility that some
configuration objects have changed.  This table has a single index. The index
must be assigned sequentially by the device."
::= {dcmOpsStatus 11}

dcmOCIEntry OBJECT-TYPE
 SYNTAX   DcmOCIEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmOCIdIndex}
::= {dcmOCITable 1}

DcmOCIEntry  ::= SEQUENCE
{
 dcmOCIdIndex      INTEGER,
```

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```
 dcmOCIdOID        OBJECT IDENTIFIER,
 dcmOCIdTime       Counter,
 dcmOCIdRowAdmin   DcmRowStatus
}
```

2.5.11.1 Object Change ID Table Index

```
dcmOCIdIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the general index into this table.  The values must be assigned
sequentially.”
::= {dcmOCIEntry 1}
```

2.5.11.2 Object Change ID Table OID

```
dcmOCIdOID OBJECT-TYPE
 SYNTAX OBJECT IDENTIFIER
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "Indicates the Object OID that is being monitored.  The referenced OID can be
any OID supported by the device.”
::= {dcmOCIEntry 2}
```

2.5.11.3 Object Change ID Table Time

```
dcmOCIdTime OBJECT-TYPE
 SYNTAX  Counter
 ACCESS  read-only
 STATUS  mandatory
 DESCRIPTION
 "Indicates the timestamp associated with the dcmOCIdIndex (this row).  The
value shows when the change to the reference object/object node occurred.  The
setup of this value is the same as defined for the controller-localTime object
as defined in NTCIP 1201.”
::= {dcmOCIEntry 3}
```

2.5.11.4 Object Change ID Row Admin

```
dcmOCIdRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows  management  of  the  associated  row  of  this  table.   The  SYNTAX
definition allows to create, delete, disable, or edit the row."
::= {dcmOCIEntry 4}
```

2.6 SITE SETUP NODE

```
--DCM Site Setup Node
dcmSiteSetup OBJECT IDENTIFIER ::= {dcm 4}
-- This node is an identifier used to group all objects for configuring
-- a data collection site that are common to data collection and
-- monitoring devices.
```

2.6.1 Unique Site ID

```
dcmSiteId OBJECT-TYPE
 SYNTAX  OCTET STRING (SIZE (0..40))
 ACCESS  read-write
 STATUS  optional
 DESCRIPTION
 "Indicates a user-assigned unique number or string of characters that
identifies the location of the DCM device.  Typically, agencies will use
character positions within this field to denote things such as county, city,
lane, direction.  This is not to be confused with the unique device ID (see
dcmDeviceID)."
::= {dcmSiteSetup 1}
```

2.6.2 Maximum Length of Site Description

```
dcmMaxLengthSiteDescr OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the number of characters that are available within this dcm device
to express the site description.”
::= {dcmSiteSetup 2}
```

2.6.3 Site Description

```
dcmSiteDescription OBJECT-TYPE
 SYNTAX  OCTET STRING
 ACCESS  read-write
 STATUS  optional
 DESCRIPTION
 " text description of the site at which the dcm device is currently placed.”
::= {dcmSiteSetup 3}
```

2.6.4 Maximum Number of Sensors per Array

```
dcmMaxSensorsPerArray   OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the maximum number of all types of sensors that can be utilized
per defined array.  A typical DCM device will support between 1 to 4 sensors
per array."
::= {dcmSiteSetup 4}
```

2.6.5 Maximum Number of Arrays

```
dcmMaxNumArrays OBJECT-TYPE
 SYNTAX  INTEGER (1..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the maximum number of arrays that can be defined within this
device.  A typical DCM device will support between 4 and 16 arrays.  The
number of arrays that can be defined will also be limited by the amount of IO
fitted in the board.  (e.g. the device may have a max of 16 arrays, but if
only 8 loop inputs are present in the device, then only 4 arrays of loop loop
can be configured)."
::= {dcmSiteSetup 5}
```

2.6.6 Current Number Of Arrays

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```
dcmNumArrays   OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the current number of defined arrays within this DCM device.  The
value of this object shall not exceed the value of the dcmMaxNumArrays
object."
::= {dcmSiteSetup 6}
```

2.6.7 Maximum Number Of Logical IO To Array Mapping Table Rows

```
dcmLIOMTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Logical IO To Array
Mapping Table.”
::= {dcmSiteSetup 7}
```

2.6.8 Current Number Of Logical IO To Array Mapping Table Rows

```
dcmLIOMTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Logical IO To Array
Mapping Table.”
::= {dcmSiteSetup 8}
```

2.6.9 Logical IO To Array Mapping Table

```
dcmLogicalIOArrayMapTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmLogicalIOArrayMapEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table assigns logical IO’s from the Physical to Logical IO Mapping
Table to an array. This is a double-indexed table.  Since the logical IO
number is used as the 2nd index into this table, it will most likely not be
sequential.   The table can be managed by the dcmLogicalIOArrayMapRowAdmin
object."
::= {dcmSiteSetup 9}

dcmLogicalIOArrayMapEntry OBJECT-TYPE
 SYNTAX   DcmLogicalIOArrayMapEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX  {dcmIOAMArrNum, dcmIOAMIONum}
::= {dcmLogicalIOArrayMapTable 1}

DcmLogicalIOArrayMapEntry  ::= SEQUENCE
{
 dcmIOAMArrNum                DcmArrayNum,
 dcmIOAMIONum                 DcmLogIONum,
 dcmIOSpacing                 INTEGER,
 dcmIOPosition                INTEGER,
```

```
 dcmIOFunctionality           INTEGER,
 dcmLogicalIOArrayMapRowAdmin DcmRowStatus
}
```

2.6.9.1 Array Number

```
dcmIOAMArrNum OBJECT-TYPE
 SYNTAX   DcmArrayNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the first index into this table.  Refer to DcmArrayNum for more a
detailed description.”
::= {dcmLogicalIOArrayMapEntry 1}
```

2.6.9.2 Logical IO Number

```
dcmIOAMIONum OBJECT-TYPE
 SYNTAX DcmLogIONum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “Refer to DcmLogIONum for description.”
::= {dcmLogicalIOArrayMapEntry 2}
```

2.6.9.3 IO Spacing

```
dcmIOSpacing OBJECT-TYPE
 SYNTAX   INTEGER (0..65535)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the spacing between each sensor associated with the same array
number (same value of dcmIOAMArrNum).
A value of zero (0) indicates that the specified sensor is the first sensor in
the array.  It may also be the only sensor in the array.  There shall always
be at least one logical IO associated with an array.  There could also be
multiple IO’s associate with an array (multiple rows in this table)A non-zero
value indicates the distance from the front edge of the first sensor (travel
direction) to the front edge of the sensor defined in this row of this table."
--UNIT      millimeter
::= {dcmLogicalIOArrayMapEntry 3}
```

2.6.9.4 IO Position

```
dcmIOPosition OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  full (2),
  center (3),
  multiple (4),
  leftHalf (5),
  rightHalf (6),
  leftThird (7),
  centerThird (8),
  rightThird (9),
  above (10),
  below (11),
  sidefire (12),
```

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```
  wheelPath (13),
  negWheelPath (14)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "indicates the position of a sensor within an array relative to the lane(s)
of travel. The values are:
- other (1),= not defined below.
- full (2),= sensor covers entire lane
- center (3),= sensor is located in the center of the lane, but doesn't cover
the entire lane
- multiple (4),= sensor crosses multiple lanes
-  leftHalf (5),= sensor is located in the left (left sensor relative to the
direction of travel) half of the lane
- rightHalf (6),= sensor is located in the right (right sensor relative to the
direction of travel) half of the lane
- leftThird (7),= sensor is located in the left third of the lane (left sensor
relative to the direction of travel)
- centerThird (8),= sensor is located in the center third of the lane
-  rightThird (9),= sensor is located in the right third of the lane (right
sensor relative to the direction of travel)
- above (10),= sensor is located above the lane
- below (11),= sensor is located below the lane
- sidefire (12)= sensor is located perpendicular to the lane
- wheelPath (13)= sensor is located in the wheel path of the lane
- negWheelPath (14)= sensor is located outside of the wheel path in the lane"
::= {dcmLogicalIOArrayMapEntry 4}
```

2.6.9.5 IO Functionality

```
dcmIOFunctionality OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  vehiclePresence (2),
  axle (3),
  wimAxle (4),
  temperature (5),
  negativeAxle (6),
  onScale (7),
  offScale (8),
  overheight (9),
  avi (10),
  height (11),
  width (12)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "  Indicates the generic functionality for the specified logical IO.   The
values are:
- other (1),= not defined below.
- vehiclePresence (2),= the IO can detect the presence of vehicles (e.g. loop)
- axle (3),=  the IO can only detect axle strikes (e.g. roadtube)
- wimAxle (4),= the IO is used to determine the weight of an axle (e.g. class
1 piezo)
- temperature (5),= the IO is used to measure temperature
```

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```
- negativeAxle (6),= the IO is used to subtract out axles (e.g. short long
roadtube configuration)
- onScale (7),= the IO is used to determine if vehicles are tracking in a
consistent position within the lane
- offScale (8),= the IO is used to determine if vehicles are not tracking in a
consistent position within the lane
-  overheight (9),= the IO is used to determine if the overall height of a
   vehicle exceeds a maximum height
-  avi (10), = Automatic Vehicle Identifier, the IO is used to uniquely
   identify a vehicle
-  height (11), = the IO is used to measure vehicle height
-  width (12), = the IO is used to measure vehicle width"
::= {dcmLogicalIOArrayMapEntry 5}
```

2.6.9.6 IO Row Administration

```
dcmLogicalIOArrayMapRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   optional
 DESCRIPTION
 "allows management of the arrays (this row of this table).  The SYNTAX
definition allows to create, delete, disable, or edit a row."
::= {dcmLogicalIOArrayMapEntry 6}
```

2.6.10 Maximum Number of Calibration Factors per Array

```
dcmMaxCalFactorsPerArray   OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the maximum number of calibration factors that can be utilized per
defined array.  A typical DCM device will support between 1 to 3 calibration
factors per array."
::= {dcmSiteSetup 10}
```

2.6.11 Maximum Number Of Array Parameter Table Rows

```
dcmAPTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Array Parameter Table.”
::= {dcmSiteSetup 11}
```

2.6.12 Current Number Of Array Parameter Table Rows

```
dcmAPTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Array Parameter Table.”
::= {dcmSiteSetup 12}
```

2.6.13 Array Parameter Table

```
dcmArrayParameterTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmArrayParameterEntry
```

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```
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 " This table assigns parameters to arrays (typically for the purposes of
fine-tuning the processing of the array within the dcm device.).  This is a
double-indexed table.  Since the Array Parameter Type is used as the 2nd
index, it will most likely not be sequential.  The table can be managed
dcmArrayParameterRowAdmin object. "
::= {dcmSiteSetup 13}

dcmArrayParameterEntry OBJECT-TYPE
 SYNTAX   DcmArrayParameterEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmAPArrNum, dcmAPType}
::= {dcmArrayParameterTable 1}

DcmArrayParameterEntry ::= SEQUENCE
{
 dcmAPArrNum               DcmArrayNum,
 dcmAPType                 DcmArrayParamType,
 dcmAPValue                DcmArrayParamValue,
 dcmAPFileName             DcmArrayParamFileName,
 dcmArrayParameterRowAdmin DcmRowStatus
}
```

2.6.13.1 Array Number

```
dcmAPArrNum OBJECT-TYPE
 SYNTAX DcmArrayNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the first index into this table.  Refer to DcmArrayNum for a more
detailed description."
::= {dcmArrayParameterEntry 1}
```

2.6.13.2 Array Parameter Type

```
dcmAPType OBJECT-TYPE
 SYNTAX DcmArrayParamType
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the type of parameter associated with an array. One or more types
can be associated with an array.
Refer to DcmArrayParamType for a more detailed description."
::= {dcmArrayParameterEntry 2}
```

2.6.13.3 Array Parameter Value

```
dcmAPValue OBJECT-TYPE
 SYNTAX   DcmArrayParamValue
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the value associated with a particular array parameter type as
specified by the dcmAPType column.  Refer to DcmArrayParamValue for a more
detailed description."
```

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```
::= {dcmArrayParameterEntry 3}
```

2.6.13.4 Array Parameter FileName Pointer

```
dcmAPFileName OBJECT-TYPE
 SYNTAX   DcmArrayParamFileName
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates a file name that contains the array parameter calibration
information. Refer to DcmArrayParamFileName for a more detailed description."
::= {dcmArrayParameterEntry 4}
```

2.6.13.5 Array Parameter Table Row Administration

```
dcmArrayParameterRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "allows management of the array parameters (this row of this table).  The
SYNTAX definition allows to create, delete, disable, or edit a row."
::= {dcmArrayParameterEntry 5}
```

2.6.14 Maximum Number Of Array Speed Calibration Table Rows

```
dcmASCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Array Speed Calibration
Table.”
::= {dcmSiteSetup 14}
```

2.6.15 Current Number Of Array Speed Calibration Table Rows

```
dcmASCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Array Speed Calibration
Table.”
::= {dcmSiteSetup 15}
```

2.6.16 Array Speed Calibration Table

```
dcmArraySpeedCalibrationTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmArraySpeedCalibrationEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table is a triple-indexed table.  It defines the calibration factors
that are used to calibrate a speed algorithm. Historically speed was
calibrated by adjusting sensor spacings within an array. This table allows for
the spacings to remain fixed at the actual values.  The table can be managed
thru the dcmArraySpeedCalibrationRowAdmin object."
::= {dcmSiteSetup 16}

dcmArraySpeedCalibrationEntry OBJECT-TYPE
```

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```
 SYNTAX   DcmArraySpeedCalibrationEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmASCArrNum, dcmLogicalIONumber1, dcmLogicalIONumber2}
::= {dcmArraySpeedCalibrationTable 1}

DcmArraySpeedCalibrationEntry  ::= SEQUENCE
{
 dcmASCArrNum           DcmArrayNum,
 dcmLogicalIONumber1    DcmLogIONum,
 dcmLogicalIONumber2    DcmLogIONum,
 dcmArraySpeedCalFactor INTEGER,
 dcmASCRowAdmin         DcmRowStatus
}
```

2.6.16.1 Array Number

```
dcmASCArrNum OBJECT-TYPE
 SYNTAX   DcmArrayNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “Indicates the first index into this table.  Refer to DcmArrayNum for a more
detailed description.”
::= {dcmArraySpeedCalibrationEntry 1}
```

2.6.16.2 First referenced Logical IO Number

```
dcmLogicalIONumber1 OBJECT-TYPE
 SYNTAX   DcmLogIONum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “Indicates the second index into this table expressing the first speed sensor
that is being used for array speed calibration purposes.  The Logical IO
Number specified must be mapped to the specified array number in the Logical
IO to Array Mapping Table.
Refer to DcmLogIONum for a detailed description.”
::= {dcmArraySpeedCalibrationEntry 2}
```

2.6.16.3 Second referenced Logical IO Number

```
dcmLogicalIONumber2 OBJECT-TYPE
 SYNTAX   DcmLogIONum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “Indicates the third index into this table expressing the second speed
sensor that is being used for array speed calibration purposes.  A value of
‘0’ shall indicate that a 2nd speed sensor is not required to determine speed
(such as a radar detector or a single loop that can determine speed).  If a
2nd Logical IO Number is required, it must be mapped to the specified array
number in the Logical IO to Array Mapping Table.
Refer to DcmLogIONum for a detailed description.”
::= {dcmArraySpeedCalibrationEntry 3}
```

2.6.16.4 Array Speed Calibration Factor

```
dcmArraySpeedCalFactor  OBJECT-TYPE
```

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```
 SYNTAX  INTEGER (1..65535)
 ACCESS  read-write
 STATUS  mandatory
 DESCRIPTION
 “Indicates the adjustment factor to calibrate the measured speed results
reported by the device  from the 2 speed sensors specified by the two Logical
IO Number fields in this row of this table. The algorithm to calculate speed
is not defined in this standard.  This is a discrete multiplier with no units
with a resolution of .001.    A value of 1000 is equal to 1.000 which would be
a multiplier of 1.000 (no change).”
::= {dcmArraySpeedCalibrationEntry 4}
```

2.6.16.5 Array Speed Calibration Table Row Administration

```
dcmASCRowAdmin  OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   optional
 DESCRIPTION
 "This object serves as the table row management item.  The possible
   values can be found in the definition of the SYNTAX 'DcmRowStatus'."
::= {dcmArraySpeedCalibrationEntry 5}
```

2.6.17 Max Number of Axles

```
dcmMaxNumAxles OBJECT-TYPE
 SYNTAX  INTEGER (1..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 " indicates the maximum number of axles per vehicle that this device will
support. This is a discrete number and has no units.”
::= {dcmSiteSetup 17}
```

2.6.18 Max Number of Filters

```
dcmMaxFilters OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the maximum number of filters that can be configured in the filter
table within this device. ”
::= {dcmSiteSetup 18}
```

2.6.19 Current Number Of Filters

```
dcmNumFilters OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the current number of filters configured for this device.
 This value is updated each time a new filter configuration is added to
 or deleted from the filter table."
::= {dcmSiteSetup 19}

-- A filter defined by the following table always excludes data, e.g. it
-- filters data out. A filter can be defined with multiple  conditions (see
-- dcmFilterRowRelation).  Parenthesis are always implied around the first two
-- entries of a filter definition (first two is defined by dcmFilterIndex
```

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```
-- values of 1 and 2), then the result of that with the next condition, and so
-- on.
```

2.6.20 Maximum Number Of Filter Configuration Table Rows

```
dcmFCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Filter Configuration
Table.”
::= {dcmSiteSetup 20}
```

2.6.21 Current Number Of Filter Configuration Table Rows

```
dcmFCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Filter Configuration
Table.”
::= {dcmSiteSetup 21}
```

2.6.22 Filter Configuration Table

```
dcmFilterConfigTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmFilterConfigEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table is a doubly-indexed table.  It defines the parameters for each
filter definition. The table can be managed thru the dcmFilterConfRowAdmin
object. Each filter defined by this table includes data (filters data in).
Each filter can be defined with multipe conditions (one row per condition).
Parenthesis are always implied around the first two criteria of any filter,
then the result of that with the next criteria, and so on."
::= {dcmSiteSetup 22}

dcmFilterConfigEntry OBJECT-TYPE
 SYNTAX   DcmFilterConfigEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmFCFilterNum, dcmFilterIndex}
::= {dcmFilterConfigTable 1}

DcmFilterConfigEntry  ::= SEQUENCE
{
 dcmFCFilterNum        DcmFilterNum,
 dcmFilterIndex        INTEGER,
 dcmFilterCriteria     OBJECT IDENTIFIER,
 dcmFilterRelation     INTEGER,
 dcmFilterValue        INTEGER,
 dcmFilterRowRelation  INTEGER,
 dcmFilterConfRowAdmin DcmRowStatus
}
```

2.6.22.1 Filter Number

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```
dcmFCFilterNum OBJECT-TYPE
 SYNTAX   DcmFilterNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the first index of a particular filter being defined within
the device.  Refer to DcmFilterNum for a more detailed description.”
::= {dcmFilterConfigEntry 1}
```

2.6.22.2 Filter Index

```
dcmFilterIndex OBJECT-TYPE
 SYNTAX   INTEGER (1..3)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the second index of a particular filter.  Each defined filter
 must have at least one second index defined.  The filters shall be processed
in ascending order based on the second index.  The first two entries for any
defined filter are processed first, the result of that is then processed with
the next row, the result of that with the 4th, etc."
::= {dcmFilterConfigEntry 2}
```

2.6.22.3 Filter Criteria

```
dcmFilterCriteria OBJECT-TYPE
 SYNTAX  OBJECT IDENTIFIER
 ACCESS  read-write
 STATUS  mandatory
 DESCRIPTION
“Indicates which criteria shall be assigned to this filter (e.g. speed, axle
class, vehicle length…).   The available criteria are defined in the dcm
Vehicle Criteria Node.  Only OID’s of objects that are defined as Integers
that require 4 or less bytes can be used to configure filters.”
::= {dcmFilterConfigEntry 3}
```

2.6.22.4 Filter Relation

```
dcmFilterRelation  OBJECT-TYPE
 SYNTAX   INTEGER
 {
  greaterThan (1),
  lessThan (2),
  equal (3),
  greaterOrEqual (4),
  lessOrEqual (5),
  notEqual (6),
  logicalAnd (7),
  logicalNot (8)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION  "Indicates  the  relationship  between  dcmFilterCriteria  and
dcmFilterValue required to trigger this filter. This data element is valid for
this row, not for interrelationship between rows of a particular filter (see
dcmFCFilterNum and dcmFilterRowRelation). The values are self-explanatory.
In opposite to the common setup of SNMP MIB objects, this object was purposely
setup to NOT include a value of (other).
The values of logicalAnd and logicalNot are used for configuring filters based
on bit-by-bit boolean comparisons of the following objects:
```

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```
dcmVehicleStatusFlag
dcmAxleWeightViolationCode."
::= {dcmFilterConfigEntry 4}
```

2.6.22.5 Filter Value

```
dcmFilterValue  OBJECT-TYPE
 SYNTAX   INTEGER (0.. 4294967295)  --4 bytes
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
"Indicates the value associated with this filter row.  The value shall always
be expressed in 4 bytes.  The unit and interpretation of this value shall be
dependent on the value of the dcmFilterCriteria object. The dcmFilterCriteria
objects are defined in the dcm Vehicle Criteria Node."
::= {dcmFilterConfigEntry 5}
```

2.6.22.6 Filter Row Relation

```
dcmFilterRowRelation  OBJECT-TYPE
 SYNTAX   INTEGER
 {
  and (1),
  or (2),
  endOfDef (3)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates how several rows with the same value of the DcmFilterNum object
are related to each other. Combines the criteria of a row (dcmFilterIndex)
with the next row (next higher value of the dcmFilterIndex object) within the
same  DcmFilterNum.    It  is  up  to  the  actual  implementation  (database
population) to ensure that the association of rows is logical. The currently
defined values are:
and  – Both criteria of the two rows must be met for the filter to be applied.
or – Either criteria of the two rows must be met for the filter to be applied.
endOfDef  – indicates that the criteria of this row is the last criteria valid
            for this DcmFilterNum.
If  only  one  criteria  is  used  per  Filter  (DcmFilterNum),  the  value  of  this
object needs to be set to endOfDef (3).
In opposite to the common setup of SNMP MIB objects, this object was purposely
setup to NOT include a value of (other)."
::= {dcmFilterConfigEntry 6}
```

2.6.22.7 Filter Configuration Table Row Administration

```
dcmFilterConfRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This object serves as the table row management item.  The possible
values can be found in the definition of the SYNTAX 'DcmRowStatus'."
::= {dcmFilterConfigEntry 7}
```

2.6.23 Maximum Number Of Logical Output To Filter Table Rows

```
dcmLOFTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
```

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```
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Logical Output To
Filter Table.”
::= {dcmSiteSetup 23}
```

2.6.24 Current Number Of Logical Output To Filter Table Rows

```
dcmLOFTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Logical Output To
Filter Table.”
::= {dcmSiteSetup 24}
```

2.6.25 Logical Output To Filter Mapping Table

```
dcmOFMTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmOFMEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
  "This table defines a mapping from a logical output (Logical IO Number which
is specifically an output) to one or more filters. Multiple filters can be
mapped to a single logical output through multiple rows in this table.  The
different filters in each row are related through the Boolean entry in this
table.  The Boolean relationships are processed in ascending order (as defined
by the 2nd index) of entries assigned to the specified logical output.  The
last row associated with each logical output must have the Boolean column set
to ‘end of definition’.  If an application attempts to set more rows
associated with a single logical output than is allowed, an application error
of ‘exceededMaxNumberOfAllowedOccurrences’ shall be set.
This is a double-indexed table.  The table can be managed thru dcmOFMRowAdmin
object.  Additionally, this table may be cleared using the User Reset Table."
::= {dcmSiteSetup 25}

dcmOFMEntry OBJECT-TYPE
 SYNTAX   DcmOFMEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX {dcmOFMIONum, dcmOFMIndex}
::= {dcmOFMTable 1}

DcmOFMEntry ::= SEQUENCE
{
 dcmOFMIONum     DcmLogIONum,
 dcmOFMIndex     INTEGER,
 dcmOFMFilterNum DcmFilterNum,
 dcmOFMState     INTEGER,
 dcmOFMStateTime INTEGER,
 dcmOFMRelation  INTEGER,
 dcmOFMRowAdmin  DcmRowStatus
}
```

2.6.25.1 OFM IO Num

```
dcmOFMIONum OBJECT-TYPE
```

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```
 SYNTAX DcmLogIONum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “Indicates the first index into this table.  Refer to DcmLogIONum for
description.”
::= {dcmOFMEntry 1}
```

2.6.25.2 Output Filter Map Index

```
dcmOFMIndex OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
  "Indicates the second index into this table.  This index must be assigned
sequentially.   It is used to map and Boolean relate multiple filters
(specified by dcmOFFFilterNum) to a single logical output. The value of
dcmOFMRelation column determines the type of Boolean processing to occur on
the specified filters. The first two entries are processed first, the result
of that is then processed with the next row, the result of that with the 4th,
etc.”
::= {dcmOFMEntry 2}
```

2.6.25.3 Filter Number

```
dcmOFMFilterNum OBJECT-TYPE
 SYNTAX   DcmFilterNum
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates a defined filter (from the dcm Filter Configuration Table) to be
mapped to the output specified by dcmOMFIONum. Refer to DcmFilterNum for a
more detailed description.”
::= {dcmOFMEntry 3}
```

2.6.25.4 Output State

```
dcmOFMState OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  turnOn (2),
  turnOff (3),
  pulse (4)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the state the output specified by dcmOMFIONum shall go to when the
specified defined filter relationship is triggered.  The value of this object
shall only be valid in rows in which the value of the dcmOFMRelation object is
set to 3 (endOfDef), otherwise the value of this object shall be ignored. The
values are:
-other=not defined
-turnOn=specified output shall turn on for the period of time specified by
dcmOMFStateTime.   If dcmOMFStateTime=0, the output shall remain in the
specified state indefinitely.
```

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-turnOff=specified output shall turn off for the period of time specified by dcmOMFStateTime. If dcmOMFStateTime=0, the output shall remain in the specified state indefinitely.
-pulse=specified output shall pulse one time. The amount of time the pulse is active for shall be specified by dcmOMFStateTime. If dcmOMFStateTime=0, the pulse shall be the default pulse time (which is implementation-specific) for the specified output."
::= {dcmOFMEntry 4}

2.6.25.5 Output State Time

```
dcmOFMStateTime OBJECT-TYPE
 SYNTAX   INTEGER (0..16777215)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the time (in milliseconds) that the logical output shall remain in the state specified by dcmOMFState. If dcmOFMState=0, the output shall remain in the specified state indefinitely.
The value of this object shall only be valid in rows in which the value of the dcmOMFRelation object is set to 3 (endOfDef), otherwise the value of this object shall be ignored."
::= {dcmOFMEntry 5}
```

2.6.25.6 Output Filter Map Relationship

```
dcmOFMRelation OBJECT-TYPE
 SYNTAX INTEGER
 {
  and (1),
  or (2),
  endOfDef (3)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates how multiple filters can be related together to trigger the specified logical output. It is up to the application to ensure that the rows are populated in the correct sequence to achieve the desired Boolean relationship. The Boolean relationships are processed in an ascending order as specified by the second index within each logical output. If 3 rows were defined (1-1-and, 1-2-or, 1-3-end) the result would be that logical output 1 is triggered if ((filter 1 and filter 2) or filter 3)=True. The currently defined values are:
and (1) – This defines a Boolean ‘and’ operation between the filter specified
            in this row and the filter defined in the next row for the same
            logical output as determined by the second index of this table.
            The logical output shall not be triggered unless both filters are
            true.
or (2) – This defines a Boolean ‘or’ operation between the filter specified in
            this row and the filter defined in the next row for the same
            logical output as determined by the second index of this table.
            The logical output shall not be triggered unless either one of the
            filters are true.
endOfDef (3) – Indicates that this row is the end of the definition for the
            criteria required to trigger the specified logical output.
If only one mapping is used per output (this row), the value of this object shall be set to endOfDef.
```

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```
In opposite to the common setup of SNMP MIB objects, this object was purposely
setup to NOT include a value of (other)."
::= {dcmOFMEntry 6}
```

2.6.25.7 Output Filter Map Row Admin

```
dcmOFMRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the associated 'logical output/filter number
combination' (this row of this table).  The SYNTAX definition allows to
create, delete, disable, or edit the row.  This object cannot be set to
'active' until a row associated with the specified logical output exists with
endOfDef.  This is a slightly different usage of this object in that it
requires a relationship between multiple rows."
::= {dcmOFMEntry 7}
```

2.6.26 Max Number of Vehicle ID's

```
dcmMaxNumVehId OBJECT-TYPE
 SYNTAX  INTEGER (1..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "Indicates the maximum number of vehicle ID's per vehicle that this device
shall support. This is a discrete number and has no units."
::= {dcmSiteSetup 26}
```

2.7 STUDY SETUP NODE

```
--DCM Study Setup Node
dcmStudyConfig OBJECT IDENTIFIER ::= {dcm 5}
-- This node is an identifier used to group all objects for configuring
-- one or more studies.  The objects utilized are common to data collection
-- and monitoring devices.
```

2.7.1 Current Number Of Studies

```
dcmNumStudies  OBJECT-TYPE
 SYNTAX INTEGER (0..255)
 ACCESS read-only
 STATUS optional
 DESCRIPTION
 "Indicates the current number of studies defined in the dcmStudyConfigTable
within this dcm device."
::= {dcmStudyConfig 1}
```

2.7.2 Maximum Number of Studies

```
dcmMaxNumStudies OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS optional
 DESCRIPTION
 "Indicates the maximum number of all types of studies that can be defined
within this device.  A typical DCM device will support between 1 and 3 studies
being defined simultaneously."
```

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```
::= {dcmStudyConfig 2}
```

2.7.3 Maximum Number Of Study Configuration Table Rows

```
dcmSCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Study Configuration
Table.”
::= {dcmStudyConfig 3}
```

2.7.4 Current Number Of Study Configuration Table Rows

```
dcmSCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Study Configuration
Table.”
::= {dcmStudyConfig 4}
```

2.7.5 Study Configuration Table

```
dcmStudyConfigTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmStudyConfigEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This table defines the required parameters to configure studies for either
data recording or Monitor Modes.  The number of rows in this table cannot
exceed the maximum number of studies (dcmMaxNumStudies) and shall be the same
as the dcmNumStudies object value. This is a single-indexed table.  The table
can be managed thru dcmStudyConfigRowAdmin object."
::= {dcmStudyConfig 5}

dcmStudyConfigEntry OBJECT-TYPE
 SYNTAX DcmStudyConfigEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION "..."
 INDEX {dcmSCStudyNum}
::= {dcmStudyConfigTable 1}

DcmStudyConfigEntry  ::= SEQUENCE
{
 dcmSCStudyNum          DcmStudyNum,
 dcmStudyType           INTEGER,
 dcmStartType           INTEGER,
 dcmStartDateTime       Counter,
 dcmEndType             INTEGER,
 dcmEndDateTime         Counter,
 dcmSCFileStudyIndex    DcmFileStudyIndex,
 dcmStudyConfigRowAdmin DcmRowStatus
}
```

2.7.5.1 Study Number

```
dcmSCStudyNum OBJECT-TYPE
```

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```
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the only index into this table. It represents a unique number for
each study that is defined within the device in this table.  It is recommended
to assign this value sequentially, however deleting studies may produce gaps
in the indexes.  It is recommended to use the deleted study number as the next
one to assign as an attempt to keep these indexes sequential.”
::= {dcmStudyConfigEntry 1}
```

2.7.5.2 Study Type

```
dcmStudyType OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  binned (2),
  pvr (3),
  event (4),
  arrayParam (5),
  logicalIOParam (6),
  log (7)
 }
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "Indicates the type of study that is being configured within this row. The
values are:
- other (1) - Not defined below.
- binned (2) - Processes data based on user-defined aggregated bins (details
are configured in Binned Filter Definition Table and Binned Study
Configuration Table).
- pvr (3) - Processes user-defined data for each vehicle (details are
configured in PVR Study Configuration Table).
- event (4) - Processes data based on raw IO (details are configured in Event
Study Configuration Table and Event To Logical IO Mapping Table).
- arrayParam (5) – Processes sensor array parameter changes to a data file.
The structure of the array parameter data record is defined by the Array
Parameter Change Record Table.
- logicalIOParam (6) - Processes logical IO  parameter changes to a data file.
The structure of the logical IO parameter data record is defined by the
Logical IO Parameter Change Record Table.
- log (7) – Processes log data to a data file.  The structure of the log
records  are defined by the Log Data Record Table.”
::= {dcmStudyConfigEntry 2}
```

2.7.5.3 Study Start Type

```
dcmStartType OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  now (2),
  nextInterval (3),
  dateTime (4)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
```

```
 "indicates how the study defined in this row is supposed to start.  The
values are:
- other = not defined below
- now = as soon as the DCM device receives the command, it shall begin
recording.  This may result in having partial data for a recording interval.
- nextInterval = as soon as the next even recording interval starts, the study
shall begin recording, e.g., if the  dcmFPRecInt is '3600' (1 hour) recording
shall begin at the next full hour.  This will ensure that no partial recording
intervals are stored.
- dateTime = The device shall begin recording data at the date/time as
specified in the dcmStartDateTime object."
::= {dcmStudyConfigEntry 3}
```

2.7.5.4 Study Start Date and Time

```
dcmStartDateTime OBJECT-TYPE
 SYNTAX   Counter
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "If Study Start Type is set to dateTime, then this object indicates the date
and time at which the study is to start.  The value of this object follows the
'controller-localTime' setup, which specifies the epoch since Midnight January
1, 1970.   For all other selections of Study Start Type, this object is
meaningless."
::= {dcmStudyConfigEntry 4}
```

2.7.5.5 Study End Type

```
dcmEndType OBJECT-TYPE
 SYNTAX  INTEGER
 {
  other (1),
  never (2),
  dateTime(3)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates how long the defined study shall run for.  At the end of the
specified time, the study shall be set to idle by the device but it shall not
be removed from this table.  The values are:
- other = not defined below
- never = The study shall run forever.  The only way to end the study is to
disable it through the Data Recording Enable Table (quitRecording option for
Data Recording Control).
- dateTime = the study shall end at the specified date and time specified in
the dcmEndDateTime object."
::= {dcmStudyConfigEntry 5}
```

2.7.5.6 Study End Date and Time

```
dcmEndDateTime OBJECT-TYPE
 SYNTAX   Counter
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "If Study End Type is set to dateTime, then this object indicates the date
and time at which the study is to end.  The value of this object follows the
'controller-localTime' setup, which specifies the epoch since Midnight January
```

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```
1, 1970.   For all other selections of Study End Type, this object is
meaningless."
::= {dcmStudyConfigEntry 6}
```

2.7.5.7 Study File Index

```
dcmSCFileStudyIndex OBJECT-TYPE
 SYNTAX   DcmFileStudyIndex
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 “Defines the file structure number within the File Structure Table (non-zero
values).  A value of zero (0) indicates that no data shall be recorded and the
study is to be used for Monitor Modes (see the Monitor Enable Table).“
::= {dcmStudyConfigEntry 7}
```

2.7.5.8 Study Configuration Row Admin

```
dcmStudyConfigRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure a study (this row of
this table).  The SYNTAX definition allows to create,delete, disable, or edit
the row.  If a study is deleted from this table, the device shall delete all
rows in any other table that references that study.  It is highly recommended
that the application make every attempt to keep the study number sequential
(reuse study numbers that have been deleted)."
::= {dcmStudyConfigEntry 8}
```

2.7.6 Maximum Number Of Array To Study Mapping Table Rows

```
dcmASMTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Array To Study Mapping
Table.”
::= {dcmStudyConfig 6}
```

2.7.7 Current Number Of Array To Study Mapping Table Rows

```
dcmASMTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Array To Study Mapping
Table.”
::= {dcmStudyConfig 7}
```

2.7.8 Array To Study Mapping Table

```
dcmStudyArrayMapTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmStudyArrayMapEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
```

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```
 "Defines which sensor arrays are mapped to which studies. It is also used to
enable/disable sensor arrays assigned to studies.  This is a double-indexed
table, with both indices defined in previous tables. The table can be managed
thru dcmStudyArrayRowAdmin object.  If a study is deleted from the Study
Configuration Table, the device shall delete any entries in this table
associated with that study."
::= {dcmStudyConfig 8}

dcmStudyArrayMapEntry OBJECT-TYPE
 SYNTAX   DcmStudyArrayMapEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmSAMStudyNum, dcmSAMArrNum}
::= {dcmStudyArrayMapTable 1}

DcmStudyArrayMapEntry  ::= SEQUENCE
{
 dcmSAMStudyNum           DcmStudyNum,
 dcmSAMArrNum             DcmArrayNum,
 dcmStudyArrayEnable      INTEGER,
 dcmStudyArrayRowAdmin    DcmRowStatus
}
```

2.7.8.1 Study Number

```
dcmSAMStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the first index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyNum for more detail.”
::= {dcmStudyArrayMapEntry 1}
```

2.7.8.2 Array Number

```
dcmSAMArrNum OBJECT-TYPE
 SYNTAX   DcmArrayNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the first index into this table.  Refer to DcmArrayNum for a more
detailed description."
::= {dcmStudyArrayMapEntry 2}
```

2.7.8.3 Study to Array Enable

```
dcmStudyArrayEnable OBJECT-TYPE
 SYNTAX   INTEGER
 {
  enable (1),
  disable (2)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates whether a particular defined array is active within the specified
study.
```

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```
enable – sensor inputs associated with this array shall be processed by the
device.
disable – sensor inputs associated with this array shall not be processed by
the device.  The device may choose to either ignore those sensor inputs, or
turn off the sensors within the Physical to Logical IO Mapping Table.
Typically an array may be turned off for diagnostic purposes.
In opposite to the common setup of SNMP MIB objects, this object was purposely
setup to NOT include a value of (other).  "
::= {dcmStudyArrayMapEntry 3}
```

2.7.8.4 Array to Study Mapping Table Row Admin

```
dcmStudyArrayRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure a study (this row of
this table).  The SYNTAX definition allows to create,delete, disable, or edit
the row. "
::= {dcmStudyArrayMapEntry 4}
```

2.7.9 Maximum Number Of Filter To Study Mapping Table Rows

```
dcmFSMTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Filter To Study Mapping
Table.”
::= {dcmStudyConfig 9}
```

2.7.10 Current Number Of Filter To Study Mapping Table Rows

```
dcmFSMTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Filter To Study Mapping
Table.”
::= {dcmStudyConfig 10}
```

2.7.11 Filter to Study Mapping Table

```
dcmStudyFilterMapTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmStudyFilterMapEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "Defines the parameters to map selected filters to each of the defined
studies.
This is a double-indexed table, with both indices defined in previous tables.
The table can be managed thru dcmStudyFilterMapRowAdmin object.
Multiple filters may be assigned to the same study.  The first two filters
assigned to a study shall be processed, the result of that processed with the
next filter assigned to the study, and so on."
::= {dcmStudyConfig 11}
```

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```
dcmStudyFilterMapEntry OBJECT-TYPE
 SYNTAX   DcmStudyFilterMapEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmSFMStudyNum, dcmSFMFilterNum}
::= {dcmStudyFilterMapTable 1}

DcmStudyFilterMapEntry  ::= SEQUENCE
{
 dcmSFMStudyNum            DcmStudyNum,
 dcmSFMFilterNum           DcmFilterNum,
 dcmStudyFilterRelation    INTEGER,
 dcmStudyFilterMapRowAdmin DcmRowStatus
}
```

2.7.11.1 Study Number

```
dcmSFMStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the first index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyNum for more detail."
::= {dcmStudyFilterMapEntry 1}
```

2.7.11.2 Filter Number

```
dcmSFMFilterNum OBJECT-TYPE
 SYNTAX   DcmFilterNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates a defined filter (from the dcm Filter Configuration Table) to be
mapped to the study specified by dcmSFMStudyNum. Refer to DcmFilterNum for a
more detailed description."
::= {dcmStudyFilterMapEntry 2}
```

2.7.11.3 Study to Filter Mapping Relationship

```
dcmStudyFilterRelation OBJECT-TYPE
 SYNTAX INTEGER
 {
  and (1),
  or (2),
  endOfDef (3)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates how several rows (filters) with the same value of the
dcmSFMStudyNum object are related to each other. It is up to the actual
implementation (database population) to ensure that the association of rows is
logical.  The first two entries for any defined filter are processed first,
the result of that is then processed with the next row, the result of that
with the 4th, etc. The currently defined values are:
```

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```
and (1) – combine the criteria of this row (dcmSFMFilterNum) with the next row
            (next higher value of the dcmSFMFilterNum object) within the same
            dcmSFMStudyNum.
or (2) – select the criteria of either this row (dcmSFMFilterNum) or of the
            next row (next higher value of the dcmSFMFilterNum object) within
            the same dcmSFMStudyNum.
endOfDef (3) – indicates that the criteria of this row is the last criteria
            valid for this dcmSFMStudyNum.
If only one criteria is used per study (dcmSFMStudyNum), the value of this
object shall  be set to 'endOfDef'.
In opposite to the common setup of SNMP MIB objects, this object was purposely
setup to NOT include a value of (other)."
::= {dcmStudyFilterMapEntry 3}
```

2.7.11.4 Filter to Study Mapping Table Row Admin

```
dcmStudyFilterMapRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure a study filter (this
row of this table).  The SYNTAX definition allows to create, delete, disable,
or edit the row. If any of the filters are deleted, the device shall
automatically delete them from this table.  A value of 'createAndGo' is only
valid in rows in which the Study to Filter Mapping Relationship is set to
EndOfDef."
::= {dcmStudyFilterMapEntry 4}
```

2.8 STUDY DATA SETUP NODE

```
--DCM Study Data Setup Node
dcmStudyDataSetup OBJECT IDENTIFIER ::= {dcm 6}
-- This node is an identifier used to group all objects for configuring
-- a data collection session that are common to data collection and
-- monitoring devices.
```

2.8.1 Display Length Units

```
dcmLengthUnits OBJECT-TYPE
 SYNTAX INTEGER
 {
  centimeter (1), -- internal units
  decimeter  (2),
  meter      (3),
  inches     (4),
  tenthFeet  (5),
  feet       (6)
 }
 ACCESS read-write
 STATUS optional
 DESCRIPTION
 "Indicates the units in which length is displayed for ASCII Monitor Mode
output and/or any local user interface (keyboard/display) that is used to
enter length such as bin limits or length filter limits. The length values
shall always be stored in internal units as defined for each object and not in
display units.
The currently defined values are:
 -centimeter (1) – 0.01 meter (internal units), (1 centimeter=0.3937 inches)
 -decimeter (2) – 0.1 meter (1 decimeter=3.937 inches)
```

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```
 -meter (3) – (1 meter=39.37 inches=3.281 feet)
 -inches (4) – (1 inch=2.54 centimeters)
 -tenthFeet (5) – 0.1 feet (1 foot=12 inches)
 -feet (6) – (1 foot=12 inches)
"
::= {dcmStudyDataSetup 1}
```

2.8.2 Display Speed Units

```
dcmSpeedUnits OBJECT-TYPE
 SYNTAX INTEGER
 {
  cms (1), -- internal units
  kmh (2),
  mph (3)
 }
 ACCESS read-write
 STATUS optional
 DESCRIPTION
 "Indicates the units in which speed is displayed for ASCII Monitor Mode
output and/or any local user interface (keyboard/display) that is used to
enter speed such as bin limits or speed filter limits. The speed values shall
always be stored in internal units as defined for each object and not in
display units.
The currently defined values are:
 -cms (1) – centimeters per second (internal units)
 -kmh (2) – kilometers per hour
 -mph (3) – miles per hour
"
::= {dcmStudyDataSetup 2}
```

2.8.3 Display Weight Units

```
dcmWeightUnits OBJECT-TYPE
 SYNTAX INTEGER
 {
  tenthTonne (1),
  tenthKips  (2),
  pounds     (3),
  kilograms  (4), -- internal units
  kips       (5)
 }
 ACCESS read-write
 STATUS optional
 DESCRIPTION
 "Indicates the units in which weight is displayed for ASCII Monitor Mode
output and/or any local user interface (keyboard/display) that is used to
enter weight such as bin limits or weight filter limits. The weight values
shall always be stored in internal units as defined for each object and not in
display units.
The currently defined values are:
 -tenthTonne (1) – 0.1 Tonne (1 Tonne=2204.62 pounds)
 -tenthKips (2) – 0.1 Kips (1 KIP=1000 pounds)
 -pounds (3) – (1 pound=0.4536 kilograms)
 -kilograms (4) – internal units, (1 kilogram=2.2046 pounds)
 -kips (5) – 1 kip (1 KIP=1000 pounds)
"
::= {dcmStudyDataSetup 3}
```

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2.8.4 Maximum Number of Headings For All Studies

```
dcmMaxNumHeadings  OBJECT-TYPE
 SYNTAX INTEGER (0..255)
 ACCESS read-only
 STATUS optional
 DESCRIPTION
 "Indicates the maximum number of headings (which are used in the Binned Study
Configuration Table to configure studies) that can be configured for all
binned studies. A typical DCM device will support between 1 to 3 headings that
can be defined for each study giving a typical maximum of between 3 to 9
headings for all studies.  As an example, if the max is 9 headings, there
could be 6 headings assigned to study 1, 1 heading to study 2 and 2 headings
to study 3."
::= {dcmStudyDataSetup 4}
```

2.8.5 Maximum Number of Bins For All Studies

```
dcmMaxNumBins OBJECT-TYPE
 SYNTAX INTEGER (0..65535)
 ACCESS read-only
 STATUS optional
 DESCRIPTION
 "Indicates the maximum number of bins that can be defined over all binned
studies.  A typical DCM device may support a maximum binning of 15 classes by
15 speeds by 4 lanes (15x15x4)=900 bins for all studies.  As an example, the
900 bins could also be broken into 200 bins for study 1, 500 bins for study 2
and 200 bins for study 3.  The 200 bins for study 1 could then be broken up
into 20 bins for heading 1 of study 1 and 10 bins for heading 2 of study 1 (20
bins x 10 bins=200 bins)."
::= {dcmStudyDataSetup 5}
```

2.8.6 Maximum Number Of Binned Filter Definition Table Rows

```
dcmBFDTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Binned Filter
Definition Table.”
::= {dcmStudyDataSetup 6}
```

2.8.7 Current Number Of Binned Filter Definition Table Rows

```
dcmBFDTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Binned Filter
Definition Table.”
::= {dcmStudyDataSetup 7}
```

2.8.8 Binned Filter Definition Table

```
dcmBinnedFilterDefTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmBinnedFilterDefEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
```

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```
 "This table is used to create definitions of ranges that can be applied to
bins in the Bin Relation Table. This is a double-indexed table. The table can
be managed thru dcmBinnedFilterDefRowAdmin object.  It is recommended that all
indexes be assigned sequentially by the application.  There can be multiple
ranges assigned to any one Binned Filter.  Parenthesis are always implied
around the first two entries assigned to the same Binned Filter for
processing.  The results of that are then processed with the next range
assigned to this binned filter.  Configuring a binned study with two headings
(15 bins of classification x 12 bins of speed) would require defining 27 bins
(entries in this table), 15 bins of class + the 12 bins of speed.
--Note that the value stored in each bin is an aggregate count and not a
--calculated value (e.g. a bin cannot contain the average gross weight of
--vehicles, but it can contain how many vehicles had an average gross
--weight that is within the bin range limits).”
::= {dcmStudyDataSetup 8}

dcmBinnedFilterDefEntry OBJECT-TYPE
 SYNTAX   DcmBinnedFilterDefEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX   {dcmBFDBinnedFilterNum, dcmBinnedFilterIndex}
::= {dcmBinnedFilterDefTable 1}

DcmBinnedFilterDefEntry  ::= SEQUENCE
{
 dcmBFDBinnedFilterNum      DcmBinnedFilterNum,
 dcmBinnedFilterIndex       INTEGER,
 dcmBinHeading              OBJECT IDENTIFIER, -- (reference objects created
                             -- for each of the enumerations from
                             -- the Vehicle Criteria Table.)
 dcmBinMinimumValue         INTEGER,
 dcmBinMaximumValue         INTEGER,
 dcmBinNumberIndexRelation  INTEGER,
 dcmBinnedFilterDefRowAdmin DcmRowStatus
}
```

2.8.8.1 Binned Filter Number

```
dcmBFDBinnedFilterNum OBJECT-TYPE
 SYNTAX   DcmBinnedFilterNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the first index into this table.  It represents a unique number
for each binned filter that is being defined within the device.  It is
strongly suggested that the numbering is assigned sequentially.  This number
can never exceed the maximum number of bins for all studies object
(dcmMaxNumBins). Refer to DcmBinnedFilterNum for more information.”
::= {dcmBinnedFilterDefEntry 1}
```

2.8.8.2 Binned Filter Index

```
dcmBinnedFilterIndex OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the second index into this table.  This value allows assigning
more than one heading type (and the associated lower and upper limit) to a
```

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```
binned filter (e.g. assign class 9 or class 11 to this bin). It is strongly
suggested that the numbering is assigned sequentially."
::= {dcmBinnedFilterDefEntry 2}
```

2.8.8.3 Bin Heading

```
dcmBinHeading OBJECT-TYPE
 SYNTAX   OBJECT IDENTIFIER
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This contains the OID of the type of data (taken from the dcm vehicle
criteria node) to be binned for this Binned Filter definition. A volume study
can be configured by specifying the Array Number OID."
::= {dcmBinnedFilterDefEntry 3}
```

2.8.8.4 Bin Minimum Value

```
dcmBinMinimumValue OBJECT-TYPE
 SYNTAX   INTEGER (0..16777215)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the lower range value for this bin (this row of the table). The
meaning of this value is dependent on the value of the dcmBinHeading object
assigned to this row. When binning data, all compare values that are greater
than or equal to the value of this object and less than the value of
dcmBinMaximumValue for this Binned Filter must be assigned to this bin."
::= {dcmBinnedFilterDefEntry 4}
```

2.8.8.5 Bin Maximum Value

```
dcmBinMaximumValue OBJECT-TYPE
 SYNTAX   INTEGER (0..16777215)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates the upper range value for this bin (this row of the table). The
meaning of this value is dependent on the value of the dcmBinHeading object
assigned to this row.  All compare values that are smaller than the value of
this object and greater than or equal to the dcmBinMinimumValue for this
Binned Filter must be assigned to this bin."
::= {dcmBinnedFilterDefEntry 5}
```

2.8.8.6 Bin Number to Index Relationship

```
dcmBinNumberIndexRelation OBJECT-TYPE
 SYNTAX   INTEGER
 {
  and (1),
  or (2),
  endOfDef (3)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates how several rows with the same value of the dcmBinnedFilterNumber
object are related to each other. It is up to the actual implementation
(database population) to ensure that the association of rows is logical. The
first two entries for any defined binned filters are processed first, the
```

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```
result of that is then processed with the next row, the result of that with
the 4th, etc.  The currently defined values are:
and (1) – combine the criteria of this row with the next row (next higher
          value of the secondary index object) within the same primary index
          number object.
or (2) – select the criteria of either this row or that of the next row (next
          higher value of the same secondary index object) within the same
          primary index number object.
endOfDef (3) – indicates that the criteria of this row is the last criteria
          valid for this primary index number object.
If only one dcmFilterCriteria is used per binned filter, the value of this
object shall be set to 'endOfDef'.
In opposite to the common setup of SNMP MIB objects, this object was purposely
setup to NOT include a value of (other)."
::= {dcmBinnedFilterDefEntry 6}
```

2.8.8.7 Binned Filter Definition Table Row Admin

```
dcmBinnedFilterDefRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure the definitions of a
binned filter (this row of this table).  The SYNTAX definition allows to
create, delete, disable, or edit the row."
::= {dcmBinnedFilterDefEntry 7}
```

2.8.9 Maximum Number Of Binned Study Configuration Table Rows

```
dcmBSCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Binned Study
Configuration Table."
::= {dcmStudyDataSetup 9}
```

2.8.10 Current Number Of Binned Study Configuration Table Rows

```
dcmBSCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Binned Study Definition
Table."
::= {dcmStudyDataSetup 10}
```

2.8.11 Binned Study Configuration Table

```
dcmBinSCTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmBinSCEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table is used to relate Binned Filters to headings within studies (e.g.
Study 1 Heading 1 Bin 1 is Speed (0-10mph),…). This is a triple-indexed table.
The table can be managed thru dcmBSCRowAdmin object.  If a Binned Filter is
deleted in the Binned Filter Definition Table, the device shall automatically
```

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```
delete any entry within this table that refers to the deleted Binned Filter
Number."
::= {dcmStudyDataSetup 11}

dcmBinSCEntry OBJECT-TYPE
 SYNTAX   DcmBinSCEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmBSCStudyNum, dcmBSCHeadingNum, dcmBSCLabelNum}
::= {dcmBinSCTable 1}

DcmBinSCEntry  ::= SEQUENCE
{
 dcmBSCStudyNum   DcmStudyNum,
 dcmBSCHeadingNum INTEGER,
 dcmBSCLabelNum   INTEGER,
 dcmBSCFilterNum  DcmBinnedFilterNum,
 dcmBSCRowAdmin   DcmRowStatus
}
```

2.8.11.1 Study Number

```
dcmBSCStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the first index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyNum for more detail."
::= {dcmBinSCEntry 1}
```

2.8.11.2 Heading Number

```
dcmBSCHeadingNum OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "Indicates the second index into this table.  It represents a unique heading
number for each study that is being defined within the device.  It is strongly
suggested that the numbering is assigned sequentially.  Typically a device
would support up to 3 headings per study.  A Boolean 'and' is always implied
across all of the specified headings for a study (e.g. if 3 bins of class
(1,2,3) are specified for heading 1 of study 1 and 2 bins of speed (0-5mph, 5-
10mph) are specified for heading 2 of study 1, then bin 1 would be any vehicle
that was a class 1 and had a speed between 0-5mph, bin 2 would be any vehicle
that was a class 2 and had a speed between 0-5mph, …).  The combination of all
the headings specified for all the studies shall never exceed the maximum
number of headings for all studies object (dcmMaxNumHeadings)."
::= {dcmBinSCEntry 2}
```

2.8.11.3 Bin Label Number

```
dcmBSCLabelNum OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
```

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```
 “Indicates the third index into this table.  This value allows assigning more
than one bin label to each heading number and each study number. For example,
if study 1 heading 1 required 5 bins to be assigned, 5 rows would be required
with this index spanning from 1 to 5. It is strongly suggested that the
numbering is assigned sequentially.”
::= {dcmBinSCEntry 3}
```

2.8.11.4 Binned Filter Number

```
dcmBSCFilterNum OBJECT-TYPE
 SYNTAX   DcmBinnedFilterNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “This object represents a unique number for each binned filter that has been
defined within the ‘dcm Binned Filter Definition Table’.    Refer to
DcmBinnedFilterNum for more information.”
::= {dcmBinSCEntry 4}
```

2.8.11.5 Bin Relation Table Row Admin

```
dcmBSCRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure the relations of a
binned filter (this row of this table).  The SYNTAX definition allows to
create, delete, disable, or edit the row."
::= {dcmBinSCEntry 5}
```

2.8.12 Maximum Number Of PVR Study Configuration Table Rows

```
dcmPSCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the PVR Study Configuration
Table.”
::= {dcmStudyDataSetup 12}
```

2.8.13 Current Number Of PVR Study Configuration Table Rows

```
dcmPSCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the PVR Study Configuration
Table.”
::= {dcmStudyDataSetup 13}
```

2.8.14 PVR Study Configuration Table

```
dcmPvrStudyConfigTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmPvrStudyConfigEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
```

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```
 "This is a doubly-indexed table.  It defines the parameters to configure PVR
studies. The parameters specified define both the pvr study as well as the
structure for the data packets to be stored in the Data Structure Table. The
table can be managed thru dcmPvrStudyConfigRowAdmin object.  If a study is
deleted from the Study Configuration Table, any entries within this table that
refer to that study shall be automatically deleted by the device.”
::= {dcmStudyDataSetup 14}

dcmPvrStudyConfigEntry OBJECT-TYPE
 SYNTAX   DcmPvrStudyConfigEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX {dcmPSCStudyNum, dcmPvrStudyIndex}
::= {dcmPvrStudyConfigTable 1}

DcmPvrStudyConfigEntry  ::= SEQUENCE
{
 dcmPSCStudyNum            DcmStudyNum,
 dcmPvrStudyIndex          INTEGER,
 dcmPvrParam               OBJECT IDENTIFIER,
 dcmPvrStudyConfigRowAdmin DcmRowStatus
}
```

2.8.14.1 Study Number

```
dcmPSCStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the first index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyConfig for more detail.”
::= {dcmPvrStudyConfigEntry 1}
```

2.8.14.2 PVR Study Index

```
dcmPvrStudyIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “indicates the second index into this table.  This allows specifying to store
multiple vehicle parameters for each study.”
::= {dcmPvrStudyConfigEntry 2}
```

2.8.14.3 PVR Parameter

```
dcmPvrParam OBJECT-TYPE
 SYNTAX   OBJECT IDENTIFIER
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 “This field contains the OID of the specified pvr parameter to store from the
dcm Vehicle Criteria node.  The OID specified must be a full OID from the root
of the iso tree, relative OID’s cannot be used.  This allows referring to
objects outside of this MIB. The objects specified here can be either single
or multi-occurrence objects as defined by the object referred to by this OID
in the Vehicle Criteria Node.  Refer to the description at the beginning of
```

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```
the Vehicle Criteria Node. The order of the PVR parameters, in this table,
specifies the order of the data in the PVR data packet.“
::= {dcmPvrStudyConfigEntry 3}
```

2.8.14.4 PVR Study Configuration Table Row Admin

```
dcmPvrStudyConfigRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure a PVR study (this row
of this table).  The SYNTAX definition allows to create, delete, disable, or
edit the row."
::= {dcmPvrStudyConfigEntry 4}
```

2.8.15 Maximum Number Of Event Study Configuration Table Rows

```
dcmESCTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Event Study
Configuration Table.”
::= {dcmStudyDataSetup 15}
```

2.8.16 Current Number Of Event Study Configuration Table Rows

```
dcmESCTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Event Study
Configuration Table.”
::= {dcmStudyDataSetup 16}
```

2.8.17 Event Study Configuration Table

```
dcmEventStudyConfigTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmEventStudyConfigEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 “This table is used to configure an Event Study.  The fields configured in
this table define the number of bits to identify the size of an event and how
frequently a timer event would be placed in the data. This uses Study Number
as the single-index into the table.  This table requires row administration.
There shall be one row defined in this table for each required event study.
The table can be managed thru dcmEventStudyConfigRowAdmin object.”
::= {dcmStudyDataSetup 17}

dcmEventStudyConfigEntry OBJECT-TYPE
 SYNTAX   DcmEventStudyConfigEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmESCStudyNum}
::= {dcmEventStudyConfigTable 1}
```

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```
DcmEventStudyConfigEntry  ::= SEQUENCE
{
 dcmESCStudyNum              DcmStudyNum,
 dcmEventNumberSize          INTEGER,
 dcmTimerEventMaxPeriod      INTEGER,
 dcmEventStudyConfigRowAdmin DcmRowStatus
 }
```

2.8.17.1 Study Number

```
dcmESCStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the only index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyConfig for more detail.”
::= {dcmEventStudyConfigEntry 1}
```

2.8.17.2 Event Number Size

```
dcmEventNumberSize OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This indicates the number of bits required to store  an event number.  This
shall reflect the total number of events that are mapped to this event study
in the Event To Logical IO Mapping Table.  For example, if this value is set
to two, then there can only be a maximum of four distinct events that can be
identified.
The value cannot be set to zero (0), since it would indicate that there are no
event #’s to refer to in the Event To Logical IO Mapping Table.”
::= {dcmEventStudyConfigEntry 2}
```

2.8.17.3 Timer Event Maximum Period

```
dcmTimerEventMaxPeriod OBJECT-TYPE
 SYNTAX   INTEGER (1..4294967295)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This field identifies the maximum number of milliseconds that can be
contained in the timestamp stored within each event(see dcmTimeStampSize).
If a timer is defined as an event # in the Event To Logical IO Mapping table,
the value of dcmTimerEventMaxPeriod defines the period between timer events.
If a timer is not identified as an event in the Event To Logical IO Mapping
Table, no timer events shall be stored, this field shall be ignored."
::= {dcmEventStudyConfigEntry 3}
```

2.8.17.4 Event Study Config Table Row Admin

```
dcmEventStudyConfigRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Allows management of the parameters used to configure an event study (this
row of this table).  The SYNTAX definition allows to create, delete, disable,
or edit the row."
::= {dcmEventStudyConfigEntry 4}
```

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2.8.18 Maximum Number Of Event To Logical IO Mapping Table Rows

```
dcmELIMTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Event To Logical IO
Mapping Table."
::= {dcmStudyDataSetup 18}
```

2.8.19 Current Number Of Event To Logical IO Mapping Table Rows

```
dcmELIMTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Event To Logical IO
Mapping Table."
::= {dcmStudyDataSetup 19}
```

2.8.20 Event To Logical IO Mapping Table

```
dcmEventConfigTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmEventConfigEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table maps logical IO's to a unique event number within a particular
study.  The parameters allow defining the structure of each event data that is
to be recorded.  An event is defined as a specific state of a logical IO and
given a unique event # for a particular study.  The parameters are  related to
a particular study number to allow for multiple structures for the same input.
An IO event record as stored in the data portion of an event data packet would
consist of an Event # (dcmEventNum), Event Value (# of bits specified by
dcmEventValueSize), Timestamp (# of bits specified by dcmTimestampSize).  The
size of the IO event would be the sum of the Event # Size
(dcmEventNumberSize), Event Value Size (dcmEventValueSize) and the
Timestampsize (dcmTimestampSize).
Therefore to decipher the bitstream in an event record, the  first x bits
(dcmEventNumberSize) of each data element would identify the Event Number and
this table would define how many bits follow for the event value and event
timestamp.
This is a single-indexed table. The index is assigned sequentially and the
table requires row administration.  There shall be one row in this table for
each event # mapped to an event study.
The table can be managed thru the dcmEventConfigRowAdmin object."
::= {dcmStudyDataSetup 20}

dcmEventConfigEntry OBJECT-TYPE
 SYNTAX   DcmEventConfigEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmECStudyNum,dcmEventConfigNumber}
::= {dcmEventConfigTable 1}

DcmEventConfigEntry ::= SEQUENCE
```

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```
{
 dcmECStudyNum          DcmStudyNum,
 dcmEventConfigNumber   INTEGER,
 dcmEventNumber         INTEGER,
 dcmECIONum             DcmLogIONum,
 dcmLogicalIOState      INTEGER,
 dcmEventValueSize      INTEGER,
 dcmTimestampSize       INTEGER,
 dcmEventConfigRowAdmin DcmRowStatus
}
```

2.8.20.1

2.8.20.2 Study Number

```
dcmECStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "Indicates a unique number for each study that is defined within the device
in the dcmStudyConfigTable.  Refer to DcmStudyConfig for more detail.”
::= {dcmEventConfigEntry 1}
```

2.8.20.3 Event Configuration Number

```
dcmEventConfigNumber OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “This is a unique number that is used to create a sequential index (within
each Study number) for this table.  This is the second index of the table.
Although dcmEventNumber could be used as the second index, it would require a
larger number of bits to store an event since an index cannot be assigned a
value of zero and thus would have to start at one.  For example, a study with
two events (Event # 1, Event # 2, (note that Event # 0 cannot be used)) would
have to use two bits in each event record rather than one (two bits are
required to represent the number 2 for Event # 2).  Using Event Config # as a
separate index provides for the least number of bits to be stored in the event
data record.”
::= {dcmEventConfigEntry 2}
```

2.8.20.4 Event Number

```
dcmEventNumber OBJECT-TYPE
 SYNTAX   INTEGER (0..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “This is a unique sequential number assigned by the equipment for each event
within this study.  The first event number shall be 0 and subsequent events
shall be numbered sequentially for the same study number in order to limit the
number of bits necessary to identify all the events for a study.  Note that
the event number can be repeated for different studies, e.g. there can be an
event number 0 for Study 1 and event number 0 for Study 2. When a study is
validated or set to prime, the device shall verify that all event numbers
relative to the same study in this table are sequential.  An application error
of ‘validationFailed’ shall be reported if they are not.”
::= {dcmEventConfigEntry 3}
```

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2.8.20.5 Logical IO Number

```
dcmECIONum OBJECT-TYPE
 SYNTAX DcmLogIONum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “Refer to DcmLogIONum for description.”
::= {dcmEventConfigEntry 4}
```

2.8.20.6 Logical IO State

```
dcmLogicalIOState OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  on (2),
  off (3),
  weight (4),
  pulsed (5),
  triggered (6),
  valueA-D (7)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This field defines the specific logical IO states (e.g., on, off,  etc) that
are used to determine if an event has occurred.    The values are:
other (1) – not defined below
on (2) – Logical IO has turned on.
off (3) – Logical IO has turned off.
weight (4) – This event record represents a raw weight.
pulsed (5) – Logical IO has been pulsed.
triggered (6) – Logical IO has been triggered.
valueA-D (7) – This event record represents a raw analog to digital count.”
::= {dcmEventConfigEntry 5}
```

2.8.20.7 Event Value Size

```
dcmEventValueSize OBJECT-TYPE
 SYNTAX   INTEGER (0..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "This object identifies the number of bits necessary to store a value
associated with this event (e.g., weight, A/D value,  etc….) that is to be
recorded within the data structure.  This object shall be set by the equipment
based on the logical IO associated to this event.  Note that this size can be
different for each logical IO.
If the value is set to zero (0), no value field is contained in the data
structure for this event.”
::= {dcmEventConfigEntry 6}
```

2.8.20.8 Timestamp Size

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

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```
 "This object identifies the number of bits used to record the timestamp of an
event within the data structure. The time stamp of an event is referenced to
the start of the study or a timer event, whichever occurred last. If the value
is set to zero (0), no timestamp field is contained in the data structure.
The time stamp resolution associated with this dcmECStudyNum is calculated by
(dcmTimerEventMaxPeriod / (2^(dcmTimestampSize)))."
::= {dcmEventConfigEntry 7}
```

2.8.20.9 Event Configuration Table Row Admin

```
dcmEventConfigRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "allows management of the parameters used to configure an event study (this
row of this table).  The SYNTAX definition allows to create, delete, disable,
or edit the row.”
::= {dcmEventConfigEntry 8}
```

2.8.21 Maximum Number Of Data Recording Enable Table Rows

```
dcmDRETMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Data Recording Enable
Table.”
::= {dcmStudyDataSetup 21}
```

2.8.22 Current Number Of Data Recording Enable Table Rows

```
dcmDRETCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Data Recording Enable
Table.”
::= {dcmStudyDataSetup 22}
```

2.8.23 Data Recording Enable Table

```
dcmDRETable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmDREEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This table is single-indexed by study number.  It is used to control and
read the state of each data recording study. The device must ensure that there
exists an entry in this table for each data recording study defined in the
Study Configuraton Table. A ‘data recording study’ is defined as any study
that has been entered into the Study Configuration Table that has a ‘Study
File Index’ greater than 0. If a study is deleted from the Study Configuration
Table, the device shall also delete it from this table."
::= {dcmStudyDataSetup 23}

dcmDREEntry OBJECT-TYPE
 SYNTAX DcmDREEntry
 ACCESS not-accessible
```

```
 STATUS mandatory
 DESCRIPTION "..."
 INDEX  {dcmDREStudyNum}
::= {dcmDRETable 1}

DcmDREEntry ::= SEQUENCE
{
 dcmDREStudyNum DcmStudyNum,
 dcmDREStatus   INTEGER,
 dcmDREControl  INTEGER
}
```

2.8.23.1 Study Number

```
dcmDREStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the only index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyConfig for more detail.”
::= {dcmDREEntry 1}
```

2.8.23.2 Data Recording Enable Status

```
dcmDREStatus OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  idle (2),
  primed (3),
  recording (4),
  validating (5),
  error (6)
 }
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the status of this study.  The values are:
- other (1),= Not defined below.
- idle (2),= The device is currently not recording any data for this study to
a file.
- primed (3),= The device is waiting to start recording data to a file (either
for the next even recording interval or a scheduled date/time).
- recording (4),= The device is currently recording data to the specified file
for this study.
- validati\ng (5),= The device is currently validating the configured study.
The device can only be in this state if the value of the dcmDREControl object
has been set to ‘validate’ or ‘prime’.
 - error (6)= Indicates any error associated with this study including invalid
configuration setups.   The dcmErrCodeTable should be checked to determine
which objects caused the errors."
::= {dcmDREEntry 2}
```

2.8.23.3 Data Recording Control

```
dcmDREControl OBJECT-TYPE
 SYNTAX INTEGER
 {
```

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```
  prime (1),
  quitRecording (2),
  validate (3)
 }
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "This object allows a user to command the device to:
-prime – Sets device into a state where it is waiting to begin data recording
(typically waiting for the start of the next even recording interval or some
scheduled start date/time).  The device shall perform a validation before
going to primed.  If there are no errors, the device shall go into the primed
state.  If there are errors, the device shall indicate 'error' in the
dcmDREStatus object.  The dcmErrCodeTable should be checked for which objects
caused the errors.
-quitRecording – The device shall stop collecting and storing data to the data
files.  This can be used when the device is either in the 'primed' mode or
'recording' mode as indicated by the Data Recording Status field in this
table.
-validate – Commands the device to perform a validation of the current study
settings for the specified study.  This control option is only valid when the
device is in idle or error mode as indicated by the Data Recording Enable
Status object.  If the Data Recording Status field is set to error after
performing the validation, the dcmErrCodeTable should be checked to determine
which object caused the errors.  The dcmDREStatus object shall be set to
either idle or error after the validation is finished.  A GET on this object
shall return the value of the last user-selected control."
::= {dcmDREEntry 3}
```

2.8.24 Maximum Number Of Monitor Enable Table Rows

```
dcmMETMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Monitor Enable Table."
::= {dcmStudyDataSetup 24}
```

2.8.25 Current Number Of Monitor Enable Table Rows

```
dcmMETCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Monitor Enable Table."
::= {dcmStudyDataSetup 25}
```

2.8.26 Monitor Enable Table

```
dcmMETable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmMEEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This table is single-indexed by study number.
It is used to control and read the state of each 'Monitor Study'.
A Binned Monitor Study shall return the bin counts for the current recording
interval as defined by the 'Data' column of the Data Structure Table for
```

Binned Data (note that in asciiData Monitor Modes, the number of octets per binned count is not sent).
A PVR Monitor Study shall return one or more PVR/s as defined by the 'Data' column of the Data Structure Table for PVR Data (note that in asciiData Monitor Modes, the dcm device may translate the vehicle time tag to a more user friendly format (e.g. 'mm/dd/yy hh:mm:ss').
An Event Monitor Study shall return one or more sensor events (Logical IO Events) as defined by the 'Data' column of the Data Structure Table for Event Data (note that in asciiData Monitor Modes, the ascii hex representation of each event record field will be sent since event records are defined in bits).
The 'Data' column of the Data Structure Table is an OCTET STRING, it will contain the length of the data returned by the device for each type of Monitor Mode 2 (binary data). The OCTET STRING identifier and length field is not included for asciiData Monitor Modes.
Note that it may possible for vehicles or sensor events (Logical IO events) to be missed if the device does not have sufficient buffer space to hold the data before being polled (specifically in Monitor Mode 2). This should only occur with either PVR or Event Monitor Studies. There currently is no mechanism to notify the central application that a data over-run has occurred. The best approach (if possible) would be to use Monitor Mode 1 allowing the device to stream out the data as it occurs. This however requires that the central application can keep up with the streamed data.
Monitor Studies are typically used to verify operation of sensors and sensor arrays.
For example, if the data in collected data files appear to be invalid, a user may want to configure an 'Event Monitor Study' (in the Study Configuration Table) that incorporates the same sensors in which the invalid data has been produced by. The user would then enable the 'Event Monitor Mode' from within this table. The user would examine the event data returned by the device to determine if all of the specified sensors appear to be operating correctly.
Monitor Studies are typically turned on for a short period of time and then disabled. The data is sent to a hardware communications port and not saved to a data file.
The study specified in this table must point to a 'Monitor Study'. A 'Monitor Study' is defined as any study that has been configured in the Study Configuration Table with it's 'Study File Index' set to 0.
The asciiData Monitor Modes are intended to provide user-readable output without interpretation and is included for historical purposes.
The Row Admin field is not required in this table. If a study is deleted from the Study Configuration Table, the device shall also delete any row associated with the same study number from this table."
::= {dcmStudyDataSetup 26}

```
dcmMEEntry OBJECT-TYPE
 SYNTAX DcmMEEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION "..."
 INDEX  {dcmMEStudyNum}
::= {dcmMETable 1}

DcmMEEntry ::= SEQUENCE
{
 dcmMEStudyNum     DcmStudyNum,
 dcmMEIONum        DcmLogIONum,
 dcmMEType         INTEGER,
 dcmMETimeInterval INTEGER,
 dcmMEControl      INTEGER,
```

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```
 dcmMEStatus       INTEGER,
 dcmMEPollNow      OCTET STRING
}
```

2.8.26.1 Study Number

```
dcmMEStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the only index into this table. It represents a unique number for the specified Monitor Study that is configured within the dcmStudyConfigTable."
::= {dcmMEEntry 1}
```

2.8.26.2 Logical IO Number

```
dcmMEIONum OBJECT-TYPE
 SYNTAX DcmLogIONum
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "Identifies which hardware communications port to which the Monitor Mode data shall be sent.  Refer to DcmLogIONum for more detail."
::= {dcmMEEntry 2}
```

2.8.26.3 Monitor Enable Type

```
dcmMEType OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  asciiData (2),
  binaryData (3)
 }
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "Indicates the encoding of the data packet returned by the device.  The values are:
-other(1)=not defined.

-asciiData(2)=data packet is encoded using an ascii representation of the 'Data' column of the Data Structure Table.  This mode of operation is intended to provide the user with readable data directly from the device without requiring interpretation (it is included for historical purposes).  Each field of the data packet (a defined bin for a binned study, a pvr parameter for a pvr study, or each field of an event record for an event study) shall be separated by a 'white space' (either an ascii space, ascii comma, ascii tab). Each record (all of the binned counts for a binned study, each set of vehicle parameters for a pvr study and each logical IO event record for an event study), will be terminated by a 'white terminator' (an ascii carriage return, an ascii line feed or a combination ascii carriage return/line feed). Because each field is separated by an ascii 'white space', the dcn device may choose to pad each field with leading ascii zeros (ascii code h30) to make each identical field the same length for readability.  The octet string code (04h) and the length of the octet string fields are not sent in asciiData mode.  The number of octets per binned counts for binned studies is not sent.  The vehicle time tag for pvr studies may be translated by before being sent. The
```

```
data fields sent for event studies shall be the ascii hex representation of
each defined field since event records are defined in bits.

-binaryData(3)=data packet is encoded in binary.  The data is encoded as
defined by the 'Data' field of the Data Structure Table for the specified type
of data."
::= {dcmMEEntry 3}
```

2.8.26.4 Monitor Enable Time Interval

```
dcmMETimeInterval OBJECT-TYPE
 SYNTAX INTEGER (0..255)
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
"Indicates the time (in seconds) between the sending of each data packet for
the specified Monitor Mode.  This column is only valid for Monitor Mode 1
configurations, it shall be ignored for Monitor Mode 2.
Setting this to 0 shall cause the device to send a data packet for every
occurrence of the specified study type data, (PVR Monitor Mode – a data packet
shall be sent for each vehicle that traverses the associated sensor array/s,
Event Monitor Mode – a data packet shall be sent for each change of state of
the associated sensor/s, Binned Monitor Mode – 0 shall not be a valid option,
the device shall return an error code of 'invalidOption' as the result of a
'validate'."
::= {dcmMEEntry 4}
```

2.8.26.5 Monitor Enable Control

```
dcmMEControl OBJECT-TYPE
 SYNTAX INTEGER
 {
  validate (1),
  enableMon1 (2),
  enableMon2 (3),
  disableMon (4)
 }
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION
 "This object allows a user to command the device to:
-validate – Commands the device to perform a validation of the current study
settings for the specified study.  If the Monitor Enable Status field is set
to error after performing the validation, the dcmErrCodeTable should be
checked to determine which object caused the errors.
-enableMon1On – Commands the device to enable Monitor Mode 1 (refer to
dcmMEStatus for a description of Monitor Mode 1).  If a validation of the
specified study hasn't been performed yet, the device shall perform a
validation.  After the validation, this study shall either be in error, idle
or a Monitor Mode On state.  If an error occurs, the application should check
the dcm Error Code table (dcmErrCodeTable) for more information regarding the
errors.
-enableMon2On – Commands the device to enable Monitor Mode 2 (see dcmMEStatus
for a description of Monitor Mode 2).  If a validation of the specified study
hasn't been performed yet, the device shall perform a validation.  After the
validation, this study shall either be in error, idle or a Monitor Mode On
state.  If an error occurs, the application should check the dcm Error Code
table (dcmErrCodeTable) for more information regarding the errors.
-disableMon – Commands the device to disable Monitor Mode.
```

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A GET on this object shall return the value of the last user-selected control.“
::= {dcmMEEntry 5}

2.8.26.6 Monitor Enable Status

```
dcmMEStatus OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  error (2),
  validating (3),
  monitorMode1On (4),
  monitorMode2On (5),
  idle(6)
 }
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the status of this study.  The values are:
```

- other (1) = Not defined below.
- error (2) = There was an error in the ‘Monitor Study’ found by the device when it was commanded to enable a Monitor Mode. Check the dcm Error Code Table (dcmErrCodeTable) for more information regarding the error.
- validating (3) = The device is currently validating the configured study. The device can only be in this state if the value of the dcmDREControl object has been set to ‘validate’ or a Monitor Mode was enabled.
- monitorMode1On (4)= Indicates that the device has successfully enabled Monitor Mode 1. Monitor Mode 1 is an asynchronous mode of operation where the device shall asynchronously stream out data packets (as defined by the ‘Data’ field in the Data Structure Table for the specified study) without any protocol wrapper. The time between the device sending each data packet is defined by dcmMETimeInterval.

This mode should only be enabled in a point to point communications architecture since there is no protocol wrapper around the streamed data. This mode has been included for compatibility with existing systems.

- monitorMode2On (5) = Indicates that the device has successfully enabled Monitor Mode 2. Monitor Mode 2 is a synchronous mode of operation in which each data packet must be polled for by the application. The encoding of each data packet shall be defined by the ‘Data’ field of the Data Structure Table for the specified type of study) The dcmMEPollNow column in this row shall be used to poll for each data packet. Each time the application performs a ‘Get’ on the dcmMEPollNow column, the device shall respond by sending a data packet. The data packet shall contain all of the associated data from the time of the last poll up to the current time.
- idle (6) = No Monitor Modes are enabled."

::= {dcmMEEntry 6}

2.8.26.7 Monitor Enable Poll Now

```
dcmMEPollNow OBJECT-TYPE
 SYNTAX OCTET STRING
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
```

“This column is only valid for Monitor Mode 2. Anytime an application performs a ‘GET’ on this column, the device shall respond by sending back a data packet (as defined by the ‘Data’ column of the ‘Data Structure Table’ for

```
the specified study).  If Monitor Mode 2 is not enabled for this Monitor
Study, the device shall respond with an OCTET STRING of size 0 octets.”
::= {dcmMEEntry 7}
```

2.8.27 Array Parameter Change Record Table

```
dcmAPCTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmAPCEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
"This table has been defined to specify a data structure record format for any
array parameter changes that need to be written to the dcmDataStructureTable,
it is not accessible by the central application.  The time tag column has been
defined as the index for syntax purposes only, there really are no indexes for
this table.
Since this table represents raw data, each column of this table shall be
stored in the ‘data’ column of the dcmDataStructureTable using the encoding
specified by the ‘File Encoding Code’ in the ‘File Parameter Table’ for this
study."
::= {dcmStudyDataSetup 27}

dcmAPCEntry OBJECT-TYPE
 SYNTAX   DcmAPCEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmAPCTimeTag}
::= {dcmAPCTable 1}

DcmAPCEntry ::= SEQUENCE
{
 dcmAPCTimeTag  DcmTimeTagIndex,
 dcmAPCArrNum   DcmArrayNum,
 dcmAPCType     DcmArrayParamType,
 dcmAPCValue    DcmArrayParamValue,
 dcmAPCFileName DcmArrayParamFileName
}
```

2.8.27.1 Time Tag

```
dcmAPCTimeTag OBJECT-TYPE
 SYNTAX   DcmTimeTagIndex
 ACCESS   read-only –-This object is not intended to be accessed,
                    -- the SMIC compiler won’t allow all objects of
                    -- a table to be defined as ‘non-accessible’,
                    -- so this object was set to be ‘read-only’.
 STATUS   mandatory
 DESCRIPTION
 "Defines the time at which the specified array parameter change occurred.
The value of this object follows the ‘controller-localTime’ setup, which
specifies the epoch since Midnight January 1, 1970.”
::= {dcmAPCEntry 1}
```

2.8.27.2 Array Number

```
dcmAPCArrNum OBJECT-TYPE
 SYNTAX DcmArrayNum
 ACCESS   not-accessible
 STATUS   mandatory
```

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```
 DESCRIPTION
 "Refer to DcmArrayNum for a more detailed description."
::= {dcmAPCEntry 2}
```

2.8.27.3 Array Parameter Type

```
dcmAPCType OBJECT-TYPE
 SYNTAX DcmArrayParamType
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "Indicates the type of parameter associated with an array. One or more types
can be associated with an array.
Refer to DcmArrayParamType for a more detailed description."
::= {dcmAPCEntry 3}
```

2.8.27.4 Array Parameter Value

```
dcmAPCValue OBJECT-TYPE
 SYNTAX   DcmArrayParamValue
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "Indicates the value associated with a particular array parameter type as
specified by the dcmAPCType column.  Refer to DcmArrayParamValue for a more
detailed description."
::= {dcmAPCEntry 4}
```

2.8.27.5 Array Parameter FileName Pointer

```
dcmAPCFileName OBJECT-TYPE
 SYNTAX   DcmArrayParamFileName
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "Indicates a file name that contains the array parameter calibration
information. This column shall always be set to a NULL (using the encoding
specified by the ‘File Encoding Code’ in the ‘File Parameter Table’ for this
study) unless the value of dcmAPCType is set to ‘calFilPointer’.  Refer to
DcmArrayParamFileName for a more detailed description."
::= {dcmAPCEntry 5}
```

2.8.28 Logical IO Parameter Change Record Table

```
dcmIOPCRecTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmIOPCRecEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table has been defined to specify a data structure record format for
any IO parameter changes that need to be written to the dcmDataStructureTable,
it is not accessible by the central application.  The time tag column has been
defined as the index for syntax purposes only, there really are no indexes for
this table.
Since this table represents raw data, each column of this table shall be
stored in the ‘data’ column of the dcmDataStructureTable using the encoding
specified by the ‘File Encoding Code’ in the ‘File Parameter Table’ for this
study."
::= {dcmStudyDataSetup 28}

dcmIOPCRecEntry OBJECT-TYPE
```

```
 SYNTAX   DcmIOPCRecEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX   {dcmIOPCTimeTag}
::= {dcmIOPCRecTable 1}

DcmIOPCRecEntry  ::= SEQUENCE
{
 dcmIOPCTimeTag   DcmTimeTagIndex,
 dcmIOPCNum       DcmLogIONum,
 dcmIOPCParamTyp  DcmIOParamType,
 dcmIOPCParamVal  DcmIOParamValue
}
```

2.8.28.1 IOPC Time Tag

```
dcmIOPCTimeTag OBJECT-TYPE
 SYNTAX   DcmTimeTagIndex
 ACCESS   read-only –-This object is not intended to be accessed,
                    -- the SMIC compiler won't allow all objects of
                    -- a table to be defined as 'non-accessible',
                    -- so this object was set to be 'read-only'.
 STATUS   mandatory
 DESCRIPTION
 "Defines the time at which the specified logical IO parameter change
occurred.  The value of this object follows the 'controller-localTime' setup,
which specifies the epoch since Midnight January 1, 1970."
::= {dcmIOPCRecEntry 1}
```

2.8.28.2 IOPC Logical IO Number

```
dcmIOPCNum OBJECT-TYPE
 SYNTAX DcmLogIONum
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
 "Refer to DcmLogIONum for description."
::= {dcmIOPCRecEntry 2}
```

2.8.28.3 IOPC IO Parameter Type

```
dcmIOPCParamTyp OBJECT-TYPE
 SYNTAX DcmIOParamType
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
 "Refer to DcmIOParamType for description."
::= {dcmIOPCRecEntry 3}
```

2.8.28.4 IOPC IO Parameter Value

```
dcmIOPCParamVal OBJECT-TYPE
 SYNTAX DcmIOParamValue
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
 "Refer to DcmIOParamValue for description."
::= {dcmIOPCRecEntry 4}
```

2.8.29 Log Data Record Table

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```
dcmLDRecTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmLDRecEntry
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This table has been defined to specify a data structure record format for
any log data that need to be written to the dcmDataStructureTable, it is not
accessible by the central application.  The time tag column has been defined
as the index for syntax purposes only, there really are no indexes for this
table.
Since this table represents raw data, each column of this table shall be
stored in the 'data' column of the dcmDataStructureTable using the encoding
specified by the 'File Encoding Code' in the 'File Parameter Table' for this
study."
::= {dcmStudyDataSetup 29}

dcmLDRecEntry OBJECT-TYPE
 SYNTAX   DcmLDRecEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX   {dcmLDTimeTag}
::= {dcmLDRecTable 1}

DcmLDRecEntry ::= SEQUENCE
{
 dcmLDTimeTag   DcmTimeTagIndex,
 dcmLDData      OCTET STRING
}
```

2.8.29.1 Time Tag

```
dcmLDTimeTag OBJECT-TYPE
 SYNTAX   DcmTimeTagIndex
 ACCESS   read-only --This object is not intended to be accessed,
                    -- the SMIC compiler won't allow all objects of
                    -- a table to be defined as 'non-accessible',
                    -- so this object was set to be 'read-only'.
 STATUS   mandatory
 DESCRIPTION
 "Defines the time at which the specified data log occurred.  The value of
this object follows the 'controller-localTime' setup, which specifies the
epoch since Midnight January 1, 1970."
::= {dcmLDRecEntry 1}
```

2.8.29.2 Log Data

```
dcmLDData OBJECT-TYPE
 SYNTAX   OCTET STRING
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "This field contains the actual log data that was written to the data file as
an octet string with no encoding."
::= {dcmLDRecEntry 2}
```

2.8.30 Data Structure Table

```
dcmDataStructureTable OBJECT-TYPE
 SYNTAX   SEQUENCE OF DcmDataStructureEntry
```

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```
 ACCESS   not-accessible
 STATUS   optional
 DESCRIPTION
 "This is a doubly-indexed table.  It defines how the data for each type of
study (binned, pvr, event) shall be stored within the data files.  This table
is not accessible to any application.  It's purpose is to define a data
structure for decoding purposes within the data files.  The 2nd index is used
as a count (sequence number) associated with the Data Structure Table.  When
the application is decoding the data, it can use the 2nd index to verify if
the data file contains all of the data packets for a specified study (2nd
index is sequential with no missing numbers for the specified study)."
::= {dcmStudyDataSetup 30}

dcmDataStructureEntry OBJECT-TYPE
 SYNTAX   DcmDataStructureEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX {dcmDSStudyNum, dcmDataStrucIndex}
::= {dcmDataStructureTable 1}

DcmDataStructureEntry ::= SEQUENCE
 {
  dcmDSStudyNum     DcmStudyNum,
  dcmDataStrucIndex INTEGER,
  dcmStartTime      Counter,
  dcmEndTime        Counter,
  dcmDataNumRecords INTEGER,
  dcmDataEncoding   INTEGER,
  dcmData           OCTET STRING
 }
```

2.8.30.1 Study Number

```
dcmDSStudyNum OBJECT-TYPE
 SYNTAX DcmStudyNum
 ACCESS   read-only --This object is not intended to be accessed,
                    -- the SMIC compiler won't allow all objects of
                    -- a table to be defined as 'non-accessible',
                    -- so this object was set to be 'read-only'.
 STATUS mandatory
 DESCRIPTION
 "Indicates the first index into this table. It represents a unique number for
each study that is defined within the device in the dcmStudyConfigTable.
Refer to DcmStudyConfig for more detail."
::= {dcmDataStructureEntry 1}
```

2.8.30.2 Data Structure Table Index

```
dcmDataStrucIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
 "Indicates the second index into this table.  The 2nd index is used as a
count (sequence number) associated with the Data Structure Table.  When the
application is decoding the data, it can use the 2nd index to verify if  the
data file contains all of the data packets (2nd index is sequential with no
missing numbers)."
```

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```
::= {dcmDataStructureEntry 2}
```

2.8.30.3 Start time associated with the data in this packet

```
dcmStartTime OBJECT-TYPE
 SYNTAX Counter
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION
 "Defines the start date/time of the data contained within the data portion of
this packet. The value of this object follows the ‘controller-localTime’
setup, which specifies the epoch since Midnight January 1, 1970.”
::= {dcmDataStructureEntry 3}
```

2.8.30.4 End time associated with the data in this packet

```
dcmEndTime OBJECT-TYPE
 SYNTAX   Counter
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "Defines the end date/time of the data contained within the data portion of
this packet.  The value of this object follows the ‘controller-localTime’
setup, which specifies the epoch since Midnight January 1, 1970.”
::= {dcmDataStructureEntry 4}
```

2.8.30.5 Number of records encoded in the data section of this table

```
dcmDataNumRecords OBJECT-TYPE
 SYNTAX   INTEGER (0..16777215)
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "This field contains the number of records contained in the data section of
this table.  A binned study record consists of the specified data (as defined
in the Bin Relation Table) for a single recording interval.  A Pvr study
record is defined as the grouping of the user-defined parameters (Pvr Study
Configuration Table) for each vehicle that traverses any array in the
specified study.  An event record consists of the grouping of bits (as defined
in the Event Study Configuration Table and the Event To Logical IO Mapping
Table) for each IO activation associated with this study.  If there is no data
associated with the specified data packet (e.g. no vehicles traversed the
sensor arrays during that time period), the number of records field shall be
set to 0 and the data field shall be set to an OCTET STRING of length 0."
::= {dcmDataStructureEntry 5}
```

2.8.30.6 Data Encoding Code

```
dcmDataEncoding OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  noEncoding (2)
 }
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "This field contains a code which specifies the encoding of the data packet.
Currently no encodings have been defined.   This field is for future
enhancements (e.g. data compression)."
::= {dcmDataStructureEntry 6}
```

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2.8.30.7 Collected Data

```
dcmData OBJECT-TYPE
 SYNTAX   OCTET STRING
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION
 "This field contains the actual data that was recorded for this study.
Although it is defined as an Octet String, it represents binary data.  The
type of data encoded in this column is identified in the configured study
mapped to this row of this table (refer to Study Configuration Table).

Binned data shall store a single octet value as the first byte in this field
which indicates the number of octets used to store each bin count.  The number
and order of the bin counts stored are defined by the Binned Study
Configuration Table (refer to Binned Data Bins Ordering C.3.1.8).  Each
recording interval is considered a binned data record.  One or more binned
data records may be stored in this field as specified by the number of records
field in this row of this table.

PVR data shall be stored as defined by the PVR Study Configuration Table.  The
PVR data (as defined in the PVR Study Configuration Table) associated with
each vehicle is considered a vehicle record.  One or more vehicle records may
be stored in this field as specified by the number of records field in this
row of this table.

Event data shall be stored as defined by the Event Study Configuration Table.
Each sensor event shall be considered an event record.  One or more event
records may be stored in this field as specified by the number of records
field in this row of this table.

ArrayParam data shall be stored as defined by the Array Parameter Change
Record Table.  It represents Array Parameters (refer to the Array Parameter
Table) that have been changed in the dcm device either manually or
automatically.  One or more Array Parameter Change Records may be stored in
this field as specified by the number of records field in this row.

LogicalIOParam data shall be stored as defined by the Logical IO Parameter
Change Record Table. It represents Logical IO Parameters (refer to the Logical
IO Parameter Table) that have been changed in the dcm device either manually
or automatically. One or more Logical IO Parameter Change Records may be
stored in this field as specified by the number of records field in this row.

LogData data shall be stored as defined by the Log Data Record Table.  It
represents information (as an octet string) with a time tag which the dcm
device has written to the data file.  One or more Log Records may be stored in
this field as specified by the number of records field in this row.

Refer to Annex C.3.1 for an example of Binned Record Data encoding, Annex
C.3.2 for an example of PVR Record Data encoding and Annex C.3.3 for an
example of Event Record Data encoding. This packet may contain data for one or
more recording intervals.  The length of the entire data section shall be
encoded  as the length field of this Octet String.  If there is no data
associated with the specified data packet (e.g. no vehicles traversed the
sensor arrays during that time period), the number of records field shall be
set to 0 and an ASN.1 NULL shall be placed in the data field."
::= {dcmDataStructureEntry 7}
```

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2.9 FILE SETUP NODE

```
--dcm File Configuration Node
dcmFileConfig OBJECT IDENTIFIER ::= {dcm 7}
-- This node is an identifier used to group all objects for configuring of the
-- file parameters that are common to data collection and monitoring
-- devices.
```

2.9.1 Current Number Of File Structures

```
dcmNumFileStructures   OBJECT-TYPE
 SYNTAX  INTEGER (0..255)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 "indicates the current number of defined file structures in the File
Structure Table."
::= {dcmFileConfig 1}
```

2.9.2 Maximum Number Of File Structure Table Rows

```
dcmFSTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the File Structure Table.”
::= {dcmFileConfig 2}
```

2.9.3 Current Number Of File Structure Table Rows

```
dcmFSTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the File Structure Table.”
::= {dcmFileConfig 3}
```

2.9.4 File Structure Table

```
dcmFileStrucTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmFileStrucEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This is a doubly-indexed table. It defines which items shall be stored in
the data files.  By default, the dcm MIB Version Number object shall always be
included as the first object.  The device shall also include the required data
packets (encoded as Data Structure Tables) for the included studies.     The
objects specified in this table shall be stored in the data file in the same
order as specified in this table.  There may be other objects included in the
header information section that have not been specified in this table, however
these object can be skipped over by using the length field of the OID and the
length field of the associated Value."
::= {dcmFileConfig 4}

dcmFileStrucEntry OBJECT-TYPE
 SYNTAX DcmFileStrucEntry
 ACCESS not-accessible
 STATUS mandatory
```

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```
 DESCRIPTION "..."
 INDEX {dcmFSFileStrucNum, dcmFileStrucIndex}
::= {dcmFileStrucTable 1}

DcmFileStrucEntry ::= SEQUENCE
{
 dcmFSFileStrucNum    DcmFileStrucNum,
 dcmFileStrucIndex    INTEGER,
 dcmFileStrucOID      OBJECT IDENTIFIER,
 dcmFileStrucRowAdmin DcmRowStatus
}
```

2.9.4.1 File Structure Number

```
dcmFSFileStrucNum OBJECT-TYPE
 SYNTAX   DcmFileStrucNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “Indicates the first index into this table.  This is the number assigned to
the defined file structure.  It is highly recommended that the application try
to keep this number sequential (reuse numbers that have been deleted).”
::= {dcmFileStrucEntry 1}
```

2.9.4.2 File Structure Index

```
dcmFileStrucIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “Indicates the second index into this table.  A 2nd index is required to
allow specifying multiple parameters to store for each File Structure Number.”
::= {dcmFileStrucEntry 2}
```

2.9.4.3 File Structure Table OID

```
dcmFileStrucOID OBJECT-TYPE
 SYNTAX   OBJECT IDENTIFIER
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 “This field contains the OID of the object/table to include in the data file.
All OID’s shall be specified using the full OID address.   Relative OID
addressing is not allowed.”
::= {dcmFileStrucEntry 3}
```

2.9.4.4 File Structure Table Row Admin

```
dcmFileStrucRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "allows management of the parameters used to configure an event study (this
row of this table).  The SYNTAX definition allows to create, delete, disable,
or edit the row.”
::= {dcmFileStrucEntry 4}
```

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2.9.5 Maximum Number Of File Parameter Table Rows

```
dcmFPTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the File Parameter Table.”
::= {dcmFileConfig 5}
```

2.9.6 Current Number Of File Parameter Table Rows

```
dcmFPTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Monitor Enable Table.”
::= {dcmFileConfig 6}
```

2.9.7 File Parameter Table

```
dcmFPTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmFPEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This is a doubly-indexed table.  It links a defined study from the Study
Configuration Table to a user-defined file format in the File Structure Table
through the Study File Index in the Study Configuration Table.  It is
recommended to include this table in the data file as one of the first objects
in the data file (specify this OID in the Data File Structure Table as one of
the first OID’s to store) to allow determining what File Encoding was used
(BER or OER) and if Relative Addressing has been enabled.  If the defined
study is deleted from the Study Configuration Table, the entry for that study
shall be automatically deleted from this table by the device."
::= {dcmFileConfig 7}

dcmFPEntry OBJECT-TYPE
 SYNTAX DcmFPEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION "..."
 INDEX {dcmFPFileStudyIndex, dcmFPFileStrucNum}
::= {dcmFPTable 1}

DcmFPEntry ::= SEQUENCE
{
 dcmFPFileStudyIndex      DcmFileStudyIndex,
 dcmFPFileStrucNum        DcmFileStrucNum,
 dcmFPRecInt              INTEGER,
 dcmFPFileFreq            INTEGER,
 dcmFPLogicalIONumber     DcmLogIONum,
 dcmFPRelativeAddrFlag    INTEGER,
 dcmFPEncodingCode        INTEGER,
 dcmFPRowAdmin            DcmRowStatus
}
```

2.9.7.1 File Study Index

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```
dcmFPFileStudyIndex OBJECT-TYPE
 SYNTAX   DcmFileStudyIndex
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “Indicates the first index into this table.  It defines the file structure
number within the File Structure Table (non-zero values).  A value of zero (0)
indicates that no data shall be recorded and the study is to be used for
Monitor Modes.“
::= {dcmFPEntry 1}
```

2.9.7.2 File Structure Number

```
dcmFPFileStrucNum OBJECT-TYPE
 SYNTAX   DcmFileStrucNum
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “Indicates the second index into this table.  This is the number assigned to
the defined file structure.  It is highly recommended that the application try
to keep this number sequential (reuse numbers that have been deleted).”
::= {dcmFPEntry 2}
```

2.9.7.3 File Recording Interval

```
dcmFPRecInt OBJECT-TYPE
 SYNTAX   INTEGER  (1..16777215)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 “This defines the recording interval (in seconds) for the specified study. A
new row shall be created in the Data Structure Table for each recording
interval. For example, if recording a binned study in 15 minute intervals
(15*60 seconds), then each row of the Data Structure Table would represent 15
minutes worth of binned data.  The same would be true for pvr data and event
data.”
::= {dcmFPEntry 3}
```

2.9.7.4 File Recording Frequency

```
dcmFPFileFreq OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  eachRecInt (2),
  hourly (3),
  daily (4),
  midnight (5),
  weekly (6),
  monthly (7),
  continuous (8)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "Indicates how frequently a new data file shall be created for the specified
study.  The values are:
- other = not defined below
- eachRecInt = Creates a new data file each recording interval.
```

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```
- hourly = Creates a new data file each hour (the recording interval must be
set to 60 minutes or less to use this option).
- daily = Creates a new data file each day at the specified start time for
this study.
- midnight = Creates a new data file each day at midnight.
- weekly = Creates a new data file each week at the specified start day of
week for this study.
- monthly = Creates a new data file at the start of each calendar month.
- continuous = Creates only one data file.  All data shall be appended to the
same file.  The only way to close this data file is to disable the study."
::= {dcmFPEntry 4}
```

2.9.7.5 FP Logical IO Number

```
dcmFPLogicalIONumber OBJECT-TYPE
 SYNTAX   DcmLogIONum
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This column is used in this table to link a file to a storage memory media
(which will have been assigned a logical IO number in the Physical To Logical
Mapping Table.  It defines where the data files for this study shall be
stored."
::= {dcmFPEntry 5}
```

2.9.7.6 Relative Address Flag

```
dcmFPRelativeAddrFlag OBJECT-TYPE
 SYNTAX   INTEGER
 {
  disabled (1),
  enabled (2)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This column is used to enable/disable the use of relative OID addressing in
the specified data file.  Setting this to a 1 shall inhibit the use of
relative OID addressing for this data file.  Setting this to a 2 shall enable
relative OID addressing for this data file.  An application can only enable
this feature.  It has no control as to where and how often (within this data
file) that the device shall use this option (see dcmRelativeAddress object)."
::= {dcmFPEntry 6}
```

2.9.7.7 File Encoding Code

```
dcmFPEncodingCode OBJECT-TYPE
 SYNTAX   INTEGER
 {
  other (1),
  berEncoding (2),
  oerEncoding (3)
 }
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "This column is used to enable various encoding schemes for the data files.
The values are:
- other = not defined below
```

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```
- berEncoding = All objects shall be stored within this data file using BER
encoding of the ASN.1 object definition.
- oerEncoding = All objects shall be stored within this data file using OER
(Octet Encoding Rules, as defined in NTCIP 1102) encoding of the ASN.1 object
definition."
::= {dcmFPEntry 7}
```

2.9.7.8 File Parameter Table Row Admin

```
dcmFPRowAdmin OBJECT-TYPE
 SYNTAX   DcmRowStatus
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 "allows management of the parameters used to configure an event study (this
row of this table).  The SYNTAX definition allows to create, delete, disable,
or edit the row."
::= {dcmFPEntry 8}
```

2.9.8 Data File Integrity Object

```
dcmDFIntegrity OBJECT-TYPE
 SYNTAX   INTEGER  (1..65535)
 ACCESS   read-only
 STATUS   optional
 DESCRIPTION
 "The purpose of this object is to allow the device to calculate a CRC16 check
on the data file for integrity and to store this within the data file (if it
has been specified in the File Structure Table).  The check shall be based on
all bytes of the data file except for this object. This object is read-only
and cannot be manipulated by the application."
::= {dcmFileConfig 8}
```

2.9.9 Maximum Number Of File Directory Structure Table Rows

```
dcmFDSTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the File Directory
Structure Table."
::= {dcmFileConfig 9}
```

2.9.10 Current Number Of File Directory Structure Table Rows

```
dcmFDSTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the File Directory
Structure Table."
::= {dcmFileConfig 10}
```

2.9.11 File Directory Structure Table

```
dcmFileDirStrucTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmFileDirStrucEntry
 ACCESS not-accessible
```

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```
 STATUS optional
 DESCRIPTION
 "This is a doubly-indexed table. It is required to provide a consistent
directory listing of data files contained within the device. The FTP directory
listing command may not provide a consistent output listing of the file fields
between the various FTP implementations."
::= {dcmFileConfig 11}

dcmFileDirStrucEntry OBJECT-TYPE
 SYNTAX DcmFileDirStrucEntry
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION "..."
 INDEX {dcmFDSLogIOIndex, dcmFDSFileNumber}
::= {dcmFileDirStrucTable 1}

DcmFileDirStrucEntry ::= SEQUENCE
{
 dcmFDSLogIOIndex   INTEGER,
 dcmFDSFileNumber   INTEGER,
 dcmFDSFileName     OCTET STRING,
 dcmFDSStartTime    Counter,
 dcmFDSEndTime      Counter,
 dcmFDSFileSize     INTEGER,
 dcmFDSDownloadFlag INTEGER,
 dcmFDSOpenFlag     INTEGER
}
```

2.9.11.1 Logical IO Number Index

```
dcmFDSLogIOIndex OBJECT-TYPE
 SYNTAX   INTEGER  (1..255)
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “The first index is the logical IO number assigned to the memory media in
which the data file is stored. The application should identify which logical
IO numbers are assigned to data storage media (downloading the Physical to
Logical IO Mapping Table) and use those logical IO numbers as the first index
into the File Directory Structure Table, or the application can perform a
getnext on the File Directory Structure Table to get the full listing of
existing files.”
::= {dcmFileDirStrucEntry 1}
```

2.9.11.2 File Number

```
dcmFDSFileNumber OBJECT-TYPE
 SYNTAX INTEGER (1..65535)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “Indicates the second index into this table.  This index is required to allow
specifying multiple data files for each Logical IO storage media.”
::= {dcmFileDirStrucEntry 2}
```

2.9.11.3 File Name

```
dcmFDSFileName OBJECT-TYPE
 SYNTAX   OCTET STRING
 ACCESS   read-only
```

```
 STATUS   mandatory
 DESCRIPTION
 “This field contains the name of the data file (including any directory
paths).  This name can be used in conjunction with FTP to download this data
file.”
::= {dcmFileDirStrucEntry 3}
```

2.9.11.4 Start Date/Time of Data File

```
dcmFDSStartTime OBJECT-TYPE
 SYNTAX   Counter
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “This field contains the start date/time for the specified data file.  The
value of this object follows the ‘controller-localTime’ setup, which specifies
the epoch since Midnight January 1, 1970.”
::= {dcmFileDirStrucEntry 4}
```

2.9.11.5 End Date/Time of Data File

```
dcmFDSEndTime OBJECT-TYPE
 SYNTAX   Counter
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 “This field contains the end date/time for the specified data file.  The
value of this object follows the ‘controller-localTime’ setup, which specifies
the epoch since Midnight January 1, 1970.  If the specified file is still
opened, the end date/time shall indicate the devices current date/time.”
::= {dcmFileDirStrucEntry 5}
```

2.9.11.6 File Size

```
dcmFDSFileSize OBJECT-TYPE
 SYNTAX   INTEGER
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 “This field is used to identify the size (in octets) of the data file.  If
the file is still open, the file size shall indicate the current size of the
file.”
::= {dcmFileDirStrucEntry 6}
```

2.9.11.7 File Download Flag

```
dcmFDSDownloadFlag OBJECT-TYPE
 SYNTAX   INTEGER (1..255)
 ACCESS   read-write
 STATUS   mandatory
 DESCRIPTION
 “This field is used to allow the application to determine if the specified
file has already been downloaded.  A file that has not been downloaded is
considered to be ‘new’.  It is up to the application as to how to process this
field.  It could simply use a 1 to indicate the data file was downloaded or it
could treat this field as a bitmap to allow multiple applications to download
this file as new  by processing different bits within this field.”
::= {dcmFileDirStrucEntry 7}
```

2.9.11.8 Open Flag

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```
dcmFDSOpenFlag OBJECT-TYPE
 SYNTAX   INTEGER
 {
  fileOpen       (1),
  fileClosed     (2),
  fileLocked     (3),
  fileOpenLocked (4)
 }
 ACCESS   read-only
 STATUS   mandatory
 DESCRIPTION
 "This field is used to allow the application to determine if the specified
file is currently open or if it has been closed by the device.  The values
are:
-fileOpen =  data file is currently open (still being written to).
-fileClosed = data file has been closed by the device.
-fileLocked = data file is locked by the device, it cannot be downloaded at
this time.
-fileOpenLocked = data file is currently open and cannot be downloaded at this
time (for example, may be writing to a FLASH storage media)"
::= {dcmFileDirStrucEntry 8}
```

2.10 ERROR LOGGING NODE

```
--DCM Error Node
dcmErrors OBJECT IDENTIFIER ::= {dcm 8}
-- This node is an identifier used to group all errors that are common to data
-- collection and monitoring devices.
```

2.10.1 Maximum Number Of Error Code Table Rows

```
dcmECTMaxNumRows OBJECT-TYPE
 SYNTAX DcmMaxNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the maximum number of rows allowed for the Error Code Table."
::= {dcmErrors 1}
```

2.10.2 Current Number Of Error Code Table Rows

```
dcmECTCurNumRows OBJECT-TYPE
 SYNTAX DcmCurNumRows
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "Indicates the current number of rows existing in the Error Code Table."
::= {dcmErrors 2}
```

2.10.3 Dcm Error Code Table

```
dcmErrCodeTable OBJECT-TYPE
 SYNTAX SEQUENCE OF DcmErrCodeEntry
 ACCESS not-accessible
 STATUS optional
 DESCRIPTION
 "This table is a read-only table that is updated by the device after each set
operation.  This table has a single general index. The index must be assigned
sequentially by the device. The number of rows present are dependent on the
results of the previous operation. If the last set operation resulted in no
```

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```
errors, then there shall be no rows configured in this table.  There can be
multiple rows set (one for each item in error) or there may only be one row
set which would contain the OID of the first object that was in error, this
choice is implementation-specific.  Each row identifies the type of error and
links it to the OID of the object that caused the dcm error. This table is NOT
used to report communications protocol errors, those are handled as part of
the communications protocols.  All existing rows shall be cleared out each
time the device updates this table.  The rows shall always indicate errors
based on the last time this table was updated and not show historical errors."
::= {dcmErrors 3}

dcmErrCodeEntry OBJECT-TYPE
 SYNTAX   DcmErrCodeEntry
 ACCESS   not-accessible
 STATUS   mandatory
 DESCRIPTION "..."
 INDEX    {dcmErrCodeIndex}
::= {dcmErrCodeTable 1}

DcmErrCodeEntry  ::= SEQUENCE
{
 dcmErrCodeIndex INTEGER,
 dcmErrCodeOID   OBJECT IDENTIFIER,
 dcmErrCode      INTEGER
}
```

2.10.3.1 Error Code Index

```
dcmErrCodeIndex OBJECT-TYPE
 SYNTAX INTEGER (1..255)
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "indicates the only index into this table.  It must be assigned sequentially
by the device."
::= {dcmErrCodeEntry 1}
```

2.10.3.2 Error Code Object Identifier

```
dcmErrCodeOID OBJECT-TYPE
 SYNTAX OBJECT IDENTIFIER
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 "This value points to the OID responsible for generating the error.  The OID
must be specified using full OID addressing.  Relative OID addressing is not
allowed."
::= {dcmErrCodeEntry 2}
```

2.10.3.3 Dcm Error Code

```
dcmErrCode OBJECT-TYPE
 SYNTAX INTEGER
 {
  other (1),
  noError (2),
  notValidAtThisTime (3),
  validationFailed (4),
  optionNotSupported (5),
  outOfRange (6),
```

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```
  invalidOption (7),
  notAllowedPrimeRec (8),
  lockedOut (9),
  exceededMaxLength (10),
  exceededMaxNumberOfAllowedOccurrences (11),
  exceededMaxNumberOfRows (12),
  readOnly (13)
 }
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION
 “Indicates the type of error that was detected for the object referenced by
dcmErrCodeOID.  The values are:
1=other
2=noError, the operation resulted in no error for the specified object.
3=notValidAtThisTime, try to set a variable to a value that under other
circumstances could be valid, but is not valid at this time (e.g. try to set
RowStatus to createAndWait when it is currently set to active).
4=validationFailed, validation of a study failed.
5=optionNotSupported, (e.g. try to set an enumeration value that is not
supported by the device).
6=out of range, try to set an object to a value that is out of range.
7=invalidOption (e.g. try to do axle class using standard loop loop sensor
array).
8=NotAllowedPrimeRec, can’t modify this object  while primed or recording
9=lockedOut, objects are currently locked (e.g. object is being modified by
another application).
10=exceededMaxLength, try to set an octet string to a length greater than is
supported.
11=exceededMaxNumberOfAllowedOccurrences for this index (e.g. try to set more
than the allowed number of cal factors for an IO).
12=exceededMaxNumberOfRows, allowed for this table.
13=readOnly, (e.g. try to set dataStorageMediaAvailable, this object value is
read-only).”
::= {dcmErrCodeEntry 3}
```

2.11 DCM RELATIVE ADDRESS OID OBJECT

```
dcmRelativeAddrOID OBJECT-TYPE
 SYNTAX   OBJECT IDENTIFIER
 ACCESS   read-write
 STATUS   optional
 DESCRIPTION
 “Indicates the OID address which shall be referenced by any object in the
specified data file if relative OID’s have been enabled (through the File
Parameter Table). The last number indicated in the OID value shall not be
repeated in the relative OID’s. This object has been included to reduce
overhead relative to OID’s when specified in data files.  This object shall
not be used to shorten OID’s within SNMP messages. The device shall return an
‘out of range’ error if the application attempts to set this object to an OID
below where this object resides.  This will prevent a situation where this
object cannot be accessed anymore.  An application can only enable the usage
of this object within specified data files.  Once enabled, it will be
determined by the device where and how often to use it to optimize the storage
requirements of OID’s.  This object may be used multiple times within the same
data file by the device to change the relative addressing of the OID’s in
order to optimize storage.”
::= {dcm 9}
```

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2.12 DCM MIB VERSION NUMBER

```
dcmMibVersionNumber OBJECT-TYPE
 SYNTAX  INTEGER (100..65535)
 ACCESS  read-only
 STATUS  optional
 DESCRIPTION
 “Contains the version number of the dcm MIB implemented in this device,
100=version 1.00.”
::= {dcm 10}

END  -- DCM-MIB1 DEFINITIONS
```

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Annex A
Information Profile

(Normative)

A Conformance Group is a basic unit of conformance and is used to specify a collection of related managed objects. The Conformance Group designation applied to a set of objects provides a systematic means for determining which objects are required to support a function. If a device has multiple functions, a Conformance Group will be defined for each function. Conformance Group definitions will be found in the NTCIP Object Definition Standard documents. The Object Definition Standard may define a Conformance Group with objects that are not in lexicographic order and only apply to devices of that type.

The related managed objects of a Conformance Group may include mandatory and/or optional objects. Mandatory objects within a Conformance Group shall be implemented. Optional objects shall be implemented only if a defined function of the device requires that particular object.

For example, assume a device implements an asynchronous RS-232 interface. It must implement all the mandatory objects in the Asynchronous Conformance Group of the RS-232 MIB. It would not have to implement the Synchronous Conformance Group of objects unless it also provided a synchronous interface.

Assume also that the Asynchronous Conformance Group has a *CRC error counter* object that is optional. The *CRC error counter* object would not have to be implemented unless the device used CRC checking on the asynchronous interface.

Conformance Groups are defined as either mandatory or optional. If a Conformance Group is mandatory, all of the objects with STATUS "mandatory" that are part of the Conformance Group shall be present for a device to claim conformance to the Conformance Group. If a Conformance Group is optional, all of the objects that are part of the Conformance Group with the STATUS "mandatory" shall be present if the device supports the Conformance Group. 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 in the table with the STATUS "optional" may be supported.

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A.1 Notation

The following notations and symbols are used to indicate status and conditional status within this standard.

A.1.1 TYPE Symbols

The following symbols are used to indicate type:

Symbol	Type
C	Control Object - use of 'dbCreateTransaction' in NTCIP 1201 Clause 2.3.1 shall NOT delay a SET to this object.
P	Parameter Object - use of 'dbCreateTransaction' in NTCIP 1201 Clause 2.3.1 to SET this object is optional.
P2	Parameter Object - use of 'dbCreateTransaction' in NTCIP 1201 Clause 2.3.1 to SET this object is mandatory.
S	Status / Information Object - this object is read only therefore a SET is not permitted.

The TYPE Symbols are not used in this standard.

A.1.2 Status Symbols

The following symbols are used to indicate status:

Symbol	Status
M	Mandatory
M.<n>	Support of every item of the group labeled by the same numeral <n> required, but only one is active at time.
O	Optional
O.<n>	Optional, but support of at least one of the group of options labeled by the same numeral <n> is required
	Conditional, (see A.1.3)
N/A	Non-applicable (e.g., logically impossible in the scope of the profile)
X	Excluded or prohibited

A.1.3 Conditional Status Notation

The following predicate notations is used:

Notation	Status
<predicate>: M	Item is conditionally mandatory on the <predicate>.
<predicate>: O	Item is conditionally optional on the <predicate>.

The <predicate>: notation means that the Status following it applies only when the feature or features identified by the predicate are supported.

In the simplest case, <predicate> is the identifying tag of a single item. For example, “2.2:M” would indicate that the Status following this notation is mandatory if 2.2 is supported.

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The <predicate> may also be comprised of multiple identifying tags related together using Boolean logic. For example, "(2.2 or 2.3):M" would indicate that the Status following this notation is mandatory if 2.2 or 2.3 are supported.

There may also be multiple <predicates> associated with a Status. There is an implied Boolean 'or' relating the multiple predicates. For example, line 1 might state "(2.2 or 2.3):M" and line 2 might state "2.4:O". This would indicate that the Status following this notation is mandatory if 2.2 or 2.3 is selected, OR, it is optional if 2.4 is selected.

If any of the notations results in the Status being mandatory, then the Status shall be included.

A.1.4 Support Column

This section is in the form of a PICS and, therefore, includes a support column. An implementer claims support of an item by circling the appropriate answer (Yes or No) in the support column.

A.2 DCM Conformance Groups

A.2-DCM CONFORMANCE GROUPS				
1206 Reference	**Conformance Group Name**	**Clause of Profile**	**Status**	**Support**
A.3	Vehicle Criteria	1206	(A.8 or A.10 or A.11):M	Yes
A.4	Site Info	1206	M	Yes
A.5	Operating Status Config	1206	M	Yes
A.6	Configure Sensor Arrays	1206	(A.8 or A.10 or A.11):M	Yes
			A.12:O	Yes/No
A.7	Configure General Study	1206	(A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M	Yes
A.8	Configure Filters	1206	O	Yes/No
A.9	Data File Setup	1206	(A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M	Yes
			A.13:O	Yes/No
A.10	Binned Studies	1206	O	Yes/No
A.11	PVR Studies	1206	O	Yes/No
A.12	Event Studies	1206	O	Yes/No
A.13	Monitor Studies	1206	O	Yes/No
A.14	Log Studies	1206	O	Yes/No
A.15	Array Parameter Studies	1206	O	Yes/No
A.16	Logical IO Parameter Studies	1206	O	Yes/No
A.17	Global Time Management	1201	O	Yes/No
A.18	STMF	2301	O	Yes/No
A.19	FTP	2303	O	Yes/No

DCM units shall adhere to the mandatory conformance requirements specified in the mandatory and selected Conformance Group statements as a minimum to claim compliance to this standard. Additional DCM or NTCIP objects or groups may be supported without being non-compliant.

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 that 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 DCM objects or NTCIP.

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

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A.3 Vehicle Criteria Conformance Group

This Conformance Group is mandatory if Filters, Binned Studies or PVR Studies are required to be configured. It identifies the vehicle parameters that can be used to configure Filters, Binned Studies or PVR Studies.

A.3-VEHICLE CRITERIA CONFORMANCE GROUP Status: (A.8 or A.10 or A.11):M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.3.4	dcmAxleNumber	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
2.3.5	dcmNumAxles	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
2.3.6	dcmVehicleClass	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
2.3.7	dcmVehicleSpeed	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.8	dcmVehicleLength	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.9	dcmFrontOverhang	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.10	dcmRearOverhang	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.11	dcmAxleSpacing	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.12	dcmVehWheelbase	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.13	dcmVehClearance	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
2.3.14	dcmVehicleHeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.15	dcmAxleWidth	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.16	dcmVehicleWidth	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.17	dcmAxleTireCount	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
2.3.18	dcmAxleWheelTrack	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.19	dcmVehicleGap	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
2.3.20	dcmVehicleHeadway	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
2.3.21	dcmLeftWheelWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.22	dcmRightWheelWeight	A.8: O1	Yes/No	0-65535	

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A.3-VEHICLE CRITERIA CONFORMANCE GROUP Status: (A.8 or A.10 or A.11):M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		A.10: O2 A.11: O3	Yes/No Yes/No		
2.3.23	dcmAxleWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.24	dcmSensorWeights	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.25	dcmGrossVehibleWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
2.3.26	dcmVehicleSeqNum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
2.3.27	dcmVehicleStatusFlag	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-4294967295	
	Bit 0 - other	---	Yes/No	---	---
	Bit 1 - onOffScale	2.3.27:O4	Yes/No	---	---
	Bit 2 - overHeight	2.3.27:O4	Yes/No	---	---
	Bit 3 - speedChange	2.3.27:O4	Yes/No	---	---
	Bit 4 - partialAxle	2.3.27:O4	Yes/No	---	---
	Bit 5 - unequalAxleCount	2.3.27:O4	Yes/No	---	---
	Bit 6 - tailgating	2.3.27:O4	Yes/No	---	---
	Bit 7 - wrongLane	2.3.27:O4	Yes/No	---	---
	Bit 8 - runningScale	2.3.27:O4	Yes/No	---	---
	Bit 9 - notWimLane	2.3.27:O4	Yes/No	---	---
	Bit 10 - overlength	2.3.27:O4	Yes/No	---	---
	Bit 11 - overGVW	2.3.27:O4	Yes/No	---	---
	Bit 12 - randomSafety	2.3.27:O4	Yes/No	---	---
	Bit 13 - overSpeed	2.3.27:O4	Yes/No	---	---
	Bit 14 - late	2.3.27:O4	Yes/No	---	---
	Bit 15 - unexpected	2.3.27:O4	Yes/No	---	---
	Bit 16 - pastDue	2.3.27:O4	Yes/No	---	---
	Bit 17 - noMatch	2.3.27:O4	Yes/No	---	---
	Bit 18 - badLateralPosition	2.3.27:O4	Yes/No	---	---
	Bit 19 - noCompliance	2.3.27:O4	Yes/No	---	---
	Bit 20 - overrideFail	2.3.27:O4	Yes/No	---	---
	Bit 21 - wrongWay	2.3.27:O4	Yes/No	---	---
	Bit 22 - minSpeed	2.3.27:O4	Yes/No	---	---
	Bit 23 - axleProcessingError	2.3.27:O4	Yes/No	---	---
	Bit 24- maxSpeed	2.3.27:O4	Yes/No	---	---
	Bit 25 - tooManyAxles	2.3.27:O4	Yes/No	---	---
	Bit 26 - sensorOrderError	2.3.27:O4	Yes/No	---	---
	Bit 27- minAxleSpacing	2.3.27:O4	Yes/No	---	---
2.3.28	dcmAxleWeightViolationCode	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
	Bit 0 - otherWeightViolation	---	Yes/No	---	---
	Bit 1 - steeringViolation	2.3.28:O5	Yes/No	---	---
	Bit 2 - singleAxleViolation	2.3.28:O5	Yes/No	---	---
	Bit 3 - tandemAxleViolation	2.3.28:O5	Yes/No	---	---
	Bit 4 - tridemAxleViolation	2.3.28:O5	Yes/No	---	---
	Bit 5 - quadremAxleViolation	2.3.28:O5	Yes/No	---	---
	Bit 6 - axleBalanceViolation	2.3.28:O5	Yes/No	---	---
	Bit 7 - axleGroupIndividualViolation	2.3.28:O5	Yes/No	---	---
	Bit 8 - bridgeViolation	2.3.28:O5	Yes/No	---	---
	Bit 9 - wheelViolation	2.3.28:O5	Yes/No	---	---
	Bit 10 - wheelImbalanceViolation	2.3.28:O5	Yes/No	---	---
2.3.29	dcmVehicleAcceleration	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	-32768-32767	

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A.3-VEHICLE CRITERIA CONFORMANCE GROUP Status: (A.8 or A.10 or A.11):M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.3.30	dcmNumVehicleIDs	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
2.3.31	dcmVehicleID	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	OCTET STRING	
2.3.32	dcmVehicleTimeTag1000	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-999	
2.6.9.1	dcmIOAMArrNum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
2.4.10.5	dcmPLMLogIONum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
2.6.22.1	dcmFCFilterNum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
1201-2.4.7	controller-localTime	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	counter	
2.3.1	dcmVCTMaxNumRows	2.3.3: M	Yes	DcmMaxNumRows	---
2.3.2	dcmVCTCurNumRows	2.3.3: M	Yes	DcmCurNumRows	---
2.3.3	dcmVehCriteriaTable	O	Yes	----	----
	DcmVehCriteriaEntry	--	--	----	----
2.3.3.1	dcmVCIndex	2.3.3: M	Yes	1-255	
2.3.3.2	dcmVCOID	2.3.3: M	Yes	OBJECT IDENTIFIER	
2.3.3.3	dcmVCBitMap	2.3.3: M	Yes	0-255	---
	Bit 0 – other	---	Yes/No	---	---
	Bit 1 – binnedStudy	A.10: M	Yes	---	---
	Bit 2 – pvrStudySingle	A.11: M	Yes	---	---
	Bit 3 – pvrStudyMulti	A.11: M	Yes	---	---
	Bit 4 – filter	A.8: M	Yes	---	---
2.6.17	dcmMaxNumAxles	(2.3.4 or 2.3.5):M	Yes	1-255	
2.6.26	dcmMaxNumVehId	(2.3.30 or 2.3.31):M	Yes	1-255	

A.4 Site Info Conformance Group

This Conformance Group is always mandatory. It identifies objects that are typically required for one-time site configuration. A site is the location in which a dcm device has been placed to perform a traffic study.

A.4-SITE INFO CONFORMANCE GROUP **Status: M**					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.4.1	dcmDeviceId	M	Yes	OCTET STRING (SIZE 0-16)	
2.6.1	dcmSiteId	M	Yes	OCTET STRING (SIZE 0-40)	
2.6.3	dcmSiteDescription	O	Yes/No	OCTET STRING	
2.6.2	dcmMaxLengthSiteDescr	2.6.3:M	Yes	0-255	
2.12	dcmMibVersionnumber	M	Yes	100-65535	----

A.5 Operating Status Config Conformance Group

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This Conformance Group is always mandatory. It identifies objects that relate to operational aspects (non-traffic-study related) of a dcm device.

A.5-OPERATING STATUS CONFIG CONFORMANCE GROUP Status: M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.4.2	dcmBatteryVoltage	O	Yes/No	0-255	
2.4.3	dcmChargingCurrent	O	Yes/No	(-100000 - 100000)	
2.5.1	dcmReset	O	Yes/No	1-7	---
	other (1)	---	Yes/No	---	---
	hardReset (2)	2.5.1:O1	Yes/No	---	---
	softReset (3)	2.5.1:O1	Yes/No	---	---
	commReset (4)	2.5.1:O1	Yes/No	---	---
	factoryReset (5)	2.5.1:O1	Yes/No	---	---
	userReset (6)	2.5.1:O1	Yes/No	---	---
	tableClear (7)	2.5.1:O1	Yes/No	---	---
2.5.2	dcmTCTMaxNumRows	2.5.4:M	Yes	DcmMaxNumRows	---
2.5.3	dcmTCTCurNumRows	2.5.4:M	Yes	DcmCurNumRows	---
2.5.4	dcmTableClearTable	O	Yes/No	----	
	DcmTableClearEntry	--	--	---	---
2.5.4.1	dcmClearTableIndex	2.5.4:M	Yes	1-255	
2.5.4.2	dcmTCTOID	2.5.4:M	Yes	OBJECT IDENTIFIER	
2.5.4.3	dcmTCTAction	2.5.4:M	Yes	0-255	
2.5.4.4	dcmTCTRowAdmin	2.5.4:M	Yes	1-7	---
	active (1)	2.5.4.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.5.5	dcmNumUserConfigs	2.5.8:M	Yes	0-255	
2.5.6	dcmURCTMaxNumRows	2.5.8:M	Yes	DcmMaxNumRows	---
2.5.7	dcmURCTCurNumRows	2.5.8:M	Yes	DcmCurNumRows	---
2.5.8	dcmURCTTable	O	Yes/No	----	
	DcmURCTEntry	--	--	---	---
2.5.8.1	dcmUserResetConfigIndex	2.5.8:M	Yes	1-255	
2.5.8.2	dcmURCTOID	2.5.8:M	Yes	OBJECT IDENTIFIER	
2.5.8.3	dcmURCTAction	2.5.8:M	Yes	1-3	---
	clearAllUserDefaults (1)	---	Yes	---	---
	clearUserDefsFromOID (2)	---	Yes/No	---	---
	saveUserDefsFromOID (3)	---	Yes	---	---
2.5.8.4	dcmURCTRowAdmin	2.5.8:M	Yes	1-6	
	active (1)	2.5.8.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.5.9	dcmOCIDTMaxNumRows	2.5.11:M	Yes	DcmMaxNumRows	---
2.5.10	dcmOCIDTCurNumRows	2.5.11:M	Yes	DcmCurNumRows	---
2.5.11	dcmOCITable	O	Yes/No	----	
	DcmOCIEntry	--	--	---	---
2.5.11.1	dcmOCIdIndex	2.5.11:M	Yes	1-255	
2.5.11.2	dcmOCIdOID	2.5.11:M	Yes	OBJECT IDENTIFIER	
2.5.11.3	dcmOCIdTime	2.5.11:M	Yes	Counter	
2.5.11.4	dcmOCIdRowAdmin	2.5.11:M	Yes	1-6	---
	active (1)	2.5.11.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---

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A.5-OPERATING STATUS CONFIG CONFORMANCE GROUP Status: M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.10.1	dcmECTMaxNumRows	2.10.3:M	Yes	DcmMaxNumRows	---
2.10.2	dcmECTCurNumRows	2.10.3:M	Yes	DcmCurNumRows	---
2.10.3	dcmErrCodeTable	M	Yes	----	----
	DcmErrCodeEntry	--	--	----	----
2.10.3.1	dcmErrorCodeIndex	2.10.3:M	Yes	1-255	
2.10.3.2	dcmErrCodeOID	2.10.3:M	Yes	OBJECT IDENTIFIER	
2.10.3.3	dcmErrCode	2.10.3:M	Yes	1-13	---
	other (1)	---	Yes/No	---	---
	noError (2)	2.10.3.3:O2	Yes/No	---	---
	notValidAtThisTime (3)	2.10.3.3:O2	Yes/No	---	---
	validationFailed (4)	2.10.3.3:O2	Yes/No	---	---
	optionNotSupported (5)	2.10.3.3:O2	Yes/No	---	---
	outOfRange (6)	2.10.3.3:O2	Yes/No	---	---
	invalidOption (7)	2.10.3.3:O2	Yes/No	---	---
	notAllowedPrimeRec (8)	2.10.3.3:O2	Yes/No	---	---
	lockedOut (9)	2.10.3.3:O2	Yes/No	---	---
	exceededMaxLength (10)	2.10.3.3:O2	Yes/No	---	---
	exceededMaxNumberOfOccurrences (11)	2.10.3.3:O2	Yes/No	---	---
	exceededMaxNumberOfRows (12)	2.10.3.3:O2	Yes/No	---	---
	readOnly (13)	2.10.3.3:O2	Yes/No	---	---
2.11	dcmRelativeAddrOID	O	Yes/No	OBJECT IDENTIFIER	----

A.6 Configure Sensor Arrays Conformance Group

This Conformance Group is mandatory if Filters, Binned Studies or PVR Studies are required. It is optional for Event Studies. It identifies all of the objects that can be used to define sensor arrays.

A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.4.4	dcmNumIOBoards	M	Yes	0-255	
2.4.5	dcmIOBCTMaxNumRows	2.4.7:M	Yes	DcmMaxNumRows	---
2.4.6	dcmIOBCTCurNumRows	2.4.7:M	Yes	DcmCurNumRows	---
2.4.7	dcmIOBoardConfigTable	M	Yes	----	---
	DcmIOBoardConfigEntry	--	--	---	---
2.4.7.1	dcmIOBCBoardNum	2.4.7:M	Yes	1-255	
2.4.7.2	dcmIOBoardFunction	2.4.7:M	Yes	1-255	
2.4.7.3	dcmIOBCNumIO	2.4.7:M	Yes	1-255	
2.4.7.4	dcmIOBoardType	2.4.7:M	Yes	1-28	---
	other (1)	---	Yes/No	---	---
	cpu (2)	2.4.7.4:O1	Yes/No	---	---
	storageMedia (3)	2.4.7.4:O1	Yes/No	---	---
	inputNonSensor (4)	2.4.7.4:O1	Yes/No	---	---
	output (5)	2.4.7.4:O1	Yes/No	---	---
	comms (6)	2.4.7.4:O1	Yes/No	---	---
	keyboard (7)	2.4.7.4:O1	Yes/No	---	---
	display (8)	2.4.7.4:O1	Yes/No	---	---
	roadTube (9)	2.4.7.4:O1	Yes/No	---	---
	piezo (10)	2.4.7.4:O1	Yes/No	---	---
	loop (11)	2.4.7.4:O1	Yes/No	---	---
	wimPiezo (12)	2.4.7.4:O1	Yes/No	---	---
	bendingPlate (13)	2.4.7.4:O1	Yes/No	---	---
	contactClosure (14)	2.4.7.4:O1	Yes/No	---	---
	acoustic (15)	2.4.7.4:O1	Yes/No	---	---

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A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	radar (16)	2.4.7.4:O1	Yes/No	---	---
	microwave (17)	2.4.7.4:O1	Yes/No	---	---
	infrared (18)	2.4.7.4:O1	Yes/No	---	---
	laser (19)	2.4.7.4:O1	Yes/No	---	---
	optoIsolated (20)	2.4.7.4:O1	Yes/No	---	---
	fiberOptic (21)	2.4.7.4:O1	Yes/No	---	---
	contactRelay (22)	2.4.7.4:O1	Yes/No	---	---
	quartz (23)	2.4.7.4:O1	Yes/No	---	---
	lightcurtain (24)	2.4.7.4:O1	Yes/No	---	---
	video (25)	2.4.7.4:O1	Yes/No	---	---
	timer (26)	2.4.7.4:O1	Yes/No	---	---
	fiberOpticWim (27)	2.4.7.4:O1	Yes/No	---	---
	ultrasound (28)	2.4.7.4:O1	Yes/No	---	---
2.4.7.5	dcmIOBoardDescription	2.4.7:M	Yes	OCTET STRING	
2.4.7.6	dcmIOBoardStatus	2.4.7:M	Yes	1-5	---
	enabled (1)	2.4.7.6:O2	Yes/No	---	---
	disabled (2)	2.4.7.6:O2	Yes/No	---	---
	fault (3)	2.4.7.6:O2	Yes/No	---	---
	resetting (4)	2.4.7.6:O2	Yes/No	---	---
	suspended (5)	2.4.7.6:O2	Yes/No	---	---
2.4.7.7	dcmIOBoardControl	2.4.7:M	Yes	1-5	---
	notSupported (1)	2.4.7.7:O3	Yes/No	---	---
	enable/d (2)	2.4.7.7:O3	Yes/No	---	---
	disable/d (3)	2.4.7.7:O3	Yes/No	---	---
	reset (4)	2.4.7.7:O3	Yes/No	---	---
	suspend (5)	2.4.7.7:O3	Yes/No	---	---
2.4.8	dcmPLMTMaxNumRows	2.4.10:M	Yes	DcmMaxNumRows	---
2.4.9	dcmPLMTCurNumRows	2.4.10:M	Yes	DcmCurNumRows	---
2.4.10	dcmPhysicalLogicalMapTable	M	Yes	----	---
	DcmPhysicalLogicalMapEntry	--	--	---	---
2.4.10.1	dcmPLMIOBoardNum	2.4.10:M	Yes	1-255	
2.4.10.3	dcmPLMIOBoardFunction	2.4.10:M	Yes	1-255	
2.4.10.4	dcmPhysicalIONumber	2.4.10:M	Yes	1-255	---
2.4.10.5	dcmPLMLogIONum	2.4.10:M	Yes	1-255	
2.4.10.6	dcmPhysicalLogicalIOStatus	2.4.10:M	Yes	1-5	---
	enabled (1)	2.4.10.6:O4	Yes/No	---	---
	disabled (2)	2.4.10.6:O4	Yes/No	---	---
	fault (3)	2.4.10.6:O4	Yes/No	---	---
	resetting (4)	2.4.10.6:O4	Yes/No	---	---
	suspended (5)	2.4.10.6:O4	Yes/No	---	---
2.4.10.7	dcmPhysicalLogicalIOControl	2.4.10:M	Yes	1-5	---
	notSupported(1)	2.4.10.7:O5	Yes/No	---	---
	enable (2)	2.4.10.7:O5	Yes/No	---	---
	disable (3)	2.4.10.7:O5	Yes/No	---	---
	reset (4)	2.4.10.7:O5	Yes/No	---	---
	suspend (5)	2.4.10.7:O5	Yes/No	---	---
2.4.11	dcmLIOPTMaxNumRows	2.4.13:M	Yes	DcmMaxNumRows	---
2.4.12	dcmLIOPTCurNumRows	2.4.13:M	Yes	DcmCurNumRows	---
2.4.13	dcmIOParamTable	A.16:M	Yes	----	---
	DcmIOParamEntry	--	--	---	---
2.4.13.1	dcmIOPNum	2.4.13:M	Yes	1-255	
2.4.13.3	dcmIOPTyp	2.4.13:M	Yes	1-24	---
	other (1)	---	Yes/No	---	---
	debounce (2)	2.4.13.3:O6	Yes/No	---	---
	deadtime (3)	2.4.13.3:O6	Yes/No	---	---
	sensitivityGain (4)	2.4.13.3:O6	Yes/No	---	---
	onThreshold (5)	2.4.13.3:O6	Yes/No	---	---
	offThreshold (6)	2.4.13.3:O6	Yes/No	---	---
	onHysteresis (7)	2.4.13.3:O6	Yes/No	---	---
	offHysteresis (8)	2.4.13.3:O6	Yes/No	---	---
	minOnTime (9)	2.4.13.3:O6	Yes/No	---	---
	minOffTime (10)	2.4.13.3:O6	Yes/No	---	---
	maxOnTime (11)	2.4.13.3:O6	Yes/No	---	---

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A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	maxOffTime (12)	2.4.13.3:O6	Yes/No	---	---
	adOffset (13)	2.4.13.3:O6	Yes/No	---	---
	scanTime (14)	2.4.13.3:O6	Yes/No	---	---
	sensorLength (15)	2.4.13.3:O6	Yes/No	---	---
	sensorWidth (16)	2.4.13.3:O6	Yes/No	---	---
	sensorHeight (17)	2.4.13.3:O6	Yes/No	---	---
	sensorDepth (18)	2.4.13.3:O6	Yes/No	---	---
	sensorAngle (19)	2.4.13.3:O6	Yes/No	---	---
	ioCal (20)	2.4.13.3:O6	Yes/No	---	---
	frequency (21)	2.4.13.3:O6	Yes/No	---	---
	memoryWrap (22)	2.4.13.3:O6	Yes/No	---	---
	dataStorageMediaAvailable (23)	2.4.13.3:O6	Yes/No	---	---
	dataStorageMediaUsed (24)	2.4.13.3:O6	Yes/No	---	---
2.4.13.4	dcmIOPVal	2.4.13:M	Yes	INTEGER	
2.4.13.5	dcmIOParamRowAdmin	2.4.13:M	Yes	1-6	---
	active (1)	2.4.13.5:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.6.4	dcmMaxSensorsPerArray	(A.8 or A.10 or A.11):M	Yes	0-255	
2.6.5	dcmMaxNumArray	(A.8 or A.10 or A.11):M	Yes	1-255	
2.6.6	dcmNumArrays	(A.8 or A.10 or A.11):M	Yes	0-255	
2.6.7	dcmLIOMTMaxNumRows	2.6.9:M	Yes	DcmMaxNumRows	---
2.6.8	dcmLIOMTCurNumRows	2.6.9:M	Yes	DcmCurNumRows	---
2.6.9	dcmLogicalIOArrayMapTable	(A.8 or A.10 or A.11):M	Yes	----	----
	DcmLogicalIOArrayMapEntry	--	--	----	----
2.6.9.1	dcmIOAMArrNum	2.6.9:M	Yes	1-255	
2.6.9.2	dcmIOAMIONum	2.6.9:M	Yes	1-255	
2.6.9.3	dcmIOSpacing	2.6.9:M	Yes	0-65535	
2.6.9.4	dcmIOPosition	2.6.9:M	Yes	1-14	---
	other (1)	---	Yes/No	---	---
	full (2)	2.6.9.4:O7	Yes/No	---	---
	center (3)	2.6.9.4:O7	Yes/No	---	---
	multiple (4)	2.6.9.4:O7	Yes/No	---	---
	leftHalf (5)	2.6.9.4:O7	Yes/No	---	---
	rightHalf (6)	2.6.9.4:O7	Yes/No	---	---
	leftThird (7)	2.6.9.4:O7	Yes/No	---	---
	centerThird (8)	2.6.9.4:O7	Yes/No	---	---
	rightThird (9)	2.6.9.4:O7	Yes/No	---	---
	above (10)	2.6.9.4:O7	Yes/No	---	---
	below (11)	2.6.9.4:O7	Yes/No	---	---
	sidefire (12)	2.6.9.4:O7	Yes/No	---	---
	wheelPath (13)	2.6.9.4:O7	Yes/No	---	---
	negWheelPath (14)	2.6.9.4:O7	Yes/No	---	---
2.6.9.5	dcmIOFunctionality	2.6.9:M	Yes	1-12	---
	other (1)	---	Yes/No	---	---
	vehiclePresence (2)	2.6.9.5:O8	Yes/No	---	---
	axle (3)	2.6.9.5:O8	Yes/No	---	---
	wimAxle (4)	2.6.9.5:O8	Yes/No	---	---
	temperature (5)	2.6.9.5:O8	Yes/No	---	---
	negativeAxle (6)	2.6.9.5:O8	Yes/No	---	---
	onScale (7)	2.6.9.5:O8	Yes/No	---	---
	offScale (8)	2.6.9.5:O8	Yes/No	---	---
	overheight (9)	2.6.9.5:O8	Yes/No	---	---
	avi (10)	2.6.9.5:O8	Yes/No	---	---
	height (11)	2.6.9.5:O8	Yes/No	---	---
	width (12)	2.6.9.5:O8	Yes/No	---	---
2.6.9.6	dcmLogicalIOArrayMapRowAdmin	2.6.9:M	Yes	1-6	---
	active (1)	2.6.9.6:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---

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A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.6.10	dcmMaxCalFactorsPerArrays	2.6.13:M	Yes	0-255	
2.6.11	dcmAPTMaxNumRows	2.6.13:M	Yes	DcmMaxNumRows	---
2.6.12	dcmAPTCurNumRows	2.6.13:M	Yes	DcmCurNumRows	---
2.6.13	dcmArrayParameterTable	A.15:M	Yes/No	----	----
	DcmArrayParameterEntry	--	--	----	----
2.6.13.1	dcmAPArrNum	2.6.13:M	Yes	1-255	
2.6.13.2	dcmAPType	2.6.13:M	Yes	1-8	---
	other (1)	---	Yes/No	---	---
	maxAxleSpacing (2)	2.6.13.2:O9	Yes/No	---	---
	vehicleAxleRatio (3)	2.6.13.2:O9	Yes/No	---	---
	singleAxleTimeout (4)	2.6.13.2:O9	Yes/No	---	---
	maxVehicleLength (5)	2.6.13.2:O9	Yes/No	---	---
	wimCalFactor (6)	2.6.13.2:O9	Yes/No	---	---
	calFilePointer (7)	2.6.13.2:O9	Yes/No	---	---
	arraySpeedCal (8)	2.6.13.2:O9	Yes/No	---	---
2.6.13.3	dcmAPValue	2.6.13:M	Yes	1-16777215	
2.6.13.4	dcmAPFileName	2.6.13:M	Yes	OCTET STRING (SIZE (0-255))	
2.6.13.5	dcmArrayParameterRowAdmin	2.6.13:M	Yes	1-6	---
	active (1)	2.6.13.5:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.6.14	dcmASCTMaxNumRows	2.6.16:M	Yes	DcmMaxNumRows	---
2.6.15	dcmASCTCurNumRows	2.6.16:M	Yes	DcmCurNumRows	---
2.6.16	dcmArraySpeedCalibrationTable	2.3.7:M	Yes	----	----
	dcmArraySpeedCalibrationEntry	--	--	----	----
2.6.16.1	dcmASCArrNum	2.6.16:M	Yes	1-255	
2.6.16.2	dcmLogicalIONumber1	2.6.16:M	Yes	1-255	
2.6.16.3	dcmLogicalIONumber2	2.6.16:M	Yes	0-255	
2.6.16.4	dcmArraySpeedCalFactor	2.6.16:M	Yes	1-65535	
2.6.16.5	dcmASCRowAdmin	2.6.16:M	Yes	1-6	---
	active (1)	2.6.16.5:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---

A.7 Configure General Study Conformance Group

This Conformance Group is mandatory if Filters, Binned Studies, PVR Studies, Event Studies, Monitor Studies, Log Studies, Array Parameter Studies or Logical IO Parameter Studies are required. It identifies all of the general study parameters that are common to all of the listed studies.

A.7-CONFIGURE GENERAL STUDY CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.7.1	dcmNumStudies	M	Yes	0-255	
2.7.2	dcmMaxNumStudies	M	Yes	1-255	
2.7.3	dcmSCTMaxNumRows	2.7.5:M	Yes	DcmMaxNumRows	---

A.7-CONFIGURE GENERAL STUDY CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.7.4	dcmSCTCurNumRows	2.7.5:M	Yes	DcmCurNumRows	---
2.7.5	dcmStudyConfigTable	M	Yes	----	----
	DcmStudyConfigEntry	--	--	----	----
2.7.5.1	dcmSCStudyNum	2.7.5:M	Yes	1-255	
2.7.5.2	dcmStudyType	2.7.5:M	Yes	1-7	---
	other (1)	---	Yes/No	---	---
	binned (2)	A.10: M	Yes	---	---
	pvr (3)	A.11: M	Yes	---	---
	event (4)	A.12: M	Yes	---	---
	arrayParam (5)	A.15:M	Yes	---	---
	logicalIOParam (6)	A.16:M	Yes	---	---
	log (7)	A.14:M	Yes	---	---
2.7.5.3	dcmStartType	2.7.5:M	Yes	1-4	---
	other (1)	---	Yes/No	---	---
	now (2)	2.7.5.3:O1	Yes/No	---	---
	nextInterval (3)	2.7.5.3:O1	Yes/No	---	---
	dateTime (4)	2.7.5.3:O1	Yes/No	---	---
2.7.5.4	dcmStartDateTime	2.7.5:M	Yes	Counter	
2.7.5.5	dcmEndType	2.7.5:M	Yes	1-3	---
	other (1)	---	Yes/No	---	---
	never (2)	2.7.5.5:O2	Yes/No	---	---
	dateTime (3)	2.7.5.5:O2	Yes/No	---	---
2.7.5.6	dcmEndDateTime	2.7.5:M	Yes	Counter	
2.7.5.7	dcmSCFileStudyIndex	2.7.5:M	Yes	0-255	
2.7.5.8	dcmStudyConfigRowAdmin	2.7.5:M	Yes	1-6	---
	active (1)	2.7.5.8:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.7.6	dcmASMTMaxNumRows	2.7.8:M	Yes	DcmMaxNumRows	---
2.7.7	dcmASMTCurNumRows	2.7.8:M	Yes	DcmCurNumRows	---
2.7.8	dcmStudyArrayMapTable	(A.8 or A.10 or A.11 or A.13):M	Yes	----	----
	DcmStudyArrayMapEntry	--	--	----	----
2.7.8.1	dcmASMStudyNum	2.7.8:M	Yes	1-255	
2.7.8.2	dcmSAMArrNum	2.7.8:M	Yes	1-255	
2.7.8.3	dcmStudyArrayEnable	2.7.8:M	Yes	1-2	
	enable (1)	---	Yes	---	---
	disable (2)	---	Yes	---	---
2.7.8.4	dcmStudyArrayRowAdmin	2.7.8:M	Yes	1-6	---
	active (1)	2.7.8.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.8.1	dcmLengthUnits	O	Yes/No	1-6	---
	centimeter (1)	2.8.1:O3	Yes/No	---	---
	decimeter (2)	2.8.1:O3	Yes/No	---	---
	meter (3)	2.8.1:O3	Yes/No	---	---
	inches (4)	2.8.1:O3	Yes/No	---	---
	tenthFeet (5)	2.8.1:O3	Yes/No	---	---
	feet (6)	2.8.1:O3	Yes/No	---	---
2.8.2	dcmSpeedUnits	O	Yes/No	1-3	---
	cms (1)	2.8.2:O4	Yes/No	---	---
	kmh (2)	2.8.2:O4	Yes/No	---	---
	mph (3)	2.8.2:O4	Yes/No	---	---
2.8.3	dcmWeightUnits	O	Yes/No	1-5	---
	tenthTonne (1)	2.8.3:O5	Yes/No	---	---
	tenthKips (2)	2.8.3:O5	Yes/No	---	---
	pounds (3)	2.8.3:O5	Yes/No	---	---

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A.7-CONFIGURE GENERAL STUDY CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	kiloGrams (4)	2.8.3:O5	Yes/No	---	---
	kips (5)	2.8.3:O5	Yes/No	---	---

A.8 Configure Filters Conformance Group

This Conformance Group is optional. It is only required if Filters are to be configured. It identifies all of the objects that can be used to configure Filters.

A.8-CONFIGURE FILTERSCONFORMANCE GROUP **Status: O**					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.6.18	dcmMaxFilters	M	Yes	0-255	
2.6.19	dcmNumFilters	M	Yes	0-255	
2.6.20	dcmFCTMaxNumRows	2.6.22:M	Yes	DcmMaxNumRows	---
2.6.21	dcmFCTCurNumRows	2.6.22:M	Yes	DcmCurNumRows	---
2.6.22	dcmFilterConfigTable	M	Yes	----	----
	DcmFilterConfigEntry	--	--	----	----
2.6.22.1	dcmFCFilterNum	2.6.22:M	Yes	1-255	
2.6.22.2	dcmFilterIndex	2.6.22:M	Yes	1-3	
2.6.22.3	dcmFilterCriteria	2.6.22:M	Yes	OBJECT IDENTIFIER	
2.6.22.4	dcmFilterRelation	2.6.22:M	Yes	1-8	---
	greaterThan (1)	2.6.22.4:O1	Yes/No	---	---
	lessThan (2)	2.6.22.4:O1	Yes/No	---	---
	equal (3)	2.6.22.4:O1	Yes/No	---	---
	greaterOrEqual (4)	2.6.22.4:O1	Yes/No	---	---
	lessOrEqual (5)	2.6.22.4:O1	Yes/No	---	---
	notEqual (6)	2.6.22.4:O1	Yes/No	---	---
	logicalAnd (7)	2.6.22.4:O1	Yes/No	---	---
	logicalNot (8)	2.6.22.4:O1	Yes/No	---	---
2.6.22.5	dcmFilterValue	2.6.22:M	Yes	0-16777215	
2.6.22.6	dcmFilterRowRelation	2.6.22:M	Yes	1-3	---
	and (1)	---	Yes/No	---	---
	or (2)	---	Yes/No	---	---
	endOfDef (3)	---	Yes	---	---
2.6.22.7	dcmFilterConfRowAdmin	2.6.22:M	Yes	1-6	---
	active (1)	2.6.22.7:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.6.23	dcmLOFTMaxNumRows	2.6.25:M	Yes	DcmMaxNumRows	---
2.6.24	dcmLOFTCurNumRows	2.6.25:M	Yes	DcmCurNumRows	---
2.6.25	dcmOFMTable	O	Yes/No	----	----
	DcmOFMEntry	--	--	----	----
2.6.25.1	dcmOFMIONum	2.6.25:M	Yes	1-255	
2.6.25.2	dcmOFMIndex	2.6.25:M	Yes	1-255	
2.6.25.3	dcmOFMFilterNum	2.6.25:M	Yes	1-255	
2.6.25.4	dcmOFMState	2.6.25:M	Yes	1-4	---
	other (1)	---	Yes/No	---	---
	turnOn (2)	2.6.25.4:O2	Yes/No	---	---
	turnoff (3)	2.6.25.4:O2	Yes/No	---	---
	pulse (4)	2.6.25.4:O2	Yes/No	---	---
2.6.25.5	dcmOFMStateTime	2.6.25:M	Yes	0-16777215	
2.6.25.6	dcmOFMRelation	2.6.25:M	Yes	1-3	

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A.8-CONFIGURE FILTERSCONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	and (1)	---	Yes/No	---	---
	or (2)	---	Yes/No	---	---
	endOfDef (3)	---	Yes	---	---
2.6.25.7	dcmOFMRowAdmin	2.6.25:M	Yes	1-6	---
	active (1)	2.6.25.7:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.7.9	dcmFSMTMaxNumRows	2.7.11:M	Yes	DcmMaxNumRows	---
2.7.10	dcmFSMTCurNumRows	2.7.11:M	Yes	DcmCurNumRows	---
2.7.11	dcmStudyFilterMapTable	A.7:M	Yes	----	----
	DcmStudyFilterMapEntry	--	--	----	----
2.7.11.1	dcmSFMStudyNum	2.7.11:M	Yes	1-255	
2.7.11.2	dcmSFMFilterNum	2.7.11:M	Yes	1-255	
2.7.11.3	dcmStudyFilterRelation	2.7.11:M	Yes	1-3	---
	and (1)	---	Yes/No	---	---
	or (2)	---	Yes/No	---	---
	endOfDef (3)	---	Yes	---	---
2.7.11.4	dcmStudyFilterMapRowAdmin	2.7.11:M	Yes	1-6	---
	active (1)	2.7.11.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---

A.9 Data File Setup Conformance Group

This Conformance Group is mandatory if data files for Binned Studies, PVR Studies, Event Studies, Log Studies, Array Parameter Studies or Logical IO Parameter Studies are required. It identifies objects that are used to define data files that are mapped to the listed studies.

A.9-DATA FILE SETUP CONFORMANCE GROUP **Status:** (A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M, A.13:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.9.1	dcmNumFileStructures	M	Yes	0-255	
2.9.2	dcmFSTMaxNumRows	2.9.4:M	Yes	DcmMaxNumRows	---
2.9.3	dcmFSTCurNumRows	2.9.4:M	Yes	DcmCurNumRows	---
2.9.4	dcmFileStrucTable	M	Yes	----	----
	DcmFileStrucEntry	--	--	----	----
2.9.4.1	dcmFSFileStrucNum	2.9.4:M	Yes	1-255	
2.9.4.2	dcmFileStrucIndex	2.9.4:M	Yes	1-255	
2.9.4.3	dcmFileStrucOID	2.9.4:M	Yes	OBJECT IDENTIFIER	
2.9.4.4	dcmFileStrucRowAdmin	2.9.4:M	Yes	1-6	---
	active (1)	2.9.4.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.9.5	dcmFPTMaxNumRows	2.9.7:M	Yes	DcmMaxNumRows	---
2.9.6	dcmFPTCurNumRows	2.9.7:M	Yes	DcmCurNumRows	---

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A.9-DATA FILE SETUP CONFORMANCE GROUP **Status:** (A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M, A.13:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.9.7	dcmFPTable	M	Yes	----	----
	DcmFPEntry	--	--	----	----
2.9.7.1	dcmFPFileStudyIndex	2.9.7:M	Yes	1-255	
2.9.7.2	dcmFPFileStrucNum	2.9.7:M	Yes	1-255	
2.9.7.3	dcmFPRecInt	2.9.7:M	Yes	1-16777215	
2.9.7.4	dcmFPFileFreq	2.9.7:M	Yes	1-8	---
	other (1)	---	Yes/No	---	---
	eachRecInt (2)	2.9.7.4:O1	Yes/No	---	---
	hourly (3)	2.9.7.4:O1	Yes/No	---	---
	daily (4)	2.9.7.4:O1	Yes/No	---	---
	Midnight (5)	2.9.7.4:O1	Yes/No	---	---
	weekly (6)	2.9.7.4:O1	Yes/No	---	---
	monthly (7)	2.9.7.4:O1	Yes/No	---	---
	continuous (8)	2.9.7.4:O1	Yes/No	---	---
2.9.7.5	dcmFPLogicalIONumber	2.9.7:M	Yes	1-255	
2.9.7.6	dcmFPRelativeAddrFlag	2.9.7:M	Yes	1-2	---
	disabled (1)	---	Yes	---	---
	enabled (2)	---	Yes	---	---
2.9.7.7	dcmFPEncodingCode	2.9.7:M	Yes	1-3	---
	other (1)	---	Yes/No	---	---
	berEncoding (2)	2.9.7.7:O2	Yes/No	---	---
	oerEncoding (3)	2.9.7.7:O2	Yes/No	---	---
2.9.7.8	dcmFPRowAdmin	2.9.7:M	Yes	1-6	---
	active (1)	2.9.7.8:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.9.8	dcmDFIntegrity	O	Yes/No	0-65535	----
2.9.9	dcmFDSTMaxNumRows	2.9.11:M	Yes	DcmMaxNumRows	---
2.9.10	dcmFDSTCurNumRows	2.9.11:M	Yes	DcmCurNumRows	---
2.9.11	dcmFileDirStrucTable	A.19:M	Yes	----	----
	DcmFileDirStrucEntry	--	--	----	----
2.9.11.1	dcmFDSLogIOIndex	2.9.11:M	Yes	1-255	
Error! Reference source not found.	dcmFDSFileNumber	2.9.11:M	Yes	1-65535	
2.9.11.3	dcmFDSFileName	2.9.11:M	Yes	OCTET STRING	
2.9.11.4	dcmFDSStartTime	2.9.11:M	Yes	Counter	
2.9.11.5	dcmFDSEndTime	2.9.11:M	Yes	Counter	
2.9.11.6	dcmFDSFileSize	2.9.11:M	Yes	INTEGER	
2.9.11.7	dcmFDSDownloadFlag	2.9.11:M	Yes	1-255	
2.9.11.8	dcmFDSOpenFlag	2.9.11:M	Yes	1-4	---
	fileOpen (1)	---	Yes	---	---
	fileClosed (2)	---	Yes	---	---
	fileLocked (3)	---	Yes	---	---
	fileOpenLocked (4)	---	Yes/No	---	---
2.8.21	dcmDRETMaxNumRows	2.8.23:M	Yes	DcmMaxNumRows	---
2.8.22	dcmDRETCurNumRows	2.8.23:M	Yes	DcmCurNumRows	---
2.8.23	dcmDRETable	M	Yes	----	----
	DcmDREEntry	--	--	----	----
2.8.23.1	dcmDREStudyNum	2.8.23:M	Yes	1-255	
2.8.23.2	dcmDREStatus	2.8.23:M	Yes	1-6	
	other (1)	---	Yes/No	---	---
	Idle (2)	---	Yes	---	---
	primed (3)	---	Yes	---	---
	recording (4)	---	Yes	---	---

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A.9-DATA FILE SETUP CONFORMANCE GROUP **Status:** (A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M, A.13:O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	validating (5)	---	Yes/No	---	---
	error (6)	---	Yes/No	---	---
2.8.23.3	dcmDREControl	2.8.23:M	Yes	1-3	
	prime (1)	---	Yes	---	---
	quitRecording (2)	---	Yes	---	---
	validate (3)	---	Yes/No	---	---
2.8.30	dcmDataStructureTable	M	Yes	----	----
	DcmDataStructureEntry	--	--	----	----
2.8.30.1	dcmDSStudyNum	2.8.30:M	Yes	1-255	
2.8.30.2	dcmDataStrucIndex	2.8.30:M	Yes	1-255	
2.8.30.3	dcmStartTime	2.8.30:M	Yes	Counter	
2.8.30.4	dcmEndTime	2.8.30:M	Yes	Counter	
2.8.30.5	dcmDataNumRecords	2.8.30:M	Yes	0-16777215	
2.8.30.6	dcmDataEncoding	2.8.30:M	Yes	1-2	
	other (1)	---	Yes/No	---	---
	noEncoding (2)	---	Yes	---	---
2.8.30.7	dcmData	2.8.30:M	Yes	OCTET STRING	

A.10 Binned Studies Conformance Group

This Conformance Group is only required if Binned Studies need to be configured. It identifies the objects that can be used to configure Binned Studies.

A.10-BINNED STUDIES CONFORMANCE GROUP **Status: O**					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.4	dcmMaxNumHeadings	M	Yes	0-255	
2.8.5	dcmMaxNumBins	M	Yes	1-65535	
2.8.6	dcmBFDTMaxNumRows	2.8.8:M	Yes	DcmMaxNumRows	---
2.8.7	dcmBFDTCurNumRows	2.8.8:M	Yes	DcmCurNumRows	---
2.8.8	dcmBinnedFilterDefTable	M	Yes	----	----
	DcmBinnedFilterDefEntry	--	--	----	----
2.8.8.1	dcmBFDBinnedFilterNum	2.8.8:M	Yes	1-255	
2.8.8.2	dcmBinnedFilterIndex	2.8.8:M	Yes	1-255	
2.8.8.3	dcmBinHeading	2.8.8:M	Yes	OBJECT IDENTIFIER	
2.8.8.4	dcmBinMinimumValue	2.8.8:M	Yes	0-16777215	
2.8.8.5	dcmBinMaximumValue	2.8.8:M	Yes	0-16777215	
2.8.8.6	dcmBinNumberIndexRelation	2.8.8:M	Yes	1-3	---
	and (1)	---	Yes/No	---	---
	or (2)	---	Yes/No	---	---
	endOfDef (3)	---	Yes	---	---
2.8.8.7	dcmBinnedFilterDefRowAdmin	2.8.8:M	Yes	1-6	---
	active (1)	2.8.8.7:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.8.9	dcmBSCTMaxNumRows	2.8.11:M	Yes	DcmMaxNumRows	---
2.8.10	DcmBSCTCurNumRows	2.8.11:M	Yes	DcmCurNumRows	---
2.8.11	dcmBinSCTable	M	Yes	----	----
	DcmBinSCEntry	--	--	----	----
2.8.11.1	dcmBSCStudyNum	2.8.11:M	Yes	1-255	
2.8.11.2	dcmBSCHeadingNum	2.8.11:M	Yes	1-255	
2.8.11.3	dcmBSCLabelNum	2.8.11:M	Yes	1-255	

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A.10-BINNED STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.11.4	dcmBSCFilterNum	2.8.11:M	Yes	1-255	
2.8.11.5	dcmBSCRowAdmin	2.8.11:M	Yes	1-6	---
	active (1)	2.8.11.5:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
A.13	Monitor Studies Conformance Group	Binned Monitor Study:M	Yes		

A.11 PVR Studies Conformance Group

This Conformance Group is only required if PVR Studies need to be configured. It identifies the objects that can be used to configure PVR Studies.

A.11-PVR STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.12	dcmPSCTMaxNumRows	2.8.14:M	Yes	DcmMaxNumRows	---
2.8.13	dcmPSCTCurNumRows	2.8.14:M	Yes	DcmCurNumRows	---
2.8.14	dcmPvrStudyConfigTable	M	Yes	----	----
	DcmPvrStudyConfigEntry	--	--	----	----
2.8.14.1	dcmPSCStudyNum	2.8.14:M	Yes	1-255	
2.8.14.2	dcmPvrStudyIndex	2.8.14:M	Yes	1-255	
2.8.14.3	dcmPvrParam	2.8.14:M	Yes	OBJECT IDENTIFIER	
2.8.14.4	dcmPvrStudyConfigRowAdmin	2.8.14:M	Yes	1-6	---
	active (1)	2.8.14.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
A.13	Monitor Studies Conformance Group	PVR Monitor Study:M	Yes		

A.12 Event Studies Conformance Group

This Conformance Group is only required if Event Studies need to be configured. It identifies the objects that can be used to configure Event Studies.

A.12-EVENT STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.15	dcmESCTMaxNumRows	2.8.17:M	Yes	DcmMaxNumRows	---
2.8.16	dcmESCTCurNumRows	2.8.17:M	Yes	DcmCurNumRows	---
2.8.17	dcmEventStudyConfigTable	M	Yes	----	----
	DcmEventStudyConfigEntry	--	--	----	----
2.8.17.1	dcmESCStudyNum	2.8.17:M	Yes	1-255	
2.8.17.2	dcmEventNumberSize	2.8.17:M	Yes	1-255	

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A.12-EVENT STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.17.3	dcmTimerEventMaxPeriod	2.8.17:M	Yes	1-4294967296	
2.8.17.4	dcmEventStudyConfigRowAdmin	2.8.17:M	Yes	1-6	
	active (1)	2.8.17.4:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
2.8.18	dcmELIMTMaxNumRows	2.8.20:M	Yes	DcmMaxNumRows	---
2.8.19	dcmELIMTCurNumRows	2.8.20:M	Yes	DcmCurNumRows	---
2.8.20	dcmEventConfigTable	M	Yes	----	----
	DcmEventConfigEntry	--	--	----	----
2.8.20.2	dcmECStudyNum	2.8.20:M	Yes	1-255	
2.8.20.3	dcmEventConfigNumber	2.8.20:M	Yes	1-255	
2.8.20.4	dcmEventNumber	2.8.20:M	Yes	0-255	
2.8.20.5	dcmECIONum	2.8.20:M	Yes	1-255	
2.8.20.6	dcmLogicalIOState	2.8.20:M	Yes	1-7	
	other (1)	---	Yes/No	---	---
	on (2)	2.8.20.6:O1	Yes/No	---	---
	off (3)	2.8.20.6:O1	Yes/No	---	---
	weight (4)	2.8.20.6:O1	Yes/No	---	---
	pulsed (5)	2.8.20.6:O1	Yes/No	---	---
	triggered (6)	2.8.20.6:O1	Yes/No	---	---
	valueA-D (7)	2.8.20.6:O1	Yes/No	---	---
2.8.20.7	dcmEventValueSize	2.8.20:M	Yes	0-255	
2.8.20.8	dcmTimestampSize	2.8.20:M	Yes	0-255	
2.8.20.9	dcmEventConfigRowAdmin	2.8.20:M	Yes	1-6	
	active (1)	2.8.20.9:M	Yes	---	---
	notInService (2)	---	Yes/No	---	---
	notReady (3)	---	Yes/No	---	---
	createAndGo (4)	---	Yes/No	---	---
	createAndWait (5)	---	Yes/No	---	---
	destroy (6)	---	Yes/No	---	---
A.13	Monitor Studies Conformance Group	Event Monitor Study:M	Yes		

A.13 Monitor Studies Conformance Group

This Conformance Group is only required if Monitor Studies need to be configured. It identifies the objects that can be used to configure Monitor Studies.

A.13-MONITOR STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.24	dcmMETMaxNumRows	2.8.26:M	Yes	DcmMaxNumRows	---
2.8.25	dcmMETCurNumRows	2.8.26:M	Yes	DcmCurNumRows	---
2.8.26	dcmMETable	M	Yes	----	----
	DcmMEEntry	--	--	----	----
2.8.26.1	dcmMEStudyNum	2.8.26:M	Yes	1-255	
2.8.26.2	dcmMEIONum	2.8.26:M	Yes	1-255	---
2.8.26.3	dcmMEType	2.8.26:M	Yes	1-3	---
	other (1)	---	Yes/No	---	---
	asciiData (2)	2.8.26.3:O1	Yes/No	---	---
	binaryData (3)	2.8.26.3:O1	Yes/No	---	---
2.8.26.4	dcmMETimeInterval	2.8.26:M	Yes	0-255	
2.8.26.5	dcmMEControl	2.8.26:M	Yes	1-4	
	validate (1)	---	Yes/No	---	---

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A.13-MONITOR STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	enableMon1 (2)	2.8.26.5:O2	Yes/No	---	---
	enableMon2 (3)	2.8.26.5:O2	Yes/No	---	---
	disableMon (4)	---	Yes	---	---
2.8.26.6	dcmMEStatus	2.8.26:M	Yes	1-6	
	other (1)	---	Yes/No	---	---
	error (2)	---	Yes/No	---	---
	validating (3)	---	Yes/No	---	---
	monitorMode1On (4)	2.8.26.5-2:M	Yes	---	---
	monitorMode2On (5)	2.8.26.5-3:M	Yes	---	---
	Idle (6)	---	Yes	---	---
2.8.26.7	dcmMEPollNow	2.8.26:M	Yes	OCTET STRING	

A.14 Log Studies Conformance Group

This Conformance Group is only required if Log Studies need to be configured. It identifies the objects that can be used to configure Log Studies.

A.14-LOG STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.29	dcmLDRecTable	M	Yes	----	----
	DcmLDReCEntry	--	--	----	----
2.8.29.1	dcmLDTimeTag	2.8.29:M	Yes	DcmTimeTagIndex	
2.8.29.2	dcmLDData	2.8.29:M	Yes	OCTET STRING	----

A.15 Array Parameter Studies Conformance Group

This Conformance Group is only required if Array Parameter Studies need to be configured. It identifies the objects that can be used to configure Array Parameter Studies.

A.15-ARRAY PARAMETER STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.27	dcmAPCTable	M	Yes	----	----
	DcmAPCEntry	--	--	----	----
2.8.27.1	dcmAPCTimeTag	2.8.27:M	Yes	DcmTimeTagIndex	
2.8.27.2	dcmAPCArrNum	2.8.27:M	Yes	1-255	
2.8.27.3	dcmAPCType	2.8.27:M	Yes	1-8	---
	other (1)	---	Yes/No	---	---
	maxAxleSpacing (2)	2.6.13.2-2:M	Yes	---	---
	vehicleAxleRatio (3)	2.6.13.2-3:M	Yes	---	---
	singleAxleTimeout (4)	2.6.13.2-4:M	Yes	---	---
	maxVehicleLength (5)	2.6.13.2-5:M	Yes	---	---
	wimCalFactor (6)	2.6.13.2-6:M	Yes	---	---
	calFilePointer (7)	2.6.13.2-7:M	Yes	---	---
	arraySpeedCal (8)	2.6.13.2-8:M	Yes	---	---
2.8.27.4	dcmAPCValue	2.8.27:M	Yes	1-16777215	
2.8.27.5	dcmAPCFileName	2.8.27:M	Yes	OCTET STRING (SIZE (0-255))	

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A.16 Logical IO Parameter Studies Conformance Group

This Conformance Group is only required if Logical IO Parameter Studies need to be configured. It identifies the objects that can be used to configure Logical IO Parameter Studies.

A.16-LOGICAL IO PARAMETER STUDIES CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.8.28	dcmIOParamChgRecTable	M	Yes	----	---
	DcmIOParamChgRecEntry	--	--	---	---
2.8.28.1	dcmIOPCTimeTag	2.8.28:M	Yes	DcmTimeTagIndex	
2.8.28.2	dcmIOPCNum	2.8.28:M	Yes	1-255	
2.8.28.3	dcmIOPCTyp	2.8.28:M	Yes	1-24	---
	other (1)	---	Yes/No	---	---
	debounce (2)	2.4.13.3-2:M	Yes	---	---
	deadtime (3)	2.4.13.3-3:M	Yes	---	---
	sensitivityGain (4)	2.4.13.3-4:M	Yes	---	---
	onThreshold (5)	2.4.13.3-5:M	Yes	---	---
	offThreshold (6)	2.4.13.3-6:M	Yes	---	---
	onHysteresis (7)	2.4.13.3-7:M	Yes	---	---
	offHysteresis (8)	2.4.13.3-8:M	Yes	---	---
	minOnTime (9)	2.4.13.3-9:M	Yes	---	---
	minOffTime (10)	2.4.13.3-10:M	Yes	---	---
	maxOnTime (11)	2.4.13.3-11:M	Yes	---	---
	maxOffTime (12)	2.4.13.3-12:M	Yes	---	---
	adOffset (13)	2.4.13.3-13:M	Yes	---	---
	scanTime (14)	2.4.13.3-14:M	Yes	---	---
	SensorLength (15)	2.4.13.3-15:M	Yes	---	---
	sensorWidth (16)	2.4.13.3-16:M	Yes	---	---
	sensorHeight (17)	2.4.13.3-17:M	Yes	---	---
	sensorDepth (18)	2.4.13.3-18:M	Yes	---	---
	sensorAngle (19)	2.4.13.3-19:M	Yes	---	---
	ioCal (20)	2.4.13.3-20:M	Yes	---	---
	frequency (21)	2.4.13.3-21:M	Yes	---	---
	memoryWrap (22)	2.4.13.3-22:M	Yes	---	---
	dataStorageMediaAvailable (23)	2.4.13.3-23:M	Yes	---	---
	dataStorageMediaUsed (24)	2.4.13.3-24:M	Yes	---	---
2.8.28.4	dcmIOPCVal	2.8.28:M	Yes	INTEGER	

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A.17 Global Time Management Conformance Group

This Conformance Group is optional. It identifes objects that are required to process date and time.

A.17-GLOBAL TIME MANAGEMENT CONFORMANCE GROUP Status: O					
NTCIP 1201 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2.4.1	globalTime	O	Yes/No	counter	
2.4.2	globalDaylightSavings	O	Yes/No	1-19	
2.4.6	controller-standardTimeZone	O	Yes/No	-43200-43200	
2.4.7	controller-localTime	M	Yes	counter	

A.18 STMF Conformance Group

This Conformance Group is optional. It identifies the mechanism that is used to manipulate the objects.

A.18-STMF CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2301	SNMP	M	Yes		
2301	STMP	X	No		

A.19 FTP Conformance Group

This Conformance Group is optional. It identifies the mechanism that is used to download data files that are created by configured traffic studies.

A.19-SITE INFO CONFORMANCE GROUP Status: O					
NTCIP 1206 Clause	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
2303	FTP	O	Yes/No		

A.20 Information Profile (PICS) Example (Informative)

This section provides an example of how a PICS might be filled in based on a set of User Requirements describing a very simple dcm loop classifier.

The User Requirements to purchase new DCM equipment are as follows:

1. Maximum of two lanes of the loop-loop sensor array (Vehicular travel in a lane will travel in one direction only for the duration of a study.)
2. Ability to collect data in 12 speed bins by 4 length bins by 2 lanes
3. Record daily binned data files in 15 minute recording intervals
4. Data file formats must be standard
5. Ability to download data files in a standard way
6. Ability to view vehicle parameters in real time
7. Ability to view sensor activations in real time for debugging purposes
8. Ability to set the date and time

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9. Additionally, the user desires to utilize the NTCIP protocol to standardize communications and data transfer in order to facilitate interoperability of different devices on the same communications line and interchangeability of equipment from different manufacturers.

The PICS is intended to be completed by the user and will serve as a detailed NTCIP specification based on this set of high-level User Requirements which can be used to procure the desired dcm equipment. The user should refer to the NTCIP Guide and may also want to consult with dcm vendors or contractors for assistance in completing the PICS.

The PICS tables contained in sections A.20.2 through A.20.19 show how the above functional User Requirements are fulfilled to achieve the interoperability and interchangeability goals.

A.20.1 PICS Example Conventions

This section describe the conventions used in the PICS example:

1. Paragraph Numbering

   The paragraph numbering in section A.20 has been configured such that the third level of numbering in the A.20 example is synchronized to the second level of numbering in Annex A.2 through A.19. For Example, the DCM Conformance Groups table has been originally defined in Annex A.2. For the purposes of this example, it will be numbered as A.20.2. This has been done to simplify a comparison of this example (A.20.2 through A.20.19) with the actual Conformance Groups numbering as defined in A.2 through A.19.

2. PICS Selection

   All selections in the PICS will be indicated by an Underlined-Font in the Support column or Object Support column of each table.

   Any items that are conditionally mandatory and only have a “Yes” selection in the Object Support column will have the “Yes” selected if the condition has been met. Otherwise no selection will be shown in the Object Support column to indicate that the specified object is not supported.

3. Supported Values

   Note that for any selected items in the PICS, the values entered in the “Supported Values” column are from the perspective of the user and represent the minimum set of values that must be supported based on the User Requirements. The implementation may support a wider range of values and the PICS for that implementation would be updated to indicate the actual values supported.

4. User Requirements Clause Column

   A new column (“U.R. Clause”) was added as the first column in each table to identify the clause of the User Requirement which pertains to the specified row of the table. The User Requirement will be denoted as A.20-1 for User Requirement number 1 to A.20-9 for User Requirement number 9. Note that if the specified object is linked to multiple User Requirements, all of the User Requirements clauses will be listed in the U.R. Clause column separated by commas. This has been done as an aide to map the User Requirements to the specific objects in the PICS Tables.

   Any object that is strictly mandatory but is not linked to any User Requirements will have an “N/A” specified in the “U.R. Clause column”.

A.20.2 DCM Conformance Groups

The first step would be to select the required Conformance Groups to achieve the top-level functionality as specified in the User Requirements.

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Note that for any Conformance Group not selected in this table, none of the objects in that Conformance Group are required and unless an object is selected as per the above criteria, none of the objects in that table will be implemented.

A.2-DCM CONFORMANCE GROUPS					
U.R. Clause	**1206 Reference**	**Conformance Group Name**	**Clause of Profile**	**Status**	**Support**
A.20-2, A.20-3, A.20-6	**A.3**	Vehicle Criteria	1206	(A.8 or A.10 or A.11):M	Yes
N/A	A.4	Site Info	1206	M	Yes
N/A	A.5	Operating Status Config	1206	M	Yes
A.20-1, A.20-2, A.20-3, A.20-6	A.6	Configure Sensor Arrays	1206	(A.8 or A.10 or A.11):M	Yes
				A.12:O	Yes/No
A.20-2, A.20-3, A.20-6, A.20-7	A.7	Configure General Study	1206	(A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M	Yes
	A.8	Configure Filters	1206	O	Yes/No
A.20-4	A.9	Data File Setup	1206	(A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M	Yes
				A.13:O	Yes/No
A.20-2, A.20-3	A.10	Binned Studies	1206	O	Yes/No
A.20-6	A.11	PVR Studies	1206	O	Yes/No
A.20-7	A.12	Event Studies	1206	O	Yes/No
A.20-6, A.20-7	A.13	Monitor Studies	1206	O	Yes/No
	A.14	Log Studies	1206	O	Yes/No
	A.15	Array Parameter Studies	1206	O	Yes/No
	A.16	Logical IO Parameter Studies	1206	O	Yes/No
A.20-8	A.17	Global Time Management	1201	O	Yes/No
A.20-9	A.18	STMF	2301	O	Yes/No
A.20-5, A.20-9	A.19	FTP	2303	O	Yes/No

A.20.3 Vehicle Criteria Conformance Group

This Conformance Group is mandatory if Filters, Binned Studies or PVR Studies are required to be configured. It identifies the vehicle parameters that can be used to configure Filters, Binned Studies or PVR Studies.

This Conformance Group is mandatory based on the User Requirements for Binned Studies (A.20-2,A.20-3) and PVR Studies (A.20-6).

Note that besides the required data to collect (A.20-2: speed (dcmVehicleSpeed), length (dcmVehicleLength, array/lane (dcmIOAMArrNum)), after consulting with a dcm vendor, it was also identified that dcmVehicleSeqNum and controller-localTime should be included for the PVR Monitor Study (A.20-6).

Note that the “Supported Values” for dcmIOAMArrNum are only 1-2 since the User Requirements specify a maximum of only two lanes (arrays) that need to be supported.

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A.3-VEHICLE CRITERIA CONFORMANCE GROUP Status: (A.8 or A.10 or A.11):M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.3.4	dcmAxleNumber	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
	2.3.5	dcmNumAxles	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
	2.3.6	dcmVehicleClass	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
A.20-2	2.3.7	dcmVehicleSpeed	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	0-65535
A.20-2	2.3.8	dcmVehicleLength	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	0-65535
	2.3.9	dcmFrontOverhang	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.10	dcmRearOverhang	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.11	dcmAxleSpacing	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.12	dcmVehWheelbase	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.13	dcmVehClearance	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
	2.3.14	dcmVehicleHeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.15	dcmAxleWidth	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.16	dcmVehicleWidth	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.17	dcmAxleTireCount	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
	2.3.18	dcmAxleWheelTrack	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.19	dcmVehicleGap	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
	2.3.20	dcmVehicleHeadway	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
	2.3.21	dcmLeftWheelWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.22	dcmRightWheelWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.23	dcmAxleWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	

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A.3-VEHICLE CRITERIA CONFORMANCE GROUP Status: (A.8 or A.10 or A.11):M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.3.24	dcmSensorWeights	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	
	2.3.25	dcmGrossVehibleWeight	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
A.20-6	2.3.26	dcmVehicleSeqNum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-65535	0-65535
	2.3.27	dcmVehicleStatusFlag	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-4294967295	
		Bit 0 - other	---	Yes/No	---	---
		Bit 1 - onOffScale	2.3.27:O4	Yes/No	---	---
		Bit 2 - overHeight	2.3.27:O4	Yes/No	---	---
		Bit 3 - speedChange	2.3.27:O4	Yes/No	---	---
		Bit 4 - partialAxle	2.3.27:O4	Yes/No	---	---
		Bit 5 - unequalAxleCount	2.3.27:O4	Yes/No	---	---
		Bit 6 - tailgating	2.3.27:O4	Yes/No	---	---
		Bit 7 - wrongLane	2.3.27:O4	Yes/No	---	---
		Bit 8 - runningScale	2.3.27:O4	Yes/No	---	---
		Bit 9 - notWimLane	2.3.27:O4	Yes/No	---	---
		Bit 10 - overlength	2.3.27:O4	Yes/No	---	---
		Bit 11 - overGVW	2.3.27:O4	Yes/No	---	---
		Bit 12 - randomSafety	2.3.27:O4	Yes/No	---	---
		Bit 13 - overSpeed	2.3.27:O4	Yes/No	---	---
		Bit 14 - late	2.3.27:O4	Yes/No	---	---
		Bit 15 - unexpected	2.3.27:O4	Yes/No	---	---
		Bit 16 - pastDue	2.3.27:O4	Yes/No	---	---
		Bit 17 - noMatch	2.3.27:O4	Yes/No	---	---
		Bit 18 - badLateralPosition	2.3.27:O4	Yes/No	---	---
		Bit 19 - noCompliance	2.3.27:O4	Yes/No	---	---
		Bit 20 - overrideFail	2.3.27:O4	Yes/No	---	---
		Bit 21 - wrongWay	2.3.27:O4	Yes/No	---	---
		Bit 22 - minSpeed	2.3.27:O4	Yes/No	---	---
		Bit 23 - axleProcessingError	2.3.27:O4	Yes/No	---	---
		Bit 24- maxSpeed	2.3.27:O4	Yes/No	---	---
		Bit 25 - tooManyAxles	2.3.27:O4	Yes/No	---	---
		Bit 26 - sensorOrderError	2.3.27:O4	Yes/No	---	---
		Bit 27- minAxleSpacing	2.3.27:O4	Yes/No	---	---
	2.3.28	dcmAxleWeightViolationCode	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-16711425	
		Bit 0 - otherWeightViolation	---	Yes/No	---	---
		Bit 1 - steeringViolation	2.3.28:O5	Yes/No	---	---
		Bit 2 - singleAxleViolation	2.3.28:O5	Yes/No	---	---
		Bit 3 - tandemAxleViolation	2.3.28:O5	Yes/No	---	---
		Bit 4 - tridemAxleViolation	2.3.28:O5	Yes/No	---	---
		Bit 5 - quadremAxleViolation	2.3.28:O5	Yes/No	---	---
		Bit 6 - axleBalanceViolation	2.3.28:O5	Yes/No	---	---
		Bit 7 - axleGroupIndividualViolation	2.3.28:O5	Yes/No	---	---
		Bit 8 - bridgeViolation	2.3.28:O5	Yes/No	---	---
		Bit 9 - wheelViolation	2.3.28:O5	Yes/No	---	---
		Bit 10 - wheelImbalanceViolation	2.3.28:O5	Yes/No	---	---
	2.3.29	dcmVehicleAcceleration	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	-32768-32767	
	2.3.30	dcmNumVehicleIDs	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-255	
	2.3.31	dcmVehicleID	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	OCTET STRING	

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A.3-VEHICLE CRITERIA CONFORMANCE GROUP Status: (A.8 or A.10 or A.11):M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.3.32	dcmVehicleTimeTag1000	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	0-999	
A.20-2	2.6.9.1	dcmIOAMArrNum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	1-2
	2.4.10.5	dcmPLMLogIONum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
	2.6.22.1	dcmFCFilterNum	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	1-255	
A.20-6	1201-2.4.7	controller-localTime	A.8: O1 A.10: O2 A.11: O3	Yes/No Yes/No Yes/No	counter	counter
	2.3.1	dcmVCTMaxNumRows	2.3.3: M	Yes	DcmMaxNumRows	---
	2.3.2	dcmVCTCurNumRows	2.3.3: M	Yes	DcmCurNumRows	---
	2.3.3 2.3.3.1 2.3.3.2 2.3.3.3 Bit 0 – other Bit 1 – binnedStudy Bit 2 – pvrStudySingle Bit 3 – pvrStudyMulti Bit 4 – filter	dcmVehCriteriaTable DcmVehCriteriaEntry dcmVCIndex dcmVCOID dcmVCBitMap	O -- 2.3.3: M 2.3.3: M 2.3.3: M --- A.10: M A.11: M A.11: M A.8: M	Yes -- Yes Yes Yes Yes/No Yes Yes Yes Yes	---- ---- 1-255 OBJECT IDENTIFIER 0-255 --- --- --- --- ---	---- ---- --- --- --- --- --- ---
	2.6.17	dcmMaxNumAxles	(2.3.4 or 2.3.5):M	Yes	1-255	
	2.6.26	dcmMaxNumVehId	(2.3.30 or 2.3.31):M	Yes	1-255	

A.20.4 Site Info Conformance Group

This Conformance Group is always mandatory. It identifies objects that are typically required for one-time site configuration based on the location in which a dcm device has been placed to perform a traffic study.

Although not specifically stated in the User Requirements, the user only requires a maximum of 12 octets for the dcmSiteId object.

A.4-SITE INFO CONFORMANCE GROUP Status: M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
N/A	2.4.1	DcmDeviceId	M	Yes	OCTET STRING (SIZE 0-16)	OCTET STRING (SIZE 0-16)
N/A	2.6.1	DcmSiteId	M	Yes	OCTET STRING (SIZE 0-40)	OCTET STRING (SIZE 0-12)
	2.6.3	dcmSiteDescription	O	Yes/No	OCTET STRING	
	2.6.2	dcmMaxLengthSiteDescr	2.6.3:M	Yes	0-255	
N/A	2.12	dcmMibVersionnumber	M	Yes	100-65535	100-65535

A.20.5 Operating Status Config Conformance Group

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This Conformance Group is always mandatory. It identifies objects that relate to operational aspects (non-traffic-study related) of a dcm device.

Although not specifically specified in the User Requirements, the user only requires a hardReset for the dcmReset object.

A.5-OPERATING STATUS CONFIG CONFORMANCE GROUP Status: M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.4.2	dcmBatteryVoltage	O	Yes/No	0-255	
	2.4.3	dcmChargingCurrent	O	Yes/No	(-100000 - 100000)	
N/A	2.5.1	dcmReset	O	Yes/No	1-7	2
		other (1)	---	Yes/No	---	---
		hardReset (2)	2.5.1:O1	Yes/No	---	---
		softReset (3)	2.5.1:O1	Yes/No	---	---
		commReset (4)	2.5.1:O1	Yes/No	---	---
		factoryReset (5)	2.5.1:O1	Yes/No	---	---
		userReset (6)	2.5.1:O1	Yes/No	---	---
		tableClear (7)	2.5.1:O1	Yes/No	---	---
	2.5.2	dcmTCTMaxNumRows	2.5.4:M	Yes	DcmMaxNumRows	---
	2.5.3	dcmTCTCurNumRows	2.5.4:M	Yes	DcmCurNumRows	---
	2.5.4	dcmTableClearTable	O	Yes/No	----	
		DcmTableClearEntry	--	--	---	---
	2.5.4.1	dcmClearTableIndex	2.5.4:M	Yes	1-255	
	2.5.4.2	dcmTCTOID	2.5.4:M	Yes	OBJECT IDENTIFIER	
	2.5.4.3	dcmTCTAction	2.5.4:M	Yes	0-255	
	2.5.4.4	dcmTCTRowAdmin	2.5.4:M	Yes	1-7	---
		active (1)	2.5.4.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
	2.5.5	dcmNumUserConfigs	2.5.8:M	Yes	0-255	
	2.5.6	dcmURCTMaxNumRows	2.5.8:M	Yes	DcmMaxNumRows	---
	2.5.7	dcmURCTCurNumRows	2.5.8:M	Yes	DcmCurNumRows	---
	2.5.8	dcmURCTTable	O	Yes/No	----	
		DcmURCTEntry	--	--	---	---
	2.5.8.1	dcmUserResetConfigIndex	2.5.8:M	Yes	1-255	
	2.5.8.2	dcmURCTOID	2.5.8:M	Yes	OBJECT IDENTIFIER	
	2.5.8.3	dcmURCTAction	2.5.8:M	Yes	1-3	---
		clearAllUserDefaults (1)	---	Yes	---	---
		clearUserDefsFromOID (2)	---	Yes/No	---	---
		saveUserDefsFromOID (3)	---	Yes	---	---
	2.5.8.4	dcmURCTRowAdmin	2.5.8:M	Yes	1-6	
		active (1)	2.5.8.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
	2.5.9	dcmOCIDTMaxNumRows	2.5.11:M	Yes	DcmMaxNumRows	---
	2.5.10	dcmOCIDTCurNumRows	2.5.11:M	Yes	DcmCurNumRows	---
	2.5.11	dcmOCITable	O	Yes/No	----	
		DcmOCIEntry	--	--	---	---
	2.5.11.1	dcmOCIdIndex	2.5.11:M	Yes	1-255	
	2.5.11.2	dcmOCIdOID	2.5.11:M	Yes	OBJECT IDENTIFIER	
	2.5.11.3	dcmOCIdTime	2.5.11:M	Yes	Counter	
	2.5.11.4	dcmOCIdRowAdmin	2.5.11:M	Yes	1-6	---
		active (1)	2.5.11.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---

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A.5-OPERATING STATUS CONFIG CONFORMANCE GROUP Status: M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
N/A	2.10.1	dcmECTMaxNumRows	2.10.3:M	Yes	DcmMaxNumRows	DcmMaxNumRows
N/A	2.10.2	dcmECTCurNumRows	2.10.3:M	Yes	DcmCurNumRows	DcmCurNumRows
N/A	2.10.3	dcmErrCodeTable	M	Yes	----	----
		DcmErrCodeEntry	--	--	----	----
	2.10.3.1	dcmErrorCodeIndex	2.10.3:M	Yes	1-255	1-5
	2.10.3.2	dcmErrCodeOID	2.10.3:M	Yes	OBJECT IDENTIFIER	
	2.10.3.3	dcmErrCode	2.10.3:M	Yes	1-13	2-10,13
		other (1)	---	Yes/No	---	---
		noError (2)	2.10.3.3:O2	Yes/No	---	---
		notValidAtThisTime (3)	2.10.3.3:O2	Yes/No	---	---
		validationFailed (4)	2.10.3.3:O2	Yes/No	---	---
		optionNotSupported (5)	2.10.3.3:O2	Yes/No	---	---
		outOfRange (6)	2.10.3.3:O2	Yes/No	---	---
		invalidOption (7)	2.10.3.3:O2	Yes/No	---	---
		notAllowedPrimeRec (8)	2.10.3.3:O2	Yes/No	---	---
		lockedOut (9)	2.10.3.3:O2	Yes/No	---	---
		exceededMaxLength (10)	2.10.3.3:O2	Yes/No	---	---
		exceededMaxNumberOfOccurrences (11)	2.10.3.3:O2	Yes/No	---	---
		exceededMaxNumberOfRows (12)	2.10.3.3:O2	Yes/No	---	---
		readOnly (13)	2.10.3.3:O2	Yes/No	---	---
	2.11	DcmRelativeAddrOID	O	Yes/No	OBJECT IDENTIFIER	----

A.20.6 Configure Sensor Arrays Conformance Group

This Conformance Group is mandatory if Filters, Binned Studies or PVR Studies are required. It is optional for Event Studies. It identifies all of the objects that can be used to define sensor arrays.

This Conformance Group is mandatory based on the User Requirements for Binned Studies (A.20-2, A.20-3) and PVR Monitor Studies (A.20-6).

A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
N/A	2.4.4	dcmNumIOBoards	M	Yes	0-255	0-255
N/A	2.4.5	dcmIOBCTMaxNumRows	2.4.7:M	Yes	DcmMaxNumRows	DcmMaxNumRows
N/A	2.4.6	dcmIOBCTCurNumRows	2.4.7:M	Yes	DcmCurNumRows	DcmCurNumRows
N/A	2.4.7	dcmIOBoardConfigTable	M	Yes	----	---
		DcmIOBoardConfigEntry	--	--	---	---
	2.4.7.1	dcmIOBCBoardNum	2.4.7:M	Yes	1-255	1-255
	2.4.7.2	dcmIOBoardFunction	2.4.7:M	Yes	1-255	1-255
	2.4.7.3	dcmIOBCNumIO	2.4.7:M	Yes	1-255	1-255
	2.4.7.4	dcmIOBoardType	2.4.7:M	Yes	1-28	2,3,6,11
		other (1)	---	Yes/No	---	---
		cpu (2)	2.4.7.4:O1	Yes/No	---	---
		storageMedia (3)	2.4.7.4:O1	Yes/No	---	---
		inputNonSensor (4)	2.4.7.4:O1	Yes/No	---	---
		output (5)	2.4.7.4:O1	Yes/No	---	---
		comms (6)	2.4.7.4:O1	Yes/No	---	---
		keyboard (7)	2.4.7.4:O1	Yes/No	---	---
		display (8)	2.4.7.4:O1	Yes/No	---	---
		roadTube (9)	2.4.7.4:O1	Yes/No	---	---
		piezo (10)	2.4.7.4:O1	Yes/No	---	---

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A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		loop (11)	2.4.7.4:O1	Yes/No	---	---
		wimPiezo (12)	2.4.7.4:O1	Yes/No	---	---
		bendingPlate (13)	2.4.7.4:O1	Yes/No	---	---
		contactClosure (14)	2.4.7.4:O1	Yes/No	---	---
		acoustic (15)	2.4.7.4:O1	Yes/No	---	---
		radar (16)	2.4.7.4:O1	Yes/No	---	---
		microwave (17)	2.4.7.4:O1	Yes/No	---	---
		infrared (18)	2.4.7.4:O1	Yes/No	---	---
		laser (19)	2.4.7.4:O1	Yes/No	---	---
		optoIsolated (20)	2.4.7.4:O1	Yes/No	---	---
		fiberOptic (21)	2.4.7.4:O1	Yes/No	---	---
		contactRelay (22)	2.4.7.4:O1	Yes/No	---	---
		quartz (23)	2.4.7.4:O1	Yes/No	---	---
		lightcurtain (24)	2.4.7.4:O1	Yes/No	---	---
		video (25)	2.4.7.4:O1	Yes/No	---	---
		timer (26)	2.4.7.4:O1	Yes/No	---	---
		fiberOpticWim (27)	2.4.7.4:O1	Yes/No	---	---
		ultrasound (28)	2.4.7.4:O1	Yes/No	---	---
N/A	2.4.7.5	dcmIOBoardDescription	2.4.7:M	Yes	OCTET STRING	OCTET STRING
N/A	2.4.7.6	dcmIOBoardStatus	2.4.7:M	Yes	1-5	1
		enabled (1)	2.4.7.6:O2	Yes/No	---	---
		disabled (2)	2.4.7.6:O2	Yes/No	---	---
		fault (3)	2.4.7.6:O2	Yes/No	---	---
		resetting (4)	2.4.7.6:O2	Yes/No	---	---
		suspended (5)	2.4.7.6:O2	Yes/No	---	---
N/A	2.4.7.7	dcmIOBoardControl	2.4.7:M	Yes	1-5	1
		notSupported (1)	2.4.7.7:O3	Yes/No	---	---
		enable/d (2)	2.4.7.7:O3	Yes/No	---	---
		disable/d (3)	2.4.7.7:O3	Yes/No	---	---
		reset (4)	2.4.7.7:O3	Yes/No	---	---
		suspend (5)	2.4.7.7:O3	Yes/No	---	---
N/A	2.4.8	dcmPLMTMaxNumRows	2.4.10:M	Yes	DcmMaxNumRows	DcmMaxNumRows
N/A	2.4.9	dcmPLMTCurNumRows	2.4.10:M	Yes	DcmCurNumRows	DcmCurNumRows
N/A	2.4.10	dcmPhysicalLogicalMapTable	M	Yes	----	---
		DcmPhysicalLogicalMapEntry	--	--	---	---
	2.4.10.1	dcmPLMIOBoardNum	2.4.10:M	Yes	1-255	1-255
	2.4.10.3	dcmPLMIOBoardFunction	2.4.10:M	Yes	1-255	1-255
	2.4.10.4	dcmPhysicalIONumber	2.4.10:M	Yes	1-255	1-255
	2.4.10.5	dcmPLMLogIONum	2.4.10:M	Yes	1-255	1-255
	2.4.10.6	dcmPhysicalLogicalIOStatus	2.4.10:M	Yes	1-5	1
		enabled (1)	2.4.10.6:O4	Yes/No	---	---
		disabled (2)	2.4.10.6:O4	Yes/No	---	---
		fault (3)	2.4.10.6:O4	Yes/No	---	---
		resetting (4)	2.4.10.6:O4	Yes/No	---	---
		suspended (5)	2.4.10.6:O4	Yes/No	---	---
	2.4.10.7	dcmPhysicalLogicalIOControl	2.4.10:M	Yes	1-5	1
		notSupported(1)	2.4.10.7:O5	Yes/No	---	---
		enable (2)	2.4.10.7:O5	Yes/No	---	---
		disable (3)	2.4.10.7:O5	Yes/No	---	---
		reset (4)	2.4.10.7:O5	Yes/No	---	---
		suspend (5)	2.4.10.7:O5	Yes/No	---	---
N/A	2.4.11	dcmLIOPTMaxNumRows	2.4.13:M	Yes	DcmMaxNumRows	DcmMaxNumRows
N/A	2.4.12	dcmLIOPTCurNumRows	2.4.13:M	Yes	DcmCurNumRows	DcmCurNumRows
N/A	2.4.13	dcmIOParamTable	A.16:M	Yes	----	---
		DcmIOParamEntry	--	--	---	---
	2.4.13.1	dcmIOPNum	2.4.13:M	Yes	1-255	1-255
	2.4.13.3	dcmIOPTyp	2.4.13:M	Yes	1-24	4,15,22,23,24
		other (1)	---	Yes/No	---	---
		debounce (2)	2.4.13.3:O6	Yes/No	---	---
		deadtime (3)	2.4.13.3:O6	Yes/No	---	---
		sensitivityGain (4)	2.4.13.3:O6	Yes/No	---	---
		onThreshold (5)	2.4.13.3:O6	Yes/No	---	---
		offThreshold (6)	2.4.13.3:O6	Yes/No	---	---

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A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		onHysteresis (7)	2.4.13.3:O6	Yes/No	---	---
		offHysteresis (8)	2.4.13.3:O6	Yes/No	---	---
		minOnTime (9)	2.4.13.3:O6	Yes/No	---	---
		minOffTime (10)	2.4.13.3:O6	Yes/No	---	---
		maxOnTime (11)	2.4.13.3:O6	Yes/No	---	---
		maxOffTime (12)	2.4.13.3:O6	Yes/No	---	---
		adOffset (13)	2.4.13.3:O6	Yes/No	---	---
		scanTime (14)	2.4.13.3:O6	Yes/No	---	---
		sensorLength (15)	2.4.13.3:O6	Yes/No	---	---
		sensorWidth (16)	2.4.13.3:O6	Yes/No	---	---
		sensorHeight (17)	2.4.13.3:O6	Yes/No	---	---
		sensorDepth (18)	2.4.13.3:O6	Yes/No	---	---
		sensorAngle (19)	2.4.13.3:O6	Yes/No	---	---
		ioCal (20)	2.4.13.3:O6	Yes/No	---	---
		frequency (21)	2.4.13.3:O6	Yes/No	---	---
		memoryWrap (22)	2.4.13.3:O6	Yes/No	---	---
		dataStorageMediaAvailable (23)	2.4.13.3:O6	Yes/No	---	---
		dataStorageMediaUsed (24)	2.4.13.3:O6	Yes/No	---	---
N/A	2.4.13.4	dcmIOPVal	2.4.13:M	Yes	INTEGER	INTEGER
N/A	2.4.13.5	dcmIOParamRowAdmin	2.4.13:M	Yes	1-6	1
		active (1)	2.4.13.5:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-3, A.20-6	2.6.4	dcmMaxSensorsPerArray	(A.8 or A.10 or A.11):M	Yes	0-255	1-2
A.20-3, A.20-6	2.6.5	dcmMaxNumArray	(A.8 or A.10 or A.11):M	Yes	1-255	2
A.20-3, A.20-6	2.6.6	dcmNumArrays	(A.8 or A.10 or A.11):M	Yes	0-255	2
A.20-3, A.20-6	2.6.7	dcmLIOMTMaxNumRows	2.6.9:M	Yes	DcmMaxNumRows	DcmMaxNumRows
A.20-3, A.20-6	2.6.8	dcmLIOMTCurNumRows	2.6.9:M	Yes	DcmCurNumRows	DcmCurNumRows
A.20-3, A.20-6	2.6.9	dcmLogicalIOArrayMapTable	(A.8 or A.10 or A.11):M	Yes	----	----
		DcmLogicalIOArrayMapEntry	--	--	----	----
	2.6.9.1	dcmIOAMArrNum	2.6.9:M	Yes	1-255	2
	2.6.9.2	dcmIOAMIONum	2.6.9:M	Yes	1-255	1-255
	2.6.9.3	dcmIOSpacing	2.6.9:M	Yes	0-65535	0-65535
	2.6.9.4	dcmIOPosition	2.6.9:M	Yes	1-14	3
		other (1)	---	Yes/No	---	---
		full (2)	2.6.9.4:O7	Yes/No	---	---
		center (3)	2.6.9.4:O7	Yes/No	---	---
		multiple (4)	2.6.9.4:O7	Yes/No	---	---
		leftHalf (5)	2.6.9.4:O7	Yes/No	---	---
		rightHalf (6)	2.6.9.4:O7	Yes/No	---	---
		leftThird (7)	2.6.9.4:O7	Yes/No	---	---
		centerThird (8)	2.6.9.4:O7	Yes/No	---	---
		rightThird (9)	2.6.9.4:O7	Yes/No	---	---
		above (10)	2.6.9.4:O7	Yes/No	---	---
		below (11)	2.6.9.4:O7	Yes/No	---	---
		sidefire (12)	2.6.9.4:O7	Yes/No	---	---
		wheelPath (13)	2.6.9.4:O7	Yes/No	---	---
		negWheelPath (14)	2.6.9.4:O7	Yes/No	---	---
	2.6.9.5	dcmIOFunctionality	2.6.9:M	Yes	1-12	2
		other (1)	---	Yes/No	---	---
		vehiclePresence (2)	2.6.9.5:O8	Yes/No	---	---
		axle (3)	2.6.9.5:O8	Yes/No	---	---
		wimAxle (4)	2.6.9.5:O8	Yes/No	---	---
		temperature (5)	2.6.9.5:O8	Yes/No	---	---

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A.6-CONFIGURE SENSOR ARRAYS CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11):M, A.12:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		negativeAxle (6)	2.6.9.5:O8	Yes/No	---	---
		onScale (7)	2.6.9.5:O8	Yes/No	---	---
		offScale (8)	2.6.9.5:O8	Yes/No	---	---
		overheight (9)	2.6.9.5:O8	Yes/No	---	---
		avi (10)	2.6.9.5:O8	Yes/No	---	---
		height (11)	2.6.9.5:O8	Yes/No	---	---
		width (12)	2.6.9.5:O8	Yes/No	---	---
	2.6.9.6	dcmLogicalIOArrayMapRowAdmin	2.6.9:M	Yes	1-6	1
		active (1)	2.6.9.6:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
N/A	2.6.10	dcmMaxCalFactorsPerArrays	2.6.13:M	Yes	0-255	0-2
N/A	2.6.11	dcmAPTMaxNumRows	2.6.13:M	Yes	DcmMaxNumRows	4
N/A	2.6.12	dcmAPTCurNumRows	2.6.13:M	Yes	DcmCurNumRows	0-4
N/A	2.6.13	dcmArrayParameterTable	A.15:M	Yes/No	----	----
		DcmArrayParameterEntry	--	--	----	----
	2.6.13.1	dcmAPArrNum	2.6.13:M	Yes	1-255	1-2
	2.6.13.2	dcmAPType	2.6.13:M	Yes	1-8	5,8
		other (1)	---	Yes/No	---	---
		maxAxleSpacing (2)	2.6.13.2:O9	Yes/No	---	---
		vehicleAxleRatio (3)	2.6.13.2:O9	Yes/No	---	---
		singleAxleTimeout (4)	2.6.13.2:O9	Yes/No	---	---
		maxVehicleLength (5)	2.6.13.2:O9	Yes/No	---	---
		wimCalFactor (6)	2.6.13.2:O9	Yes/No	---	---
		calFilePointer (7)	2.6.13.2:O9	Yes/No	---	---
		arraySpeedCal (8)	2.6.13.2:O9	Yes/No	---	---
	2.6.13.3	dcmAPValue	2.6.13:M	Yes	1-16777215	1-16777215
	2.6.13.4	dcmAPFileName	2.6.13:M	Yes	OCTET STRING (SIZE (0-255))	OCTET STRING (SIZE (0-255))
	2.6.13.5	dcmArrayParameterRowAdmin	2.6.13:M	Yes	1-6	1
		active (1)	2.6.13.5:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-2	2.6.14	dcmASCTMaxNumRows	2.6.16:M	Yes	DcmMaxNumRows	2
A.20-2	2.6.15	dcmASCTCurNumRows	2.6.16:M	Yes	DcmCurNumRows	0-2
A.20-2	2.6.16	dcmArraySpeedCalibrationTable	2.3.7:M	Yes	----	----
		dcmArraySpeedCalibrationEntry	--	--	----	----
	2.6.16.1	dcmASCArrNum	2.6.16:M	Yes	1-255	1-2
	2.6.16.2	dcmLogicalIONumber1	2.6.16:M	Yes	1-255	1-255
	2.6.16.3	dcmLogicalIONumber2	2.6.16:M	Yes	0-255	1-255
	2.6.16.4	dcmArraySpeedCalFactor	2.6.16:M	Yes	1-65535	1-65535
	2.6.16.5	dcmASCRowAdmin	2.6.16:M	Yes	1-6	1
		active (1)	2.6.16.5:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---

A.20.7 Configure General Study Conformance Group

This Conformance Group is mandatory if Filters, Binned Studies, PVR Studies, Event Studies, Monitor Studies, Log Studies, Array Parameter Studies or Logical IO Parameter Studies are required. It identifies all of the general study parameters that are common to all of the listed studies.

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This Conformance Group is mandatory based on the User Requirements for Binned Studies (A.20-2, A.20-3), PVR Monitor Studies (A.20-6) and Event Monitor Studies (A.20-7).

A maximum of three studies is required, one study to process vehicles into binned data files (A.20-3 - Binned Study), one study to monitor vehicle parameters in real time (A.20-6 – PVR Monitor Study) and one study to monitor sensor activations in real time (A.20-7 – Event Monitor Study).

A maximum of 6 rows are required for the dcmStudyArrayMapTable. There are a maximum of two arrays over a maximum of three studies (2*3)=6. Each row maps a single array to a study. Each study can have up to two arrays mapped to it.

Both dcmLengthUnits and dcmSpeedUnits are required for the PVR Monitor Study (A.20-6).

A.7-CONFIGURE GENERAL STUDY CONFORMANCE GROUP

Status: (A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M

U.R. Clause	NTCIP 1206 Clause	Object Name	Object Status	Object Support	Allowed Values	Supported Values
A.20-2, A.20-3, A.20-6, A.20-7	2.7.1	dcmNumStudies	M	Yes	0-255	0-3
A.20-2, A.20-3, A.20-6, A.20-7	2.7.2	dcmMaxNumStudies	M	Yes	1-255	1-3
A.20-2, A.20-3, A.20-6, A.20-7	2.7.3	dcmSCTMaxNumRows	2.7.5:M	Yes	DcmMaxNumRows	3
A.20-2, A.20-3, A.20-6, A.20-7	2.7.4	dcmSCTCurNumRows	2.7.5:M	Yes	DcmCurNumRows	0-3
A.20-2, A.20-3, A.20-6, A.20-7	2.7.5	dcmStudyConfigTable	M	Yes	----	----
		DcmStudyConfigEntry	--	--	----	----
	2.7.5.1	dcmSCStudyNum	2.7.5:M	Yes	1-255	1-3
	2.7.5.2	dcmStudyType	2.7.5:M	Yes	1-7	2,3,4
		other (1)	---	Yes/No	---	---
		binned (2)	A.10: M	Yes	---	---
		pvr (3)	A.11: M	Yes	---	---
		event (4)	A.12: M	Yes	---	---
		arrayParam (5)	A.15:M	Yes	---	---
		logicalIOParam (6)	A.16:M	Yes	---	---
		log (7)	A.14:M	Yes	---	---
	2.7.5.3	dcmStartType	2.7.5:M	Yes	1-4	3
		other (1)	---	Yes/No	---	---
		now (2)	2.7.5.3:O1	Yes/No	---	---
		nextInterval (3)	2.7.5.3:O1	Yes/No	---	---
		dateTime (4)	2.7.5.3:O1	Yes/No	---	---
	2.7.5.4	dcmStartDateTime	2.7.5:M	Yes	Counter	Counter
	2.7.5.5	dcmEndType	2.7.5:M	Yes	1-3	2
		other (1)	---	Yes/No	---	---
		never (2)	2.7.5.5:O2	Yes/No	---	---
		dateTime (3)	2.7.5.5:O2	Yes/No	---	---
	2.7.5.6	dcmEndDateTime	2.7.5:M	Yes	Counter	Counter
	2.7.5.7	dcmSCFileStudyIndex	2.7.5:M	Yes	0-255	0-1
	2.7.5.8	dcmStudyConfigRowAdmin	2.7.5:M	Yes	1-6	1
		active (1)	2.7.5.8:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---

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A.7-CONFIGURE GENERAL STUDY CONFORMANCE GROUP **Status:** (A.8 or A.10 or A.11 or A.12 or A.13 or A.14 or A.15 or A.16):M						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-2, A.20-3, A.20-6, A.20-7	2.7.6	dcmASMTMaxNumRows	2.7.8:M	Yes	DcmMaxNumRows	6
A.20-2, A.20-3, A.20-6, A.20-7	2.7.7	dcmASMTCurNumRows	2.7.8:M	Yes	DcmCurNumRows	0-6
A.20-2, A.20-3, A.20-6, A.20-7	2.7.8	dcmStudyArrayMapTable	(A.8 or A.10 or A.11 or A.13):M	Yes	----	----
		DcmStudyArrayMapEntry	--	--	----	----
	2.7.8.1	dcmASMStudyNum	2.7.8:M	Yes	1-255	1-3
	2.7.8.2	dcmSAMArrNum	2.7.8:M	Yes	1-255	1-2
	2.7.8.3	dcmStudyArrayEnable	2.7.8:M	Yes	1-2	1-2
		enable (1)	---	Yes	---	---
		disable (2)	---	Yes	---	---
	2.7.8.4	dcmStudyArrayRowAdmin	2.7.8:M	Yes	1-6	1
		active (1)	2.7.8.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-6	2.8.1	dcmLengthUnits	O	Yes/No	1-6	5
		centimeter (1)	2.8.1:O3	Yes/No	---	---
		decimeter (2)	2.8.1:O3	Yes/No	---	---
		meter (3)	2.8.1:O3	Yes/No	---	---
		inches (4)	2.8.1:O3	Yes/No	---	---
		tenthFeet (5)	2.8.1:O3	Yes/No	---	---
		feet (6)	2.8.1:O3	Yes/No	---	---
A.20-6	2.8.2	dcmSpeedUnits	O	Yes/No	1-3	3
		cms (1)	2.8.2:O4	Yes/No	---	---
		kmh (2)	2.8.2:O4	Yes/No	---	---
		mph (3)	2.8.2:O4	Yes/No	---	---
	2.8.3	dcmWeightUnits	O	Yes/No	1-5	---
		tenthTonne (1)	2.8.3:O5	Yes/No	---	---
		tenthKips (2)	2.8.3:O5	Yes/No	---	---
		pounds (3)	2.8.3:O5	Yes/No	---	---
		kiloGrams (4)	2.8.3:O5	Yes/No	---	---
		kips (5)	2.8.3:O5	Yes/No	---	---

A.20.8 Configure Filters Conformance Group

This Conformance Group is optional. It is only required if Filters are to be configured. It identifies all of the objects that can be used to configure Filters.

This Conformance Group is not required to address the User Requirements. Note that no selections have been indicated in the table, none of the objects will be included.

A.8-CONFIGURE FILTERSCONFORMANCE GROUP **Status: O**

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U.R. Clause	NTCIP 1206 Clause	Object Name	Object Status	Object Support	Allowed Values	Supported Values
	2.6.18	dcmMaxFilters	M	Yes	0-255	
	2.6.19	dcmNumFilters	M	Yes	0-255	
	2.6.20	dcmFCTMaxNumRows	2.6.22:M	Yes	DcmMaxNumRows	---
	2.6.21	dcmFCTCurNumRows	2.6.22:M	Yes	DcmCurNumRows	---
	2.6.22	dcmFilterConfigTable	M	Yes	----	----
		DcmFilterConfigEntry	--	--	----	----
	2.6.22.1	dcmFCFilterNum	2.6.22:M	Yes	1-255	
	2.6.22.2	dcmFilterIndex	2.6.22:M	Yes	1-3	
	2.6.22.3	dcmFilterCriteria	2.6.22:M	Yes	OBJECT IDENTIFIER	
	2.6.22.4	dcmFilterRelation	2.6.22:M	Yes	1-8	---
		greaterThan (1)	2.6.22.4:O1	Yes/No	---	---
		lessThan (2)	2.6.22.4:O1	Yes/No	---	---
		equal (3)	2.6.22.4:O1	Yes/No	---	---
		greaterOrEqual (4)	2.6.22.4:O1	Yes/No	---	---
		lessOrEqual (5)	2.6.22.4:O1	Yes/No	---	---
		notEqual (6)	2.6.22.4:O1	Yes/No	---	---
		logicalAnd (7)	2.6.22.4:O1	Yes/No	---	---
		logicalNot (8)	2.6.22.4:O1	Yes/No	---	---
	2.6.22.5	dcmFilterValue	2.6.22:M	Yes	0-16777215	
	2.6.22.6	dcmFilterRowRelation	2.6.22:M	Yes	1-3	---
		and (1)	---	Yes/No	---	---
		or (2)	---	Yes/No	---	---
		endOfDef (3)	---	Yes	---	---
	2.6.22.7	dcmFilterConfRowAdmin	2.6.22:M	Yes	1-6	---
		active (1)	2.6.22.7:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
	2.6.23	dcmLOFTMaxNumRows	2.6.25:M	Yes	DcmMaxNumRows	---
	2.6.24	dcmLOFTCurNumRows	2.6.25:M	Yes	DcmCurNumRows	---
	2.6.25	dcmOFMTable	O	Yes/No	----	----
		DcmOFMEntry	--	--	----	----
	2.6.25.1	dcmOFMIONum	2.6.25:M	Yes	1-255	
	2.6.25.2	dcmOFMIndex	2.6.25:M	Yes	1-255	
	2.6.25.3	dcmOFMFilterNum	2.6.25:M	Yes	1-255	
	2.6.25.4	dcmOFMState	2.6.25:M	Yes	1-4	---
		other (1)	---	Yes/No	---	---
		turnOn (2)	2.6.25.4:O2	Yes/No	---	---
		turnoff (3)	2.6.25.4:O2	Yes/No	---	---
		pulse (4)	2.6.25.4:O2	Yes/No	---	---
	2.6.25.5	dcmOFMStateTime	2.6.25:M	Yes	0-16777215	
	2.6.25.6	dcmOFMRelation	2.6.25:M	Yes	1-3	
		and (1)	---	Yes/No	---	---
		or (2)	---	Yes/No	---	---
		endOfDef (3)	---	Yes	---	---
	2.6.25.7	dcmOFMRowAdmin	2.6.25:M	Yes	1-6	---
		active (1)	2.6.25.7:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
	2.7.9	dcmFSMTMaxNumRows	2.7.11:M	Yes	DcmMaxNumRows	---
	2.7.10	dcmFSMTCurNumRows	2.7.11:M	Yes	DcmCurNumRows	---
	2.7.11	dcmStudyFilterMapTable	A.7:M	Yes	----	----
		DcmStudyFilterMapEntry	--	--	----	----
	2.7.11.1	dcmSFMStudyNum	2.7.11:M	Yes	1-255	

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A.8-CONFIGURE FILTERSCONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.7.11.2	dcmSFMFilterNum	2.7.11:M	Yes	1-255	
	2.7.11.3	dcmStudyFilterRelation	2.7.11:M	Yes	1-3	---
		and (1)	---	Yes/No	---	---
		or (2)	---	Yes/No	---	---
		endOfDef (3)	---	Yes	---	---
	2.7.11.4	dcmStudyFilterMapRowAdmin	2.7.11:M	Yes	1-6	---
		active (1)	2.7.11.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---

A.20.9 Data File Setup Conformance Group

This Conformance Group is mandatory if data files formats for Binned Studies, PVR Studies, Event Studies, Log Studies, Array Parameter Studies or Logical IO Parameter Studies are required to be standardized. It identifies objects that are used to define data file formats that are mapped to the listed studies.

This Conformance Group is mandatory based on the User Requirement to have standardized data file formats (A.20-4).

A maximum of one data file structure (dcmNumFileStructures) is required to allow for a single Binned Study Data File.

A.9-DATA FILE SETUP CONFORMANCE GROUP **Status:** (A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M, A.13:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-4	2.9.1	dcmNumFileStructures	M	Yes	0-255	0-1
A.20-4	2.9.2	dcmFSTMaxNumRows	2.9.4:M	Yes	DcmMaxNumRows	DcmMaxNumRows
A.20-4	2.9.3	dcmFSTCurNumRows	2.9.4:M	Yes	DcmCurNumRows	DcmCurNumRows
A.20-4	2.9.4	dcmFileStrucTable	M	Yes	----	----
		DcmFileStrucEntry	--	--	----	----
	2.9.4.1	dcmFSFileStrucNum	2.9.4:M	Yes	1-255	1
	2.9.4.2	dcmFileStrucIndex	2.9.4:M	Yes	1-255	1-255
	2.9.4.3	dcmFileStrucOID	2.9.4:M	Yes	OBJECT IDENTIFIER	OBJECT IDENTIFIER
	2.9.4.4	dcmFileStrucRowAdmin	2.9.4:M	Yes	1-6	1
		active (1)	2.9.4.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-4	2.9.5	dcmFPTMaxNumRows	2.9.7:M	Yes	DcmMaxNumRows	1
A.20-4	2.9.6	dcmFPTCurNumRows	2.9.7:M	Yes	DcmCurNumRows	0-1
A.20-4	2.9.7	dcmFPTable	M	Yes	----	----
		DcmFPEntry	--	--	----	----
	2.9.7.1	dcmFPFileStudyIndex	2.9.7:M	Yes	1-255	1-3
	2.9.7.2	dcmFPFileStrucNum	2.9.7:M	Yes	1-255	1
	2.9.7.3	dcmFPRecInt	2.9.7:M	Yes	1-16777215	900
	2.9.7.4	dcmFPFileFreq	2.9.7:M	Yes	1-8	4
		other (1)	---	Yes/No	---	---
		eachRecInt (2)	2.9.7.4:O1	Yes/No	---	---
		hourly (3)	2.9.7.4:O1	Yes/No	---	---

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A.9-DATA FILE SETUP CONFORMANCE GROUP **Status:** (A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M, A.13:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		daily (4)	2.9.7.4:O1	Yes/No	---	---
		Midnight (5)	2.9.7.4:O1	Yes/No	---	---
		weekly (6)	2.9.7.4:O1	Yes/No	---	---
		monthly (7)	2.9.7.4:O1	Yes/No	---	---
		continuous (8)	2.9.7.4:O1	Yes/No	---	---
	2.9.7.5	dcmFPLogicalIONumber	2.9.7:M	Yes	1-255	1-255
	2.9.7.6	dcmFPRelativeAddrFlag	2.9.7:M	Yes	1-2	1-2
		disabled (1)	---	Yes	---	---
		enabled (2)	---	Yes	---	---
	2.9.7.7	dcmFPEncodingCode	2.9.7:M	Yes	1-3	3
		other (1)	---	Yes/No	---	---
		berEncoding (2)	2.9.7.7:O2	Yes/No	---	---
		oerEncoding (3)	2.9.7.7:O2	Yes/No	---	---
	2.9.7.8	dcmFPRowAdmin	2.9.7:M	Yes	1-6	1
		active (1)	2.9.7.8:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
	2.9.8	dcmDFIntegrity	O	Yes/No	0-65535	----
A.20-5	2.9.9	dcmFDSTMaxNumRows	2.9.11:M	Yes	DcmMaxNumRows	DcmMaxNumRows
A.20-5	2.9.10	dcmFDSTCurNumRows	2.9.11:M	Yes	DcmCurNumRows	DcmCurNumRows
A.20-5	2.9.11	dcmFileDirStrucTable	A.19:M	Yes	----	----
		DcmFileDirStrucEntry	--	--	----	----
	2.9.11.1	dcmFDSLogIOIndex	2.9.11:M	Yes	1-255	1-255
		dcmFDSFileNumber	2.9.11:M	Yes	1-65535	1-65535
	2.9.11.3	dcmFDSFileName	2.9.11:M	Yes	OCTET STRING	OCTET STRING
	2.9.11.4	dcmFDSStartTime	2.9.11:M	Yes	Counter	Counter
	2.9.11.5	DcmFDSEndTime	2.9.11:M	Yes	Counter	Counter
	2.9.11.6	dcmFDSFileSize	2.9.11:M	Yes	INTEGER	INTEGER
	2.9.11.7	dcmFDSDownloadFlag	2.9.11:M	Yes	1-255	1-255
	2.9.11.8	dcmFDSOpenFlag	2.9.11:M	Yes	1-4	1,2,3
		fileOpen (1)	---	Yes	---	---
		fileClosed (2)	---	Yes	---	---
		fileLocked (3)	---	Yes	---	---
		fileOpenLocked (4)	---	Yes/No	---	---
A.20-4	2.8.21	dcmDRETMaxNumRows	2.8.23:M	Yes	DcmMaxNumRows	1
A.20-4	2.8.22	dcmDRETCurNumRows	2.8.23:M	Yes	DcmCurNumRows	0-1
A.20-4	2.8.23	dcmDRETable	M	Yes	----	----
		DcmDREEntry	--	--	----	----
	2.8.23.1	dcmDREStudyNum	2.8.23:M	Yes	1-255	1-3
	2.8.23.2	dcmDREStatus	2.8.23:M	Yes	1-6	2-6
		other (1)	---	Yes/No	---	---
		Idle (2)	---	Yes	---	---
		primed (3)	---	Yes	---	---
		recording (4)	---	Yes	---	---
		validating (5)	---	Yes/No	---	---
		error (6)	---	Yes/No	---	---
	2.8.23.3	dcmDREControl	2.8.23:M	Yes	1-3	1-3
		prime (1)	---	Yes	---	---
		quitRecording (2)	---	Yes	---	---
		validate (3)	---	Yes/No	---	---
A.20-4	2.8.30	dcmDataStructureTable	M	Yes	----	----
		DcmDataStructureEntry	--	--	----	----
	2.8.30.1	dcmDSStudyNum	2.8.30:M	Yes	1-255	1-3
	2.8.30.2	dcmDataStrucIndex	2.8.30:M	Yes	1-255	1-255
	2.8.30.3	dcmStartTime	2.8.30:M	Yes	Counter	Counter
	2.8.30.4	dcmEndTime	2.8.30:M	Yes	Counter	Counter
	2.8.30.5	dcmDataNumRecords	2.8.30:M	Yes	0-16777215	0-1440
	2.8.30.6	dcmDataEncoding	2.8.30:M	Yes	1-2	2

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A.9-DATA FILE SETUP CONFORMANCE GROUP **Status:** (A.10 or A.11 or A.12 or A.14 or A.15 or A.16):M, A.13:O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		other (1)	---	Yes/No	---	---
		noEncoding (2)	---	Yes	---	---
	2.8.30.7	dcmData	2.8.30:M	Yes	OCTET STRING	OCTET STRING

A.20.10 Binned Studies Conformance Group

This Conformance Group is only required if Binned Studies need to be configured. It identifies the objects that can be used to configure Binned Studies.

This Conformance Group is necessary based on the User Requirements to configure a Binned Study (A.20-2, A.20-3).

A maximum of 3 headings (dcmMaxNumHeadings) is required, one for speed, one for length and one for lane/array.
A maximum of 96 bins is required (12 bins speed x 4 bins length x 2 bins lane/array).
A maximum of 18 rows in the dcmBinnedFilterDefTable are required (12 speed bin definitions + 4 length bin definitions + 2 lane/array bin definitions).

A.10-BINNED STUDIES CONFORMANCE GROUP **Status: O**						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-2 A.20-3	2.8.4	dcmMaxNumHeadings	M	Yes	0-255	0-3
A.20-2 A.20-3	2.8.5	dcmMaxNumBins	M	Yes	1-65535	1-96
A.20-2 A.20-3	2.8.6	dcmBFDTMaxNumRows	2.8.8:M	Yes	DcmMaxNumRows	1-18
A.20-2 A.20-3	2.8.7	dcmBFDTCurNumRows	2.8.8:M	Yes	DcmCurNumRows	1-18
A.20-2 A.20-3	2.8.8	dcmBinnedFilterDefTable	M	Yes	----	----
		DcmBinnedFilterDefEntry	--	--	----	----
	2.8.8.1	dcmBFDBinnedFilterNum	2.8.8:M	Yes	1-255	1-18
	2.8.8.2	dcmBinnedFilterIndex	2.8.8:M	Yes	1-255	1
	2.8.8.3	dcmBinHeading	2.8.8:M	Yes	OBJECT IDENTIFIER	OBJECT IDENTIFIER
	2.8.8.4	dcmBinMinimumValue	2.8.8:M	Yes	0-16777215	0-16777215
	2.8.8.5	dcmBinMaximumValue	2.8.8:M	Yes	0-16777215	0-16777215
	2.8.8.6	dcmBinNumberIndexRelation	2.8.8:M	Yes	1-3	3
		and (1)	---	Yes/No	---	---
		or (2)	---	Yes/No	---	---
		endOfDef (3)	---	Yes	---	---
	2.8.8.7	dcmBinnedFilterDefRowAdmin	2.8.8:M	Yes	1-6	1
		active (1)	2.8.8.7:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-2 A.20-3	2.8.9	dcmBSCTMaxNumRows	2.8.11:M	Yes	DcmMaxNumRows	18
A.20-2 A.20-3	2.8.10	DcmBSCTCurNumRows	2.8.11:M	Yes	DcmCurNumRows	1-18
A.20-2 A.20-3	2.8.11	dcmBinSCTable	M	Yes	----	----

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A.10-BINNED STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		DcmBinSCEntry	--	--	----	----
	2.8.11.1	dcmBSCStudyNum	2.8.11:M	Yes	1-255	1-3
	2.8.11.2	dcmBSCHeadingNum	2.8.11:M	Yes	1-255	1-18
	2.8.11.3	dcmBSCLabelNum	2.8.11:M	Yes	1-255	1-12
	2.8.11.4	dcmBSCFilterNum	2.8.11:M	Yes	1-255	1-18
	2.8.11.5	dcmBSCRowAdmin	2.8.11:M	Yes	1-6	1
		active (1)	2.8.11.5:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
	A.13	Monitor Studies Conformance Group	Binned Monitor Study:M	Yes		

A.20.11 PVR Studies Conformance Group

This Conformance Group is only required if PVR Studies need to be configured. It identifies the objects that can be used to configure PVR Studies.

This Conformance Group is necessary based on the User Requirement to configure a PVR Monitor Study (A.20-6).

A maximum of 5 rows is required to configure the PVR Study (time tag, array number, vehicle sequence number, vehicle speed and vehicle length).

The Monitor Studies Conformance Group is required to link the PVR Study to a Monitor Study (A.20-6).

A.11-PVR STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-6	2.8.12	dcmPSCTMaxNumRows	2.8.14:M	Yes	DcmMaxNumRows	5
A.20-6	2.8.13	dcmPSCTCurNumRows	2.8.14:M	Yes	DcmCurNumRows	0-5
A.20-6	2.8.14	dcmPvrStudyConfigTable	M	Yes	----	----
		DcmPvrStudyConfigEntry	--	--	----	----
	2.8.14.1	dcmPSCStudyNum	2.8.14:M	Yes	1-255	1-3
	2.8.14.2	dcmPvrStudyIndex	2.8.14:M	Yes	1-255	1-5
	2.8.14.3	dcmPvrParam	2.8.14:M	Yes	OBJECT IDENTIFIER	OBJECT IDENTIFIER
	2.8.14.4	dcmPvrStudyConfigRowAdmin	2.8.14:M	Yes	1-6	1
		active (1)	2.8.14.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-6	A.13	Monitor Studies Conformance Group	PVR Monitor Study:M	Yes		

A.20.12 Event Studies Conformance Group

This Conformance Group is only required if Event Studies need to be configured. It identifies the objects that can be used to configure Event Studies.

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This Conformance Group is necessary based on the User Requirement to configure an Event Monitor Study (A.20-7).

Since there will only be one Event Study configured, only one row is required for the dcmEventStudyConfigTable. A maximum of 8 distinct events are required, two events per loop (on and off), over four loops. Therefore dcmEventNumberSize must be a maximum of 3 bits to allow for the 8 events.

Since no timer event is used, a time stamp will be stored with each event and dcmTimerEventMaxPeriod can be ignored.

Since there is no value associated with each loop sensor event, dcmEventValueSize can be set to 0.

This device uses a timestamp of 13 bits to force the size of each sensor event to 16 bits, (3 bits for the Event number and 13 bits for the timestamp).

The Monitor Studies Conformance Group is required to link the Event Study to a Monitor Study (A.20-7).

A.12-EVENT STUDIES CONFORMANCE GROUP **Status: O**						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-7	2.8.15	dcmESCTMaxNumRows	2.8.17:M	Yes	DcmMaxNumRows	1
A.20-7	2.8.16	dcmESCTCurNumRows	2.8.17:M	Yes	DcmCurNumRows	0-1
A.20-7	2.8.17	dcmEventStudyConfigTable	M	Yes	----	----
		DcmEventStudyConfigEntry	--	--	----	----
	2.8.17.1	dcmESCStudyNum	2.8.17:M	Yes	1-255	1-3
	2.8.17.2	dcmEventNumberSize	2.8.17:M	Yes	1-255	1-3
	2.8.17.3	dcmTimerEventMaxPeriod	2.8.17:M	Yes	1-4294967296	Ignore
	2.8.17.4	dcmEventStudyConfigRowAdmin	2.8.17:M	Yes	1-6	1
		active (1)	2.8.17.4:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-7	2.8.18	DcmELIMTMaxNumRows	2.8.20:M	Yes	DcmMaxNumRows	8
A.20-7	2.8.19	dcmELIMTCurNumRows	2.8.20:M	Yes	DcmCurNumRows	1-8
A.20-7	2.8.20	dcmEventConfigTable	M	Yes	----	----
		DcmEventConfigEntry	--	--	----	----
	2.8.20.2	dcmECStudyNum	2.8.20:M	Yes	1-255	1-3
	2.8.20.3	dcmEventConfigNumber	2.8.20:M	Yes	1-255	1-8
	2.8.20.4	dcmEventNumber	2.8.20:M	Yes	0-255	0-7
	2.8.20.5	dcmECIONum	2.8.20:M	Yes	1-255	1-255
	2.8.20.6	dcmLogicalIOState	2.8.20:M	Yes	1-7	2,3
		other (1)	---	Yes/No	---	---
		on (2)	2.8.20.6:O1	Yes/No	---	---
		off (3)	2.8.20.6:O1	Yes/No	---	---
		weight (4)	2.8.20.6:O1	Yes/No	---	---
		pulsed (5)	2.8.20.6:O1	Yes/No	---	---
		triggered (6)	2.8.20.6:O1	Yes/No	---	---
		valueA-D (7)	2.8.20.6:O1	Yes/No	---	---
	2.8.20.7	dcmEventValueSize	2.8.20:M	Yes	0-255	0
	2.8.20.8	dcmTimestampSize	2.8.20:M	Yes	0-255	13
	2.8.20.9	dcmEventConfigRowAdmin	2.8.20:M	Yes	1-6	1
		active (1)	2.8.20.9:M	Yes	---	---
		notInService (2)	---	Yes/No	---	---
		notReady (3)	---	Yes/No	---	---
		createAndGo (4)	---	Yes/No	---	---
		createAndWait (5)	---	Yes/No	---	---
		destroy (6)	---	Yes/No	---	---
A.20-7	A.13	Monitor Studies Conformance Group	Event Monitor Study:M	Yes		

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A.20.13 Monitor Studies Conformance Group

This Conformance Group is only required if Monitor Studies need to be configured. It identifies the objects that can be used to configure Monitor Studies.

This Conformance Group is necessary based on the User Requirements to link a PVR Study (A.20-6) and an Event Study to a Monitor Study (A.20-7).

A maximum of two Monitor Studies are required, one PVR Monitor Study and one Event Monitor Study. Each Monitor Study will be configured for asciiData in Monitor Mode 1 (streaming) with no time delay between sending each packet. Note that this configuration is only intended for a point-to-point communications architecture since the data packets are streamed out on the communications line with no protocol.

A.13-MONITOR STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-6, A.20-7	2.8.24	dcmMETMaxNumRows	2.8.26:M	Yes	DcmMaxNumRows	1-2
A.20-6, A.20-7	2.8.25	dcmMETCurNumRows	2.8.26:M	Yes	DcmCurNumRows	0-2
A.20-6, A.20-7	2.8.26	dcmMETable	M	Yes	----	----
		DcmMEEntry	--	--	----	----
	2.8.26.1	dcmMEStudyNum	2.8.26:M	Yes	1-255	1-3
	2.8.26.2	dcmMEIONum	2.8.26:M	Yes	1-255	1-255
	2.8.26.3	dcmMEType	2.8.26:M	Yes	1-3	2
		other (1)	---	Yes/No	---	---
		asciiData (2)	2.8.26.3:O1	Yes/No	---	---
		binaryData (3)	2.8.26.3:O1	Yes/No	---	---
	2.8.26.4	dcmMETimeInterval	2.8.26:M	Yes	0-255	0
	2.8.26.5	dcmMEControl	2.8.26:M	Yes	1-4	1,2,4
		validate (1)	---	Yes/No	---	---
		enableMon1 (2)	2.8.26.5:O2	Yes/No	---	---
		enableMon2 (3)	2.8.26.5:O2	Yes/No	---	---
		disableMon (4)	---	Yes	---	---
	2.8.26.6	dcmMEStatus	2.8.26:M	Yes	1-6	2,3,4,6
		other (1)	---	Yes/No	---	---
		error (2)	---	Yes/No	---	---
		validating (3)	---	Yes/No	---	---
		monitorMode1On (4)	2.8.26.5-2:M	Yes	---	---
		monitorMode2On (5)	2.8.26.5-3:M	Yes	---	---
		Idle (6)	---	Yes	---	---
	2.8.26.7	dcmMEPollNow	2.8.26:M	Yes	OCTET STRING	OCTET STRING

A.20.14 Log Studies Conformance Group

This Conformance Group is only required if Log Studies need to be configured. It identifies the objects that can be used to configure Log Studies.

This Conformance Group is not required to address the User Requirements. Note that no selections have been indicated in the table, none of the objects will be included.

A.14-LOG STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.8.29	dcmLDRecTable	M	Yes	----	----

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A.14-LOG STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
		DcmLDReCEntry	--	--	----	----
	2.8.29.1	dcmLDTimeTag	2.8.29:M	Yes	DcmTimeTagIndex	
	2.8.29.2	dcmLDData	2.8.29:M	Yes	OCTET STRING	----

A.20.15 Array Parameter Studies Conformance Group

This Conformance Group is only required if Array Parameter Studies need to be configured. It identifies the objects that can be used to configure Array Parameter Studies.

This Conformance Group is not required to address the User Requirements. Note that no selections have been indicated in the table, none of the objects will be included.

A.15-ARRAY PARAMETER STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.8.27	dcmAPCTable	M	Yes	----	----
		DcmAPCEntry	--	--	----	----
	2.8.27.1	dcmAPCTimeTag	2.8.27:M	Yes	DcmTimeTagIndex	
	2.8.27.2	dcmAPCArrNum	2.8.27:M	Yes	1-255	
	2.8.27.3	dcmAPCType	2.8.27:M	Yes	1-8	---
		other (1)	---	Yes/No	---	---
		maxAxleSpacing (2)	2.6.13.2-2:M	Yes	---	---
		vehicleAxleRatio (3)	2.6.13.2-3:M	Yes	---	---
		singleAxleTimeout (4)	2.6.13.2-4:M	Yes	---	---
		maxVehicleLength (5)	2.6.13.2-5:M	Yes	---	---
		wimCalFactor (6)	2.6.13.2-6:M	Yes	---	---
		calFilePointer (7)	2.6.13.2-7:M	Yes	---	---
		arraySpeedCal (8)	2.6.13.2-8:M	Yes	---	---
	2.8.27.4	dcmAPCValue	2.8.27:M	Yes	1-16777215	
	2.8.27.5	dcmAPCFileName	2.8.27:M	Yes	OCTET STRING (SIZE (0-255))	

A.20.16 Logical IO Parameter Studies Conformance Group

This Conformance Group is only required if Logical IO Parameter Studies need to be configured. It identifies the objects that can be used to configure Logical IO Parameter Studies.

This Conformance Group is not required to address the User Requirements. Note that no selections have been indicated in the table, none of the objects will be included.

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A.16-LOGICAL IO PARAMETER STUDIES CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.8.28	dcmIOParamChgRecTable	M	Yes	----	---
		DcmIOParamChgRecEntry	--	--	---	---
	2.8.28.1	dcmIOPCTimeTag	2.8.28:M	Yes	DcmTimeTagIndex	
	2.8.28.2	dcmIOPCNum	2.8.28:M	Yes	1-255	
	2.8.28.3	dcmIOPCTyp	2.8.28:M	Yes	1-24	---
		other (1)	---	Yes/No	---	---
		debounce (2)	2.4.13.3-2:M	Yes	---	---
		deadtime (3)	2.4.13.3-3:M	Yes	---	---
		sensitivityGain (4)	2.4.13.3-4:M	Yes	---	---
		onThreshold (5)	2.4.13.3-5:M	Yes	---	---
		offThreshold (6)	2.4.13.3-6:M	Yes	---	---
		onHysteresis (7)	2.4.13.3-7:M	Yes	---	---
		offHysteresis (8)	2.4.13.3-8:M	Yes	---	---
		minOnTime (9)	2.4.13.3-9:M	Yes	---	---
		minOffTime (10)	2.4.13.3-10:M	Yes	---	---
		maxOnTime (11)	2.4.13.3-11:M	Yes	---	---
		maxOffTime (12)	2.4.13.3-12:M	Yes	---	---
		adOffset (13)	2.4.13.3-13:M	Yes	---	---
		scanTime (14)	2.4.13.3-14:M	Yes	---	---
		SensorLength (15)	2.4.13.3-15:M	Yes	---	---
		sensorWidth (16)	2.4.13.3-16:M	Yes	---	---
		sensorHeight (17)	2.4.13.3-17:M	Yes	---	---
		sensorDepth (18)	2.4.13.3-18:M	Yes	---	---
		sensorAngle (19)	2.4.13.3-19:M	Yes	---	---
		ioCal (20)	2.4.13.3-20:M	Yes	---	---
		frequency (21)	2.4.13.3-21:M	Yes	---	---
		memoryWrap (22)	2.4.13.3-22:M	Yes	---	---
		dataStorageMediaAvailable (23)	2.4.13.3-23:M	Yes	---	---
		dataStorageMediaUsed (24)	2.4.13.3-24:M	Yes	---	---
	2.8.28.4	dcmIOPCVal	2.8.28:M	Yes	INTEGER	

A.20.17 Global Time Management Conformance Group

This Conformance Group is optional. It identifies objects that are required to process date and time.

This Conformance Group is necessary based on the User Requirement to set the date and time (A.20-8).

A.17-GLOBAL TIME MANAGEMENT CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1201 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
	2.4.1	globalTime	O	Yes/No	counter	
	2.4.2	globalDaylightSavings	O	Yes/No	1-19	
	2.4.6	controller-standardTimeZone	O	Yes/No	-43200-43200	
A.20-8	2.4.7	controller-localTime	M	Yes	counter	counter

A.20.18 STMF Conformance Group

This Conformance Group is optional. It identifies a standard mechanism that is used to manipulate the objects.

This Conformance Group is necessary based on the User Requirement to be able to configure the objects in a standard manner to meet the interoperability and interchangeability goals (A.20-9).

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A.18-STMF CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-9	2301	SNMP	M	Yes		
	2301	STMP	X	No		

A.20.19 FTP Conformance Group

This Conformance Group is optional. It identifies a standard mechanism that is used to download the data files that are created by configured traffic studies.

This Conformance Group is necessary based on the User Requirements to download the data files in a standard way (A.20-5) and to meet the interoperability and interchangeability goals (A.20-9).

A.19-SITE INFO CONFORMANCE GROUP Status: O						
U.R. Clause	**NTCIP 1206 Clause**	**Object Name**	**Object Status**	**Object Support**	**Allowed Values**	**Supported Values**
A.20-5, A.20-9	2303	FTP	O	Yes/No		

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ANNEX B
Tree Structure Tables

(Informative)

This section is included as a visual guide for each table defined in this standard.

B.1 Vehicle Criteria Node (see Section 2.3)

VEHICLE CRITERIA TABLE (SEE SECTION 2.3.1)		
Veh Criteria Index (index 1)	Veh Criteria OID	Veh Criteria Support BitMap

B.2 Device Setup Node (see Section 2.4)

IO BOARD CONFIGURATION TABLE (SEE SECTION 2.4.7) (one entry for each board in unit)						
IO Board # (index 1)	IO Board Function (Index 2)	Number Of IO (on this board)	IO Board Function Type	IO Board Description	IO Board Status	IO Board Control

PHYSICAL TO LOGICAL IO MAPPING TABLE (SEE SECTION 2.4.10) (one entry for each physical IO)					
IO Board # (index 1)	IO Board Function (index 2)	Physical IO # (index 3)	Logical IO #	Physical IO Status	Physical IO Control

LOGICAL IO PARAMETER TABLE (SEE SECTION 2.4.13) (one or more entries for each IO parameter)			
Logical IO (index 1)	IO Parameter Type (index 2)	IO Parameter Value	IO Parameter Row Admin

B.3 Operating Status Configuration Node (see Section 2.5)

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TABLE CLEAR TABLE (SEE SECTION 2.5.4)			
Table Clear Index (index 1)	Table Clear OID	Table Clear Action	Table Clear Row Admin

USER RESET CONFIG TABLE (SEE SECTION 2.5.8)			
User Reset Configuration Index (index 1)	User Reset Table OID	User Reset Config Table Action	User Reset Config Row Admin

OBJECT CHANGE ID TABLE (SEE SECTION 2.5.11)			
Object Change ID Table (index 1)	Object Change ID Table OID	Object Change ID Table Time	Object Change ID Row Admin

B.4 Site Setup Node (see Section 2.6)

LOGICAL IO TO ARRAY MAPPING TABLE (SEE SECTION 2.6.9) (one entry for each IO mapped to an array)					
Array # (Index 1)	Logical IO # (Index 2)	IO Spacing	IO Position	IO Functionality	Array Mapping Table Row Admin

ARRAY PARAMETER TABLE (SEE SECTION 2.6.13) (one or more entries for each parameter per array)				
Array # (Index 1)	Array Parameter Type (Index 2)	Array Parameter Value	Array Parameter File Name Pointer	Array Parameter Table Row Admin

ARRAY SPEED CALIBRATION TABLE (SEE SECTION 2.6.16)			
First Logical IO Number (index 1)	Second Logical IO Number (index 2)	Array Speed Calibration Factor	Array Speed Calibration Row Admin

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FILTER CONFIGURATION TABLE (SEE SECTION 2.6.22) (one or more entries per filter)						
Filter # (index 1)	Filter Index (index 2)	Filter Criteria	Filter Relation	Filter Value	Filter Row Relation	Filter Configuration Row Admin

LOGICAL OUTPUT TO FILTER MAPPING TABLE (SEE SECTION 2.6.25)						
Logical IO # (Index 1)	Output Filter # (Index 2)	Filter #	Output State	Ouput State Time	Output Filter Map Relationship	Output Filter Map Row Admin

B.5 Study Setup Node (see Section 2.7)

STUDY CONFIGURATION TABLE (SEE SECTION 2.7.5) (one entry per study)							
Study # (Index 1)	Study Type	Study Start Type	Study Start Date/Time	Study End Type	Study End Date/Time	Study File Index #	Row Admin

ARRAY TO STUDY MAPPING TABLE (SEE SECTION 2.7.8) (can be many entries per study)			
Study # (Index 1)	Array # (Index 2)	Study to Array Enable	Row Admin

FILTER TO STUDY MAPPING TABLE (SEE SECTION 2.7.11) (can be many entries for each array)			
Study # (Index 1)	Filter # (Index 2)	Study to Filter Mapping Relationship	Row Admin

B.6 Study Data Setup Node (see Section 2.8)

BINNED FILTER DEFINITION TABLE (SEE SECTION 2.8.8)

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Binned Filter # (index 1)	Binned Filter (index 2)	Bin Heading	Bin Minimum Value	Bin Maximum Value	Bin # to Index Relationship	Row Admin

BINNED STUDY CONFIGURATION TABLE (SEE SECTION 2.8.11) (can be many entries for each Study/Bin to define)				
Study # (Index 1)	Heading # (Index 2)	Bin Label # (Index 3)	Binned Filter # Index	Row Admin

PVR STUDY CONFIGURATION TABLE (SEE SECTION 2.8.14)			
Study # (index 1)	PVR Study (index 2)	PVR Parameter OID	Row Admin

EVENT STUDY CONFIGURATION TABLE (SEE SECTION 2.8.17)			
Study # (index 1)	Event # Size	Timer Event Maximum Period	RowAdmin

EVENT TO LOGICAL IO MAPPING TABLE (SEE SECTION 2.8.20)							
Study # (index 1)	Event Config # (index 2)	Event #	Logical IO #	Logical IO State	Event Value Size	Timestamp Size	Row Admin

DATA RECORDING ENABLE TABLE (SEE SECTION 2.8.23)		
Study # (index 1)	Data Recording Enable Status	Data Recording Control

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1)	Monitor Enable IO Number	Monitor Enable Type	Monitor Enable Time Interval	Monitor Enable Control	Monitor Enable Status	Monitor Enable Poll Now

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ARRAY PARAMETER CHANGE RECORDTABLE (SEE SECTION 2.8.27) (Defines a record format for Array Parameter changes to be encoded in the 'Data' column of the dcmDataStructureTable)				
Time Tag (index 1)	Array #	Array Parameter Type	Array Parameter Value	Array Parameter File Name Pointer

LOGICAL IO PARAMETER CHANGE RECORD TABLE (SEE SECTION 2.8.28) (Defines a record format for Logical IO Parameter changes to be encoded in the 'Data' column of the dcmDataStructureTable)			
Time Tag (index 1)	Logical IO Number	IO Parameter Type	IO Parameter Value

LOG DATA RECORD TABLE (SEE SECTION 2.8.29)	
TimeTag (index 1)	Log Data

DATA STRUCTURE TABLE (SEE SECTION 2.8.30)						
Study # (index 1)	Data Structure (index 2)	Start Date/Time	End Date/Time	# Of Records	Data Encoding	Data

B.7 File Setup Node (see Section 2.9)

FILE STRUCTURE TABLE (SEE SECTION 2.9.4)			
File Structure # (index 1)	File Structure Index (index 2)	File Structure Table OID	File Structure Table Row Admin

FILE PARAMETER TABLE (SEE SECTION 2.9.7)							
Study File Index # (index 1)	File Structure # (index 2)	File Recording Interval	File Recording Frequency	Logical IO #	Relative Address Flag	File Encoding Code	File Parameter Table Row Admin

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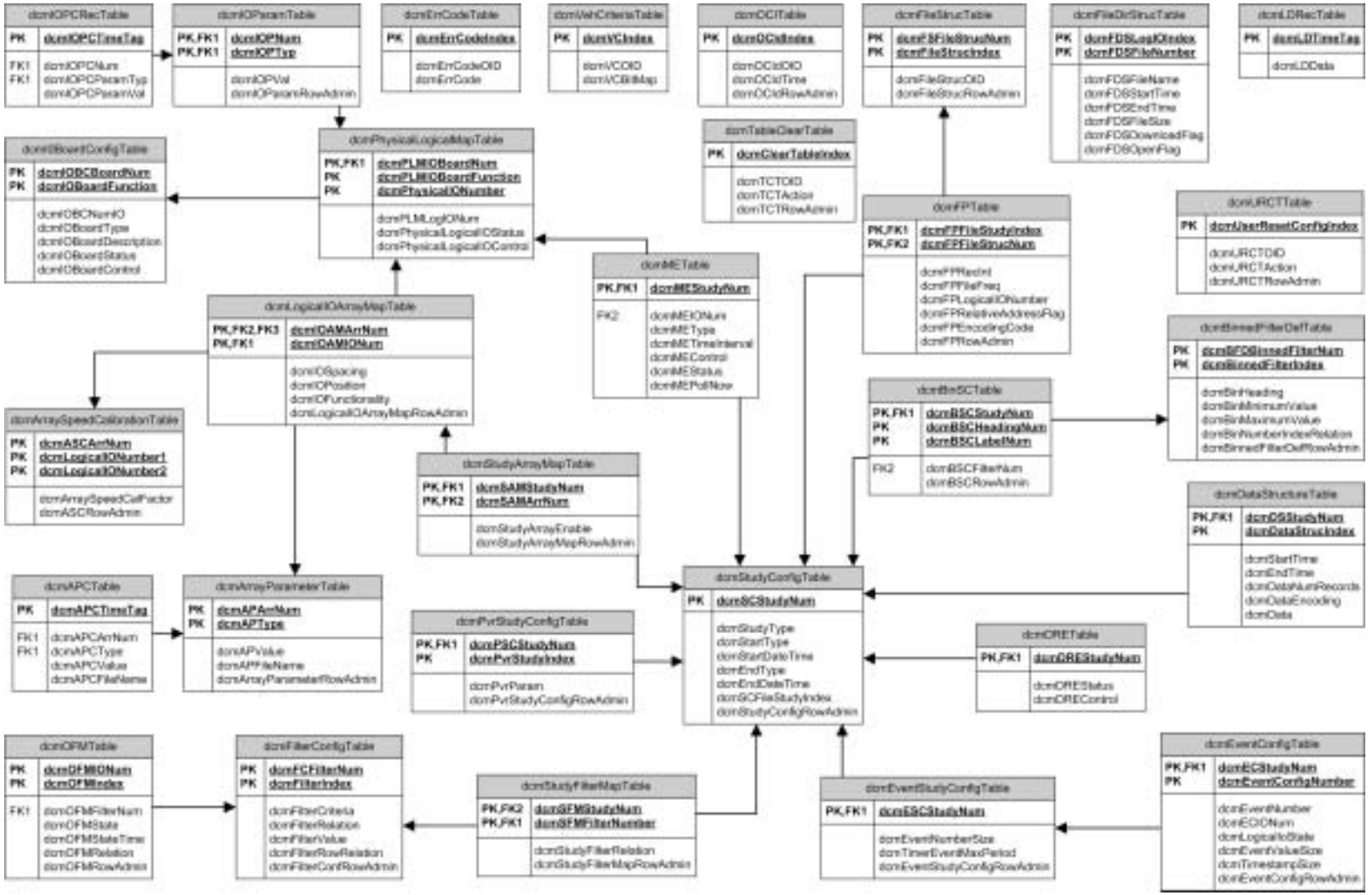
FILE DIRECTORY STRUCTURE TABLE (SEE SECTION 2.9.11)							
Logical IO # (index 1)	File # (index 2)	File Name	Start Date/Time	End Date/Time	File Size	File Download Flag	Open Flag

B.8 Error Logging Node (see Section 2.10)

DCM ERROR CODE TABLE (SEE SECTION 2.10.3)		
Error Code Index (index 1)	Error Code OID	Error Code

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B.9 Table ER (Entity Relationship) Diagram



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ANNEX C
EXAMPLES

C.1 HOW TO CONFIGURE A DCM DEVICE (INFORMATIVE)

This section describes a recommended path to configure a dcm device. All of the examples in this annex follow this recommended path.

You will need to know the following information before you begin:

- The physical sensor configuration at the site:
- Number of sensor arrays
- Sensor configuration for each lane
- Sensor spacing and sizes for each array

It is recommended to process objects in the following order:

C.1.1 DETERMINE DEVICE CAPABILITIES

1.1.1. Read IO Board Configuration Table
1.1.2. Read Physical to Logical IO Mapping Table
1.1.3. Read Vehicle Criteria Table

C.1.2 CONFIGURE SITE INFORMATION

1.2.1. Set Date/Time
1.2.2. Set Unique Site ID
1.2.3. Set Site Description
1.2.4. Set the Logical IO to Array Mapping Table to reflect the physical sensor configuration at the site.

C.1.3 CONFIGURE GENERAL STUDY

1.3.1. Read the Max Number Of Studies Object
1.3.2. Set an entry in the Study Configuration Table for each required study.
1.3.3. Map sensor arrays to the desired study in the Array To Study Mapping Table.
1.3.4. Configure the data file for each study:
1.3.4.1. Set Study Configuration Table
1.3.4.2. Set File Parameter Table
1.3.4.3. Set File Structure Table

C.1.4 CONFIGURE STUDY DETAILS

1.4.1. Configure Filters

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1.4.1.1. Set Filter Configuration Table
1.4.1.2. Set Logical Output To Filter Mapping Table
1.4.1.3. Set Filter to Study Mapping Table
1.4.2. For Binned Studies:
1.4.2.1. Set Binned Filter Definition Table
1.4.2.2. Set Bin Relation Table
1.4.3. For PVR Studies:
1.4.3.1. Set PVR Study Configuration Table
1.4.4. For Event Studies:
1.4.4.1. Set Event To Logical IO Mapping Table
1.4.4.2. Set Event Study Configuration Table

C.1.5 VERIFY SYSTEM IS WORKING

1.5.1. Configure and start an Event Monitor Study:
1.5.1.1. Configure Event Monitor Study in Study Configuration Table
1.5.1.2. Event To Logical IO Mapping Table
1.5.1.3. Event Study Configuration Table
1.5.1.4. Set Monitor Enable Table to validate study.
1.5.1.5. Set Monitor Enable Table to start study.
1.5.2. Set IO Calibration Parameters to fine-tune:
1.5.2.1. Read the Logical IO Parameter Table
1.5.2.2. Verify all sensors inputs are being received correctly by the device by analyzing the sequence of sensor strikes reported by the dcm device.
1.5.2.3. Make any adjustments to sensors in IO Calibration Parameter Table.
1.5.3. Stop and delete Event Monitor Study
1.5.3.1. Stop the Event Monitor in Monitor Enable Table.
1.5.3.2. Delete the Event Monitor Study by using the RowAdmin column in the Study Configuration Table.
1.5.4. Configure and start a Vehicle Monitor Study:
1.5.4.1. Configure a Vehicle Monitor Study in Study Configuration Table
1.5.4.2. Set PVR Study Configuration Table
1.5.4.3. Set Monitor Enable Table to validate study
1.5.4.4. Set Monitor Enable Table to start study
1.5.5. Set Array Parameters to fine-tune:
1.5.5.1. Read the Array Parameter Table and the Array Speed Calibration Table
1.5.5.2. Verify that vehicle parameters look reasonable.
1.5.5.3. Make any adjustments to the sensor array in the Array Parameter Table and Array Speed Calibration Table.
1.5.6. Stop and delete the Vehicle Monitor Study
1.5.6.1. Stop the Vehicle Monitor Study in the Monitor Enable Table.
1.5.6.2. Delete the Vehicle Monitor Study by using the RowAdmin column in the Study Configuration Table.

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C.1.6 START EACH STUDY

1.6.1. Validate each study configuration by setting the ‘control’ field in the Study Enable Table to ‘validate configuration now’ and verify there are no errors.
1.6.2. Start each study by setting the ‘control’ field in the Study Enable Table to ‘go to primed’.

C.1.7 COLLECT DATA

1.7.1. Download the File Directory Structure Table to get a listing of all files in the dcm device.
1.7.2. Use FTP to download the specified file.
1.7.3. Mark the specified file as being downloaded by setting the ‘downloaded flag’ for the specified file in the File Directory Structure Table.
1.7.4. The downloaded file can be interpreted as per the file encoding defined in this standard (see Annex C.2).

C.2 DCM DATA FILE STRUCTURE (NORMATIVE)

The main service of a dcm device is to produce data files as defined by user-configurable studies.

C.2.1 CONFIGURING A DCM DEVICE TO CREATE DATA FILES

The following steps should be followed to produce data files on a dcm device:

1. Configure a study for each type of data required (binned data, pvr data, event data, array parameter data, logical IO parameter data or log data).
2. Configure one or more data file structures that define the desired header data to be written to the data file, the recording interval and the frequency of the data file.
3. Map each study to a data file structure (note that one or more studies may be mapped to the same data file structure).
4. Enable each study.

C.2.2 TRANSFERRING DATA FILES FROM A DCM DEVICE TO A CENTRAL APPLICATION

The following steps should be followed to transfer data files from a dcm device to a central application:

1. Read the File Directory Structure Table to get a listing of all data files in the dcm device (note that the FTP directory command is not being used as it was determined that the directory listing output format for each file may not be consistent over the various implementations of FTP).
2. **NOTE THAT IF THE FILE TO DOWNLOAD IS BEING WRITTEN TO A WRITE-ONCE BEFORE ERASING STORAGE MEDIA (SUCH AS FLASH), AND THE FILE HAS NOT BEEN CLOSED, THE FILE MAY NOT BE ABLE TO BE DOWNLOADED SINCE IT MAY NOT BE POSSIBLE TO CHANGE THE REQUIRED SIZE FIELDS IN THE DATA FILE DUE TO THE STORAGE MEDIA.**
   The File Open Flag in the File Directory Structure Table shall indicate ‘fileOpenLocked’ if this is the case.
3. Transfer the desired data file/s using FTP.
4. Set the desired bit of the File Download Flag column in the File Directory Structure Table for the specified data file/s that were transferred.

   This is an administrative policy issue in that the agency that owns the dcm equipment should direct each central application that needs to download data files from the dcm equipment as to which bit/s they are assigned to set in the File Download Flag.

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This field is typically used by applications to determine if a data file has already been downloaded to facilitate an automated process of downloading only "new" data files (not previously downloaded) typically known as auto-polling.

5. If the dcm Data File Integrity Object was included with the data file, it can be used to verify the contents of the transferred data file.

The dcm data files can be deleted via ftp commands.

To format a specified storage media, perform a reset of that media in the IO Board Configuration Table.

C.2.3 DCM DATA FILE STRUCTURE

Each dcm data file is defined by the following ASN.1 notation:

```
dcmDataFile ::= SEQUENCE
{
 dcmMibVersionNumber-oid     OBJECT IDENTIFIER,
 dcmMibVersionNumber-value   INTEGER,
 DataFileHeader              SEQUENCE OF OidValuePair1,
 DataFileData                OidValuePair2
}
```

Notes:

1. The dcmMibVersionNumber-oid must be specified using a full OID address, relative OID addressing cannot be used.
2. The 'DataFileHeader' field shall be repeated for each object (table or single object) specified by the OID column in the dcmFileStrucTable and in the same order (based on row number). The OID's specified in the dcmFileStrucTable may be from the dcm MIB or any other external MIB.

   However, at any point, the agent may insert a new 'Relative OID Address' object into the sequence. If a 'Relative OID Address' object is encountered, all OID's (from that point forward) in the OID section of the OidValuePair1 will be relative to the value of the 'Relative OID Address' object (e.g. the OID will be shortened).

   For data files that are encoded using BER (as selected in the dcmFPTable), the 'DataFileHeader' field may also contain objects that have not been specified in the dcmFileStrucTable. This allows for flexibility of implementation-specific functionality to be added in a defined manner as these objects can be skipped over (by the central application) since the size of the OID and the size of the object structure are defined in the encoding. Data files encoded using OER shall not contain objects that have not been specified in the dcmFileStrucTable (except for the 'Relative OID Address' object as stated above) since OER encoding does not specify the length of every object type.
3. The 'DataFileData' field shall contain a single OID/Value pair consisting of only the dcmDataStructureTable. Note that this object will always be included in each dcm data file and does not need to be specified in the dcmFileStrucTable.

   There shall be at least one row created in the dcmDataStructureTable for each study that is mapped to this data file for each recording interval for Binned, PVR, Event and Log Studies. Array Parameter Changes and Logical IO Parameter Changes shall be written to the data file as a row in this table each time one of the specified parameters changes (either manually or automatically).
   Note that one or more Parameter Change Records may be stored in the data field of this row (as specified by the number of records field in this row).

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Each row of the dcmDataStructureTable can be conceptualized as a data record for the specified study. Note that the rows are not required to be sequential by 'Study Number' (the first index into this table), however they shall be sequential by 'Data Structure Index' (the 2nd index into this table). For example, if two studies are included in this data file and each study contains two rows, the following sequence of rows would be valid ([(1,1)(1,2)(2,1)(2,2)], [(2,1)(2,2)(1,1)(1,2)], [(1,1)(2,1)(1,2)(2,2)], [(2,1)(1,1)(2,2)(1,2)], [(1,1)(2,1)(2,2)(1,2)]). [(1,2)(1,1)(2,2)(2,1)] would be an invalid sequence.

The 'Data' column in the dcmDataStructureTable (in the 'DataFileData' field) contains the actual recorded data as defined by:

1. Binned Data = Binned Filter Definition Table, Binned Study Configuration Table
2. PVR Data = PVR Study Configuration Table Event Data = Event Study Configuration Table, Event To Logical IO Mapping Table
3. Event Data = Event Study Configuration Table, Event To Logical IO Mapping Table
4. Array Parameter Change Data=Array Calibration Change Record Table
5. Logical IO Parameter Change Data=Logical IO Calibration Change Record Table
6. Log Data=Log Data Record Table

```
OidValuePair1 ::= SEQUENCE
{
  oid1    OID.&oid,
  value1 OID.&syntax
}
```

Notes:

1. oid1 = the OID of any object (table or single object) from any MIB and may be specified using relative OID addressing.
2. value1 = the OER or BER encoding (as selected in the dcmFPTable) of the value of the object referenced by oid1.
3. For tables with multiple rows, the oid shall be stored with each row of the specified table (for example [(TableOid1,Row 1),(TableOid1,Row 2)…(TableOid1,Row n)].
4. The value and order of the oid1/value1 pairs shall follow the same order as the oid's specified in the OID column of the dcmFileStrucTable (based on row number) with the exception of the dcmRelativeAddrOid object or any implementation-specific objects which may be inserted by the agent at any point in the DataFileHeader sequence (typically the dcmRelativeAddrOid object would be used to optimize file size by shortening the encoding of each OID from that point forward (including the 'DataFileData' field), note that implementation-specific objects may only be inserted if BER encoding is used as described above).
5. Only the rows specific to the studies mapped to each data file shall be stored for each specified table. All columns shall be stored with each table row (e.g. all columns are mandatory for each table).

```
OidValuePair2 ::= SEQUENCE
{
 oid2     OID.&oid,
 value2 SEQUENCE OF OID.&syntax
}
```

Notes:

1. oid2 = the OID of the dcmDataStructureTable.

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2. If there are multiple rows in this table, the oid shall only be stored once followed by each row of the table in sequence (for example [(TableOid1,Row 1, Row 2,… Row n)].
3. value2 = the OER or BER encoding (as selected in the dcmFPTable) of each row in the dcmDataStructureTable (note that value2 may contain the encodings for one or more rows). There shall be at least one row created in the dcmDataStructureTable for each study that is mapped to this data file for each recording interval for Binned, PVR, Event and Log Studies. Array Parameter Changes and Logical IO Parameter Changes shall be written to the data file as a row in this table each time one of the specified parameters changes (either manually or automatically). Note that one or more Parameter Change Records may be stored in the data field of this row (as specified by the number of records field in this row).

   A “NULL” data record can be stored by setting the number of records field in this row to 0 and setting the data field to an OCTET STRING of length 0 octets. This may be required to indicate that although the device was recording data for the period specified between the start date/time and end date/time for the study specified in this row of the Data Structure Table, there were no vehicles that had traversed the sensor arrays and therefore no actual data was recorded.

There are two ways to reduce data file overhead:

1. Relative OID Addressing – reduces the overhead of each OID (in the OID field of OidValuePair1 and OidValuePair2) specified after this object is encountered.
2. OER Encoding – an encoding scheme that reduces the number of octets required to represent data relative to BER encoding.

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C.2.4 DCM DATA FILE ENCODING TABLE

The following table shows the BER and OER encoding of a basic dcm data file. Refer to the examples included in this document for more detail on the encoding of objects in a dcm data file.

ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 (len=2+2+b+2+1+2+9d=b1)	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 (09=dcm node) (0a=dcmMibVersionNumber)	0b 2b 06 01 04 01 89 36 04 02 (09=dcm node) (0a=dcmMibVersionNumber)
dcmMibVersionNumber-value	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 (len=2+9b=9d)	
OidValuePair1::=SEQUENCE	30 (len=2+2+b+2+a+2+7e=9b)	
oid1 (dcmRelativeAddrOID)	06 0b 2b 06 01 04 01 89 36 04 02 (09=dcm node) (09=dcmRelativeAddrOID)	0b 2b 06 01 04 01 89 36 04 02 (09=dcm node) (09=dcmRelativeAddrOID)
value1 (set to dcm node)	06 0a 2b 06 01 04 01 89 36 04 02 (09=dcm node)	0a 2b 06 01 04 01 89 36 04 02 (09=dcm node)
DataFileData::=		
OidValuePair2::=SEQUENCE	30 (len=2+2+2+2+76=7e)	
oid2 (dcmDataStructureTable)	06 02 (06=dcmStudyDataSetup Node) (1e=dcmDataStructureTable)	02 (06=dcmStudyDataSetup Node) (1e=dcmDataStructureTable)
value2::=SEQUENCE OF	30 (len=2+2+38+2+38=76)	(02=# of rows)
SEQUENCE (row 1,1)	30 38	
dcmDSStudyNum	02 01 01	01
dcmDataStrucIndex	02 01 01	01
dcmStartTime	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords	02 01 01	00 00 01
dcmDataEncoding	02 01 02	02
dcmData Binned Data, or PVR Data, or Event Data, or Array Parameter Change, or Logical IO Parameter Change, or Log Data	04 (1e=LenData) (DataOctet1) (DataOctet2)…(DataOctet1e)	(1e=LenData) (DataOctet1) (DataOctet2)…(DataOctet1e)
SEQUENCE (row 1,2)	30 38	
dcmDSStudyNum	02 01 01	01
dcmDataStrucIndex	02 01 02	02
dcmStartTime	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords	02 01 01	00 00 01
dcmDataEncoding	02 01 02	02

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dcmData Binned Data, or PVR Data, or Event Data, or Array Parameter Change, or Logical IO Parameter Change, or Log Data	04 (1e=LenData) (DataOctet1) (DataOctet2)…(DataOctet1e)	(1e=LenData) (DataOctet1) (DataOctet2)…(DataOctet1e)
TOTAL NUMBER OF OCTETS REQUIRED(not part of the data file):	(2+9d=9f(hex)=159(dec))	(72(hex)=114(dec))

Table Notes:

1. Object names have been used in the encoding of the last sub-identifier for each OID.
2. All encodings in this table represent an octet in hexadecimal.
3. (?? ?? ?? ??) is used to denote a generic value for all date/time fields.
4. The table shows only one object in the 'DataFileHeader' field (the dcm Relative OID Address object), typically there would be more objects stored in this section.
5. The table shows only two rows of the dcmDataStructureTable in the 'DataFileData' field. Refer to the examples in this standard for more detailed encoding of the 'Data' column in the dcmDataStructureTable for each type of data (binned, pvr and event).
6. The Data column (dcmData) would only contain one of the listed types of data (Binned Data, PVR Data, Event Data, Array Parameter Change Data, Logical IO Parmeter Change Data or Log Data).

dcm Data File Note: In order to properly decode a dcm data file, it is recommended to store a copy of the version of the dcm MIB that was used in the dcm device that created the dcm data file at the central application location (the dcm MIB version number is stored with each dcm data file created).

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C.3 EXAMPLES (INFORMATIVE)

The following sections contain examples for configuring a dcm device for a Binned Study, a PVR Study and an Event Study. Each of these sections follow the guidelines in the 'How To Configure A DCM Device' section(C.1).

C.3.1 BINNED STUDY EXAMPLE (INFORMATIVE)

In this example, we have a dcm device on a two lane roadway with two loops and a piezo in each direction (see diagram below). The counter has been set up to collect vehicle classification data into 15 bins on an hourly basis by lane. A second study has been set up to collect volume only data over the entire roadway level for a specified 48 hour time period.

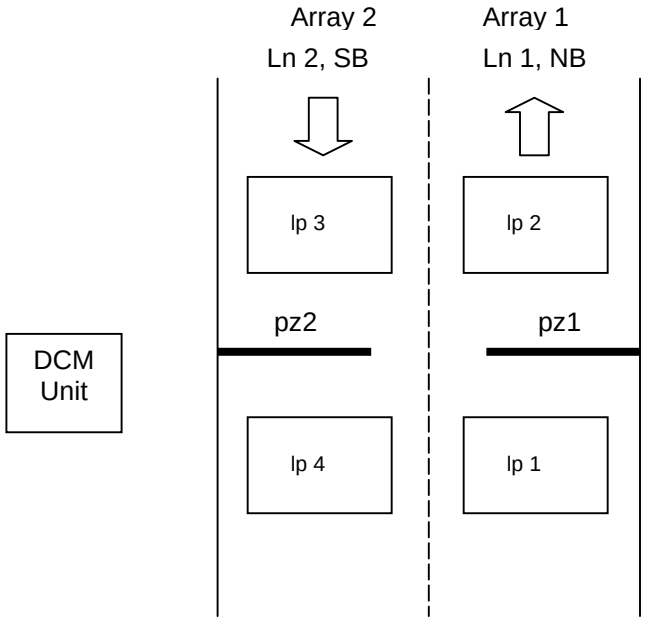


Figure C-1: Binned Study Sensor Array

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C.3.1.1 Determine Device Capabilities

Read the IO Board Configuration Table to determine the capabilities of the device. This device is fitted with 3 IO boards (cpu/memory/comms, loop detector board, piezo board). The status of suspended indicates that the board is available, but currently not required to be used based on the current device study configuration. There are 6 sensor inputs required to configure the two specified sensor arrays (2 piezos and 4 loops). The IO Board Configuration Table indicates that there is a sufficient number and type of sensors available (4 piezos and 4 loops) to configure the desired sensor arrays.

IO Board Configuration Table						
IO Board # (index 1) RO	IO Board Function (index 2) RO	Number Of IO R/O	IO Board Function Type R/O	Mfg. IO Board Description R/O	IO Board Status R/O	IO Board Control R/W
1	1	1	2 (cpu)	2.24Mhz CPU	1 (enabled)	2 (enable)
1	2	1	3 (storageMedia)	3.5MB SRAM	1 (enabled)	2 (enable)
1	3	1	6 (comms)	rs232 comms channel	1 (enabled)	2 (enable)
2	1	4	11 (loop)	Loop Detector with 4 channels	5 (suspended)	5 (suspend)
3	1	4	10 (piezo)	Piezo Interface with 4 channels	5 (suspended)	5 (suspend)

Physical loop 1 (lp 1) is connected to Physical IO # 1 of IO Board # 2 of the dcm device and is mapped to Logical IO # 3. Note that this mapping was assigned by the dcm device. Logical IO # 3 will be used by the dcm device to refer to physical loop 1 (lp 1) in all other tables. All other IO's are mapped the same way within this table. Note that the cpu function (IO Board 1, IO Board Function 1, IO Board Function Type=cpu) is not mapped to a logical IO since it is not used in configuring the studies.

Physical to Logical IO Mapping Table					
IO Board # (index 1) RO	IO Board Function (index 2) RO	Physical IO # (index 3) RO	Logical IO # R/O	IO Status R/O	IO Control R/W
1	2	1 (storageMedia)	1	1 (enabled)	2 (enable)
1	3	1 (comms)	2	1 (enabled)	2 (enable)
2	1	1 (lp1)	3	5 (suspended)	5 (suspend)
2	1	2 (lp2)	4	5 (suspended)	5 (suspend)
2	1	3 (lp3)	5	5 (suspended)	5 (suspend)
2	1	4 (lp4)	6	5 (suspended)	5 (suspend)
3	1	1 (pz1)	7	5 (suspended)	5 (suspend)
3	1	2 (pz2)	8	5 (suspended)	5 (suspend)
3	1	3	9	5 (suspended)	5 (suspend)
3	1	4	10	5 (suspended)	5 (suspend)

Read the Vehicle Criteria Table to determine which vehicle criteria are supported by this device to configure Binned Studies. This device supports (Number of Axles, Vehicle Class, Axle Spacing and Array Number for Binned Studies).

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For the sake of summary, the entire Vehicle Criteria Table has not been shown.

VEHICLE CRITERIA TABLE		
Veh Criteria Index (index 1) RO	Veh Criteria OID R/O	Veh Criteria Support BitMap R/O
1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,05) (Number Of Axles, dcmNumAxles)	&h(02) (binnedStudy)
2	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	&h(02) (binnedStudy)
3	&h(2B,06,01,04,01,89,36,04,02,dcm,01,0B) (Axle Spacing, dcmAxleSpacing)	&h(02) (binnedStudy)
4	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number, dcmIOArrNum)	&h(02) (binnedStudy)
…	…	…

C.3.1.2 Configure Site Information

Set the device date/time (Controller Local Time Object)

Set the device unique site ID (Unique Site ID Object)

Set the device site description (Maximum Length of Site Description Object, Site Description Object)

Configure the required sensor arrays in the Logical IO to Array Mapping Table:
In our example, we are establishing two arrays that correspond to the two lanes being monitored. Array one will use loop 1, piezo 1, and loop 2 (logical IO's 3, 7, and 4 respectively) and array two will use loop 3, piezo 2, and loop 4 (logical IO's 5, 8, and 6 respectively). The spacing between the two loops in each array will be 16 feet from leading edge to leading edge. The piezo axle sensor will be located 8 foot from the leading edge of the first loop in the sensor array.

Logical IO to Array Mapping Table					
Array # (index 1) RO	Logical IO # (index 2) RO	IO Spacing RW	IO Position RW	IO Functionality RW	Row Admin R/W
1	3 (lp 1)	0	3 (center)	2 (vehiclePresence)	1 (active)
1	7 (pz 1)	2438 mm (8 ft)	2 (full)	3 (axle)	1 (active)
1	4 (lp 2)	4877 mm (16 ft)	3 (center)	2 (vehiclePresence)	1 (active)
2	5 (lp 3)	0	3 (center)	2 (vehiclePresence)	1 (active)
2	8 (pz 2)	2438 mm (8 ft)	2 (full)	3 (axle)	1 (active)
2	6 (lp 4)	4877 mm (16 ft)	3 (center)	2 (vehiclePresence)	1 (active)

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C.3.1.3 Configure General Study

Read the Current Number of Studies: 0 (if this was non-zero, either the existing studies would have to be removed from the Study Configuration Table by using the Row Admin column in the Study Configuration Table or the next available sequential study # would be used.)

Read the Maximum Number of Studies: 3 (2 studies are required)

Configure the Study Configuration Table:
The Study Configuration Table is set up with two studies: a binned study that will collect vehicle classification data continuously into daily data files and another binned study that will collect volume data for a specified 48 hour time period into a single data file.

Study Configuration Table							
Study # (index 1) RO	Study Type R/W	Study Start Type R/W	Study Start Date / Time R/W	Study End Type R/W	Study End Date / Time R/W	Study File Index # R/W	Row Admin R/W
1	2 (binned)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)
2	2 (binned)	4 (dateTime)	09/05/2001 00:00	4 (dateTime)	09/07/2001 00:00	2	1 (active)

Configure Array To Study Mapping Table:
Assigns array 1 and array2 to study 1 and to study 2.

Array to Study Mapping Table			
Study # (index 1) RO	Array # (index 2) RO	Study to Array Enable R/W	Row Admin R/W
1	1	1 (enable)	1 (active)
1	2	1 (enable)	1 (active)
2	1	1 (enable)	1 (active)
2	2	1 (enable)	1 (active)

Configure the File Parameter Table:
The File Parameter Table relates a study to a file structure defined in the File Structure Table and defines how that file will be stored. Study 1 is in one hour intervals (3600 seconds) and will output one file per day (File Recording Frequency is set to daily) to on-board memory (logical IO 1). Study 2 is in 15 minute intervals (900 seconds) and will output just one file for the entire study (File Recording Frequency is set to continuous). Both of the studies will be mapped to file structure # 1, use relative addressing and OER encoding.

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File Parameter Table							
Study File Index # (index 1) RO	File Structure # (index 2) RO	File Recording Interval RW	File Recording Frequency R/W	FP Logical IO # R/W	Relative Address Flag	File Encoding Code	Row Admin
1	1	3600 seconds (60 minutes)	4 (daily)	1 (3.5MB SRAM)	2 (enabled)	3 (oer)	1 (active)
2	1	900 seconds (15 minutes)	8 (continuous)	1 (3.5MB SRAM)	2 (enabled)	3 (oer)	1 (active)

Configure the File Structure Table:
The File Structure Table defines the objects that will be stored in the data file. This includes the items that would be considered header items and any other pertinent objects that are needed to interpret the data. In this example, both studies will store the Study Configuration Table, the File Parameter Table, the Unique SiteId, the Binned Filter Definition Table, and the Binned Study Configuration Table. Note that the dcm MIB Version Number (dcmMibVersionnumber) and the required data packets (encoded and stored as the Data Structure Table (dcmDataStructureTable) for each data packet) will automatically be stored in the data file and do not have to be specified in this table.

File Structure Table			
File Structure # (index 1) RO	File Structure Index (index 2) RO	Data Element OID R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,07,07) (File Parameter Table, dcmFPTable)	1 (active)
1	3	&h(2B,06,01,04,01,89,36,04,02,dcm,04,01) (Unique Site Id, dcmSiteId)	1 (active)
1	4	&h(2B,06,01,04,01,89,36,04,02,dcm,06,08) (Binned Filter Definition Table, dcmBinnedFilterDefTable)	1 (active)
1	5	&h(2B,06,01,04,01,89,36,04,02,dcm,06,0B) (Binned Study Configuration Table, dcmBinSCTable)	1 (active)

C.3.1.4 Configure Study Details

Configure Binned Filter Definition Table:

Now the contents of the study can be configured in more detail. Two tables are used to define the bin limits required for a binned study: the Binned Filter Definition Table and the Binned Study Configuration Table. Both tables are used in conjunction to describe the bins used in a study.

The Binned Filter Definition table creates definitions of ranges used in the Binned Study Configuration Table. In the daily vehicle classification study, there will be 17 total bins used: 15 classification bins and one bin per array (two arrays). In our short-duration volume study, only one bin is required: the combined lane total (counts on both arrays). This requires a total of 18 bins to be defined.

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Binned Filter Definition Table						
Binned Filter # (index 1) RO	Binned Filter (index 2) RO	Bin Heading (OID Taken From Vehicle Criteria Table) R/W	Bin Minimum Value R/W	Bin Maximum Value R/W	Bin # to Index Relationship R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number,dcmIOArrNum)	1	2	3 (endOfDef)	1 (active)
2	1	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number,dcmIOArrNum)	2	3	3 (endOfDef)	1 (active)
3	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	1	2	3 (endOfDef)	1 (active)
4	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	2	3	3 (endOfDef)	1 (active)
5	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	3	4	3 (endOfDef)	1 (active)
6	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	4	5	3 (endOfDef)	1 (active)
7	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	5	6	3 (endOfDef)	1 (active)
8	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	6	7	3 (endOfDef)	1 (active)
9	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	7	8	3 (endOfDef)	1 (active)
10	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	8	9	3 (endOfDef)	1 (active)
11	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	9	10	3 (endOfDef)	1 (active)
12	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	10	11	3 (endOfDef)	1 (active)
13	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	11	12	3 (endOfDef)	1 (active)
14	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	12	13	3 (endOfDef)	1 (active)
15	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	13	14	3 (endOfDef)	1 (active)
16	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	14	15	3 (endOfDef)	1 (active)
17	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06)	15	16	3 (endOfDef)	1 (active)

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Binned Filter Definition Table						
Binned Filter # (index 1) RO	Binned Filter (index 2) RO	Bin Heading (OID Taken From Vehicle Criteria Table) R/W	Bin Minimum Value R/W	Bin Maximum Value R/W	Bin # to Index Relationship R/W	Row Admin R/W
		(Vehicle Class, dcmVehicleClass)				
18	1	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number,dcmIOArrNum)	1	2	2 (Or)	1 (active)
18	2	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number,dcmIOArrNum)	2	3	3 (endOfDef)	

Note that bin filter 18 could have also been defined using 1 row with a bin minimum value of 1 and a bin maximum value of 3.

Configure Binned Relationship Table:
The Binned Study Configuration Table relates entries in the Binned Filter Definition Table to headings within studies. In this example, study 1 has two headings (heading 1= 15 bins of vehicle class, heading 2=2 bins of arrays (1 bin for each array)). Study two has only one heading (heading 1=1 bin of array (the combined arrays)).

Binned Study Configuration Table				
Study # (Index 1) RO	Heading # (Index 2) RO	Bin Label # (Index 3) RO	Binned Filter # Index	Row Admin
1	1	1	3 (vehicle class 1)=H1BL1	1 (active)
1	1	2	4 (vehicle class 2)=H1BL2	1 (active)
1	1	3	5 (vehicle class 3)=H1BL3	1 (active)
1	1	4	6 (vehicle class 4)=H1BL4	1 (active)
1	1	5	7 (vehicle class 5)=H1BL5	1 (active)
1	1	6	8 (vehicle class 6)=H1BL6	1 (active)
1	1	7	9 (vehicle class 7)=H1BL7	1 (active)
1	1	8	10 (vehicle class 8)=H1BL8	1 (active)
1	1	9	11 (vehicle class 9)=H1BL9	1 (active)
1	1	10	12 (vehicle class 10)=H1BL10	1 (active)
1	1	11	13 (vehicle class 11)=H1BL11	1 (active)
1	1	12	14 (vehicle class 12)=H1BL12	1 (active)
1	1	13	15 (vehicle class 13)=H1BL13	1 (active)
1	1	14	16 (vehicle class 14)=H1BL14	1 (active)
1	1	15	17 (vehicle class 15)=H1BL15	1 (active)
1	2	1	1 (array 1)=H2BL1	1 (active)
1	2	2	2 (array 2)=H2BL2	1 (active)

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Binned Study Configuration Table				
Study # (Index 1) RO	Heading # (Index 2) RO	Bin Label # (Index 3) RO	Binned Filter # Index	Row Admin
2	1	1	18 (array 1-2)=H1BL1	1 (active)

C.3.1.5 Verify Proper Operation Of Sensors/Arrays

Verify Sensor Operation:
At this point, the sensor operation should be verified. This can be done by configuring an Event Monitor Study. Once configured and enabled, verify that all sensors are being activated and in the proper order. Read the Logical IO Parameter Table. If there is a problem, the sensors can be fine-tuned by adjusting IO Parameters in the Logical IO Parameter Table or adding additional IO Parameters to the table.
Note that there may already be default parameters stored in this table set by the device.
The result of this step will be a modified Logical IO Parameter Table:

Logical IO Parameter Table			
Logical IO (index 1) RO	IO Calibration Parameter (index 2) RO	IO Calibration Value R/W	Row Admin R/W
3 (lp1)	15 (sensorLength)	1829 mm (6 ft)	1 (active)
4 (lp2)	15 (sensorLength)	1829 mm (6 ft)	1 (active)
5 (lp3)	15 (sensorLength)	1829 mm (6 ft)	1 (active)
6 (lp4)	15 (sensorLength)	1829 mm (6 ft)	1 (active)
7 (pz1)	4 (sensitivityGain)	50 (50% of maximum)	1 (active)
8 (pz2)	4 (sensitivityGain)	50 (50% of maximum)	1 (active)

Verify Sensor Array Operation:
Once the sensors have been verified to be working correctly, disable the Event Monitor Study and configure a Vehicle Monitor Study. Read the Array Parameter Table and Array Speed Calibration Table. This study will be used to perform fine-tuning of the array parameters (Array Parameter Table, Array Speed Calibration Table).
Note that there may already be default parameters stored in these tables set by the device.
The result of this step will be a modified Array Parameter and Array Speed Calibration Table:

Array Parameter Table				
Array # (index 1) RO	Array Parameter Type (index 2) RO	Array Parameter Value R/W	Array Parameter File Name Pointer R/W	Row Admin R/W

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Array Parameter Table				
Array # (index 1) RO	Array Parameter Type (index 2) RO	Array Parameter Value R/W	Array Parameter File Name Pointer R/W	Row Admin R/W
1	5 (maxVehicleLength)	32004 mm (105 ft)		1 (active)
1	7 (calFilePointer)		FHWAClassSchemeF	1 (active)
2	5 (maxVehicleLength)	33528 mm (110 ft)		1 (active)
2	7 (calFilePointer)		FHWAClassSchemeF	1 (active)

Array Speed Calibration Table			
First Logical IO Number (index 1) RO	Second Logical IO Number (index 2) RO	Array Speed Calibration Factor	Row Admin R/W
3 (lp1)	4 (lp2)	1150 (1.150, speeds are 15% too low)	1 (active)
5 (lp3)	6 (lp4)	950 (0.950, speeds are 5% too high)	1 (active)

C.3.1.6 Validate And Start The Recording Study

Validate each of the two studies by setting the Data Recording Control to “validate”. The Data Recording Enable Status will indicate “validating” while the device is verifying the configuration. If there are no errors in the configuration, the device will set the Data Recording Enable Status to “idle”. At this point, the two studies can be started by setting the Data Recording Control to “prime”. The Data Recording Enable Status will indicate “primed” until the next even recording interval for study 1 and the specified start date/time for study 2. Each study will begin recording at the specified start date/time, at which time the Data Recording Enable Status will change to “recording”. Data is now being written to the specified data files.

Data Recording Enable Table		
Study # (index 1) RO	Data Recording Enable Status R/W	Data Recording Control R/W
1	4 (recording)	1 (prime)
2	4 (recording)	1 (prime)

C.3.1.7 Data File Formats

Each day at midnight the device will close the currently open file and create a new data file (since the recording file frequency was set to daily in the File Parameter Table) for study 1. A second single data file will be created for the 48 hours specified in study 2. Therefore after 3 full days of operation, the device will have 4 data files, 3 daily data files for study 1 and 1 continuous data file for study 2. The File Directory Structure Table can be read to determine the names of each data file. The data files can then be downloaded via an FTP file transfer.

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Read the File Directory Structure Table to determine if the files to be downloaded are locked out (File Open flag is set to either 'fileLocked' or 'fileOpenLocked'). If the File Open flag is set to 'fileOpenLocked', the file can be downloaded by first closing the open file. In this example, the files to be downloaded have already been closed.

Each study 1 data packet will contain 1 record consisting of the binned counts for a 60 minute recording interval. **It is recommended to read the Binned Data Bins Ordering Section before proceeding with this example (refer to C.3.1.8).**

Each object specified in the File Parameter Table for study 1 will be stored in the data file as an [(OID) (Value)] pair. The (OID) and (Value) will be encoded using OER as specified in the File Encoding Field of the File Parameter Table. The OID's are shortened after the Relative Addressing Object has been encountered. Only the rows specific to the studies mapped to each data file will be stored with each specified table. All columns must be stored with each table row.

For the purposes of this study 1 data file example, the following made-up data will be used for the binned data bin counts for recording intervals 00:00 to 01:00 and 01:00 to 02:00. The remaining recording intervals will use "xx" as a placeholder for each binned data bin count with a size of 1 octet.

Assume the following binned counts were recorded over a two hour period for study 1 (H denotes Heading #, BL denotes Bin Label #, Bin Label #'s are in decimal, the binned counts are represented in hexadecimal to make decoding the data packet easier to understand):

	H1BL1 (class 1)	H1BL2 (class2)	H1BL3 (class3)	H1BL4 (class4)	H1BL5 (class5)	H1BL6 (class6)	H1BL7 (class7)	H1BL8 (class8)	H1BL9 (class9)	H1BL10 (class10)	H1BL11 (class11)	H1BL12 (class12)	H1BL13 (class13)	H1BL14 (class14)	H1BL15 (class15)
00:00-01:00															
H2BL1 (Array 1)	09	52	07	03	02	06	02	02	0f	01	03	02	01	00	02
H2BL2 (Array 2)	07	6a	03	04	01	04	02	01	1a	02	01	02	01	00	ac
01:00-02:00															
H2BL1 (Array 1)	06	42	02	04	02	05	03	02	1c	02	05	02	05	02	01
H2BL2 (Array 2)	09	0114	04	03	09	04	02	04	17	05	02	09	04	00	f2

?? ?? ?? ?? will be used in place of the actual Local Controller Time for (Start Date/Time of data packet, End Date/Time of data packet)

It is important to note that the Data Structure Table is not intended to be manipulated by the central application. It is only included as an ASN.1 table to define the structure to store the raw data (binned counts) to a data file.

Since the biggest binned count in the hour 00:00-01:00 requires only 1 octet to store (ac), each binned count shall be stored as one octet for the data in this data packet.
Since the biggest binned count in the hour 01:00-02:00 requires 2 octets to store (01 14), each binned count shall be stored as two octets for the data in this data packet.
The remaining data packets shall use a single octet to store each binned count.

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The encoding of each daily data file for study 1 is shown in the following table. Although this study was specifically configured to use OER encoding, the table shows both the BER and OER encodings for completeness.

The row numbers shown in the ASN.1 encoding for each table row are in decimal. All of the data shown in the BER and OER columns are in hexadecimal.

ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 82 0a 1f	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 dcm 0a	0b 2b 06 01 04 01 89 36 04 02 dcm 0a
dcmMibVersionNumber-value=1.00	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 82 04 59	26
OidValuePair1::=SEQUENCE	30 82 04 55	
oid1=**dcmRelativeAddrOID**	06 0b 2b 06 01 04 01 89 36 04 02 dcm 09	0b 2b 06 01 04 01 89 36 04 02 dcm 09
value1=dcm node	06 0a 2b 06 01 04 01 89 36 04 02 dcm	0a 2b 06 01 04 01 89 36 04 02 dcm
oid2=**Study Configuration Table**	06 02 05 05	02 05 05
value2::=SEQUENCE (row 1)	30 1e	
dcmSCStudyNum=1	02 01 01	01
dcmStudyType=2(binned)	02 01 02	02
dcmStartType=3(nextInterval)	02 01 03	03
dcmStartDateTime=don't care	41 04 xx xx xx xx	xx xx xx xx
dcmEndType=2(never)	02 01 02	02
dcmEndDateTime=don't care	41 04 xx xx xx xx	xx xx xx xx
dcmSCFileStudyIndex=1	02 01 01	01
dcmStudyConfigRowAdmin=1(active)	02 01 01	01
oid3=**File Parameter Table**	06 02 07 07	02 07 07
value3::=SEQUENCE (row 1,1)	30 16	
dcmFPFileStudyIndex=1	02 01 01	01
dcmFPFileStrucNum=1	02 01 01	01
dcmRecInt=3600(60 minutes)	02 02 0e 10	00 0e 10
dcmFPFileFreq=4(daily)	02 01 04	04
dcmFPLogicalIONumber=1	02 01 01	01
dcmFPRelativeAddrFlag=2(enabled)	02 01 02	02
dcmFPEncodingCode=3(OER)	02 01 03	03
oid4=**Unique Site ID**	06 02 04 01	02 04 01
value4="Route 301"	04 09 52 6f 75 74 65 20 33 30 31	09 52 6f 75 74 65 20 33 30 31
oid5=**Binned Filter Definition Table**	06 02 06 08	02 06 08
value5::=SEQUENCE (row 1,1)	30 21	
dcmBFDBinnedFilterNum=1	02 01 01	01
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Array Number)	06 0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01	0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01
dcmBinMinimumValue=1	02 01 01	00 00 01
dcmBinMaximumValue=2	02 01 02	00 00 02

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dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid6=Binned Filter Definition Table	06 02 06 08	02 06 08
value6::=SEQUENCE (row 2,1)	30 21	
dcmBFDBinnedFilterNum=2	02 01 02	02
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Array Number)	06 0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01	0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01
dcmBinMinimumValue=2	02 01 02	00 00 02
dcmBinMaximumValue=3	02 01 03	00 00 03
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid7=Binned Filter Definition Table	06 02 06 08	02 06 08
value7::=SEQUENCE (row 3,1)	30 20	
dcmBFDBinnedFilterNum=3	02 01 03	03
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=1	02 01 01	00 00 01
dcmBinMaximumValue=2	02 01 02	00 00 02
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid8=Binned Filter Definition Table	06 02 06 08	02 06 08
value8::=SEQUENCE (row 4,1)	30 20	
dcmBFDBinnedFilterNum=4	02 01 04	04
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=2	02 01 02	00 00 02
dcmBinMaximumValue=3	02 01 03	00 00 03
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid9=Binned Filter Definition Table	06 02 06 08	02 06 08
value9::=SEQUENCE (row 5,1)	30 20	
dcmBFDBinnedFilterNum=5	02 01 05	05
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=3	02 01 03	00 00 03
dcmBinMaximumValue=4	02 01 04	00 00 04
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid10=Binned Filter Definition Table	06 02 06 08	02 06 08
value10::=SEQUENCE (row 6,1)	30 20	
dcmBFDBinnedFilterNum=6	02 01 06	06
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04

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dcmBinMinimumValue=4	02 01 04	00 00 04
dcmBinMaximumValue=5	02 01 05	00 00 05
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid11=Binned Filter Definition Table	06 02 06 08	02 06 08
value11::=SEQUENCE (row 7,1)	30 20	
dcmBFDBinnedFilterNum=7	02 01 07	07
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=5	02 01 05	00 00 05
dcmBinMaximumValue=6	02 01 06	00 00 06
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid12=Binned Filter Definition Table	06 02 06 08	02 06 08
value12::=SEQUENCE (row 8,1)	30 20	
dcmBFDBinnedFilterNum=8	02 01 08	08
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=6	02 01 06	00 00 06
dcmBinMaximumValue=7	02 01 07	00 00 07
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid13=Binned Filter Definition Table	06 02 06 08	02 06 08
value13::=SEQUENCE (row 9,1)	30 20	
dcmBFDBinnedFilterNum=9	02 01 09	09
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=7	02 01 07	00 00 07
dcmBinMaximumValue=8	02 01 08	00 00 08
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid14=Binned Filter Definition Table	06 02 06 08	02 06 08
value14::=SEQUENCE (row 10,1)	30 20	
dcmBFDBinnedFilterNum=10	02 01 0a	0a
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=8	02 01 08	00 00 08
dcmBinMaximumValue=9	02 01 09	00 00 09
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid15=Binned Filter Definition Table	06 02 06 08	02 06 08
value15::=SEQUENCE (row 11,1)	30 20	
dcmBFDBinnedFilterNum=11	02 01 0b	0b

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dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=9	02 01 09	00 00 09
dcmBinMaximumValue=10	02 01 0a	00 00 0a
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid16=Binned Filter Definition Table	06 02 06 08	02 06 08
value16::=SEQUENCE (row 12,1)	30 20	
dcmBFDBinnedFilterNum=12	02 01 0c	0c
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=10	02 01 0a	00 00 0a
dcmBinMaximumValue=11	02 01 0b	00 00 0b
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
Oid17=Binned Filter Definition Table	06 02 06 08	02 06 08
value17::=SEQUENCE (row 13,1)	30 20	
dcmBFDBinnedFilterNum=13	02 01 0d	0d
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=11	02 01 0b	00 00 0b
dcmBinMaximumValue=12	02 01 0c	00 00 0c
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid18=Binned Filter Definition Table	06 02 06 08	02 06 08
value18::=SEQUENCE (row 14,1)	30 20	
dcmBFDBinnedFilterNum=14	02 01 0e	0e
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=12	02 01 0c	00 00 0c
dcmBinMaximumValue=13	02 01 0d	00 00 0d
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid19=Binned Filter Definition Table	06 02 06 08	02 06 08
value19::=SEQUENCE (row 15,1)	30 20	
dcmBFDBinnedFilterNum=15	02 01 0f	0f
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=13	02 01 0c	00 00 0c
dcmBinMaximumValue=14	02 01 0e	00 00 0e
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid20=Binned Filter Definition Table	06 02 06 08	02 06 08

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value20::=SEQUENCE (row 16,1)	30 20	
dcmBFDBinnedFilterNum=16	02 01 10	10
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=14	02 01 0e	00 00 0e
dcmBinMaximumValue=15	02 01 0f	00 00 0f
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid21=Binned Filter Definition Table	06 02 06 08	02 06 08
value21::=SEQUENCE (row 17,1)	30 20	
dcmBFDBinnedFilterNum=17	02 01 11	11
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Vehicle Class)	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 04	0c 2b 06 01 04 01 89 36 04 02 dcm 01 04
dcmBinMinimumValue=15	02 01 0f	00 00 0f
dcmBinMaximumValue=16	02 01 10	00 00 10
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid22=**Binned Study Configuration Table**	06 02 06 0b	02 06 0b
value22::=SEQUENCE (row 1,1,1)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=1	02 01 01	01
dcmBSCFilterNum=3	02 01 03	03
dcmBSCRowAdmin=1(active)	02 01 01	01
oid23=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value23::=SEQUENCE (row 1,1,2)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=2	02 01 02	02
dcmBSCFilterNum=4	02 01 04	04
dcmBSCRowAdmin=1(active)	02 01 01	01
oid24=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value24::=SEQUENCE (row 1,1,3)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=3	02 01 03	03
dcmBSCFilterNum=5	02 01 05	05
dcmBSCRowAdmin=1(active)	02 01 01	01
oid25=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value25::=SEQUENCE (row 1,1,4)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=4	02 01 04	04

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dcmBSCFilterNum=6	02 01 06	06
dcmBSCRowAdmin=1(active)	02 01 01	01
oid26=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value26::=SEQUENCE (row 1,1,5)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=5	02 01 05	05
dcmBSCFilterNum=7	02 01 07	07
dcmBSCRowAdmin=1(active)	02 01 01	01
oid27=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value27::=SEQUENCE (row 1,1,6)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=6	02 01 06	06
dcmBSCFilterNum=8	02 01 08	08
dcmBSCRowAdmin=1(active)	02 01 01	01
oid28=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value28::=SEQUENCE (row 1,1,7)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=7	02 01 07	07
dcmBSCFilterNum=9	02 01 09	09
dcmBSCRowAdmin=1(active)	02 01 01	01
oid29=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value29::=SEQUENCE (row 1,1,8)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=8	02 01 08	08
dcmBSCFilterNum=10	02 01 0a	0a
dcmBSCRowAdmin=1(active)	02 01 01	01
oid30=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value30::=SEQUENCE (row 1,1,9)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=9	02 01 09	09
dcmBSCFilterNum=11	02 01 0b	0b
dcmBSCRowAdmin=1(active)	02 01 01	01
oid31=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value31::=SEQUENCE (row 1,1,10)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=10	02 01 0a	0a
dcmBSCFilterNum=12	02 01 0c	0c

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dcmBSCRowAdmin=1(active)	02 01 01	01
oid32=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value32::=SEQUENCE (row 1,1,11)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=11	02 01 0b	0b
dcmBSCFilterNum=13	02 01 0d	0d
dcmBSCRowAdmin=1(active)	02 01 01	01
oid33=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value33::=SEQUENCE (row 1,1,12)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=12	02 01 0c	0c
dcmBSCFilterNum=14	02 01 0e	0e
dcmBSCRowAdmin=1(active)	02 01 01	01
oid34=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value34::=SEQUENCE (row 1,1,13)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=13	02 01 0d	0d
dcmBSCFilterNum=15	02 01 0f	0f
dcmBSCRowAdmin=1(active)	02 01 01	01
oid35=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value35::=SEQUENCE (row 1,1,14)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=14	02 01 0e	0e
dcmBSCFilterNum=16	02 01 10	10
dcmBSCRowAdmin=1(active)	02 01 01	01
oid36=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value36::=SEQUENCE (row 1,1,15)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=15	02 01 0f	0f
dcmBSCFilterNum=17	02 01 11	11
dcmBSCRowAdmin=1(active)	02 01 01	01
oid37=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value37::=SEQUENCE (row 1,2,1)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=2	02 01 02	02
dcmBSCLabelNum=1	02 01 01	01
dcmBSCFilterNum=1	02 01 01	01
dcmBSCRowAdmin=1(active)	02 01 01	01

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oid38=Binned Study Configuration Table	06 02 06 0b	02 06 0b
value38::=SEQUENCE (row 1,2,2)	30 0f	
dcmBSCStudyNum=1	02 01 01	01
dcmBSCHeadingNum=2	02 01 02	02
dcmBSCLabelNum=2	02 01 02	02
dcmBSCFilterNum=2	02 01 02	02
dcmBSCRowAdmin=1(active)	02 01 01	01
DataFileData::=		
OidValuePair2::=SEQUENCE	30 82 05 ae	
oid1=**dcmDataStructureTable**	06 02 06 1e	02 06 1e
value1::=SEQUENCE OF	30 82 05 a6	18
SEQUENCE (row 1,1)	30 39	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(09/05/2001 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/05/2001 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=1 binnedDataBinCounts H1BL1-H1BL15 (class 1-15 for array 1) H2BL1-H2BL15 (class 1-15 for array 2)	 04 1f 01 09 52 07 03 02 06 02 02 0f 01 03 02 01 00 02 07 6a 03 04 01 04 02 01 1a 02 01 02 01 00 ac	 1f 01 09 52 07 03 02 06 02 02 0f 01 03 02 01 00 02 07 6a 03 04 01 04 02 01 1a 02 01 02 01 00 ac
SEQUENCE (row 1,2)	30 57	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=2	02 01 02	02
dcmStartTime=(09/05/2001 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/05/2001 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=2 binnedDataBinCounts H1BL1-H1BL15 (class 1-15 for array 1) H2BL1-H2BL15 (class 1-15 for array 2)	 04 1f 02 00 06 00 42 00 02 00 04 00 02 00 05 00 03 00 02 00 1c 00 02 00 05 00 02 00 05 00 02 00 01 00 09 01 14 00 04 00 03 00 09 00 04 00 02 00 04 00 17 00 05 00 02 00 09 00 04 00 00 00 f2	 1f 02 09 52 07 03 02 06 02 02 0f 01 03 02 01 00 02 07 6a 03 04 01 04 02 01 1a 02 01 02 01 00 ac 00 09 01 14 00 04 00 03 00 09 00 04 00 02 00 04 00 17 00 05 00 02 00 09 00 04 00 00 00 f2
SEQUENCE (row 1,3)	30 39	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=3	02 01 01	01

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dcmStartTime=(09/05/2001 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/05/2001 03:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=1 binnedDataBinCounts H1BL1-H1BL15 (class 1-15 for array 1) H2BL1-H2BL15 (class 1-15 for array 2)	 04 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx
SEQUENCE (row 1,4)	30 39	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=4	02 01 04	04
dcmStartTime=(09/05/2001 03:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/05/2001 04:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=1 binnedDataBinCounts H1BL1-H1BL15 (class 1-15 for array 1) H2BL1-H2BL15 (class 1-15 for array 2)	 04 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx
… (and so forth down to) …	**…**	**…**
SEQUENCE (row 1,23)	30 39	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=23	02 01 17	17
dcmStartTime=(09/05/2001 22:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/05/2001 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=1 binnedDataBinCounts H1BL1-H1BL15 (class 1-15 for array 1) H2BL1-H2BL15 (class 1-15 for array 2)	 04 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx
SEQUENCE (row 1,24)	30 39	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=24	02 01 18	18
dcmStartTime=(09/05/2001 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/06/2001 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01

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dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=1 binnedDataBinCounts H1BL1-H1BL15 (class 1-15 for array 1) H2BL1-H2BL15 (class 1-15 for array 2)	 04 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	 1f 01 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx
TOTAL NUMBER OF OCTETS REQUIRED (in decimal) (not part of the data file):	2593 octets	1795 octets

Each study 2 data packet will contain 1 record consisting of a single binned count (for both arrays) for a 15 minute recording interval. **It is recommended to read the Binned Data Bins Ordering Section before proceeding with this example (refer to C.3.1.8).**

Each object specified in the File Parameter Table for study 2 will be stored in the data file as an [(OID) (Value)] pair. The (OID) and (Value) will be encoded using OER as specified in the File Encoding Field of the File Parameter Table. The OID's are shortened after the Relative Addressing Object has been encountered. Only the rows specific to the studies mapped to each data file will be stored with each specified table. All columns must be stored with each table row.

For the purposes of this study 2 data file example, the following made-up data will be used for the binned data bin counts for recording intervals 00:00 to 00:15, 00:15-00:30, 00:30-00:45, 00:45-01:00, 01:00-01:15, 01:15-01:30, 01:30-01:45, 01:45-12:00. The remaining recording intervals will use "xx" as a placeholder for each binned data bin count with a size of 1 octet.

Assume the following binned counts were recorded over a one hour period for study 2 (in 15 minute recording intervals) (H denotes Heading #, BL denotes Bin Label #, Bin Label #'s are in decimal, the binned counts are represented in hexadecimal to make decoding the data packet easier to understand):

	H1BL1 (Array 1-3)
00:00-00:15	75
00:15-00:30	66
00:30-00:45	54
00:45-01:00	a6
01:00-01:15	a7
01:15-01:30	Ad
01:30-01:45	Bd
01:45-02:00	Ca

?? ?? ?? ?? will be used in place of the actual Local Controller Time for (Start Date/Time of data packet, End Date/Time of data packet)

It is important to note that the Data Structure Table is not intended to be manipulated by the central application. It is only included as an ASN.1 table to define the structure to store the raw data (binned counts) to a data file.

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This implementation has chosen to store 96 15 minute recording intervals (dcmDataNumRecords=96 in Data Structure Table, 24 hours's worth of data) in each Data Structure Table Row. This was done to minimize the overhead of having multiple rows in the Data Structure Table (each row would have 96 bytes of actual data). This data could also have been stored as 1 15 minute recording interval (dcmDataNumRecords=1 in Data Structure Table) in each Data Structure Table Row which would then carry the overhead of each row of the Data Structure Table only having a single byte of actual data.
Since the biggest binned count in the hour 00:00-02:00 (assume all the other intervals only require 1 octet) requires only 1 octet to store (ca), each binned count shall be stored as one octet for the data in this data packet.

The encoding of each daily data file for study 2 is shown in the following table. Although this study was specifically configured to use OER encoding, the table shows both the BER and OER encodings for completeness.

The row numbers shown in the ASN.1 encoding for each table row are in decimal. All of the data shown in the BER and OER columns are in hexadecimal.

ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 82 01 e9	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 dcm 0a	0b 2b 06 01 04 01 89 36 04 02 dcm 0a
dcmMibVersionNumber-value=1.00	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 82 00 cf	07
OidValuePair1::=SEQUENCE	30 82 00 cb	
oid1=**dcmRelativeAddrOID**	06 0b 2b 06 01 04 01 89 36 04 02 dcm 09	0b 2b 06 01 04 01 89 36 04 02 dcm 09
value1=dcm node	06 0a 2b 06 01 04 01 89 36 04 02 dcm	0a 2b 06 01 04 01 89 36 04 02 dcm
oid2=**Study Configuration Table**	06 02 05 05	02 05 05
value2::=SEQUENCE (row 2)	30 1e	
dcmSCStudyNum=2	02 01 02	02
dcmStudyType=2(binned)	02 01 02	02
dcmStartType=4(dateTime)	02 01 04	04
dcmStartDateTime=09/05/2001 00:00	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndType=4(dateTime)	02 01 04	04
dcmEndDateTime=09/07/2001 00:00	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmSCFileStudyIndex=2	02 01 02	02
dcmStudyConfigRowAdmin=1(active)	02 01 01	01
oid3=**File Parameter Table**	06 02 07 07	02 07 07
value3::=SEQUENCE (row 2,1)	30 16	
dcmFPFileStudyIndex=2	02 01 02	02
dcmFPFileStrucNum=1	02 01 01	01
dcmRecInt=900(15 minutes)	02 02 03 84	00 03 84
dcmFPFileFreq=8(continuous)	02 01 08	08
dcmFPLogicalIONumber=1	02 01 01	01
dcmFPRelativeAddrFlag=2(enabled)	02 01 02	02
dcmFPEncodingCode=3(OER)	02 01 03	03
oid4=**Unique Site ID**	06 02 04 01	02 04 01
value4="Route 301"	04 09 52 6f 75 74 65 20 33 30 31	09 52 6f 75 74 65 20 33 30 31

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oid5=**Binned Filter Definition Table**	06 02 06 08	02 06 08
value5::=SEQUENCE (row 18,1)	30 21	
dcmBFDBinnedFilterNum=18	02 01 12	12
dcmBinnedFilterIndex=1	02 01 01	01
dcmBinHeading=(Array Number)	06 0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01	0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01
dcmBinMinimumValue=1	02 01 01	00 00 01
dcmBinMaximumValue=2	02 01 02	00 00 02
dcmBinNumberIndexRelation=2(or)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid6=Binned Filter Definition Table	06 02 06 08	02 06 08
value6::=SEQUENCE (row 18,2)	30 21	
dcmBFDBinnedFilterNum=18	02 01 12	12
dcmBinnedFilterIndex=2	02 01 02	02
dcmBinHeading=(Array Number)	06 0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01	0d 2b 06 01 04 01 89 36 04 02 dcm 04 07 01
dcmBinMinimumValue=2	02 01 02	00 00 02
dcmBinMaximumValue=3	02 01 03	00 00 03
dcmBinNumberIndexRelation=3(endOfDef)	02 01 03	03
dcmBinnedFilterDefRowAdmin=1(active)	02 01 01	01
oid7=**Binned Study Configuration Table**	06 02 06 0b	02 06 0b
value7::=SEQUENCE (row 2,1,1)	30 0f	
dcmBSCStudyNum=2	02 01 02	02
dcmBSCHeadingNum=1	02 01 01	01
dcmBSCLabelNum=1	02 01 01	01
dcmBSCFilterNum=18	02 01 12	12
DcmBSCRowAdmin=1(active)	02 01 01	01
DataFileData::=		
OidValuePair2::=SEQUENCE	30 82 01 02	
oid2=**dcmDataStructureTable**	06 02 06 1e	02 06 1e
value2::=SEQUENCE OF	30 82 00 fa	02
SEQUENCE (row 2,1)	30 7b	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(09/05/2001 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/06/2001 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=96	02 01 60	00 00 60
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet OCTET STRING binCountLenOctet=1 binnedDataBinCounts H1BL1 09/05/2001 (00:00-00:15) H1BL1 (00:15-00:30)	 04 61 01 75 66	 61 01 75 66

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H1BL1 (00:30-00:45)	54	54
H1BL1 (00:45-01:00)	a6	a6
H1BL1 (01:00-01:15)	a7	a7
H1BL1 (01:15-01:30)	ad	ad
H1BL1 (01:30-01:45)	bd	bd
H1BL1 (01:45-02:00)	ca	ca
H1BL1 (02:00-02:15)	xx	xx
H1BL1 (02:15-02:30)	xx	xx
H1BL1 (02:30-02:45)	xx	xx
H1BL1 (02:45-03:00)	xx	xx
… And So Forth Down To…	…	…
H1BL1 (23:00-23:15)	xx	xx
H1BL1 (23:15-23:30)	xx	xx
H1BL1 (23:30-23:45)	xx	xx
H1BL1 (23:45-00:00)	xx	xx
SEQUENCE (row 2,1)	30 7b	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=2	02 01 02	02
dcmStartTime=(09/06/2001 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(09/07/2001 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=96	02 01 60	00 00 60
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Binned Data Packet		
OCTET STRING	04 61	61
binCountLenOctet=1	01	01
binnedDataBinCounts		
H1BL1 09/06/2001 (00:00-00:15)	xx	xx
H1BL1 (00:15-00:30)	xx	xx
H1BL1 (00:30-00:45)	xx	xx
H1BL1 (00:45-01:00)	xx	xx
H1BL1 (01:00-01:15)	xx	xx
H1BL1 (01:15-01:30)	xx	xx
H1BL1 (01:30-01:45)	xx	xx
H1BL1 (01:45-02:00)	xx	xx
H1BL1 (02:00-02:15)	xx	xx
H1BL1 (02:15-02:30)	xx	xx
H1BL1 (02:30-02:45)	xx	xx
H1BL1 (02:45-03:00)	xx	xx
… And So Forth Down To…	…	…
H1BL1 (23:00-23:15)	xx	xx
H1BL1 (23:15-23:30)	xx	xx
H1BL1 (23:30-23:45)	xx	xx
H1BL1 (23:45-00:00)	xx	xx

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TOTAL NUMBER OF OCTETS REQUIRED (in decimal) (not part of the data file):	493 octets	370 octets

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C.3.1.8 Binned Data Bins Ordering (Normative)

This section defines the ordering of how the specified data bins shall be stored in the data section of each Data Structure Table.

Each data packet (row in the Data Structure Table) shall only contain binned data for 1 study. The ordering of the bins shall be based on the Heading # and Bin Label # fields from the Binned Study Configuration Table for the specified study. Each study can be configured as a single or multi-dimensional binned study. A single dimensional study would be a binned study in which there is only 1 Heading # defined for that study. A multi-dimensional binned study would have more than one Heading # defined for that study.

The bins shall be ordered in ascending sequence as follows (H denotes Heading #, BL denotes Bin Label #) for each recording interval. Headings range from 1 to m, Heading 1 Bin Labels range from 1 to n, Heading 2 Bin Labels range from 1 to x, Heading m Bin Labels range from 1 to y:

(H1BL1,H2BL1,..HmBL1), (H1BL2,H2BL1,..HmBL1),...(H1BLn,H2BL1,..HmBL1)
(H1BL1,H2BL2,..HmBL1), (H1BL2,H2BL2,..HmBL1),…(H1BLn,H2BL2,..HmBL1)
(H1BL1,H2BLx,..HmBL1), (H1BL2,H2BLx,..HmBL1),…(H1BLn,H2BLx,..HmBL1)
(H1BL1,H2BL1,..HmBL2), (H1BL2,H2BL1,..HmBL2),…(H1BLn,H2BL1,..HmBL2)
(H1BL1,H2BL2,..HmBL2), (H1BL2,H2BL2,..HmBL2),…(H1BLn,H2BL2,..HmBL2)
(H1BL1,H2BLx,..HmBL2), (H1BL2,H2BLx,..HmBL2),…(H1BLn,H2BLx,..HmBL2)
(H1BL1,H2BL1,..HmBLy), (H1BL2,H2BL1,..HmBLy),…(H1BLn,H2BL1,..HmBLy)
(H1BL1,H2BL2,..HmBLy), (H1BL2,H2BL2,..HmBLy),…(H1BLn,H2BL2,..HmBLy)
(H1BL1,H2BLx,..HmBLy), (H1BL2,H2BLx,..HmBLy),…(H1BLn,H2BLx,..HmBLy)

The data section of the data packet may contain one or more recording intervals. The number of recording intervals contained within the data section shall be indicated in the Number of Records field of the data packet. If more than one recording interval is included, they shall be ordered in ascending sequence of recording intervals [(binned data for recording interval 1), (binned data for recording interval 2), (binned data for recording interval n)]. The start and end date/time fields of the data packet shall be adjusted accordingly to reflect the start of the earliest recording interval (which shall be the first recording interval stored in the data) to the end of the last recording interval (which shall be the last recording interval stored in the data).

The size of each bin count (# of octets used to represent the count for that bin) shall be the same for all bin counts contained within the same data packet. The size of each bin count shall be specified by the first octet in the data section for each data packet.

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A sample data packet would be as follows:

Data Structure Table						
Study #	Data Structure Table Index	Start Date/Time	End Date/Time	# of Records	Data Encoding	Data (H=Heading #, BL=Bin Label #, RI=Recording Interval #)
1	packet n (next sequential data packet number)	?? ?? ?? ??	?? ?? ?? ??	2 (represents # of recording intervals included in the Data section)	2	(1), = single octet identifying the # of octets per bin count ((H1BL1,H2BL1)..(H1BLn,H2BL1))..((H1BLn,H2BL1)..(H1BLnH2BLn)) for RI 1 ((H1BL1,H2BL1)..(H1BLn,H2BL1))..((H1BLn,H2BL1)..(H1BLnH2BLn)) for RI 2

The following are some examples of bin studies and the required bin ordering (H is used to denote Heading #, BL is used to denote Bin Label #, RI is used to denote Recording Interval):

1. Record 3 bins of volume data on 3 sensor arrays:

Binned Study Configuration Table				
Study # (Index 1)	Heading # (Index 2)	Bin Label # (Index 3)	Binned Filter # Index	Row Admin
1	1	1	1 (array bin 1)=H1BL1	1 (active)
1	1	2	2 (array bin 2)=H1BL2	1 (active)
1	1	3	3 (array bin 3)=H1BL3	1 (active)

The number of bins per recording interval: (3 bins for Heading 1)=3 bins
The binned data in the data packet (Data Structure Table) will be ordered as follows for each recording interval:

[
Array1Count(H1BL1), Array2Count(H1BL2), Array3Count(H1BL3)
]

2. Record 3 bins of vehicle speed by 2 sensor arrays:

Binned Study Configuration Table

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Study # (Index 1)	Heading # (Index 2)	Bin Label # (Index 3)	Binned Filter # Index	Row Admin
1	1	1	1 (speed bin 1)=H1BL1	1 (active)
1	1	2	2 (speed bin 2)=H1BL2	1 (active)
1	1	3	3 (speed bin 3)=H1BL3	1 (active)
1	2	1	4 (array bin 1)=H2BL1	1 (active)
1	2	2	5 (array bin 2)=H2BL2	1 (active)

The number of bins per recording interval: (3 bins for Heading 1)(2 bins for Heading 2)=6 bins
The binned data in the data packet (Data Structure Table) will be ordered as follows for each recording interval:

[
Speed1Array1Count(H1BL1,H2BL1), Speed2Array1Count(H1BL2,H2BL1), Speed3Array1Count(H1BL3,H2BL1)
Speed1Array2Count(H1BL1,H2BL2), Speed2Array2Count(H1BL2,H2BL2), Speed3Array2Count(H1BL3,H2BL2)
]

3. Record 2 bins of vehicle speed by 3 bins of vehicle length by 2 sensor arrays:

Binned Study Configuration Table				
Study # (Index 1)	Heading # (Index 2)	Bin Label # (Index 3)	Binned Filter # Index	Row Admin
1	1	1	1 (speed bin 1)=H1BL1	1 (active)
1	1	2	2 (speed bin 2)=H1BL2	1 (active)
1	2	1	3 (length bin 1)=H2BL1	1 (active)
1	2	2	4 (length bin 2)=H2BL2	1 (active)
1	2	3	5 (length bin 3)=H2BL3	1 (active)
1	3	1	6 (array bin 1)=H3BL1	1 (active)
1	3	2	7 (array bin 2)=H3BL2	1 (active)

The number of bins per recording interval: (2 bins for Heading 1)(3 bins for Heading 2)(2 bin for Heading 3)=12 bins
The binned data in the data packet (Data Structure Table) will be ordered as follows for each recording interval:

[
Speed1Length1Array1Count(H1BL1,H2BL1,H3BL1), Speed2Length1Array1Count(H1BL2,H2BL1,H3BL1)
Speed1Length2Array1Count(H1BL1,H2BL2,H3BL1), Speed2Length2Array1Count(H1BL2,H2BL2,H3BL1)
Speed1Length3Array1Count(H1BL1,H2BL3,H3BL1), Speed2Length3Array1Count(H1BL2,H2BL3,H3BL1)
Speed1Length1Array2Count(H1BL1,H2BL1,H3BL2), Speed2Length1Array2Count(H1BL2,H2BL1,H3BL2)
Speed1Length2Array2Count(H1BL1,H2BL2,H3BL2), Speed2Length2Array2Count(H1BL2,H2BL2,H3BL2)
Speed1Length3Array2Count(H1BL1,H2BL3,H3BL2), Speed2Length3Array2Count(H1BL2,H2BL3,H3BL2)

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C.3.2 PER VEHICLE RECORD (PVR) STUDY EXAMPLE (INFORMATIVE)

A PVR Study is a study in which the specified vehicle information that is determined by the device is stored in the data file for the specified vehicles. This example has two lanes in the same direction fitted with different sensor arrays. Lane 1 (Sensor Array 1) is a WIM piezo array (pz1,pz2) with a 16 foot spacing between the two WIM piezos and lane 2 (Sensor Array 2) is a speed loop pair array (lp1,lp2) with a 12 foot spacing (leading edge to leading edge) between the two loops (each loop is 6 foot long in the direction of travel).

A single data file each day with the following vehicle data is required:

Array 1: (Vehicle Time Tag, Vehicle Sequence Number, Array Number, Vehicle Speed, Vehicle Class, Number of Axles, Axle Spacings, Axle Weights) for Vehicle Classes 4 to 15 (these classes are typically the trucks)

Note that in order to only record Vehicle Classes 4 to 15, a Filter will have to be configured for array 1.

Array 2: (Vehicle Time Tag, Vehicle Sequence Number, Array Number, Vehicle Speed, Vehicle Length) for all Vehicles

Since the required vehicle data for Lane 1 (array 1) is different than the required vehicle data for Lane 2 (array 2), two separate PVR studies will be configured, one for Lane 1 (array 1) data and one for Lane 2 (array 2) data.

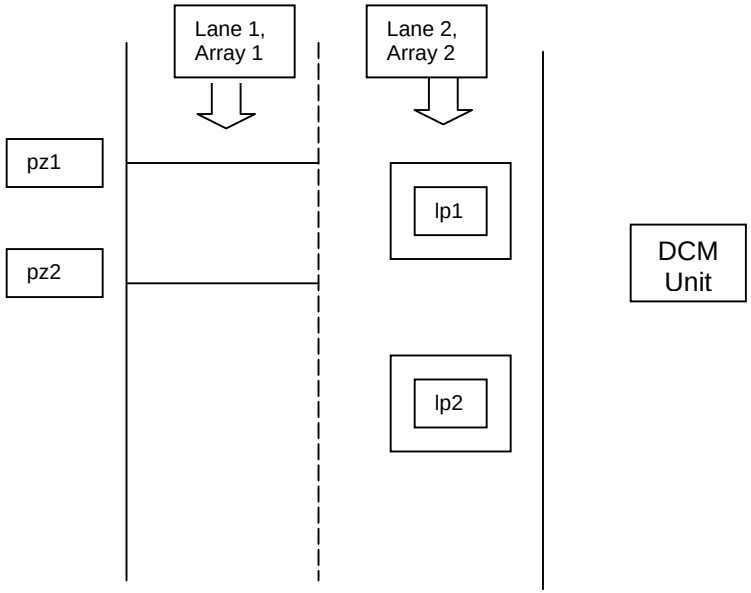


Figure C-2: PVR Study Sensor Array

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C.3.2.1 Determine Device Capabilites

Read the IO Board Configuration Table to determine the capabilities of the device. This device is fitted with 5 IO boards (cpu/comms, keyboard/display, storageMedia, WIM piezo board, Loop board). The status of suspended indicates that the board is available, but currently not required to be used based on the current device study configuration.
There are 4 sensor inputs required to configure the two specified sensor arrays (2 WIM piezos and 2 loops). The IO Board Configuration Table indicates that there is a sufficient number and type of sensors available. This table shows that there are 8 WIM piezos and 4 loops available.

IO Board Configuration Table

IO Board # (index 1) RO	IO Board Function (index 2) RO	Number Of IO R/O	IO Board Function Type R/O	Mfg. IO Board Description R/O	IO Board Status R/O	IO Board Control R/W
1	1	1	2 (cpu)	CPU, V4.00	1 (enabled)	1 (notSupported)
1	2	1	6 (comms)	RS232	1 (enabled)	1 (notSupported)
2	1	1	7 (keyboard)	16 Key Keyboard	1 (enabled)	1 (notSupported)
2	2	1	8 (display)	20x4 LCD	1 (enabled)	1 (notSupported)
3	1	1	3 (storageMedia)	SRAM-8MB	1 (enabled)	1 (notSupported)
4	1	8	12 (wimPiezo)	8 Input WIM Piezo	5 (suspended)	5 (suspend)
5	1	4	11 (loop)	4 Input Loop	5 (suspended)	5 (suspend)

Read the Physical to Logical IO Mapping Table to determine the Logical IO Number assigned to each required IO. Note that all IO board peripherals may not be assigned a Logical IO Number if they are not required to be used.

Physical to Logical IO Mapping Table

IO Board # (index 1) RO	IO Board Function (index 2) RO	Physical IO Number (index 3) RO	Logical IO # R/O	IO Status R/O	IO Control R/W
1	2	1	1	1 (enabled)	1 (notSupported)
2	2	1	2	1 (enabled)	1 (notSupported)
3	1	1	3	1 (enabled)	1 (notSupported)
4	1	1 (pz1)	4	5 (suspended)	5 (suspend)
4	1	2 (pz2)	5	5 (suspended)	5 (suspend)
4	1	3	6	5 (suspended)	5 (suspend)
4	1	4	7	5 (suspended)	5 (suspend)
4	1	5	8	5 (suspended)	5 (suspend)
4	1	6	9	5 (suspended)	5 (suspend)
4	1	7	10	5 (suspended)	5 (suspend)
4	1	8	11	5 (suspended)	5 (suspend)

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5	1	1 (lp1)	12	5 (suspended)	5 (suspend)
5	1	2 (lp2)	13	5 (suspended)	5 (suspend)
5	1	3	14	5 (suspended)	4 (suspend)
5	1	4	15	5 (suspended)	4 (suspend)

Read the Vehicle Criteria Table to determine which vehicle criteria are supported by this device for PVR Studies and filters. This device supports the following device parameters (vehicle criteria): [(Axle Number,pvrStudyMulti), (Number Of Axles, binnedStudy-pvrStudySingle), (Vehicle Class, binnedStudy-pvrStudySingle-filters), (Vehicle Speed, binnedStudy-pvrStudySingle), (Vehicle Length, binnedStudy-pvrStudySingle), (Axle Spacing, binnedStudy-pvrStudyMulti), (Axle Weight, binnedStudy-pvrStudyMulti), (Gross Vehicle Weight, binnedStudy-pvrStudySingle) and (Vehicle Sequence Number, pvrStudySingle), (Array Number, binnedStudy-pvrStudySingle-filters), (Vehicle Time Tag, pvrStudySingle)]. Note that It does not support Axle Number, Vehicle Sequence Number and Vehicle Time Tag for Binned Studies (although not required for this example and probably wouldn't make sense for a Binned Study), but it does support Array Number and Vehicle Class for filters (as required for Array 1 filter).
For the sake of summary, the entire Vehicle Criteria Table has not been shown.

VEHICLE CRITERIA TABLE		
Veh Criteria Index (index 1) RO	Veh Criteria OID R/O	Veh Criteria Support BitMap R/O
1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,04) (Axle Number, dcmAxleNumber)	&h(08) (pvrStudyMulti)
1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,05) (Number Of Axles, dcmNumAxles)	&h(06) (binnedStudy,pvrStudySingle)
2	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	&h(16) (binnedStudy,pvrStudySingle,filters)
3	&h(2B,06,01,04,01,89,36,04,02,dcm,01,07) (Vehicle Speed, dcmVehicleSpeed)	&h(06) (binnedStudy,pvrStudySingle)
4	&h(2B,06,01,04,01,89,36,04,02,dcm,01,08) (Vehicle Length, dcmVehicleLength)	&h(06) (binnedStudy,pvrStudySingle)
5	&h(2B,06,01,04,01,89,36,04,02,dcm,01,0B) (Axle Spacing, dcmAxleSpacing)	&h(0A) (binnedStudy,pvrStudyMulti)
6	&h(2B,06,01,04,01,89,36,04,02,dcm,01,17) (Axle Weight, dcmAxleWeight)	&h(0A) (binnedStudy,pvrStudyMulti)
7	&h(2B,06,01,04,01,89,36,04,02,dcm,01,19) (Gross Vehicle Weight, dcmGrossVehicleWeight)	&h(06) (binnedStudy,pvrStudySingle)
8	&h(2B,06,01,04,01,89,36,04,02,dcm,01,1A) (Vehicle Sequence Number, dcmVehicleSeqNum)	&h(04) (pvrStudySingle)
9	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number, dcmIOArrNum)	&h(16) (binnedStudy,pvrStudySingle,filters)
10	&h(2B,06,01,04,01,89,36,04,02,Global Objects,03,07) (Vehicle Time Tag=Local Controller Time)	&h(04) (pvrStudySingle)
…	…	…

C.3.2.2 Configure Site Information

Set the device date/time (Controller Local Time Object)

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Set the device unique site ID (Unique Site ID Object)

Set the device site description (Maximum Length of Site Description Object, Site Description Object)

Configure the required sensor arrays in the Logical IO to Array Mapping Table:

Logical IO to Array Mapping Table					
Array # (index 1) RO	Logical IO # (index 2) RO	IO Spacing RW	IO Position RW	IO Functionality RW	Row Admin R/W
1	4 (pz1)	0	2 (full)	4 (wimAxle)	1 (active)
1	5 (pz2)	4877mm (16 ft)	2 (full)	4 (wimAxle)	1 (active)
2	12 (lp1)	0	3 (center)	2 (vehiclePresence)	1 (active)
2	13 (lp2)	3658mm (12 ft)	3 (center)	2 (vehiclePresence)	1 (active)

C.3.2.3 Configure General Study

Read the Current Number of Studies: 0 (if this was non-zero, the existing studies would have to be removed from the Study Configuration Table by using the Row Admin column in the Study Configuration Table)

Read the Maximum Number of Studies: 5 (Only 2 studies are required)

Configure the Study Configuration Table:

Two PVR studies are configured, both to store recorded pvr data to the same file (Study File Index) every 60 minutes.

Study Configuration Table							
Study # (index 1) RO	Study Type R/W	Study Start Type R/W	Study Start Date / Time R/W	Study End Type R/W	Study End Date / Time R/W	Study File Index # R/W	Row Admin R/W
1	3 (pvr)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)
2	3 (pvr)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)

Configure Array To Study Mapping Table:
Assigns array 1 to study 1 and array 2 to study 2.

Array to Study Mapping Table

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Study # (index 1) RO	Array # (index 2) RO	Study to Array Enable R/W	Row Admin R/W
1	1	1 (enable)	1 (active)
2	2	1 (enable)	1 (active)

Configure the File Parameter Table:

File Parameter Table							
Study File Index # (index 1) RO	File Structure # (index 2) RO	File Recording Interval RW	File Recording Frequency R/W	FP Logical IO # R/W	Relative Address Flag	File Encoding Code	Row Admin R/W
1	1	3600 (60 minutes)	4 (daily)	3 (SRAM-8MB)	2 (enabled)	3 (oer)	1 (active)

Configure the File Structure Table:

File Structure Table			
File Structure # (index 1) RO	File Structure Index (index 2) RO	Data Element OID R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0A) (Physical To Logical IO Mapping Table,dcmPhysicalLogicalMapTable)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09) (Logical IO To Array Mapping Table, dcmLogicalIOArrayMapTable)	1 (active)
1	3	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
1	4	&h(2B,06,01,04,01,89,36,04,02,dcm,07,07) (File Parameter Table, dcmFPTable)	1 (active)
1	5	&h(2B,06,01,04,01,89,36,04,02,dcm,04,16) (Filter Configuration Table, dcmFilterConfigTable)	1 (active)
1	6	&h(2B,06,01,04,01,89,36,04,02,dcm,05,0B) (Filter To Study Mapping Table, dcmStudyFilterMapTable)	1 (active)
1	7	&h(2B,06,01,04,01,89,36,04,02,dcm,06,0E) (PVR Study Configuration Table, dcmPvrStudyConfigTable)	1 (active)
1	8	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0D) (Logical IO Parameter Table, dcmIOParamTable)	1 (active)
1	9	&h(2B,06,01,04,01,89,36,04,02,dcm,04,0D) (Array Parameter Table, dcmArrayParameterTable)	1 (active)

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C.3.2.4 Configure Study Details

Configure Filter Configuration Table:

Since a filter is defined as including data, the filter must be defined as (Vehicle Class >3 or Vehicle Class < 16) to include only the vehicle classes between 4 and 15.

Filter Configuration Table						
Filter # (index 1) RO	Filter Index (index 2) RO	Filter Criteria (OID Taken From Vehicle Criteria Table) R/W	Filter Relation R/W	Filter Value R/W	Filter Row Relation R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	1 (greaterThan)	03	02 (or)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	2 (lessThan)	16	03 (endOfDef)	1 (active)

Configure Filter to Study Mapping Table:

Apply Filter # 1 to Study # 1 only.

Filter to Study Mapping Table			
Study # (Index 1) RO	Filter # (Index 2) RO	Study to Filter Mapping Relationship R/W	Row Admin R/W
1	1	03 (endOfDef)	1 (active)

Configure PVR Study Configuration Table:

This table defines which vehicle parameters (Vehicle Criteria) will be stored for each vehicle for each study.

PVR Study Configuration Table			
Study # (index 1) RO	PVR Study (index 2) RO	PVR Parameter OID (OID Taken From Vehicle Criteria Table) R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,Global Objects,03,07) (Vehicle Time Tag=Local Controller Time)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,01,1A) (Vehicle Sequence Number, dcmVehicleSeqNum)	1 (active)
1	3	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number,dcmIOArrNum)	1 (active)
1	4	&h(2B,06,01,04,01,89,36,04,02,dcm,01,07) (Vehicle Speed, dcmVehicleSpeed)	1 (active)

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1	5	&h(2B,06,01,04,01,89,36,04,02,dcm,01,06) (Vehicle Class, dcmVehicleClass)	1 (active)
1	6	&h(2B,06,01,04,01,89,36,04,02,dcm,01,05) (Number of Axles, dcmNumAxle)	1 (active)
1	7	&h(2B,06,01,04,01,89,36,04,02,dcm,01,0B) (Axle Spacing, dcmAxleSpacing)	1 (active)
1	8	&h(2B,06,01,04,01,89,36,04,02,dcm,01,17) (Axle Weight, dcmAxleWeight)	1 (active)
2	1	&h(2B,06,01,04,01,89,36,04,02,Global Objects,03,07) (Vehicle Time Tag=Local Controller Time)	1 (active)
2	2	&h(2B,06,01,04,01,89,36,04,02,dcm,01,1A) (Vehicle Sequence Number, dcmVehicleSeqNum)	1 (active)
2	3	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09,01,01) (Array Number,dcmIOArrNum)	1 (active)
2	4	&h(2B,06,01,04,01,89,36,04,02,dcm,01,07) (Vehicle Speed, dcmVehicleSpeed)	1 (active)
2	5	&h(2B,06,01,04,01,89,36,04,02,dcm,01,08) (Vehicle Length, dcmVehicleLength)	1 (active)

C.3.2.5 Verify Proper Operation Of Sensors/Arrays

Verify Sensor Operation:
At this point, the sensor operation should be verified. This can be done by configuring an Event Monitor Study. Once configured and enabled, verify that all sensors are being activated and in the proper order. Read the Logical IO Parameter Table. If there is a problem, the sensors can be fine-tuned by adjusting or adding IO Parameters to the Logical IO Parameter Table.
Note that there may already be default parameters stored in this table set by the device.
The result of this step will be a modified Logical IO Parameter Table:

Logical IO Parameter Table			
Logical IO (index 1) RO	IO Calibration Parameter (index 2) RO	IO Calibration Value R/W	Row Admin R/W
4 (pz1)	4 (sensitivityGain)	50 (50% of maximum)	1 (active)
5 (pz2)	4 (sensitivityGain)	20 (20% of maximum)	1 (active)
12 (lp1)	4 (sensitivityGain)	50 (50% of maximum)	1 (active)
12 (lp1)	15 (sensorLength)	1829 mm (6 ft)	1 (active)
13 (lp2)	4 (sensitivityGain)	50 (50% of maximum)	1 (active)
13 (lp2)	15 (sensorLength)	1829 mm (6 ft)	1 (active)

Verify Sensor Array Operation:
Once the sensors have been verified to be working correctly, disable the Event Monitor Study and configure a Vehicle Monitor Study. Read the Array Parameter Table and Array Speed Calibration Table. This study will be used to perform fine-tuning of the array parameters (Array Parameter Table, Array Speed Calibration Table).
Note that there may already be default parameters stored in these table set by the device.
The result of this step will be modified Array Parameter and Array Speed Calibration Tables:

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Array Parameter Table				
Array # (index 1) RO	Array Parameter Type (index 2) RO	Array Parameter Value R/W	Array Parameter File Name Pointer R/W	Row Admin R/W
1	2 (maxAxleSpacing)	13716 mm (45 ft)		1 (active)
1	6 (wimCalFactor)	75 (.75 of Weight)		1 (active)
1	7 (calFilePointer)		FHWAClassScheme	1 (active)
2	5 (maxVehicleLength)	33529 mm (110 ft)		1 (active)

Array Speed Calibration Table			
First Logical IO Number (index 1) RO	Second Logical IO Number (index 2) RO	Array Speed Calibration Factor	Row Admin R/W
4 (pz1)	5 (pz2)	1150 (1.150, speeds are 15% too low)	1 (active)
12 (lp1)	13 (lp2)	950 (0.950, speeds ar 5% too high)	1 (active)

C.3.2.6 Validate And Start The Recording Study

Validate each of the two studies by setting the Data Recording Control to “validate”. The Data Recording Enable Status will indicate “validating” while the device is verifying the configuration. If there are no errors in the configuration, the device will set the Data Recording Enable Status to “idle”. At this point, the two studies can be started by setting the Data Recording Control to “prime”. The Data Recording Enable Status will indicate “primed” until the next even recording interval. At that time, the Data Recording Enable Status will change to “recording”. Data is now being written to the specified data files.

Data Recording Enable Table		
Study # (index 1) RO	Data Recording Enable Status R/W	Data Recording Control R/W
1	4 (recording)	1 (prime)
2	4 (recording)	1 (prime)

C.3.2.7 Data File Formats

Each day at midnight the device will close the currently open file and create a new data file (since the recording file frequency was set to daily in the File Parameter Table). Each daily data file will consist of a Header Section as specified by the File Structure Table (note that only the rows specific to the studies mapped to this data file will be stored (study 1 and study 2) for each specified table) and a Data Section as specified by the Data Structure Table. The data column in each row of the Data Structure Table will consist of one or more rows as specified by the PVR Study Configuration Table.

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Read the File Directory Structure Table to determine if the file to be downloaded is locked out (File Open flag is set to either 'fileLocked' or 'fileOpenLocked'). If the File Open flag is set to 'fileOpenLocked', the file can be downloaded by first closing the open file. In this example, the file to be downloaded has already been closed.

Each object specified in the File Parameter Table for study 1 and study 2 will be stored in the data file as an [(OID) (Value)] pair. The (OID) and (Value) will be encoded using OER as specified in the File Encoding Field of the File Parameter Table. The OID's are shortened after the Relative Addressing Object has been encountered. Only the rows specific to the studies mapped to each data file will be stored with each specified table. All columns must be stored with each table row.

For the purposes of this example, the following table identifies the made-up vehicle data for a full 24 hour period that will be used (note that this is not a realistic scenario as there is no vehicle activity from 03:16am until midnight and this example only shows a small number of vehicles on each array):

Time Tag hh:mm	Veh Seq. Num	Array Num	Veh. Speed (cm/s)	Veh. Length (cm)	Veh. Class	Num Axles	Axle Spacing/s (cm)	Axle Weights (kg)
00:05	1	1	54 mph (2414=h096e cm/s)	22 ft. (670=h29e cm)	4	2	21ft. (640=0280h cm)	1900 lbs. (862=h035e kg) 2500 lbs. (1134=h046e kg)
00:07	2	2	65 mph (2906=h0b5a cm/s)	16 ft. (488=01e8 cm)				
00:15	3	1	51 mph (2280=h08e8 cm/s)	21 ft. (640=h280 cm)	6	3	15 ft. (457=h01c9cm) 5 ft. (152=h098cm)	9800 lbs. (4445=h115d kg) 4100 lbs. (1860=h0744 kg) 4150 lbs. (1882=h075a kg)
00:27	4	2	71 mph (3174=h0c66cm/s)	14 ft. (427=h01ab cm)				
02:04	5	1	74 mph (3308=h0cec cm/s)	37 ft. (229=0e5cm)	8	3	12 ft. (366=h016e cm) 23 ft. (701=h02bd cm)	8500 lbs. (3856=h0f10 kg) 13000 lbs. (5897=h1709 kg) 9700 lbs. (4400=h1130kg)
03:16	6	2	72 mph (3219=h0c93 cm/s)	15 ft. (457=h01c9cm)				

Since the recording interval was set to 60 minutes, there will be 24 data packets included in each daily file for each study (a total of 48 data packets for each day). Any data packet that does not include vehicles (e.g. 01:00 – 02:00) will contain a data packet for that time frame with the 'Number Of Records' field in the Data Structure Table set to 0 and the 'Data' field set to an Octet String of 0 octet length.

?? ?? ?? ?? will be used in place of the actual Local Controller Time for (Start Date/Time of data packet, End Date/Time of data packet)

It is important to note that the Data Structure Table is not intended to be manipulated by the central application. It is only included as an ASN.1 table to define the structure to store the raw data (binned counts) to a data file.

The encoding of each daily data file for both study 1 and study 2 is shown in the following table. Although these studies were specifically configured to use OER encoding, the table shows both the BER and OER encodings for completeness.

The row numbers shown in the ASN.1 encoding for each table row are in decimal. All of the data shown in the BER and OER columns are in hexadecimal.

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ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 82 09 ae	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 dcm 0a	0b 2b 06 01 04 01 89 36 04 02 dcm 0a
dcmMibVersionNumber-value=1.00	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 82 04 28	31
OidValuePair1::=SEQUENCE	30 82 04 24	
oid1=**dcmRelativeAddrOID**	06 0b 2b 06 01 04 01 89 36 04 02 dcm 09	0b 2b 06 01 04 01 89 36 04 02 dcm 09
value1=dcm node	06 0a 2b 06 01 04 01 89 36 04 02 dcm	0a 2b 06 01 04 01 89 36 04 02 dcm
oid2=**dcmPhysicalLogicalMapTable**	06 02 02 0a	02 02 0a
value2::=SEQUENCE (row 1,2,1)	30 12	
dcmPLMIOBoardNum	02 01 01	01
dcmPLMIOBoardFunction	02 01 02	02
dcmPhysicalIONumber	02 01 01	01
dcmPLMLogIONum	02 01 01	01
dcmPhysicalLogicalIOStatus	02 01 01	01
dcmPhysicalLogicalIOControl	02 01 01	01
oid3=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value3::=SEQUENCE (row 2,2,1)	30 12	
dcmPLMIOBoardNum	02 01 02	02
dcmPLMIOBoardFunction	02 01 02	02
dcmPhysicalIONumber	02 01 01	01
dcmPLMLogIONum	02 01 02	02
dcmPhysicalLogicalIOStatus	02 01 01	01
dcmPhysicalLogicalIOControl	02 01 01	01
oid4=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value4::=SEQUENCE (row 3,1,1)	30 12	
dcmPLMIOBoardNum	02 01 03	03
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 01	01
dcmPLMLogIONum	02 01 03	03
dcmPhysicalLogicalIOStatus	02 01 01	01
dcmPhysicalLogicalIOControl	02 01 01	01
oid5=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value5::=SEQUENCE (row 4,1,1)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 01	01
dcmPLMLogIONum	02 01 04	04
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid6=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a

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value6::=SEQUENCE (row 4,1,2)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 02	02
dcmPLMLogIONum	02 01 05	05
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid7=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value7::=SEQUENCE (row 4,1,3)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 03	03
dcmPLMLogIONum	02 01 06	06
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid8=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value8::=SEQUENCE (row 4,1,4)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 04	04
dcmPLMLogIONum	02 01 07	07
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid9=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value9::=SEQUENCE (row 4,1,5)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 05	05
dcmPLMLogIONum	02 01 08	08
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid10=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value10::=SEQUENCE (row 4,1,6)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 06	06
dcmPLMLogIONum	02 01 09	09
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid11=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value11::=SEQUENCE (row 4,1,7)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01

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dcmPhysicalIONumber	02 01 07	07
dcmPLMLogIONum	02 01 0a	0a
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid12=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value12::=SEQUENCE (row 4,1,8)	30 12	
dcmPLMIOBoardNum	02 01 04	04
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 08	08
dcmPLMLogIONum	02 01 0b	0b
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid13=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value13::=SEQUENCE (row 5,1,1)	30 12	
dcmPLMIOBoardNum	02 01 05	05
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 01	01
dcmPLMLogIONum	02 01 0c	0c
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid14=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value14::=SEQUENCE (row 5,1,2)	30 12	
dcmPLMIOBoardNum	02 01 05	05
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 02	02
dcmPLMLogIONum	02 01 0d	0d
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid15=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value15::=SEQUENCE (row 5,1,3)	30 12	
dcmPLMIOBoardNum	02 01 05	05
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 03	03
dcmPLMLogIONum	02 01 0e	0e
dcmPhysicalLogicalIOStatus	02 01 05	05
dcmPhysicalLogicalIOControl	02 01 05	05
oid16=dcmPhysicalLogicalMapTable	06 02 02 0a	02 02 0a
value16::=SEQUENCE (row 5,1,4)	30 12	
dcmPLMIOBoardNum	02 01 05	05
dcmPLMIOBoardFunction	02 01 01	01
dcmPhysicalIONumber	02 01 04	04
dcmPLMLogIONum	02 01 0f	0f
dcmPhysicalLogicalIOStatus	02 01 05	05

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dcmPhysicalLogicalIOControl	02 01 05	05
oid17=**dcmLogicalIOArrayMapTable**	06 02 04 09	02 04 09
value17::=SEQUENCE (row 1,4)	30 12	
dcmIOAMArrNum	02 01 01	01
dcmIOAMIONum	02 01 04	04
dcmIOSpacing	02 01 00	00 00
dcmIOPosition	02 01 02	02
dcmIOFunctionality	02 01 04	04
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid18=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value18::=SEQUENCE (row 1,5)	30 13	
dcmIOAMArrNum	02 01 01	01
dcmIOAMIONum	02 01 05	05
dcmIOSpacing	02 02 13 0d	13 0d
dcmIOPosition	02 01 02	02
dcmIOFunctionality	02 01 04	04
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid19=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value19::=SEQUENCE (row 2,12)	30 12	
dcmIOAMArrNum	02 01 02	02
dcmIOAMIONum	02 01 0c	0c
dcmIOSpacing	02 01 00	00 00
dcmIOPosition	02 01 03	03
dcmIOFunctionality	02 01 02	02
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid20=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value20::=SEQUENCE (row 2,13)	30 13	
dcmIOAMArrNum	02 01 02	02
dcmIOAMIONum	02 01 0d	0d
dcmIOSpacing	02 02 0e 4a	0e 4a
dcmIOPosition	02 01 03	03
dcmIOFunctionality	02 01 02	02
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid21=**dcmStudyConfigTable**	06 02 05 05	02 05 05
value21::=SEQUENCE (row 1)	30 1e	
dcmSCStudyNum	02 01 01	01
dcmStudyType	02 01 03	03
dcmStartType	02 01 03	03
dcmStartDateTime=don't care	41 04 xx xx xx xx	xx xx xx xx
dcmEndType	02 01 02	02
dcmEndDateTime	41 04 xx xx xx xx	xx xx xx xx
dcmSCFileStudyIndex	02 01 01	01

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dcmStudyConfigRowAdmin	02 01 01	01
oid22=dcmStudyConfigTable	06 02 05 05	05 05
value22::=SEQUENCE (row 2)	30 1e	
dcmSCStudyNum	02 01 02	02
dcmStudyType	02 01 03	03
dcmStartType	02 01 03	03
dcmStartDateTime=don't care	41 04 xx xx xx xx	xx xx xx xx
dcmEndType	02 01 02	02
dcmEndDateTime	41 04 xx xx xx xx	xx xx xx xx
dcmSCFileStudyIndex	02 01 01	01
dcmStudyConfigRowAdmin	02 01 01	01
oid23=**dcmFPTable**	06 02 07 07	02 07 07
value23::=SEQUENCE (row 1,1)	30 19	
dcmFPFileStudyIndex	02 01 01	01
dcmFPFileStrucNum	02 01 01	01
dcmFPRecInt	02 02 0e 10	00 0e 10
dcmFPFileFreq	02 01 04	04
dcmFPLogicalIONumber	02 01 03	03
dcmFPRelativeAddrFlag	02 01 02	02
dcmFPEncodingCode	02 01 03	03
dcmFPRowAdmin	02 01 01	01
oid24=**dcmFilterConfigTable**	06 02 04 16	02 04 16
value24::=SEQUENCE (row 1,1)	30 20	
dcmFCFilterNum	02 01 01	01
dcmFilterIndex	02 01 01	01
dcmFilterCriteria=Vehicle Class	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 06	0c 2b 06 01 04 01 89 36 04 02 dcm 01 06
dcmFilterRelation	02 01 01	01
dcmFilterValue	02 01 03	00 00 00 03
dcmFilterRowRelation	02 01 02	02
dcmFilterConfRowAdmin	02 01 01	01
oid25=dcmFilterConfigTable	06 02 04 16	02 04 16
value25::=SEQUENCE (row 1,2)	30 20	
dcmFCFilterNum	02 01 01	01
dcmFilterIndex	02 01 02	02
dcmFilterCriteria=Vehicle Class	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 06	0c 2b 06 01 04 01 89 36 04 02 dcm 01 06
dcmFilterRelation	02 01 02	02
dcmFilterValue	02 01 10	00 00 00 10
dcmFilterRowRelation	02 01 03	03
dcmFilterConfRowAdmin	02 01 01	01
oid26=**dcmStudyFilterMapTable**	06 02 05 0b	02 05 0b
value26::=SEQUENCE (row 1,1)	30 0c	
dcmSFMStudyNum	02 01 01	01

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dcmSFMFilterNum	02 01 01	01
dcmStudyFilterRelation	02 01 03	03
dcmStudyFilterMapRowAdmin	02 01 01	01
oid27=**dcmPvrStudyConfigTable**	06 02 06 0e	02 06 0e
Value27::=SEQUENCE (row 1,1)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 01	01
dcmPvrParam=Local Controller Time	06 0c 2b 06 01 04 01 89 36 04 02 GlobalObjects 03 07	0c 2b 06 01 04 01 89 36 04 02 GlobalObjects 03 07
dcmStudyConfigRowAdmin	02 01 01	01
oid28=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value28::=SEQUENCE (row 1,2)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 02	02
dcmPvrParam=Vehicle Sequence Number	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 1a	0c 2b 06 01 04 01 89 36 04 02 dcm 01 1a
dcmStudyConfigRowAdmin	02 01 01	01
oid29=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value29::=SEQUENCE (row 1,3)	30 19	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 03	03
dcmPvrParam=Array Number	06 0e 2b 06 01 04 01 89 36 04 02 dcm 04 09 01 01	0e 2b 06 01 04 01 89 36 04 02 dcm 04 09 01 01
dcmStudyConfigRowAdmin	02 01 01	01
oid30=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value30::=SEQUENCE (row 1,4)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 04	04
dcmPvrParam=Vehicle Speed	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 07	0c 2b 06 01 04 01 89 36 04 02 dcm 01 07
dcmStudyConfigRowAdmin	02 01 01	01
oid31=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value31::=SEQUENCE (row 1,5)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 05	05
dcmPvrParam=Vehicle Class	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 06	0c 2b 06 01 04 01 89 36 04 02 dcm 01 06
dcmStudyConfigRowAdmin	02 01 01	01
oid32=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value32::=SEQUENCE (row 1,6)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 06	06
dcmPvrParam=Number Of Axles	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 05	0c 2b 06 01 04 01 89 36 04 02 dcm 01 05
dcmStudyConfigRowAdmin	02 01 01	01
oid33=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value33::=SEQUENCE (row 1,7)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 07	07

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dcmPvrParam=Axle Spacing	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 0b	0c 2b 06 01 04 01 89 36 04 02 dcm 01 0b
dcmStudyConfigRowAdmin	02 01 01	01
oid34=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value34::=SEQUENCE (row 1,8)	30 17	
dcmPSCStudyNum	02 01 01	01
dcmPvrStudyIndex	02 01 08	08
dcmPvrParam=Axle Weight	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 17	0c 2b 06 01 04 01 89 36 04 02 dcm 01 17
dcmStudyConfigRowAdmin	02 01 01	01
oid35=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value35::=SEQUENCE (row 2,1)	30 17	
dcmPSCStudyNum	02 01 02	02
dcmPvrStudyIndex	02 01 01	01
dcmPvrParam=Local Controller Time	06 0c 2b 06 01 04 01 89 36 04 02 GlobalObjects 03 07	0c 2b 06 01 04 01 89 36 04 02 GlobalObjects 03 07
dcmStudyConfigRowAdmin	02 01 01	01
oid36=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value36::=SEQUENCE (row 2,2)	30 17	
dcmPSCStudyNum	02 01 02	02
dcmPvrStudyIndex	02 01 02	02
dcmPvrParam=Vehicle Sequence Number	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 1a	0c 2b 06 01 04 01 89 36 04 02 dcm 01 1a
dcmStudyConfigRowAdmin	02 01 01	01
oid37=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value37::=SEQUENCE (row 2,3)	30 19	
dcmPSCStudyNum	02 01 02	02
dcmPvrStudyIndex	02 01 03	03
dcmPvrParam=Array Number	06 0e 2b 06 01 04 01 89 36 04 02 dcm 04 09 01 01	0e 2b 06 01 04 01 89 36 04 02 dcm 04 09 01 01
dcmStudyConfigRowAdmin	02 01 01	01
oid38=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value38::=SEQUENCE (row 2,4)	30 17	
dcmPSCStudyNum	02 01 02	02
dcmPvrStudyIndex	02 01 04	04
dcmPvrParam=Vehicle Speed	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 07	0c 2b 06 01 04 01 89 36 04 02 dcm 01 07
dcmStudyConfigRowAdmin	02 01 01	01
oid39=dcmPvrStudyConfigTable	06 02 06 0e	02 06 0e
value39::=SEQUENCE (row 2,5)	30 17	
dcmPSCStudyNum	02 01 02	02
dcmPvrStudyIndex	02 01 05	05
dcmPvrParam=Vehicle Length	06 0c 2b 06 01 04 01 89 36 04 02 dcm 01 08	0c 2b 06 01 04 01 89 36 04 02 dcm 01 08
dcmStudyConfigRowAdmin	02 01 01	01
oid40=**dcmIOParamTable**	06 02 02 0d	02 02 0d
value40::=SEQUENCE (row 4,4)	30 0c	
dcmIOPNum	02 01 04	04
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32

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dcmIOParamRowAdmin	02 01 01	01
oid41=dcmIOParamTable	06 02 02 0d	02 02 0d
value41::=SEQUENCE (row 5,4)	30 0c	
dcmIOPNum	02 01 05	05
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 14	02 01 14
dcmIOParamRowAdmin	02 01 01	01
oid42=dcmIOParamTable	06 02 02 0d	02 02 0d
value42::=SEQUENCE (row 12,4)	30 0c	
dcmIOPNum	02 01 0c	0c
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid43=dcmIOParamTable	06 02 02 0d	02 02 0d
value43::=SEQUENCE (row 12,15)	30 0d	
dcmIOPNum	02 01 0c	0c
dcmIOPTyp	02 01 0f	0f
dcmIOPVal	02 02 07 25	02 02 07 25
dcmIOParamRowAdmin	02 01 01	01
oid44=dcmIOParamTable	06 02 02 0d	02 02 0d
value44::=SEQUENCE (row 13,4)	30 0c	
dcmIOPNum	02 01 0d	0d
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid45=dcmIOParamTable	06 02 02 0d	02 02 0d
value45::=SEQUENCE (row 13,15)	30 0d	
dcmIOPNum	02 01 0d	0d
dcmIOPTyp	02 01 0f	0f
dcmIOPVal	02 02 07 25	02 02 07 25
dcmIOParamRowAdmin	02 01 01	01
oid46=**dcmArrayParameterTable**	06 02 04 0d	02 04 0d
value46::=SEQUENCE (row 1,2)	30 0f	
dcmAPArrNum	02 01 01	01
dcmAPType	02 01 02	02
dcmAPValue	02 02 35 94	02 03 00 35 94
dcmAPFileName="" (0 octet size)	04 00	04 00
dcmArrayParameterRowAdmin	02 01 01	01
oid47=dcmArrayParameterTable	06 02 04 0d	02 04 0d
value47::=SEQUENCE (row 1,6)	30 0e	
dcmAPArrNum	02 01 01	01
dcmAPType	02 01 06	06
dcmAPValue	02 01 4b	02 03 00 00 4b

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dcmAPFileName="" (0 octet size)	04 00	04 00
dcmArrayParameterRowAdmin	02 01 01	01
oid48=dcmArrayParameterTable	06 02 04 0d	02 04 0d
value48::=SEQUENCE (row 1,7)	30 1d	
dcmAPArrNum	02 01 01	01
dcmAPType	02 01 07	07
dcmAPValue	02 01 00	02 03 00 00 00
dcmAPFileName="FHWAClassScheme"	04 0f 46 48 57 41 43 6c 61 73 73 53 63 68 65 6d 65	04 0f 46 48 57 41 43 6c 61 73 73 53 63 68 65 6d 65
dcmArrayParameterRowAdmin	02 01 01	01
oid49=dcmArrayParameterTable	06 02 04 0d	02 04 0d
value49::=SEQUENCE (row 2,5)	30 0f	
dcmAPArrNum	02 01 02	02
dcmAPType	02 01 05	05
dcmAPValue	02 02 82 f9	02 03 00 82 f9
dcmAPFileName="" (0 octet size)	04 00	04 00
dcmArrayParameterRowAdmin	02 01 01	01
DataFileData::=		
OidValuePair2::=SEQUENCE	30 82 05 6e	
Oid1=**dcmDataStructureTable**	06 02 06 1e	02 06 1e
value1::=SEQUENCE OF	30 82 05 66	30
SEQUENCE (row 1,1)	30 42	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/06/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=2	02 01 02	00 00 02
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING Veh. Data (00:05) Veh. Data (00:15)	 04 28 ?? ?? ?? ??,01,01,09 6e,04,02,01-02 80,02-03 5e 04 6e ?? ?? ?? ??,03,01,08 e8,06,03,02-01 c9 09 8c,03-11 5d 07 44 07 5a	 28 ?? ?? ?? ??,01,01,09 6e,04,02,01-02 80,02-03 5e 04 6e ?? ?? ?? ??,03,01,08 e8,06,03,02-01 c9 09 8c,03-11 5d 07 44 07 5a
SEQUENCE (row 2,1)	30 2e	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/06/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=2	02 01 02	00 00 02
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING Veh. Data (00:07)	 04 14 ?? ?? ?? ??,02,02,0b 5a,01 e8	 14 ?? ?? ?? ??,02,02,0b 5a,01 e8

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Veh. Data (00:27)	?? ?? ?? ??,04,02,0c 66,01 ab	?? ?? ?? ??,04,02,0c 66,01 ab
SEQUENCE (row 1,2)	30 1a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=2	02 01 02	02
dcmStartTime=(05/06/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 2,2)	30 1a	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=2	02 01 02	02
dcmStartTime=(05/06/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 1,3)	30 30	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=3	02 01 03	03
dcmStartTime=(05/06/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 03:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING Veh. Data (02:04)	04 16 ?? ?? ?? ??,05,01,0c ec,08,03,02-01 6e 02 bd,03-0f 10 17 09 11 30	16 ?? ?? ?? ??,05,01,0c ec,08,03,02-01 6e 02 bd,03-0f 10 17 09 11 30
SEQUENCE (row 2,3)	30 1a	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=3	02 01 03	03
dcmStartTime=(05/06/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 03:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING	04 00	00

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No Veh. Data For This Study During This Period.		
SEQUENCE (row 1,4)	30 1a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=4	02 01 04	04
dcmStartTime=(05/06/2003 03:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 04:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 2,4)	30 24	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=4	02 01 04	04
dcmStartTime=(05/06/2003 03:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 04:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING Veh. Data (03:16)	04 0a ?? ?? ?? ??,06,02,0c 93,01 c9	0a ?? ?? ?? ??,06,02,0c 93,01 c9
SEQUENCE (row 1,5)	30 1a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=5	02 01 05	05
dcmStartTime=(05/06/2003 04:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 05:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 2,5)	30 1a	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=5	02 01 05	05
dcmStartTime=(05/06/2003 04:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 05:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING	04 00	00

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No Veh. Data For This Study During This Period.		
SEQUENCE (row 1,6)	30 1a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=6	02 01 06	06
dcmStartTime=(05/06/2003 05:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 06:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 2,6)	30 1a	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=6	02 01 06	06
dcmStartTime=(05/06/2003 05:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 06:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
… (and so forth for Study 1 down to) …	**…**	**…**
… (and so forth for Study 2 down to) …	**…**	**…**
SEQUENCE (row 1,23)	30 1a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=23	02 01 17	17
dcmStartTime=(05/06/2003 22:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 2,23)	30 1a	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=23	02 01 17	17
dcmStartTime=(05/06/2003 22:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/06/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00

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dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 1,24)	30 1a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=24	02 01 18	18
dcmStartTime=(05/06/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/07/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
SEQUENCE (row 2,24)	30 1a	
dcmDSStudyNum=2	02 01 02	02
dcmDataStrucIndex=24	02 01 18	18
dcmStartTime=(05/06/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/07/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=PVR Data Packet OCTET STRING No Veh. Data For This Study During This Period.	04 00	00
TOTAL NUMBER OF OCTETS REQUIRED (in decimal) (not part of the data file):	2482 octets	1477 octets

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C.3.3 EVENT STUDY EXAMPLE (INFORMATIVE)

Event studies are studies in which an event (a change of state of a Logical IO), is stored in a data file with no processing. Generally the data will contain information to identify a time tag, the Logical IO, and the changed state that has occurred. The time associated with an event may be relative to a timer event added to the data at regular intervals or it may contain a full time tag. Where appropriate, the event may also contain the value of that input, such as a raw weight value for a WIM sensor or temperature value read from a temperature sensor.

In this example, a portable event counter with four air switches is used to collect data in two lanes of opposing traffic. The equipment has an integrated CPU board that contains the communications port and four air switches. It also has a separate flash card that can be used to store the events to a data file. The physical sensor configuration consists of two tubes covering the first lane and two tubes that are extended across both lanes. The unit will be configured to timestamp each sensor input relative to a timer event that is placed in the data file every 6 seconds.

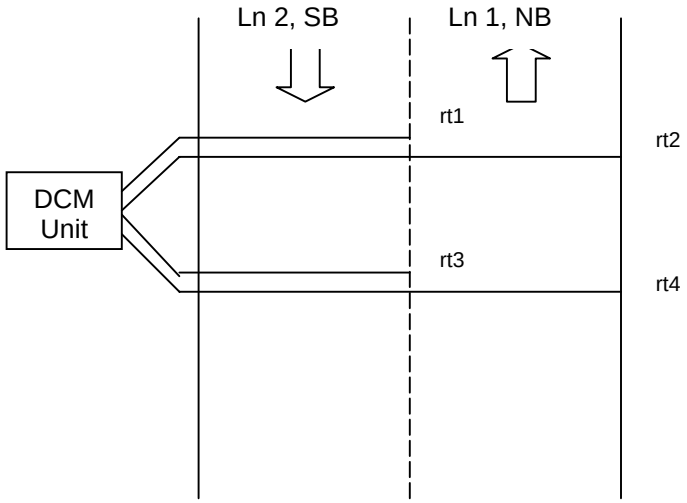


Figure C-3: Event Study Sensor Array

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C.3.3.1 Determine Device Capabilities

First read the IO Board Configuration Table (this table has been configured by the device). This device is fitted with two IO boards.
The first IO board has a CPU (2), airswitches or road tube inputs(9), storage media (3), communications (6), keyboard (7), display (8) and a timer (26).
The second IO board contains only a storage media (3).
All the board functions are enabled (1) except for the onboard SRAM (disabled) and the four air switches which are suspended (suspended indicates that they are not required for the current device configuration) as indicated by the IO Board Status column.
Note that the user cannot control any of the IO board peripherals in this device as indicated by the IO Board Control column (set to 'notSupported').
The IO Board Configuration Table indicates that there are sufficient IO available to configure the desired event study (4 air switches, storageMedia, and a timer).

IO Board Configuration Table

IO Board # (index 1) R/O	IO Board Function (index 2) R/O	Number Of IO R/O	IO Board Function Type R/O	Mfg. IO Board Description R/O	IO Board Status R/O	IO Board Control R/W
1	1	1	2 (cpu)	CPU v1.2	1 (enabled)	1 (notSupported)
1	2	4	9 (roadTube)	Four air switches	5 (suspended)	1 (notSupported)
1	3	1	3 (storageMedia)	32K SRAM 0	2 (disabled)	1 (notSupported)
1	4	1	6 (comms)	DB-9 Modified RS232	1 (enabled)	1 (notSupported)
1	5	1	7(keyboard)	Buttons	1 (enabled)	1 (notSupported)
1	6	1	8 (display)	LEDs	1 (enabled)	1 (notSupported)
1	7	1	26 (timer)	Timer (1ms)	1 (enabled)	1 (notSupported)
2	1	1	3 (storageMedia)	Flash Memory 2048K 0	1 (enabled)	1 (notSupported)

Read the Physical to Logical IO Mapping Table to determine the Logical IO Number assigned to each required IO. Note that all IO board peripherals may not be assigned a Logical IO Number if they are not required to be used.

Physical to Logical IO Mapping Table

IO Board # (index 1) R/O	IO Board Function (index 2) R/O	Physical IO Number (index 3) R/O	Logical IO # R/O	IO Status R/O	IO Control R/W
1	2	1 (rt1)	1	5 (suspended)	5 (suspend)
1	2	2 (rt2)	2	5 (suspended)	5 (suspend)
1	2	3 (rt3)	3	5 (suspended)	5 (suspend)
1	2	4 (rt4)	4	5 (suspended)	5 (suspend)
1	4	1 (commsChannel)	5	1 (enabled)	2 (enable)
1	6	1 (display)	6	1 (enabled)	2 (enable)
1	7	1 (timer)	7	1 (enabled)	2 (enable)
2	1	1 (storageMedia)	8	1 (enabled)	2 (enable)

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Note the the Vehicle Criteria Table does not need to be read for Event Studies.

C.3.3.2 Configure Site Information

Set the device date/time (Controller Local Time Object)

Set the device unique site ID (Unique Site ID Object)

Set the device site description (Maximum Length of Site Description Object, Site Description Object)

Configure the required sensor arrays in the Logical IO to Array Mapping Table:

The Logical IO to Array Mapping Table is configured in an Event Study for the purposes of post-processing and verification that the sensors are working correctly. Array 1 will use road tubes 1 and 3 (logical IO# 1 and 3) to collect event data for vehicle processing in the near lane. Array 2 will use all four road tubes (logical IO #1-4) to collect event data for vehicle processing. Note that even though road tubes 1 and 3 are not physically in the lane that Array 2 is monitoring the data from those inputs are necessary to isolate events occurring in the far lane.

Logical IO to Array Mapping Table					
Array # (index 1) RO	Logical IO # (index 2) RO	IO Spacing RW	IO Position RW	IO Functionality RW	Row Admin R/W
1	1 (rt1)	0	2 (full)	3 (axle)	1 (active)
1	3 (rt3)	4877 mm (16 ft)	2 (full)	3 (axle)	1 (active)
2	1 (rt1)	0	2 (full)	6 (negativeAxle)	1 (active)
2	2 (rt2)	457 mm (1.5 ft)	4 (multiple)	3 (axle)	1 (active)
2	3 (rt3)	4877 mm (16 ft)	2 (full)	6 (negativeAxle)	1 (active)
2	4 (rt4)	5334 mm (17.5 ft)	4 (multiple)	3 (axle)	1 (active)

C.3.3.3 Configure General Study

Read the Current Number of Studies: 0 (if this was non-zero, the existing studies would have to be removed from the Study Configuration Table by using the Row Admin column in the Study Configuration Table)

Read the Maximum Number of Studies:1 (Only 1 study is required)

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Configure the Study Configuration Table:

Study Configuration Table							
Study # (index 1) RO	Study Type R/W	Study Start Type R/W	Study Start Date / Time R/W	Study End Type R/W	Study End Date / Time R/W	Study File Index # R/w	Row Admin R/W
1	4 (event)	2 (now)	don't care	2 (never)	don't care	1	1 (active)

The Array To Study Mapping Table does not need to be configured for an Event Study.

Configure the File Parameter Table:

File Parameter Table							
Study File Index # (index 1) RO	File Structure # (index 2) RO	File Recording Interval RW	File Recording Frequency R/W	FP Logical IO # R/W	Relative Address Flag	File Encoding Code	Row Admin
1	1	&h(ff,ff,ff,ff) (max value)	8 (continuous)	8 (2048K Flash Memory)	2 (enabled)	3 (oer)	1 (active)

Configure the File Structure Table:

File Structure Table			
File Structure # (index 1) RO	File Structure Index (index 2) RO	Data Element OID R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0D) (Logical IO Parameter Table, dcmIOParamTable)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09) (Logical IO To Array Mapping Table, dcmLogicalIOArrayMapTable)	1 (active)
1	3	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
1	4	&h(2B,06,01,04,01,89,36,04,02,dcm,06,11) (Event Study Configuration Table, dcmEventStudyConfigTable)	1 (active)
1	5	&h(2B,06,01,04,01,89,36,04,02,dcm,06,14) (Event To Logical IO Mapping Table, dcmEventConfigTable)	1 (active)

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C.3.3.4 Configure Study Details

Configure Event Study Configuration Table:

The next area to be configured is how the events will be recorded. The Event Number Size is set to 3 bits which allows for up to seven events. Only five events are required (four air switch inputs and one timer).
The Timer Event Max Period is set to 6000ms (6 seconds) to allow for a 6 second time stamp.

Event Study Configuration Table			
Study # (index 1) RO	Event NumberSize R/W	Timer Event Max Period R/W	Row Admin
1	3 bits	6000 ms	1 (active)

Configure the Event To Logical IO Mapping Table:

The Event To Logical IO Mapping Table is used to map a Logical IO to the lowest set of Event Numbers to minimize the number of bits required to store the Event Number.

Logical IO Numbers 1-4 are mapped to Event #'s 0-3. Logical IO Number 7 is mapped to Event # 4.

The Logical IO State is set to 'on' for all events. This will cause an event to be saved to the data file each time it is turned on.

The Event Value Size is set to 0 bits for Event #'s 0-3 (air switches) since there is no value associated with each airswitch.
The Event Value Size is set to 13 bits for Logical Event # 4 (timer). This number represents the number of 'timer' events which have occurred. 13 bits allows for 8192 timer events which equates to 8192*(6 seconds for each timer event)=49152 seconds=819.2 minutes=34.13 days at which time the Event Value will wrap around to 0. If this example was creating daily files, this number could have been reset to 0 each day.

The Timestamp Size is set to 13 bits for Event #'s 0-3 (air switches) which allows for a time tag from 0 to 5999 (8191 maximum with 13 bits). This will be used to determine the time (in milliseconds) in which each event occurred relative to the last timer event in the data file (which occurs every 6 seconds).

These two tables define an IO event record (for the data portion of an event data packet) as consisting of the Event Number (3 bits), Event Value (0 bits for event #'s 0 to 3, 13 bits for event # 4) and a Timestamp (13 bits for event #'s 0 to 3, 0 bits for event # 4)).

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Event To Logical IO Mapping Table							
Study # (index 1) RO	Event Config # (index 2) RO	Event #	Logical IO #	Logical IO State	Event Value Size	Timestamp Size	Row Admin
1	1	0	1 (rt1)	2 (on)	0 bits	13 bits	1 (active)
1	2	1	2 (rt2)	2 (on)	0 bits	13 bits	1 (active)
1	3	2	3 (rt3)	2 (on)	0 bits	13 bits	1 (active)
1	4	3	4 (rt4)	2 (on)	0 bits	13 bits	1 (active)
1	5	4	7 (timer)	2 (on)	13 bits	0 bits	1 (active)

C.3.3.5 Verify Proper Operation Of Sensors/Arrays

Verify Sensor Operation:

At this point, the sensor operation should be verified. This can be done by configuring an Event Monitor Study. Once configured and enabled, verify that all sensors are being activated and in the proper order. Read the Logical IO Parameter Table. If there is a problem, the sensors can be fine-tuned by adjusting or adding IO Parameters to the Logical IO Parameter Table.
Note that there may already be default parameters stored in this table set by the device.
The result of this step will be a modified Logical IO Parameter Table:

Logical IO Parameter Table			
Logical IO (index 1) RO	IO Calibration Parameter (index 2) RO	IO Calibration Value R/W	Row Admin R/W
1 (rt1)	4 (sensitivityGain)	50 (50% of full scale)	1 (active)
2 (rt2)	4 (sensitivityGain)	50 (50% of full scale)	1 (active)
3 (rt3)	4 (sensitivityGain)	50 (50% of full scale)	1 (active)
4 (rt4)	4 (sensitivityGain)	50 (50% of full scale)	1 (active)
1 (rt1)	3 (deadtime)	30 ms	1 (active)
2 (rt2)	3 (deadtime)	30 ms	1 (active)
3 (rt3)	3 (deadtime)	30 ms	1 (active)
4 (rt4)	3 (deadtime)	30 ms	1 (active)

Verify Sensor Array Operation:

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Although it may not be necessary to verify the sensors are working correctly in a sensor array configuration for an Event Study, post-processing software may require to have the array parameters for correct processing of vehicles. This will also give the user a level of confidence that everything is configured properly.

Once the sensors have been verified to be working correctly, disable the Event Monitor Study and configure a Vehicle Monitor Study. Read the Array Parameter Table and Array Speed Calibration Table. This study will be used to perform fine-tuning of the array parameters (Array Parameter Table, Array Speed Calibration Table).
Note that there may already be default parameters stored in these table set by the device.
The result of this step will be modified Array Parameter and Array Speed Calibration Tables:

Array Parameter Table				
Array # (index 1) RO	Array Parameter Type (index 2) RO	Array Parameter Value R/W	Array Parameter File Name Pointer R/W	Row Admin R/W
1	2 (maxAxleSpacing)	13716 mm (45 ft)		1 (active)
2	2 (maxAxleSpacing)	10668 mm (35 ft)		1 (active)

Array Speed Calibration Table			
First Logical IO Number (index 1) RO	Second Logical IO Number (index 2) RO	Array Speed Calibration Factor	Row Admin R/W
1 (rt1)	3 (rt3)	1150 (1.150, speeds are 15% too low)	1 (active)
2 (rt2)	4 (rt4)	950 (0.950, speeds ar 5% too high)	1 (active)

C.3.3.6 Validate And Start The Recording Study

Validate the study by setting the Data Recording Control to “validate”. The Data Recording Enable Status will indicate “validating” while the device is verifying the configuration. If there are no errors in the configuration, the device will set the Data Recording Enable Status to “idle”. At this point, the study can be started by setting the Data Recording Control to “prime”. The Data Recording Enable Status will go directly to indicate “recording” since the “Start Type” was set to “now” in the Study Configuration Table. Data is now being written to the specified data files.

Data Recording Enable Table		
Study # (index 1) RO	Data Recording Enable Status R/W	Data Recording Control R/W
1	4 (recording)	1 (prime)

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C.3.3.7 Data File Formats

There will be one data file produced for this study (File Recording Frequency was set to continuous in the File Parameter Table).

Read the File Directory Structure Table to determine if the file to be downloaded is locked out (File Open flag is set to either 'fileLocked' or 'fileOpenLocked'). If the File Open flag is set to 'fileOpenLocked', the file can be downloaded by first closing the open file. In this example, the file to be downloaded is still open and is set to 'fileOpenLocked' because it is being written to a FLASH storage media that cannot be updated without erasing the storage media.
This data file can only be downloaded by first quitting recording (setting the Data Recording Control column in the Data Recording Table to 'quitRecording').

The single data file will have a header consisting of the each object specified in the File Parameter Table for study 1 and will be stored in the data file as an [(OID) (Value)] pair. The (OID) and (Value) will be encoded using OER as specified in the File Encoding Field of the File Parameter Table. The OID's are shortened after the Relative Addressing Object has been encountered. Only the rows specific to the studies mapped to each data file will be stored with each specified table. All columns must be stored with each table row.

For the purposes of this example, the following table identifies the made-up vehicle data for a full 24 hour period that will be used (note that this is not a realistic scenario as there is no vehicle activity from 03:16am until midnight and this example only shows a small number of vehicles on each array):

Assume the following events were recorded:

- (h indicates the hex representation, b represents the binary representation).
- Since there will only be one data packet associated with this data file, until the data file is closed, each time the data file is downloaded the
- The data file was closed to allow downloading.
- Event Description is in total seconds from the start of recording.

Event Description real time (total seconds)	Event # (binary-3 bits)	Event Value (0/13 bits) (decimal,hex,binary)	Time Stamp (13 bits) (relative to last 6 second time stamp) (decimal,hex, binary)	Event Record Data [(Event #)(Event Value) (Time Stamp)] (binary,hex)
timer 0s	b(100)	0=h(0000)=b(0 0000 0000 0000) 0*(6)=0 seconds		b(1000 0000 0000 0000)=h(8000)
timer 6s	b(100)	1=h(0001)=b(0 0000 0000 0001) 1*(6)=6 seconds		b(1000 0000 0000 0001)=h(8001)
timer 12s	b(100)	2=h(0002)=b(0 0000 0000 0010) 2*(6)=12 seconds		b(1000 0000 0000 0010)=h(8002)
rt1 12+0,4500= 12.4500s	b(000)		4500ms=h(1194)=b(1 0001 1001 0100)	b(0001 0001 1001 0100)=h(1194)

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rt3 12+0.5500= 12.5500s	b(010)		5500ms=h(157c)=b(1 0101 0111 1100)	b(0101 0101 0111 1100)=h(557c)
timer 18s	b(100)	3=h(0003)=b(0 0000 0000 0011) 3*(6)=18 seconds		b(1000 0000 0000 0011)=h(8003)
rt1 18+0.1550= 18.1550s	b(000)		1550ms=h(060e)=b(0 0110 0000 1110)	b(0000 0110 0000 1110)=h(060e)
rt3 18+0.1560= 18.1560s	b(010)		1560ms=h(0618)=b(0 0110 0001 1000)	b(0100 0110 0001 1000)=h(4618)

Since the recording interval was set to the maximum value h(ff,ff,ff,ff), there will only be a single data packet included in the data file for all of the events that have been recorded. This example will show the data from the start of recording to the last event (rt3 @ 18.1560 seconds) in the example.

?? ?? ?? ?? will be used in place of the actual Local Controller Time for (Start Date/Time of data packet, End Date/Time of data packet)

It is important to note that the Data Structure Table is not intended to be manipulated by the central application. It is only included as an ASN.1 table to define the structure to store the raw data (binned counts) to a data file.

The encoding of the data file for study 1 is shown in the following table. Although this study was specifically configured to use OER encoding, the table shows both the BER and OER encodings for completeness.

The row numbers shown in the ASN.1 encoding for each table row are in decimal. All of the data shown in the BER and OER columns are in hexadecimal.

ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 82 01 d2	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 dcm 0a	0b 2b 06 01 04 01 89 36 04 02 dcm 0a
dcmMibVersionNumber-value=1.00	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 82 01 be	16
OidValuePair1::=SEQUENCE	30 82 01 ba	
oid1=**dcmRelativeAddrOID**	06 0b 2b 06 01 04 01 89 36 04 02 dcm 09	0b 2b 06 01 04 01 89 36 04 02 dcm 09
value1=dcm node	06 0a 2b 06 01 04 01 89 36 04 02 dcm	0a 2b 06 01 04 01 89 36 04 02 dcm
oid2=**dcmIOParamTable**	06 02 02 0d	02 02 0d
value2::=SEQUENCE (row 1,4)	30 0c	
dcmIOPNum	02 01 01	01
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid3=dcmIOParamTable	06 02 02 0d	02 02 0d
value3::=SEQUENCE (row 2,4)	30 0c	

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dcmIOPNum	02 01 02	02
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid4=dcmIOParamTable	06 02 02 0d	02 02 0d
value4::=SEQUENCE (row 3,4)	30 0c	
dcmIOPNum	02 01 03	03
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid5=dcmIOParamTable	06 02 02 0d	02 02 0d
value5::=SEQUENCE (row 4,4)	30 0c	
dcmIOPNum	02 01 04	04
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid6=dcmIOParamTable	06 02 02 0d	02 02 0d
value6::=SEQUENCE (row 1,3)	30 0c	
dcmIOPNum	02 01 01	01
dcmIOPTyp	02 01 03	03
dcmIOPVal	02 01 1e	02 01 1e
dcmIOParamRowAdmin	02 01 01	01
oid7=dcmIOParamTable	06 02 02 0d	02 02 0d
value7::=SEQUENCE (row 2,3)	30 0c	
dcmIOPNum	02 01 02	02
dcmIOPTyp	02 01 03	03
dcmIOPVal	02 01 1e	02 01 1e
dcmIOParamRowAdmin	02 01 01	01
oid8=dcmIOParamTable	06 02 02 0d	02 02 0d
value8::=SEQUENCE (row 3,3)	30 0c	
dcmIOPNum	02 01 03	03
dcmIOPTyp	02 01 03	03
dcmIOPVal	02 01 1e	02 01 1e
dcmIOParamRowAdmin	02 01 01	01
oid9=dcmIOParamTable	06 02 02 0d	02 02 0d
value9::=SEQUENCE (row 4,3)	30 0c	
dcmIOPNum	02 01 04	04
dcmIOPTyp	02 01 03	03
dcmIOPVal	02 01 1e	02 01 1e
dcmIOParamRowAdmin	02 01 01	01
oid10=**dcmLogicalIOArrayMapTable**	06 02 04 09	02 04 09
value10::=SEQUENCE (row 1,1)	30 12	
dcmIOAMArrNum	02 01 01	01

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dcmIOAMIONum	02 01 01	01
dcmIOSpacing	02 01 00	00 00
dcmIOPosition	02 01 02	02
dcmIOFunctionality	02 01 03	03
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid11=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value11::=SEQUENCE (row 1,3)	30 13	
dcmIOAMArrNum	02 01 01	01
dcmIOAMIONum	02 01 03	03
dcmIOSpacing	02 02 13 0d	13 0d
dcmIOPosition	02 01 02	02
dcmIOFunctionality	02 01 03	03
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid12=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value12::=SEQUENCE (row 2,1)	30 12	
dcmIOAMArrNum	02 01 02	02
dcmIOAMIONum	02 01 01	01
dcmIOSpacing	02 01 00	00 00
dcmIOPosition	02 01 02	02
dcmIOFunctionality	02 01 06	06
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid13=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value13::=SEQUENCE (row 2,2)	30 13	
dcmIOAMArrNum	02 01 02	02
dcmIOAMIONum	02 01 02	02
dcmIOSpacing	02 02 01 c9	01 c9
dcmIOPosition	02 01 04	04
dcmIOFunctionality	02 01 03	03
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid14=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value14::=SEQUENCE (row 2,3)	30 13	
dcmIOAMArrNum	02 01 02	02
dcmIOAMIONum	02 01 03	03
dcmIOSpacing	02 02 13 0d	13 0d
dcmIOPosition	02 01 02	02
dcmIOFunctionality	02 01 06	06
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid15=dcmLogicalIOArrayMapTable	06 02 04 09	02 04 09
value15::=SEQUENCE (row 2,4)	30 13	
dcmIOAMArrNum	02 01 02	02
dcmIOAMIONum	02 01 04	04
dcmIOSpacing	02 02 14 d6	14 d6
dcmIOPosition	02 01 04	04

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dcmIOFunctionality	02 01 03	03
dcmLogicalIOArrayMapRowAdmin	02 01 01	01
oid16=**dcmStudyConfigTable**	06 02 05 05	02 05 05
value16::=SEQUENCE (row 1)	30 1e	
dcmSCStudyNum	02 01 01	01
dcmStudyType	02 01 04	04
dcmStartType	02 01 02	02
dcmStartDateTime=don't care	41 04 xx xx xx xx	xx xx xx xx
dcmEndType	02 01 02	02
dcmEndDateTime	41 04 xx xx xx xx	xx xx xx xx
dcmSCFileStudyIndex	02 01 01	01
dcmStudyConfigRowAdmin	02 01 01	01
oid17=**dcmEventStudyConfigTable**	06 02 06 11	02 06 11
value17::=SEQUENCE (row 1)	30 0d	
dcmESCStudyNum	02 01 01	01
dcmEventNumberSize	02 01 03	03
dcmTimerEventMaxPeriod	02 02 17 70	00 00 17 70
dcmEventStudyConfigRowAdmin	02 01 01	01
oid18=**dcmEventConfigTable**	06 02 06 14	02 06 14
value18::=SEQUENCE (row 1,1)	30 18	
dcmECStudyNum	02 01 01	01
dcmEventConfigNumber	02 01 01	01
dcmEventNumber	02 01 00	00
dcmECIONum	02 01 01	01
dcmLogicalIOState	02 01 02	02
dcmEventValueSize	02 01 00	00
dcmTimestampSize	02 01 0d	0d
dcmEventConfigRowAdmin	02 01 01	01
oid19=dcmEventConfigTable	06 02 06 14	02 06 14
value19::=SEQUENCE (row 1,2)	30 18	
dcmECStudyNum	02 01 01	01
dcmEventConfigNumber	02 01 02	02
dcmEventNumber	02 01 01	01
dcmECIONum	02 01 02	02
dcmLogicalIOState	02 01 02	02
dcmEventValueSize	02 01 00	00
dcmTimestampSize	02 01 0d	0d
dcmEventConfigRowAdmin	02 01 01	01
oid20=dcmEventConfigTable	06 02 06 14	02 06 14
value20::=SEQUENCE (row 1,3)	30 18	
dcmECStudyNum	02 01 01	01
dcmEventConfigNumber	02 01 03	03

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dcmEventNumber	02 01 02	02
dcmECIONum	02 01 03	03
dcmLogicalIOState	02 01 02	02
dcmEventValueSize	02 01 00	00
dcmTimestampSize	02 01 0d	0d
dcmEventConfigRowAdmin	02 01 01	01
oid21=dcmEventConfigTable	06 02 06 14	02 06 14
value21::=SEQUENCE (row 1,4)	30 18	
dcmECStudyNum	02 01 01	01
dcmEventConfigNumber	02 01 04	04
dcmEventNumber	02 01 03	03
dcmECIONum	02 01 04	04
dcmLogicalIOState	02 01 02	02
dcmEventValueSize	02 01 00	00
dcmTimestampSize	02 01 0d	0d
dcmEventConfigRowAdmin	02 01 01	01
oid22=dcmEventConfigTable	06 02 06 14	02 06 14
value22::=SEQUENCE (row 1,5)	30 18	
dcmECStudyNum	02 01 01	01
dcmEventConfigNumber	02 01 05	05
dcmEventNumber	02 01 04	04
dcmECIONum	02 01 07	07
dcmLogicalIOState	02 01 02	02
dcmEventValueSize	02 01 0d	0d
dcmTimestampSize	02 01 00	00
dcmEventConfigRowAdmin	02 01 01	01
DataFileData::=		
OidValuePair2::=SEQUENCE	30 32	
oid1=**dcmDataStructureTable**	06 02 06 1e	02 06 1e
value1::=SEQUENCE OF	30 2c	01
SEQUENCE (row 1,1)	30 2a	
dcmDSStudyNum=1	02 01 01	01
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/12/2003 07:34)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/12/2003 08:42)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=8	02 01 05	00 00 05
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Event Data Packet OCTET STRING timer @ 0 seconds timer @ 6 seconds timer @ 12 seconds	 04 10 80 00 80 01 80 02	 10 80 00 80 01 80 02

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rt1 @ 12.4500 seconds rt3 @ 12.5500 seconds timer @ 18 seconds rt1 @ 18.1550 seconds rt3 @ 18.1560 seconds	11 94 55 7c 80 03 06 0e 46 18	11 94 55 7c 80 03 06 0e 46 18
TOTAL NUMBER OF OCTETS REQUIRED (in decimal) (not part of the data file):	522 octets	287 octets

C.3.4 LOG FILE STUDY EXAMPLE (INFORMATIVE)

In this example, a Log File Study will be added to the existing PVR Study (see C.3.2).

C.3.4.1 Determine Device Capabilites

This step is not necessary since it has already been performed in the Pvr Study Example.
The only information that a Log Study would require from this step is the Logical IO Number of a storage media to use to store the Log Files.

C.3.4.2 Configure Site Information

This step is not necessary for Log File Studies.

C.3.4.3 Configure General Study

The Current Number of Studies is set to 2 since the existing Pvr Study Example uses two studies.

This device allows the Maximum Number of Studies to be 5, a third study for the Log File can be added.

Configure the Study Configuration Table:

Add a third Log File Study that will store Log Data Records to a Log File every 60 minutes. Note that a new Study File Index # was used for the Log File.

Study Configuration Table

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Study # (index 1) RO	Study Type R/W	Study Start Type R/W	Study Start Date / Time R/W	Study End Type R/W	Study End Date / Time R/W	Study File Index # R/W	Row Admin R/W
1	3 (pvr)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)
2	3 (pvr)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)
3	7 (log)	3 (nextInterval)	Don't care	2 (never)	don't care	2	1 (active)

Configure Array To Study Mapping Table:

Not necessary for Log File studies.

Configure the File Parameter Table:

A new Study File Entry will be defined for the Log File since it will only record the OID's of objects specific to a Log Study to the Header section of the Log File.

File Parameter Table							
Study File Index # (index 1) RO	File Structure # (index 2) RO	File Recording Interval RW	File Recording Frequency R/W	FP Logical IO # R/W	Relative Address Flag	File Encoding Code	Row Admin R/W
1	1	3600 (60 minutes)	4 (daily)	3 (SRAM-8MB)	2 (enabled)	3 (oer)	1 (active)
2	1	3600 (60 minutes)	4 (daily)	3 (SRAM-8MB)	2 (enabled)	3 (oer)	1 (active)

Configure the File Structure Table:

Add the required entries to the File Structure Table for the Log File. Only the Study Configuration Table and File Parameter Table will be stored to the Header Section of the Log File.

File Structure Table			
File Structure # (index 1) RO	File Structure Index (index 2) RO	Data Element OID R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0A) (Physical To Logical IO Mapping Table,dcmPhysicalLogicalMapTable)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09) (Logical IO To Array Mapping Table, dcmLogicalIOArrayMapTable)	1 (active)
1	3	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
1	4	&h(2B,06,01,04,01,89,36,04,02,dcm,07,07) (File Parameter Table, dcmFPTable)	1 (active)

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1	5	&h(2B,06,01,04,01,89,36,04,02,dcm,04,16) (Filter Configuration Table, dcmFilterConfigTable)	1 (active)
1	6	&h(2B,06,01,04,01,89,36,04,02,dcm,05,0B) (Filter To Study Mapping Table, dcmStudyFilterMapTable)	1 (active)
1	7	&h(2B,06,01,04,01,89,36,04,02,dcm,06,0E) (PVR Study Configuration Table, dcmPvrStudyConfigTable)	1 (active)
1	8	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0D) (Logical IO Parameter Table, dcmIOParamTable)	1 (active)
1	9	&h(2B,06,01,04,01,89,36,04,02,dcm,04,0D) (Array Parameter Table, dcmArrayParameterTable)	1 (active)
2	1	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
2	2	&h(2B,06,01,04,01,89,36,04,02,dcm,07,07) (File Parameter Table, dcmFPTable)	1 (active)

C.3.4.4 Configure Study Details

This step is not necessary for Log File Studies.

C.3.4.5 Verify Proper Operation Of Sensors/Arrays

This step is not necessary for Log File Studies.

C.3.4.6 Validate And Start The Recording Study

Validate the log file study by setting the Data Recording Control to “validate”. The Data Recording Enable Status will indicate “validating” while the device is verifying the configuration. If there are no errors in the configuration, the device will set the Data Recording Enable Status to “idle”.

At this point, the Log File Study can be started by setting the Data Recording Control to “prime”. The Data Recording Enable Status will indicate “primed” until the next even recording interval. At that time, the Data Recording Enable Status will change to “recording”. Data is now being written to the specified data files.

Note that this table shows that both Studies 1 and 2 are already recording since they have been previously configured.

Data Recording Enable Table		
Study # (index 1) RO	Data Recording Enable Status R/W	Data Recording Control R/W
1	4 (recording)	1 (prime)
2	4 (recording)	1 (prime)
3	3 (primed)	1 (prime)

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C.3.4.7 Data File Formats

Each day at midnight the device will close the currently open Log File and create a new Log File (since the recording file frequency was set to daily in the File Parameter Table). Each daily data file will consist of a Header Section as specified by the File Structure Table (note that only the rows specific to the studies mapped to this data file will be stored (study 3) for each specified table) and a Data Section as specified by the Data Structure Table. The 'data' column of each row in the Data Structure Table will consist of one or more rows as specified by the Log Data Record Table.

Each object specified in the File Parameter Table for study 3 will be stored in the data file as an [(OID) (Value)] pair. The (OID) and (Value) will be encoded using OER as specified in the File Encoding Field of the File Parameter Table. The OID's are shortened after the Relative Addressing Object has been encountered. Only the rows specific to the studies mapped to each data file will be stored with each specified table. All columns must be stored with each table row.

Since the recording interval was set to 60 minutes, there will be 24 data packets included in each daily file for study 3. Any data packet that does not include log data will contain a data packet for that time frame with the 'Number Of Records' field in the Data Structure Table set to 0 and the 'Data' field set to an Octet String of 0 octet length.

?? ?? ?? ?? will be used in place of the actual Local Controller Time for (Start Date/Time of data packet, End Date/Time of data packet)

It is important to note that the Data Structure Table is not intended to be manipulated by the central application. It is only included as an ASN.1 table to define the structure to store the raw data (binned counts) to a data file.

The encoding of a daily data file for study 3 is shown in the following table. Although this study was specifically configured to use OER encoding, the table shows both the BER and OER encodings for completeness.

The row numbers shown in the ASN.1 encoding for each table row are in decimal. All of the data shown in the BER and OER columns are in hexadecimal.

ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 82 03 2d	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 dcm 0a	0b 2b 06 01 04 01 89 36 04 02 dcm 0a
dcmMibVersionNumber-value=1.00	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 5a	03
OidValuePair1::=SEQUENCE	30 58	
oid1=**dcmRelativeAddrOID**	06 0b 2b 06 01 04 01 89 36 04 02 dcm 09	0b 2b 06 01 04 01 89 36 04 02 dcm 09
value1=dcm node	06 0a 2b 06 01 04 01 89 36 04 02 dcm	0a 2b 06 01 04 01 89 36 04 02 dcm
oid2=**dcmStudyConfigTable**	06 02 05 05	02 05 05
value2::=SEQUENCE (row 3)	30 1e	
dcmSCStudyNum	02 01 03	03
dcmStudyType	02 01 07	07
dcmStartType	02 01 03	03
dcmStartDateTime=don't care	41 04 xx xx xx xx	xx xx xx xx
dcmEndType	02 01 02	02
dcmEndDateTime	41 04 xx xx xx xx	xx xx xx xx

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dcmSCFileStudyIndex	02 01 02	02
dcmStudyConfigRowAdmin	02 01 01	01
oid3=**dcmFPTable**	06 02 07 07	02 07 07
value3::=SEQUENCE (row 2,1)	30 19	
dcmFPFileStudyIndex	02 01 02	02
dcmFPFileStrucNum	02 01 01	01
dcmFPRecInt	02 02 0e 10	00 0e 10
dcmFPFileFreq	02 01 04	04
dcmFPLogicalIONumber	02 01 03	03
dcmFPRelativeAddrFlag	02 01 02	02
dcmFPEncodingCode	02 01 03	03
dcmFPRowAdmin	02 01 01	01
DataFileData::=		
OidValuePair2::=SEQUENCE	30 82 02 8e	
Oid1=**dcmDataStructureTable**	06 02 06 1e	02 06 1e
value1::=SEQUENCE OF	30 82 02 86	18
SEQUENCE (row 3,1)	30 2d	
dcmDSStudyNum=3	02 01 03	03
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/19/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/19/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Log Data Packet OCTET STRING Time Tag (05/19/2003 00:14) Log Data OCTET STRING “Power Reset”	 04 13 02 04 ?? ?? ?? ?? 04 0b 50 6f 77 65 72 20 52 65 73 65 74	 10 ?? ?? ?? ?? 0b 50 6f 77 65 72 20 52 65 73 65 74
SEQUENCE (row 3,2)	30 1a	
dcmDSStudyNum=3	02 01 03	03
dcmDataStrucIndex=2	02 01 02	02
dcmStartTime=(05/19/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/19/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Log Data Packet OCTET STRING Time Tag (05/19/2003 00:14) Log Data OCTET STRING	04 00	00
… (and so forth for Study 3 down to) …	**…**	**…**

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SEQUENCE (row 3,23)	30 1a	
dcmDSStudyNum=3	02 01 03	03
dcmDataStrucIndex=23	02 01 17	17
dcmStartTime=(05/19/2003 22:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/19/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Log Data Packet OCTET STRING Time Tag (05/19/2003 00:14) Log Data OCTET STRING	04 00	00
SEQUENCE (row 3,24)	30 1a	
dcmDSStudyNum=3	02 01 03	03
dcmDataStrucIndex=24	02 01 18	18
dcmStartTime=(05/19/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/20/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Log Data Packet OCTET STRING Time Tag (05/19/2003 00:14) Log Data OCTET STRING	04 00	00
TOTAL NUMBER OF OCTETS REQUIRED (in decimal) (not part of the data file):	817 octets	444 octets

C.3.5 ARRAY AND LOGICAL IO PARAMETER CHANGE STUDY EXAMPLE (INFORMATIVE)

In this example, two additional studies (an Array Parameter Change and Logical IO Parameter Change Study) will be added to the existing PVR Study (see C.3.2).

C.3.5.1 Determine Device Capabilites

This step is not necessary since it has already been performed in the Pvr Study Example.
The only information that would be required from this step is the Logical IO Number of a storage media to use to store the Log Files.

C.3.5.2 Configure Site Information

This step is not necessary for Array and Logical IO Parameter Studies.

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C.3.5.3 Configure General Study

The Current Number of Studies is set to 3, the existing Pvr Study Example uses the first two studies and the Log File Study uses the third study.

This device allows the Maximum Number of Studies to be 5, a fourth study for the Array Parameter Change Records and a fifth study for the Logical IO Parameter Change Records can be added.

Configure the Study Configuration Table:

Add a fourth study to store Array Parameter Changes to a data file every 60 minutes. Add a fifth study to store Logical IO Parameter Changes to the same data file every 60 minutes.

Study Configuration Table							
Study # (index 1) RO	Study Type R/W	Study Start Type R/W	Study Start Date / Time R/W	Study End Type R/W	Study End Date / Time R/W	Study File Index # R/W	Row Admin R/W
1	3 (pvr)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)
2	3 (pvr)	3 (nextInterval)	Don't care	2 (never)	don't care	1	1 (active)
3	7 (log)	3 (nextInterval)	Don't care	2 (never)	don't care	2	1 (active)
4	5 (arrayParam)	3 (nextInterval)	Don't care	2 (never)	don't care	3	1 (active)
5	6 (logicalIOParam)	3 (nextInterval)	Don't care	2 (never)	don't care	3	1 (active)

Configure Array To Study Mapping Table:

Not necessary for Array and Logical IO Parameter File studies.

Configure the File Parameter Table:

A new Study File Entry will be defined for the Array Parameter File and the Logical IO Parameter File since they will only record the OID's of objects specific to their studies.

File Parameter Table							
Study File Index # (index 1) RO	File Structure # (index 2) RO	File Recording Interval RW	File Recording Frequency R/W	FP Logical IO # R/W	Relative Address Flag	File Encoding Code	Row Admin R/W
1	1	3600 (60 minutes)	4 (daily)	3 (SRAM-8MB)	2 (enabled)	3 (oer)	1 (active)

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2	1	3600 (60 minutes)	4 (daily)	3 (SRAM-8MB)	2 (enabled)	3 (oer)	1 (active)
3	1	3600 (60 minutes)	4 (daily)	3 (SRAM-8MB)	2 (enabled)	3 (oer)	1 (active)

Configure the File Structure Table:

Add the required entries to the File Structure Table for the Array and Logical IO Parameter File. Only the Array Parameter Table and the Logical IO Parameter Table will be stored to the Header Section of this File.

File Structure Table			
File Structure # (index 1) RO	File Structure Index (index 2) RO	Data Element OID R/W	Row Admin R/W
1	1	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0A) (Physical To Logical IO Mapping Table,dcmPhysicalLogicalMapTable)	1 (active)
1	2	&h(2B,06,01,04,01,89,36,04,02,dcm,04,09) (Logical IO To Array Mapping Table, dcmLogicalIOArrayMapTable)	1 (active)
1	3	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
1	4	&h(2B,06,01,04,01,89,36,04,02,dcm,07,07) (File Parameter Table, dcmFPTable)	1 (active)
1	5	&h(2B,06,01,04,01,89,36,04,02,dcm,04,16) (Filter Configuration Table, dcmFilterConfigTable)	1 (active)
1	6	&h(2B,06,01,04,01,89,36,04,02,dcm,05,0B) (Filter To Study Mapping Table, dcmStudyFilterMapTable)	1 (active)
1	7	&h(2B,06,01,04,01,89,36,04,02,dcm,06,0E) (PVR Study Configuration Table, dcmPvrStudyConfigTable)	1 (active)
1	8	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0D) (Logical IO Parameter Table, dcmIOParamTable)	1 (active)
1	9	&h(2B,06,01,04,01,89,36,04,02,dcm,04,0D) (Array Parameter Table, dcmArrayParameterTable)	1 (active)
2	1	&h(2B,06,01,04,01,89,36,04,02,dcm,05,05) (Study Configuration Table, dcmStudyConfigTable)	1 (active)
2	2	&h(2B,06,01,04,01,89,36,04,02,dcm,07,07) (File Parameter Table, dcmFPTable)	1 (active)
3	2	&h(2B,06,01,04,01,89,36,04,02,dcm,04,0D) (Array Parameter Table, dcmArrayParameterTable)	1 (active)
3	1	&h(2B,06,01,04,01,89,36,04,02,dcm,02,0D) (Logical IO Parameter Table, dcmIOParamTable)	1 (active)

C.3.5.4 Configure Study Details

This step is not necessary for Array and Logical IO Parameter File Studies.

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C.3.5.5 Verify Proper Operation Of Sensors/Arrays

This step is not necessary for Array and Logical IO Parameter File Studies.

C.3.5.6 Validate And Start The Recording Study

Validate the Array Parameter Change and the Logical IO Parameter Change studies by setting the Data Recording Control to “validate”. The Data Recording Enable Status will indicate “validating” while the device is verifying the configuration. If there are no errors in the configuration, the device will set the Data Recording Enable Status to “idle”.

At this point, the Log File Study can be started by setting the Data Recording Control to “prime”. The Data Recording Enable Status will indicate “primed” until the next even recording interval. At that time, the Data Recording Enable Status will change to “recording”. Data is now being written to the specified data files.

Note that this table shows that Studies 1,2 and 3 are already recording since they have been previously configured.

Data Recording Enable Table		
Study # (index 1) RO	Data Recording Enable Status R/W	Data Recording Control R/W
1	4 (recording)	1 (prime)
2	4 (recording)	1 (prime)
3	4 (recording)	1 (prime)
4	3 (primed)	1 (prime)
5	3 (primed)	1 (prime)

C.3.5.7 Data File Formats

Each day at midnight the device will close the currently open Array and Logical IO Parameter File and create a new File (since the recording file frequency was set to daily in the File Parameter Table). Each daily data file will consist of a Header Section as specified by the File Structure Table (note that only the rows specific to the studies mapped to this data file will be stored (studies 4 and 5) for each specified table) and a Data Section as specified by the Data Structure Table. The ‘data’ column of each row in the Data Structure Table will consist of one or more rows as specified by either the Array Parameter Change Record Table or the Logical IO Parameter Change Record Table.

Each object specified in the File Parameter Table for studies 4 and 5 will be stored in the data file as an [(OID) (Value)] pair. The (OID) and (Value) will be encoded using OER as specified in the File Encoding Field of the File Parameter Table. The OID’s are shortened after the Relative Addressing Object has been encountered. Only the rows specific to the studies mapped to each data file will be stored with each specified table. All columns must be stored with each table row.

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Since the recording interval was set to 60 minutes, there will be 48 data packets (24 data packets for study 4 and 24 data packets for study 5) included in each daily file. Any data packet that does not include the specified type of data will contain a data packet for that time frame with the 'Number Of Records' field in the Data Structure Table set to 0 and the 'Data' field set to an Octet String of 0 octet length.

?? ?? ?? ?? will be used in place of the actual Local Controller Time for (Start Date/Time of data packet, End Date/Time of data packet)

It is important to note that the Data Structure Table is not intended to be manipulated by the central application. It is only included as an ASN.1 table to define the structure to store the raw data (binned counts) to a data file.

The encoding of a daily data file for study 3 is shown in the following table. Although this study was specifically configured to use OER encoding, the table shows both the BER and OER encodings for completeness.

The row numbers shown in the ASN.1 encoding for each table row are in decimal. All of the data shown in the BER and OER columns are in hexadecimal.

ASN.1	BER	OER
dcmDataFile::=SEQUENCE	30 82 05 ec	
dcmMibVersionNumber-oid	06 0b 2b 06 01 04 01 89 36 04 02 dcm 0a	0b 2b 06 01 04 01 89 36 04 02 dcm 0a
dcmMibVersionNumber-value=1.00	02 01 64	00 64
DataFileHeader::=SEQUENCE OF	30 82 00 c7	0b
OidValuePair1::=SEQUENCE	30 82 00 c4	
oid1=**dcmRelativeAddrOID**	06 0b 2b 06 01 04 01 89 36 04 02 dcm 09	0b 2b 06 01 04 01 89 36 04 02 dcm 09
value1=dcm node	06 0a 2b 06 01 04 01 89 36 04 02 dcm	0a 2b 06 01 04 01 89 36 04 02 dcm
oid2=**dcmArrayParameterTable**	06 02 04 0d	02 04 0d
value2::=SEQUENCE (row 1,2)	30 0f	
dcmAPArrNum	02 01 01	01
dcmAPType	02 01 02	02
dcmAPValue	02 02 35 94	02 03 00 35 94
dcmAPFileName="" (0 octet size)	04 00	04 00
dcmArrayParameterRowAdmin	02 01 01	01
oid3=dcmArrayParameterTable	06 02 04 0d	02 04 0d
value3::=SEQUENCE (row 1,6)	30 0e	
dcmAPArrNum	02 01 01	01
dcmAPType	02 01 06	06
dcmAPValue	02 01 4b	02 03 00 00 4b
dcmAPFileName="" (0 octet size)	04 00	04 00
dcmArrayParameterRowAdmin	02 01 01	01
oid4=dcmArrayParameterTable	06 02 04 0d	02 04 0d
value4::=SEQUENCE (row 1,7)	30 1d	
dcmAPArrNum	02 01 01	01
dcmAPType	02 01 07	07
dcmAPValue	02 01 00	02 03 00 00 00
dcmAPFileName="FHWAClassScheme"	04 0f 46 48 57 41 43 6c 61 73 73 53 63 68 65	04 0f 46 48 57 41 43 6c 61 73 73 53 63

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	6d 65	68 65 6d 65
dcmArrayParameterRowAdmin	02 01 01	01
oid5=dcmArrayParameterTable	06 02 04 0d	02 04 0d
value5::=SEQUENCE (row 2,5)	30 0f	
dcmAPArrNum	02 01 02	02
dcmAPType	02 01 05	05
dcmAPValue	02 02 82 f9	02 03 00 82 f9
dcmAPFileName="" (0 octet size)	04 00	04 00
dcmArrayParameterRowAdmin	02 01 01	01
oid6=**dcmIOParamTable**	06 02 02 0d	02 02 0d
value6::=SEQUENCE (row 4,4)	30 0c	
dcmIOPNum	02 01 04	04
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid7=dcmIOParamTable	06 02 02 0d	02 02 0d
value7::=SEQUENCE (row 5,4)	30 0c	
dcmIOPNum	02 01 05	05
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 14	02 01 14
dcmIOParamRowAdmin	02 01 01	01
oid8=dcmIOParamTable	06 02 02 0d	02 02 0d
value8::=SEQUENCE (row 12,4)	30 0c	
dcmIOPNum	02 01 0c	0c
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid9=dcmIOParamTable	06 02 02 0d	02 02 0d
value9::=SEQUENCE (row 12,15)	30 0d	
dcmIOPNum	02 01 0c	0c
dcmIOPTyp	02 01 0f	0f
dcmIOPVal	02 02 07 25	02 02 07 25
dcmIOParamRowAdmin	02 01 01	01
oid10=dcmIOParamTable	06 02 02 0d	02 02 0d
value10::=SEQUENCE (row 13,4)	30 0c	
dcmIOPNum	02 01 0d	0d
dcmIOPTyp	02 01 04	04
dcmIOPVal	02 01 32	02 01 32
dcmIOParamRowAdmin	02 01 01	01
oid11=dcmIOParamTable	06 02 02 0d	02 02 0d
value11::=SEQUENCE (row 13,15)	30 0d	
dcmIOPNum	02 01 0d	0d
DcmIOPTyp	02 01 0f	0f

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DcmIOPVal	02 02 07 25	02 02 07 25
dcmIOParamRowAdmin	02 01 01	01
DataFileData::=		
OidValuePair2::=SEQUENCE	30 82 05 0c	
Oid1=**dcmDataStructureTable**	06 02 06 1e	02 06 1e
value1::=SEQUENCE OF	30 82 05 04	30
SEQUENCE (row 4,1)	30 2b	
DcmDSStudyNum=4	02 01 04	04
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/20/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/20/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Array Parameter Data Packet		
OCTET STRING	04 12	0a
Time Tag (05/20/2003 00:37)	02 04 ?? ?? ?? ??	?? ?? ?? ??
Array Number (1)	02 01 01	01
Array Parameter Type (2=maxAxleSpacing)	02 01 02	02
Array Parameter Value (40ft.=12192mm=2fa0h)	02 02 2f a0	00 2f a0
Array Parameter File Name (“”)	04 00	00
SEQUENCE (row 5,1)	30 29	
DcmDSStudyNum=5	02 01 05	05
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/20/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/20/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=1	02 01 01	00 00 01
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Logical IO Parameter Data Packet		
OCTET STRING	04 0f	09
Time Tag (05/20/2003 00:37)	02 04 ?? ?? ?? ??	?? ?? ?? ??
Logical IO Number (4)	02 01 04	04
Logical IO Parameter Type (4=sensitivityGain)	02 01 04	04
Logical IO Parameter Value (45%=45=2dh)	02 01 2d	02 01 2d
SEQUENCE (row 4,2)	30 1a	
dcmDSStudyNum=4	02 01 04	04
dcmDataStrucIndex=1	02 01 01	01
dcmStartTime=(05/20/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/20/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Array Parameter Data Packet		
OCTET STRING	04 00	00

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Time Tag (05/20/2003 00:37) Array Number (1) Array Parameter Type (2=maxAxleSpacing) Array Parameter Value (40ft.=12192mm=2fa0h) Array Parameter File Name (“”)		
SEQUENCE (row 5,2)	30 1a	
dcmDSStudyNum=5	02 01 05	05
dcmDataStrucIndex=2	02 01 02	02
dcmStartTime=(05/20/2003 01:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/20/2003 02:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Logical IO Parameter Data Packet OCTET STRING Time Tag (05/20/2003 00:37) Logical IO Number (4) Logical IO Parameter Type (4=sensitivityGain) Logical IO Parameter Value (45%=45=2dh)	04 00	00
… (and so forth for Study 4 down to) …	**…**	**…**
… (and so forth for Study 5 down to) …	**…**	**…**
SEQUENCE (row 4,24)	30 1a	
dcmDSStudyNum=4	02 01 04	04
dcmDataStrucIndex=24	02 01 18	18
dcmStartTime=(05/20/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/21/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Array Parameter Data Packet OCTET STRING Time Tag (05/20/2003 00:37) Array Number (1) Array Parameter Type (2=maxAxleSpacing) Array Parameter Value (40ft.=12192mm=2fa0h) Array Parameter File Name (“”)	04 00	00
SEQUENCE (row 5,24)	30 1a	
dcmDSStudyNum=5	02 01 05	05
dcmDataStrucIndex=24	02 01 18	18
dcmStartTime=(05/20/2003 23:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmEndTime=(05/21/2003 00:00)	41 04 ?? ?? ?? ??	?? ?? ?? ??
dcmDataNumRecords=0	02 01 00	00 00 00
dcmDataEncoding=2(noEncoding)	02 01 02	02
dcmData=Logical IO Parameter Data Packet OCTET STRING	04 00	00

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Time Tag (05/20/2003 00:37) Logical IO Number (4) Logical IO Parameter Type (4=sensitivityGain) Logical IO Parameter Value (45%=45=2dh)		
TOTAL NUMBER OF OCTETS REQUIRED (in decimal) (not part of the data file):	1520 octets	904 octets

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C.3.6 MONITOR MODE EXAMPLES (INFORMATIVE)

The following Monitor Mode Examples will use the previous examples (Binned Study, PVR Study and Event Study) to demonstrate how Monitor Mode can be used within a dcm device.

To utilize a Monitor Mode Study, the following steps should be followed:

1. Configure a study (Binned, PVR or Event). Note that this study does not have to be the same as the data recording study the dcm device is configured for. For example, the dcm device can be configured for a Binned Study, but the user may want to configure a PVR Monitor Mode Study to confirm that the dcm device is properly processing vehicles.

    a. Note that a Binned Study Monitor Mode will only return binned counts as defined in the Binned Study. The data streamed out will be for the current recording period (before it is written to the data file).
    b. Note that a PVR Study Monitor Mode will only return the vehicle parameters as specified in the PVR Study.
    c. Note that a PVR Study Monitor Mode will only return the vehicle parameters as specified in the PVR Study.

2. If configuring a PVR Monitor Mode, set the the units to stream out for the following objects (note that these units do not need to be set for Binned and Event Monitor Studies):

    a. dcmLenghtUnits (length units to display in output stream)
    b. dcmSpeedUnits (speed units to display in output stream)
    c. dcmWeightUnits (weight units to display in output stream)

3. Configure a row in the Monitor Enable Table that points to the desired study to monitor. Note that Monitor Mode can be configured in many ways:

    a. Streamed ASCII Data
    b. Streamed Binary Data
    c. Polled ASCII Data
    d. Polled Binary Data

4. Enable the Monitor Mode by setting the Monitor Enable Control column to ‘Validate’.

5. After the dcm device has validated the study settings:

    a. If there are no errors, it will set the Monitor Enable Status to the type of Monitor Mode selected.
    OR
    b. If there are errors, it will set the Monitor Enable Status to ‘error’. The DCM Error Code Table can be checked at this point to get more information regarding the configuration errors.

6. If Monitor Mode 1 (monitorMode1) has been successfully enabled, the dcm device will be streaming out data to the Logical IO port as selected in the Monitor Enable Table.

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7. If Monitor Mode 2 (monitorMode2) has been successfully enabled, the dcm device will have to be 'polled' (do a read of the 'Monitor Enable Poll Now' column for the desired study row.

C.3.6.1 Binned Monitor Mode Example 1: (Informative)

This example utilizes only Study 2 of the Binned Study Example to demonstrate the streaming ASCII data Binned Monitor Mode.

The following assumptions are made:

1. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
2. The dial-up connection has already been established.
3. This dcm device uses an ascii space (ascii code 32 (20h)) as it's 'white space' for asciiData.
4. This dcm device uses an ascii combination of carriage return/line feed for it's 'white terminator' (ascii codes 13/10, (0dh)(0ah)) as it's 'white space' for asciiData.

The Binned Study has already been configured (refer to Section C.3.1).

Display units do not need to be set for Binned Monitor Mode.

Configure a row in the Monitor Enable Table.

Study 2 of the Binned Study Example has been selected for Monitor Mode. The device is configured to send out the study 2 binned counts in ascii format every 10 seconds.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	2 (asciiData)	10 seconds	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Streamed Monitor Mode is selected.

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MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	2 (asciiData)	10 seconds	2 (enableMon1)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	2 (asciiData)	10 seconds	2 (enableMon1)	4 (monitorMode1On)	doesn't need to be configured

The dcm device will now be streaming out the binned counts (for the current recording period) in ascii every 10 seconds to Logical IO port 2.

The data streamed out will be structured the same as the data portion of each data packet for study 2 of the Binned Study Example except that each binned count will be the ascii representation of the count separated by an ascii 'white space'.

This study only has a single binned count for each recording interval. Note that if there were more than one binned count per recording interval, each binned count would be separated by a 'white space'.

The number of octets per binned counts in ascii Monitor Mode indicates the number of octets required to represent the largest binned count for the current recording interval in binary. For example, a binned count of 48 (decimal) requires only 1 octet in binary (30h) although it requires two ascii octets ('48'=(34h,38h)). Since a 'white space' is used to separate the binned counts this number can be ignored.

Each row of the Streamed Data Representation Table represents a 10 second sample of the current recording interval (15 minutes).

Although this study has been configured to use OER Encoding, the following Streamed Data Representation Table shows both the BER and OER Encodings of the streamed data.

Streamed Data Represention Table			
Real Time (hh:mm:ss)	**ASN.1** (data shown in decimal)	**BER** (ascii code in hex)	**OER** (ascii code in hex)

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08:59:40	Octet String code (not sent) -length of Octet String (not sent) -number of octets per binned count (not sent) -binned count for study 2 (‘0048’, this device pads each binned count to four digits) -white terminater (c/r,l/f)	 30 30 34 38 0d 0a	 30 30 34 38 0d 0a
08:59:50	Octet String code (not sent) -length of Octet String (not sent) -number of octets per binned count (not sent) -binned count for study 2 (‘0101’, this device pads each binned count to four digits) -white terminater (c/r,l/f)	 30 31 30 31 0d 0a	 30 31 30 31 0d 0a
09:00:00 (note that since a new 15 minute recording period has started, the binned counts for the current recording period have been reset to 0).	Octet String code (not sent) -length of Octet String (not sent) -number of octets per binned count (not sent) -binned count for study 2 (‘0000’, this device pads each binned count to four digits) -white terminater (c/r,l/f)	 30 30 30 30 0d 0a	 30 30 30 30 0d 0a
09:00:10	Octet String code (not sent) -length of Octet String (not sent) -number of octets per binned count (not sent) -binned count for study 2 (‘0007’, this device pads each binned count to four digits) -white terminater (c/r,l/f)	 30 30 30 37 0d 0a	 30 30 30 37 0d 0a

Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	2 (asciiData)	10 seconds	4 (disableMon)	4 (monitorMode1On)	doesn’t need to be configured

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Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	2 (asciiData)	10 seconds	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.6.2 Binned Monitor Mode Example 2: (Informative)

This example utilizes only Study 2 of the Binned Study Example to demonstrate the streaming binary data Binned Monitor Mode.

The same data from the Binned Monitor Mode Example 1 will be used.

The following assumptions are made:

1. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
2. The dial-up connection has already been established.

The Binned Study has already been configured (refer to Section C.3.1).

Display units do not need to be set for Binned Monitor Mode:

Configure a row in the Monitor Enable Table.

Study 2 of the Binned Study Example has been selected for Monitor Mode. The device is configured to send out the study 2 binned counts in binary format every 10 seconds.

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MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	10 seconds	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Streamed Monitor Mode is selected.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	10 seconds	2 (enableMon1)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	10 seconds	2 (enableMon1)	4 (monitorMode1On)	doesn't need to be configured

The dcm device will now be streaming out the binned counts (for the current recording period) in ascii every 10 seconds to Logical IO port 2.

The data streamed out will be structured the same as the data portion of each data packet for study 2 of the Binned Study Example.

This study only has a single binned count for each recording interval. Note that if there were more than one binned count per recording interval, each binned count would be sent out consecutively.

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The number of octets per binned is the number of octets required to represent the largest binned count for the current recording interval in binary. For example, a binned count of 48 (decimal) requires only 1 octet in binary (30h). Note that if there were more than one binned count per recording interval, each binned count would be sent out consecutively and using the number of octets per binned count.

Each row of the Streamed Data Representation Table represents a 10 second sample of the current recording interval (15 minutes).

Although this study has been configured to use OER Encoding, the following Streamed Data Representation Table shows both the BER and OER Encodings of the streamed data.

Streamed Data Represention Table			
Real Time (hh:mm:ss)	**ASN.1** (data shown in hex)	**BER** (hex)	**OER** (hex)
08:59:40	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (30)	04 02 01 30	 02 01 30
08:59:50	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (35)	04 02 01 35	 02 01 35
09:00:00 (note that since a new 15 minute recording period has started, the binned counts for the current recording period have been reset to 0).	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (00)	04 02 01 00	 02 01 00
09:00:10	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (07)	04 02 01 07	 02 01 07

Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	10 seconds	4 (disableMon)	4 (monitorMode1On)	doesn't need to be configured

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Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	10 seconds	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.6.3 Binned Monitor Mode Example 3: (Informative)

This example utilizes only Study 2 of the Binned Study Example to demonstrate the polled binary data Binned Monitor Mode.

The same data from the Binned Monitor Mode Example 1 will be used.

The following assumptions are made:

1. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
2. The dial-up connection has already been established.

The Binned Study has already been configured (refer to Section C.3.1).

Display units do not need to be set for Binned Monitor Mode:

Configure a row in the Monitor Enable Table.

Study 2 of the Binned Study Example has been selected for Monitor Mode. The device is configured to send out the study 2 binned counts in binary format .

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MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	(don't care)	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Polled Monitor Mode is selected.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	(don't care)	3 (enableMon2)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	(don't care)	3 (enableMon2)	5 (monitorMode2On)	doesn't need to be configured

The dcm device will now be waiting to be polled by the central software for the binned counts for the current recording period. Every time the central software polls, (performs a read of the Monitor Enable Poll Now column for this row in the Monitor Enable Table), the dcm device will send back the binary binned counts through Logical IO port 2.

The data sent out will be structured the same as the data portion of each data packet for study 2 of the Binned Study Example.

This study only has a single binned count for each recording interval. Note that if there were more than one binned count per recording interval, each binned count would be sent out consecutively.

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The number of octets per binned is the number of octets required to represent the largest binned count for the current recording interval in binary. For example, a binned count of 48 (decimal) requires only 1 octet in binary (30h). Note that if there were more than one binned count per recording interval, each binned count would be sent out consecutively and using the number of octets per binned count.

Each row of the Polled Data Representation Table represents the binned counts for the current recording period between each poll.

Although this study has been configured to use OER Encoding, the following Polled Data Representation Table shows both the BER and OER Encodings of the polled data.

Polled Data Represention Table			
Poll Time (hh:mm:ss)	**ASN.1** (data shown in hex)	**BER** (hex)	**OER** (hex)
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 2 row of Monitor Enable Table)			
08:59:41	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (30)	04 02 01 30	 02 01 30
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 2 row of Monitor Enable Table)			
08:59:53	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (35)	04 02 01 35	 02 01 35
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 2 row of Monitor Enable Table)			
09:00:02 (note that since a new 15 minute recording period has started, the binned counts for the current recording period have been reset to 0).	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (00)	04 02 01 00	 02 01 00
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 2 row of Monitor Enable Table)			
09:00:14	Octet String (04) -length of Octet String (05) -number of octets per binned count (01) -binned count for study 2 (07)	04 02 01 07	 02 01 07

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Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	(don't care)	4 (disableMon)	5 (monitorMode2On)	doesn't need to be configured

Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	2 (rs232 comms channel	3 (binaryData)	(don't care)	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.6.4 PVR Monitor Mode Example 1: (Informative)

This example utilizes Study 2 of the Per Vehicle Record (PVR) Study Example to demonstrate the streamed ascii data PVR Monitor Mode.

The following assumptions are made:

1. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
2. The dial-up connection has already been established.
3. This dcm device uses an ascii space (ascii code 32 (20h)) as it's 'white space' for asciiData.
4. This dcm device uses an ascii combination of carriage return/line feed for it's 'white terminator' (ascii codes 13/10, (0dh)(0ah)) as it's 'white space' for asciiData.
5. This dcm device interprets the vehicle time tag to 'mm/dd/yy hh:mm:ss' before sending it.

The PVR Study has already been configured (refer to Section C.3.2).

Set the following units to display for PVR Monitor Mode:

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- Set dcmLengthUnits to 4=(.1ft)
- Set dcmSpeedUnits to 2=(mph)
- Weight units do not need to be set (dcmWeightUnits) as study 2 does not use weight

Configure a row in the Monitor Enable Table.

Study 2 of the PVR Study Example has been selected for Monitor Mode. The device is configured to send out a study 2 vehicle record in ascii format each time a vehicle has been processed (no buffering of vehicles).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	2 (asciiData)	0 seconds	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Streamed Monitor Mode is selected.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	2 (asciiData)	0 seconds	2 (enableMon1)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms	2 (asciiData)	0 seconds	2 (enableMon1)	4 (monitorMode1On)	doesn't need to

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	channel					be configured

The dcm device will now be streaming out vehicle information as configured by study 2 in the PVR Study Example after each vehicle is processed.
If the Monitor Enable Time had been set to a non-zero number (e.g. 10 seconds), the dcm device would have to buffer the vehicle for 10 seconds and then send out a pvr data packet that contained all of the vehicles from the last 10 seconds.

The data streamed out will be structured the same as the data portion of each data packet for study 2 of the PVR Study Example except that each vehicle parameter will be the ascii representation of that parameter separated by an ascii 'white space'.

Although this study has been configured to use OER Encoding, the following Streaned Data Representation Table shows both the BER and OER Encodings of the polled data.

Each row of the Streamed Data Representation Table represents a Vehicle Record.

This dcm device interprets the vehicle time tag to 'mm/dd/yy hh:mm:ss'.

Streamed Data Represention Table			
Real Time (hh:mm:ss)	**ASN.1** (PVR data shown in decimal)	**BER** (ascii code in hex)	**OER** (ascii code in hex)
PVR 1 (11:58:32)	Octet String (not sent) -length of Octet String (not sent) -Time Tag (translated to '05/13/03 ' ' 11:58:32') -white space (' ') -Seq # (padded to four digits '0046') -white space (' ') -Array # (padded to two digits '02') -white space (' ') -Speed ('65'mph) -white space (' ') -Length (20ft.='200'.1ft) -white terminator (c/r,l/f)	 30 35 2f 31 33 2f 30 33 20 31 31 3a 35 38 3a 33 32 20 30 30 34 36 20 30 32 20 36 35 20 32 30 30 0d 0a	 30 35 2f 31 33 2f 30 33 20 31 31 3a 35 38 3a 33 32 20 30 30 34 36 20 30 32 20 36 35 20 32 30 30 0d 0a
PVR 2 (11:58:39)	Octet String (not sent) -length of Octet String (not sent) -Time Tag (translated to '05/13/03 ' ' 11:58:39') -white space (' ') -Seq # (padded to four digits '0047') -white space (' ')	 30 35 2f 31 33 2f 30 33 20 31 31 3a 35 38 3a 33 39 20 30 30 34 37 20	 30 35 2f 31 33 2f 30 33 20 31 31 3a 35 38 3a 33 39 20 30 30 34 37 20

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	-Array # (padded to two digits '02') -white space (' ') -Speed ('63'mph) -white space (' ') -Length (18ft.='180'.1ft) -white terminator (c/r,l/f)	30 32 20 36 33 20 31 38 30 0d 0a	30 32 20 36 33 20 31 38 30 0d 0a

Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	2 (asciiData)	0 seconds	4 (disableMon)	4 (monitorMode1On)	doesn't need to be configured

Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	2 (asciiData)	0 seconds	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.6.5 PVR Monitor Mode Example 2: (Informative)

This example utilizes Study 2 of the Per Vehicle Record (PVR) Study Example to demonstrate the polled binary data PVR Monitor Mode.

The following assumptions are made:

6. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
7. The dial-up connection has already been established.

The PVR Study has already been configured (refer to Section C.3.2).

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Set the following units to display for PVR Monitor Mode:

- Set dcmLengthUnits to 1=(cm)
- Set dcmSpeedUnits to 1=(cm/s)
- Weight units do not need to be set (dcmWeightUnits) as study 2 does not use weight

Configure a row in the Monitor Enable Table.

Study 2 of the PVR Study Example has been selected for Monitor Mode. The device is configured to send out the study 2 vehicle records in binary format .

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	3 (binaryData)	(don't care)	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Polled Monitor Mode is selected.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	3 (binaryData)	(don't care)	3 (enableMon2)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1)	Monitor Enable IO Number	Monitor Enable Type RW	Monitor Enable Time Interval	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now

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RO	RW		RW			RO
2	1 (rs232 comms channel	3 (binaryData)	(don't care)	3 (enableMon2)	5 (monitorMode2On)	doesn't need to be configured

The dcm device will now be waiting to be polled by the central software for the vehicle data. Every time the central software polls, (performs a read of the Monitor Enable Poll Now column for this row in the Monitor Enable Table), the dcm device will send back the binary vehicle data as defined by the PVR Study through Logical IO port 2.

The data sent out will be structured the same as the data portion of each data packet for study 2 of the PVR Study Example.

Each row of the Polled Data Representation Table represents the buffered Vehicle Records between each poll.

Although this study has been configured to use OER Encoding, the following Polled Data Representation Table shows both the BER and OER Encodings of the polled data.

?? ?? ?? ?? will be used for each vehicle time tag in the Polled Data Representation Table.

Polled Data Represention Table			
Poll Time (hh:mm:ss)	**ASN.1** (PVR data shown in decimal,hex)	**BER** (hex)	**OER** (hex)
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 2 row of Monitor Enable Table)			
11:58:43	Octet String (04)	04	
There have been 2 PVR's since the last poll.	-length of Octet String (22=h16)	16	16
PVR1 (11:58:32):	-Time Tag (?? ?? ?? ??)	?? ?? ?? ??	?? ?? ?? ??
	-Seq # (46=h002e)	00 2e	00 2e
	-Array # (02)	02	02
	-Speed (65mph=2906cm/s=h0b5a)	0b 5a	0b 5a
	-Length (20ft.=610cm=h0262)	02 62	02 62
PVR2 (11:58:39):	-Time Tag (?? ?? ?? ??)	?? ?? ?? ??	?? ?? ?? ??
	-Seq # (47=h002f)	00 2f	00 2f
	-Array # (02)	02	02
	-Speed (65mph=2906cm/s=h0b5a)	0b 5a	0b 5a
	-Length (18ft.=549cm=h0225)	02 25	02 25

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Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	3 (binaryData)	(don't care)	4 (disableMon)	5 (monitorMode2On)	doesn't need to be configured

Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
2	1 (rs232 comms channel	3 (binaryData)	(don't care)	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.6.6 Event Monitor Mode Example 1: (Informative)

This example utilizes Study 1 of the Event Study Example to demonstrate the streamed ascii data Event Monitor Mode.

The following assumptions are made:

1. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
2. The dial-up connection has already been established.
3. This dcm device uses an ascii space (ascii code 32 (20h)) as it's 'white space' for asciiData.
4. This dcm device uses an ascii combination of carriage return/line feed for it's 'white terminator' (ascii codes 13/10, (0dh)(0ah)) as it's 'white space' for asciiData.

The Event Study has already been configured (refer to Section C.3.3).

Display units do not need to be set for Event Monitor Mode.

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Configure a row in the Monitor Enable Table.

Study 1 of the Event Study Example has been selected for Monitor Mode. The device is configured to send out a study 1 logical IO event records in ascii format for each occurrence of an event (no buffering of event records).

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	2 (asciiData)	0 seconds	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Streamed Monitor Mode is selected.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	2 (asciiData)	0 seconds	2 (enableMon1)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	2 (asciiData)	0 seconds	2 (enableMon1)	4 (monitorMode1On)	doesn't need to be configured

The dcm device will now be streaming out logical IO records as configured by study 1 in the Event Study Example for each event that is processed.
If the Monitor Enable Time had been set to a non-zero number (e.g. 10 seconds), the dcm device would have to buffer the event records for 10 seconds and then send out an event data packet that contained all of the event records from the last 10 seconds.

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The data streamed out will be structured the same as the data portion of each data packet for study 1 of the Event Study Example except that each event field will be the ascii hex representation of that field separated by an ascii 'white space'.

The following Streamed Data Representation Table uses exactly the same event record examples as study 1 of the Event Study Example.

Each row of the Streamed Data Representation Table represents a Logical IO Event Record.

Although this study has been configured to use OER Encoding, the following Streaned Data Representation Table shows both the BER and OER Encodings of the polled data.

Streamed Data Represention Table			
Event Description (time in decimal)	**ASN.1** (Event data shown in hex)	**BER** (ascii code in hex)	**OER** (ascii code in hex)
timer event at 0 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '03') -white space (' ') -Event Value (padded to 4 hex digits '0000') -white terminator (c/r,l/f)	 30 33 20 30 30 30 30 0d 0a	 30 33 20 30 30 30 30 0d 0a
timer event at 6 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '03') -white space (' ') -Event Value (padded to 4 hex digits '0001') -white terminator (c/r,l/f)	 30 33 20 30 30 30 31 0d 0a	 30 33 20 30 30 30 31 0d 0a
timer event at 12 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '03') -white space (' ') -Event Value (padded to 4 hex digits '0002') -white terminator (c/r,l/f)	 30 33 20 30 30 30 32 0d 0a	 30 33 20 30 30 30 32 0d 0a
rt1 event at 12.4500 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '00') -white space (' ') -Event Time Stamp (padded to 4 hex digits '1194') -white terminator (c/r,l/f)	 30 30 20 31 31 39 34 0d 0a	 30 30 20 31 31 39 34 0d 0a
rt3 event at 12.5500 seconds	Octet String (not sent) -length of Octet String (not sent)		

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	-Event Number (padded to 2 hex digits '02') -white space (' ') -Event Time Stamp (padded to 4 hex digits '157c') -white terminator (c/r,l/f)	30 32 20 31 35 37 63 0d 0a	30 32 20 31 36 37 63 0d 0a
timer event at 18 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '03') -white space (' ') -Event Value (padded to 4 hex digits '0003') -white terminator (c/r,l/f)	 30 33 20 30 30 30 33 0d 0a	 30 33 20 30 30 30 33 0d 0a
rt1 event at 18.1550 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '00') -white space (' ') -Event Time Stamp (padded to 4 hex digits '060e') -white terminator (c/r,l/f)	 30 30 20 30 36 30 65 0d 0a	 30 30 20 30 36 30 65 0d 0a
rt3 event at 18.1560 seconds	Octet String (not sent) -length of Octet String (not sent) -Event Number (padded to 2 hex digits '02') -white space (' ') -Event Time Stamp (padded to 4 hex digits '0618') -white terminator (c/r,l/f)	 30 32 20 30 36 31 38 0d 0a	 30 32 20 30 36 31 38 0d 0a

Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	2 (asciiData)	0 seconds	4 (disableMon)	4 (monitorMode1On)	doesn't need to be configured

Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

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MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	2 (asciiData)	0 seconds	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.6.7 Event Monitor Mode Example 2: (Informative)

This example utilizes Study 1 of the Event Study Example to demonstrate the polled binary data Event Monitor Mode.

The following assumptions are made:

1. The central software is communicating to the dcm device on a dial-up connection. It is not on a multi-drop communications architecture and therefore streaming of data can be allowed.
2. The dial-up connection has already been established.

The Event Study has already been configured (refer to Section C.3.3).

Display units do not need to be set for Event Monitor Mode.

Configure a row in the Monitor Enable Table.

Study 1 of the Event Study Example has been selected for Monitor Mode. The device is configured to send out the study 1 event records in binary format .

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	3 (binaryData)	(don't care)	(don't care)	(don't care)	doesn't need to be configured

Set the Monitor Enable Control to enable the desired type of Monitor Mode.

Polled Monitor Mode is selected.

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MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	3 (binaryData)	(don't care)	3 (enableMon2)	3 (validating)	doesn't need to be configured

Verify that the desired Monitor Mode has been successfully enabled.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	3 (binaryData)	(don't care)	3 (enableMon2)	5 (monitorMode2On)	doesn't need to be configured

The dcm device will now be waiting to be polled by the central software for the event data. Every time the central software polls, (performs a read of the Monitor Enable Poll Now column for this row in the Monitor Enable Table), the dcm device will send back the binary event data as defined by the Event Study through Logical IO port 5.

The data sent out will be structured the same as the data portion of each data packet for study 1 of the Event Study Example.

The following Polled Data Representation Table uses exactly the same event record examples as study 1 of the Event Study Example.

Each row of the Polled Data Representation Table represents the buffered Logical IO Event Records between each poll.

Although this study has been configured to use OER Encoding, the following Polled Data Representation Table shows both the BER and OER Encodings of the polled data.

Polled Data Represention Table			
Event Description	**ASN.1** (event data shown in decimal,hex)	**BER** (hex)	**OER** (hex)
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 1 row of Monitor Enable Table) @ 08:31:58			
timer event at 0 seconds	Octet String (04) -length of Octet String (0c) -Event Number (03) -Event Value (00)	04 0c 03 00	 0c 03 00

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timer event at 6 seconds	-Event Number (03) -Event Value (01)	03 01	03 01
timer event at 12 seconds	-Event Number (03) -Event Value (02)	03 02	03 02
rt1 event at 12.4500 seconds	-Event Number (00) -Event Time Stamp (1194)	00 11 94	00 11 94
rt3 event at 12.5500 seconds	-Event Number (02) -Event Time Stamp (157c)	02 15 7c	02 15 7c
CENTRAL SOFTWARE POLLS, (Reads 'Monitor Enable Poll Now' column in study 1 row of Monitor Enable Table) @ 08:32:13			
timer event at 18 seconds	Octet String (04) -length of Octet String (08) -Event Number (03) -Event Value (03)	04 08 03 03	 08 03 03
rt1 event at 18.1550 seconds	-Event Number (00) -Event Time Stamp (060e)	00 06 0e	00 06 0e
rt3 event at 18.1560 seconds	-Event Number (02) -Event Time Stamp (0618)	02 06 18	02 06 18

Disable the Monitor Mode Study.

MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	3 (binaryData)	(don't care)	4 (disableMon)	5 (monitorMode2On)	doesn't need to be configured

Verify the Monitor Mode Study has been disabled.

The Monitor Mode has been successfully disabled (Monitor Enable Status=idle).

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MONITOR ENABLE TABLE (SEE SECTION 2.8.26)						
Study # (index 1) RO	Monitor Enable IO Number RW	Monitor Enable Type RW	Monitor Enable Time Interval RW	Monitor Enable Control RW	Monitor Enable Status RO	Monitor Enable Poll Now RO
1	5 (rs232 comms channel	3 (binaryData)	(don't care)	4 (disableMon)	6 (idle)	doesn't need to be configured

C.3.7 SNMP 'GETNEXT' EXAMPLE: (INFORMATIVE)

This section was included to help the dcm working group members gain a better understanding of the SNMP GETNEXT command .

(Start of DCM Tree)

Table 1	
Index 1	***A***
1	A1
2	A2
3	A3

Table 2			
Index 1	***Index 2***	***B***	***C***
1	1	B1	C1
1	2	B2	C2

(End of DCM Tree)

GetNext (dcm)
GetNextResponse (dcm.Table1.1.A,A1)

GetNext (dcm.Table1.1.A)
GetNextResponse (dcm.Table1.2.A,A2)

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GetNext (dcm.Table1.2.A)
GetNextResponse (dcm.Table1.3.A,A3)

GetNext (dcm.Table1.3.A)
GetNextResponse (dcm.Table2.1.1.B,B1)

GetNext (dcm.Table2.1.1.B)
GetNextResponse (dcm.Table2.1.2.B,B2)

GetNext (dcm.Table2.1.2.B)
GetNextResponse (dcm.Table2.1.1.C,C1)

GetNext (dcm.Table2.1.1.C)
GetNextResponse (dcm.Table2.1.2.C,C2)

GetNext (dcm.Table2.1.2.C)
ErrorResponse (dcm.Table2.1.2.C) - indicating ‘noSuchName’ (as error number) because the End of the MIB was reached.

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C.3.8 SNMP ENCODING OF A 'GET RESPONSE' ON A TABLE – EXAMPLE (INFORMATIVE)

This section was included to help the dcm working group members gain a better understanding of the SNMP GET RESPONSE command .

(Retrieve Column 1 and Column 2 data in row indexed by 1-1)

Table OID=..dcm.08.01.01			
Index 1	Index 2	Col 1 (integer(0..255))	Col 2 (octet string(0..20))
1	1	4	"ABC"
1	2	5	"DE"

SNMP MESSAGE																										
														SNMP PDU (Get Response)												
Seq		Version #			Community Name									Get Resp		Request ID			Error Status			Error Index			Variable-Bindings			
T	L	T	L	V	T	L	V							T	L	T	L	V	T	L	V	T	L	V	T	L	Var-Bind1	Var-Bind2
30	46	02	01	01	04	06	70	75	62	6C	69	63		A2	39	02	01	00	02	01	00	02	01	00	30	2E		

Var-Bind 1																						
Seq		OID of [(Col 1)(Row=1,1)]																		Value=Integer 4		
T	L	T	L	V																T	L	V
30	15	06	10	2B	06	01	04	01	89	36	04	02	09 dcm	01 node	01 table	01 entry	01 column	01 index1	01 index2	02	01	04

Var-Bind 2																								
Seq		OID of [(Col 2)(Row=1,1)]																		Value=Octet String "ABC"				
T	L	T	L	V																T	L	V		
30	17	06	10	2B	06	01	04	01	89	36	04	02	09 dcm	01 node	01 table	01 entry	02 column	01 index1	01 index2	04	03	41	42	43

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ANNEX D
Typical Communications Profiles List

(Informative)

The NTCIP Data Collection and Monitoring (DCM) Working Group developing this standard decided after several discussions to provide the readers and implementers with some guidance in terms of the underlying communications profiles that could be used with equipment conforming to this standard. These communications profiles are typical of existing implementations.

The recommended profiles are based on the existing or planned NTCIP standards, which in turn are based on existing Information Technology (IT) standards or on new 'NTCIP-developed' standards.

The DCM WG recommends the following combination of communications profiles ***to setup and monitor the DCM Unit (Configuration)***.

Information Profile: 1. NTCIP 1206 (this document – Section 2)
2. NTCIP 1201 (the NTCIP Global Object Definitions) plus the approved Amendments.
NOTE: conformance groups are defined in Annex A.

Application Profile: 1. NTCIP 2301 – defines SNMP, STMP. However, the DCM WG recommends support of only the SNMP aspects.

Transport Profile: 1. NTCIP 2202 – defines the use of TCP/UDP/IP as the transport and network protocol mechanism, ***OR***
2. NTCIP 2201 – defines a bandwidth-conserving transport and network protocol mechanism. *Note that if a "NULL" transport profile is used to setup the dcm unit, a different device driver may be required than the one used for the FTP file transfers to retrieve recorded data files.*

Subnetwork Profile: ANY – due to the use of NTCIP 2202, any commonly available data link layer and physical layer protocol could be used. These protocols include

- dial-up (PPP) – as defined in NTCIP 2103
- Ethernet – as defined in NTCIP 2104
- FDDI – not defined as NTCIP Profile
- Direct connect (PMPP) – as defined in NTCIP 2101

The DCM WG recommends the following combination of communications profiles ***to retrieve recorded data collection files from the DCM Unit (file transfer / retrieval)***.

Information Profile: 1. NTCIP 1206 (this document – Section 2)
NOTE: conformance groups are defined in Annex A.

Application Profile: 1. NTCIP 2302 – defines the File Transfer Protocol (FTP) that is being recommended for transferring files from the DCM device to a central location. These files may contain the collected data in the format as was setup by use of the objects defined in NTCIP 1206 and/or NTCIP 1201.

Transport Profile: NTCIP 2202 – defines the use of TCP/UDP/IP as the transport and network protocol mechanism.

Subnetwork Profile: ANY – due to the use of NTCIP 2202, any commonly available data link layer and physical layer protocol could be used. These protocols include

- dial-up (PPP) – as defined in NTCIP 2103
- Ethernet – as defined in NTCIP 2104
- FDDI – not defined as NTCIP Profile

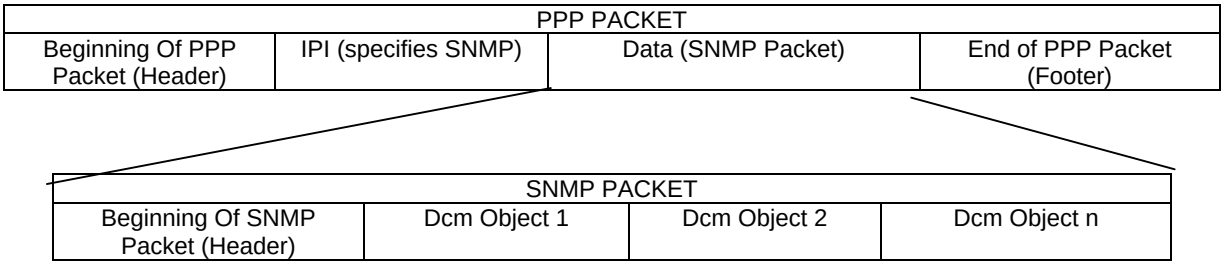
Note: any implementor or agency may choose to recommend, purchase, and/or implement any other combination of communications profiles that addresses their needs.

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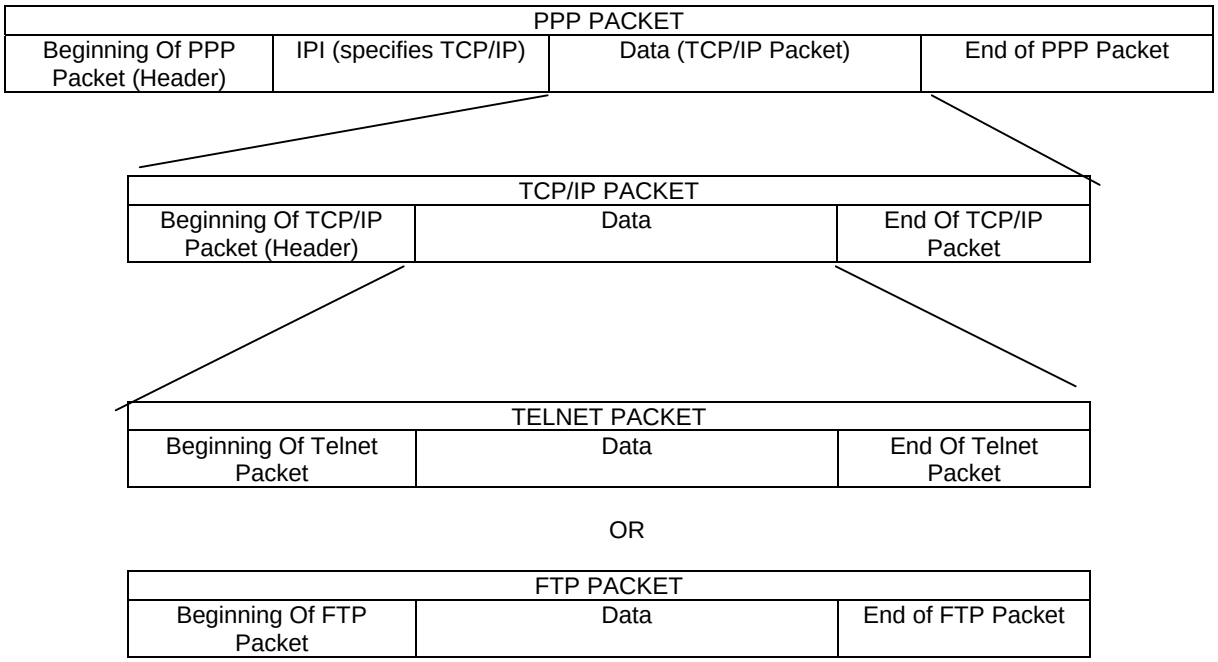
D.1 DCM Typical Communications Architectures

Below are two examples of typical Communications Architectures that conform to the Recommended Profiles.

D.1.1 Dial-up / Direct Connect (for Configuration or Setup of the DCM Unit)



D.1.2 Dial-up / Direct-Connect / Network (for File Transfers)



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