INTERNET-DRAFT   R. Lutz
MFPA Technical Committee   Cognisys, Inc.
May 6, 2001   R. Bergman
                                                     Hitachi Koki
                                                        B. Wagner
                                                 NETsilicon, Inc.

Network Scanner MIB, Version 13.0

<draft-mfpa-scannermib-xx.txt>

Expires October 6, 2001

Status of this Memo

Copyright Notice

Abstract

   The Network Scanner MIB is an industry standard SNMP MIB for the
   management of networked scanner devices. The Scanner MIB was
   developed as a solution for multifunction devices, and consequently
   this MIB covers only the unique scanner related sub-units. However
   by importing objects from other MIBs, the MIB is equally applicable
   to stand-alone scanner products.

TABLE OF CONTENTS

1. INTRODUCTION

   This document defines an SNMP Management Information Base (MIB) to
   provide for the management of the scanner portion of a multifunction
   device. A full-featured multifunction environment includes functions
   such as a Printer, Scanner, Facsimile, and Copier, and multiple MIBs
   are required to completely define the entire system. The Scanner MIB
   supports the following functional sub-units:

   -- Scanner General
   -- Original Document Handler
   -- Image Sensor
   -- Color Space
   -- Communication Channel
   -- Scanner Control Interpreter

1.1. Terminology for Conformance

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted per [RFC-2119].

1.2 Network Scanning Environment

   Scanners have been typically either been vertically integrated into
   larger systems or have been desktop devices connected directly to a
   workstation for previewing and transforming the image captured. For
   this reason, the management of a scanner as an appliance on a network
   has not received the same attention as other devices that may operate
   as pure services to a client workstation. As the scanner device
   becomes more functional, or if you consider the co-located
   workstation to be part of the scanning solution, then these devices
   can operate not as services but as a complete client service solution
   at that location. Other users can establish the settings for their
   future scan sessions and then provide the original documents when
   convenient, recovering the settings desired for that session, and
   storing the resulting information at the desired location on the
   network.

   The management of capturing the image of an original document can be
   divided into two overlapping pieces, the management of scanning and
   the management of the scanner. Scanning encompasses the entire
   process of (1) selection of a scanner, (2) choosing scanning
   properties, (3) sensing an original document to a raw data form,
   (4) transformation of the raw data to normalize it due to
   irregularities in the sensing hardware, possibly enhance it in some
   way (5) compression of the data (6) placing the image data in a known
   format, (7) storage of the image in a local file store, (8) routing
   to or notifying the user. Most of the scanning process is outside the
   scope of the model presented here; only the management of the scanner
   is covered.

```
Figure 1a - One Scanner's View of the Network:
            Scanner with a colocated workstation


     system    scanner    asset      user           user            user
     manager   operator   manager
       O          O          O          O             O               O
      /|\        /|\        /|\        /|\           /|\             /|\
      / \        / \        / \        / \           / \             / \
       |          |          |          |             |               |
 +---------+ +-------+ +-------+ +-------+   +-----------+ +-----------+
 |configur-| |scanner| | asset | |scanner|   |   user    | |   user    |
 |ator     | |manager| |manager| |browser|   |application| |application|
 +---------+ +-------+ +-------+ +-------+   +-----------+ +-----------+
     ^          ^          ^          ^           ^               ^
     |R/W       |R/W       |R         |R          |R/W             |R/W
     |          |          |          |           |               |
     |          |          |          |           |               |
     |          |          |          |           |               |
     v          v          |          |           V               V
 =============================================================================
                           |                            ^         ^
                           |SNMP                     scan|     scan|
          +-----+      +-------+                   control|     data|
          | MIB |<------>| agent |                        |         |
          +-----+      +-------+                           |         |
                           |unspecified                    |         |
       +----------------------|-------+                     |         |
       | +============+  +==========+ |                     |         |
    O  | |            |  |          | |    +-----------+    |         |
   /|\ ---| |          |  | Colocated | |  +-----------+|    V         |
   / \  | |  SCANNER   |--|Workstation|---| interface ||<--------+
  walk-up | |          |  | (OPTIONAL)| | |           |+
   user | |            |  |          | | | +-----------+
       | +============+  +==========+ |
       +----------------------|-------+
                   +-------------+
                   | Data Store  |
                   | (Optional)  |
                   +-------------+

NOTE: The interface between the workstation and the scanner is not
      Specified.  The network views the scanner/workstation as a
      single unit.
```
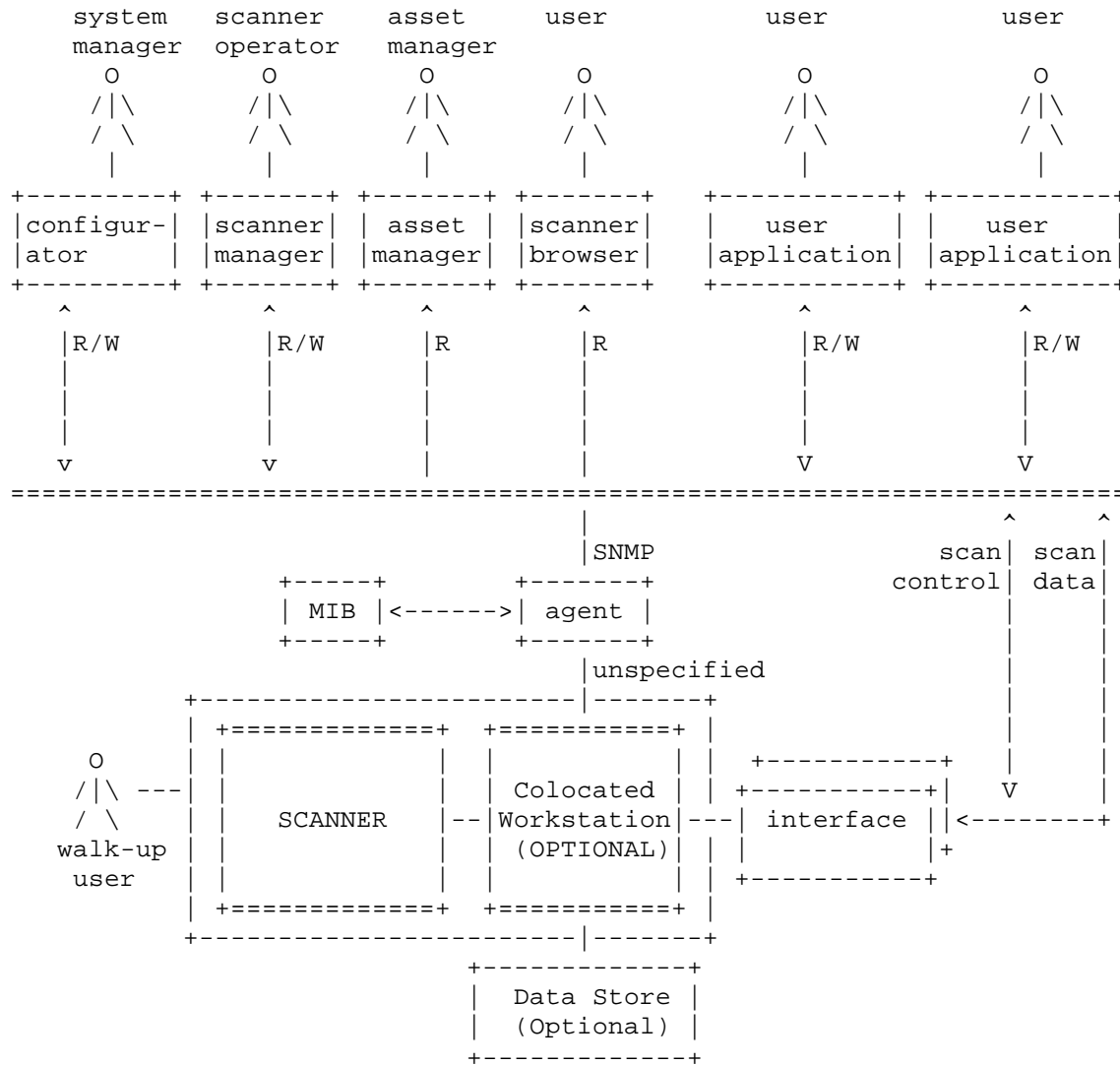
Figure 1b - One Scanner's View of the Network:
          Stand-alone scanner


```
     system    scanner    asset     user         user             user
     manager   operator   manager
       O          O         O         O            O                O
      /|\        /|\       /|\       /|\          /|\              /|\
      / \        / \       / \       / \          / \              / \
       |          |         |         |            |                |
 +---------+ +-------+ +-------+ +-------+   +-----------+  +-----------+
 |config-  | |scanner| | asset | |scanner|   |   user    |  |   user    |
 | urator  | |manager| |manager| |browser|   |application|  |application|
 +---------+ +-------+ +-------+ +-------+   +-----------+  +-----------+
     ^          ^         ^         ^            ^                ^
     |R/W       |R/W      |R        |R           |R/W             |R/W
     |          |         |         |            |                |
     |          |         |         |            |                |
     |          |         |         |            |                |
     v          v         |         |            V                V
 ================================================================
                |                            ^        ^
                |SNMP              scan|        |scan
 +-----+        +-------+          control|        |data
 | MIB |<------>| agent |               |        |
 +-----+        +-------+               |        |
                |unspecified            |        |
            +=============+             |        |
     O          |            |   +-----------+   |        |
    /|\ ----  |            |   +-----------+|   V        |
    / \       |   SCANNER  |--| interface ||<-----+-----+
   walk-up    |            |   |           |+
    user      |            |   +-----------+
            +=============+
                |
            +---------+
            | Data    |
            | Store   |
            | (Opt'l) |
            +---------+
```
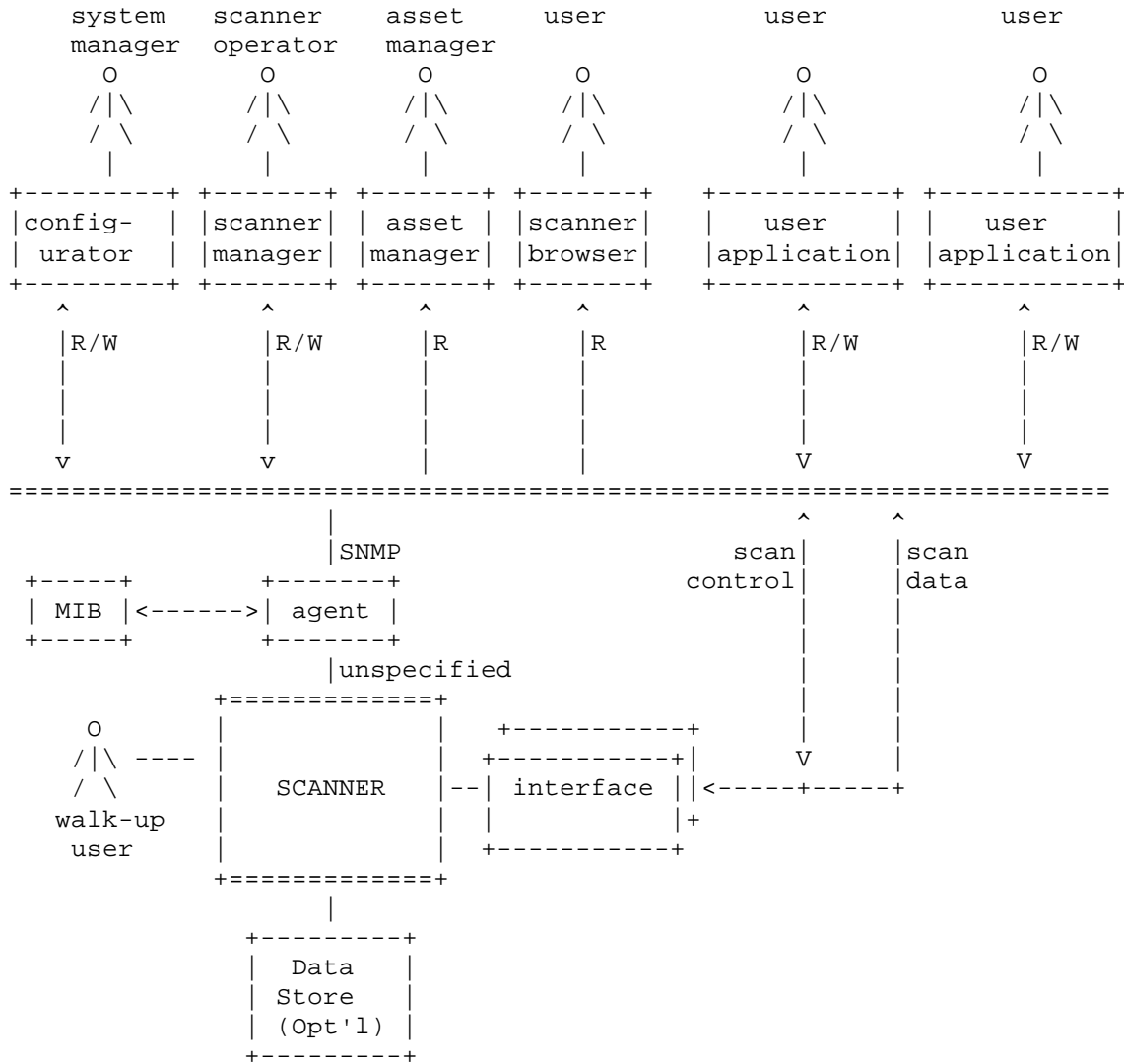

1.3 Scanner Device Overview

   A scanner is the physical device that takes originals from an input
   source, exposes the original with a light source, detects the color
   of the original based on the light reflected from the original using
   photosensitive electronic elements. The image is composed of a
   rectangular array of pixels, where each is treated as a single
   uniform color. The photosensitive elements provide a numerical
   quantity for each pixel, typically compressed to reduce storage space

and bandwidth required to transmit the image. There is typically
normalization to account for irregularities in the sensing hardware
and color correction steps before the compression occurs. In the
management of the physical scanning device, the description, status,
and alert information concerning the scanner and its various sub-
units is made available to the management application so that it can
be reported to the end user or key operator. The information needed
in the management of the physical scanner and the management of a
scan job overlap highly and many of the tasks in each management area
require the same or similar information.

Some production-grade scanners may have a marker mechanism that
produces marks on the document original media, typically referred to
as "endorsing". This marking can be performed either before or after
the scan of the document, but typically not both. Marking is
typically confined to a small and specific portion of the image area,
and it utilized to indicate on the original that it has been scanned
into the system, and optionally, also to indicate on the scanned
image when it was actually scanned into the system. The marker sub-
units and their associated supplies specifically not supported by
this standard. This results in a substantial simplification.

1.4 Categories of Scanner Information

Information about scanners is classified into three basic categories;
descriptions, status, and alerts.

1.4.1 Descriptions

Descriptions convey information about the configuration and
capabilities of the scanner and its various sub-units. This
information is largely static information and does not generally
change during the operation of the system but may change as the
scanner is repaired, reconfigured or upgraded. The descriptions are
one part of the visible state of the scanner where state means the
condition of being of the scanner at any point in time.

1.4.2 Status

Status is the information regarding the current operating state of
the scanner and its various sub-units. A single status value
indicates the overall status of the scanner and whether any Alerts
are outstanding. Additional information regarding the reason for an
Alert can be determined by examining the Alerts table.

1.4.3 Alerts

An Alert is the representation of a reportable event in the scanner.
An event is a change in the state of the scanner. Some of those state
changes are of interest to a management application and are therefore
reportable. Typically, these are the events that affect the scanner's

ability to scan. See the Multifunction Product MIB [MFP-MIB] for
additional information regarding the design and usage of the Alert
Table.

2. THE SNMP MANGEMENT FRAMEWORK

The SNMP Management Framework presently consists of five major
components:

   o   An overall architecture, described in RFC 2571 [RFC2571].

   o   Mechanisms for describing and naming objects and events for the
        purpose of management. The first version of this Structure of
        Management Information (SMI) is called SMIv1 and described in
        STD 16, RFC 1155 [RFC1155], STD 16, RFC 1212 [RFC1212] and RFC
        1215 [RFC1215]. The second version, called SMIv2, is described
        in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and
        STD 58, RFC 2580 [RFC2580].

   o   Message protocols for transferring management information. The
        first version of the SNMP message protocol is called SNMPv1 and
        described in STD 15, RFC 1157 [RFC1157]. A second version of
        the SNMP message protocol, which is not an Internet standards
        track protocol, is called SNMPv2c and described in RFC 1901
        [RFC1901] and RFC 1906 [RFC1906]. The third version of the
        message protocol is called SNMPv3 and described in RFC 1906
        [RFC1906], RFC 2572 [RFC2572] and RFC 2574 [RFC2574].

   o   Protocol operations for accessing management information. The
        first set of protocol operations and associated PDU formats is
        described in STD 15, RFC 1157 [RFC1157]. A second set of
        protocol operations and associated PDU formats is described in
        RFC 1905 [RFC1905].

   o   A set of fundamental applications described in RFC 2573
        [RFC2573] and the view-based access control mechanism described
        in RFC 2575 [RFC2575].

A more detailed introduction to the current SNMP Management Framework
can be found in RFC 2570 [RFC2570].

Managed objects are accessed via a virtual information store, termed
the Management Information Base or MIB. Objects in the MIB are
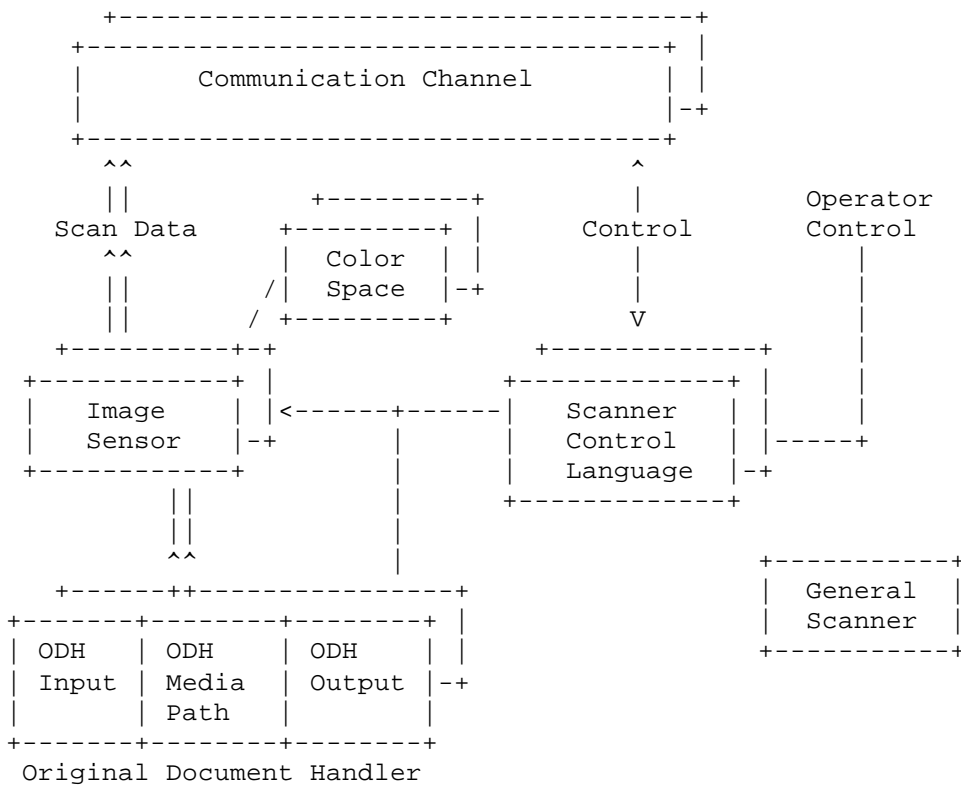defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIv2. A
MIB conforming to the SMIv1 can be produced through the appropriate
translations. The resulting translated MIB must be semantically
equivalent, except where objects or events are omitted because no
translation is possible (use of Counter64). Some machine readable
information in SMIv2 will be converted into textual descriptions in

SMIv1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

3. SCANNER MODEL

In order to accomplish the management of the scanner, an abstract model of the scanner is needed to represent the sub-units composing the scanner. The scanner model shown in figure 2 represents the scanner portion of a multifunction device, as defined in the Multifunction Product MIB [MFP-MIB]. Refer to the MFP MIB for the relationship between the Scanner MIB model and the additional required sub-units to fully define an operational device.

Figure 2 - Scanner Block Diagram

```
            +------------------------------------+
          +------------------------------------+ |
          |        Communication Channel       | |
          |                                    |-+
          +------------------------------------+
            ^^                              ^
            ||                              |          Operator
         Scan Data      +---------+      Control       Control
            ^^       +---------+ |         |              |
            ||       | Color   | |         |              |
            ||      /| Space   |-+         |              |
            ||     / +---------+           V              |
         +---------+-+                +------------+       |
       +-----------+ |              +------------+ |       |
       |   Image   | |<------+------|  Scanner   | |       |
       |  Sensor   |-+       |      |  Control   | |-----+ |
       +-----------+         |      |  Language  |-+
            ||               |      +------------+
            ||               |
            ^^               |                  +-----------+
       +------++-------------+                  | General   |
     +-------+--------+--------+ |              | Scanner   |
     | ODH   | ODH    | ODH    | |              +-----------+
     | Input | Media  | Output |-+
     |       | Path   |        |
     +-------+--------+--------+
       Original Document Handler
```

3.1 Overview of the Scanner Model

The model has three basic parts: (1) the flow of Job Control data to

the scanner, (2) image data flow of scan data from the scanner, (3)
the flow of original documents through the scanner. There are also
auxiliary sub-units that control and facilitate the basic flows.

Job control data provided by the transport protocol (interface)
appears on a channel which is the input to the Job Control
Interpreter. The interpreter converts job control information into
settings of the scanner for a specific scan job. The job control
information for a specific job ("Ticket") is either applied
immediately, or stored to be applied to one or more future jobs.
The walk-up operator can establish all the settings via the Operator
Console (see the Multifunction Product MIB [MFP-MIB]), or he may
indicate which previously established Ticket is to be applied.

The user inserts original documents into the Original Document
Handler (ODH) mechanism which handles the original documents, prior
to, during, and after scanning. This mechanism has many design
possibilities, including a flatbed glass window, a single sheet
feeder, multiple sheet input with separate output bin, or an input
bin that is also used as the output bin with mechanism to separate
the scanned documents from those already scanned.

Image data are derived from the sensor array, normalized, corrected,
and converted to a form suitable for storage and transport. Then
those data flow through a physical connection on which some form of
transport protocol stack is running.

The auxiliary sub-units facilitate control of the scanner,
inquiry/control of the operator panel, reporting of alerts, and the
adaptation of the scanner to various natural languages and characters
sets. All the software sub-units run on the System Controller which
represents the processor, memory and storage systems of the Scanner.
Each of the sub-units is discussed in more detail below.

The scanner system may have a partner workstation that will be used
for some of the processing that is implied to be in the scanner
itself. For example, the scanner mechanism may only provide raw data
output to the workstation or network. The partner workstation may
then provide the image processing and format transformation
functions. For the purposed of the MIB, these functions are treated
as if they existed within the scanner itself.

3.2 Scanner Sub-Units

The scanner model defines 5 types of sub-units, and the corresponding
management data are organized into "groups". The following sections
describe the sub-units. Refer to the Multifunction Product MIB
[MFP-MIB] for additional sub-units that may be required for specific
implementations.

3.2.1 General Scanner

   The general scanner sub-unit is responsible for the overall control
   and status of the scanner. There is exactly one general scanner sub-
   unit in a scanner. The general scanner sub-unit is represented by the
   General Scanner Group in the model. It provides the overall status of
   the scanner, allows the scanner to be reset, and is the means to
   localize messages used in management of the scanner.

   A major portion of the General Scanner sub-unit is imported from the
   Multifunction Product MIB [MFP-MIB]. The Scanner MIB General Table
   contains unique objects that define the default settings for scanner
   specific features. This includes entries that identify the default
   Original Document Handler, the default sensor configuration, and the
   default color space selection.

3.2.2 Original Document Handler

   A scanner may implement some form of Original Document Handler (ODH),
   which can feed originals from an input tray or feeder to a given
   position where a moving sensor is moved across the original, or the
   original may be moved across the sensor array, and then the document
   is deposited an output tray. In some cases, the input and output tray
   may be the same.

   The ODH mechanism has many design possibilities, including a flatbed
   glass window, a single sheet feeder, multiple sheet input with
   separate output bin, or an input bin that is also used as the output
   bin with mechanism to separate the scanned documents from those
   already scanned. A single scanner device may offer several ODH
   options. Although great emphasis is placed here on original paper
   documents, this does not exclude scanning other original material,
   such as with scanning slides, transparencies, film, or capturing
   images directly with a digital camera.

   There are as many ODH sub-units as there are distinctly selectable
   ODH "addresses". For example, if an input has an option for manually
   placing documents on a flat-bed as well as automatically feeding from
   an automatic document feeder, then two ODH sub-units exist if each
   can be separately selected and one ODH sub-unit exists if putting an
   original document on the flat-bed overrides feeding from the
   automatic document feeder; that is, in the second case there is no
   way to separately select or address the flat-bed portion.

   Original Media

   The input-portion of an ODH sub-unit may hold one or more instances
   of document originals to be scanned. The ODH Group describes the
   maximum and minimum supported original media sizes. The document
   originals may change in size from one original to the next and the
   size of the original may be indicated as part of the captured image

data file.

3.2.3 Image Sensor

An image sensor is the mechanism that detects the surface color of
scanned document originals resulting in a set of digital information.
The original is illuminated with a light source. The reflected light
from the light source is detected by one or more discrete photo-
detectors. These detectors may be organized in a variety of physical
forms, including a) a linear array parallel to the leading edge of
the paper, thereby requiring that paper or the imaging unit be moved
along the feeding direction of the paper so that the entire paper is
imaged; or b) a complete rectangular array which accepts the image of
the paper in a snap-shot fashion; or c) a scanning laser with an
associated single photo-detector.

The image area is divided in to a rectangular array of square or
nearly square "pixels". Each pixel is detected by a single hardware
detector or detector set and therefore is treated as a single,
uniform color. The color of the pixel is then represented by one or
more numbers, each relating to a given set of sensed light
frequencies. The value of the number relates to the intensity of the
light of that frequency range that reached the detector.

The Sensor sub-units are represented by the Sensor Group in the
model. A scanner can contain one or more image sensor mechanisms.
Some examples of multiple sensor sub-units are: a scanner with
separate sensors for front and back-side scanning, or separately
treated sensors for various frequency ranges (colors). (However, it
is preferred that this arrangement be avoided and treat this as a
single sensor mechanism with the capability of detecting multiple
light frequency ranges (color ranges).

3.2.4 Communication Channel

The channel sub-units identify the independent flow of scan data and
scanner control data. As in the Printer MIB, the primary purpose of
the channels group in the Scanner MIB is to identify and optionally
provide control of the paths that may be used to access the scanner.
Unlike the Printer, in which setup/control information and image data
are typically sent via the same channel (and sometimes in the same
file), scan control and scan data delivery are typically over
separate channels. This is because the scanning process must precede
data delivery, and therefore the control information must be present
before scanning starts.

The channel sub-units are represented by the Communciation Channel
Group in the Model. Each channel is typically identified by the
electronic path and service protocol used to deliver scan data from
the scanner, along with a image format. A channel sub-unit may be
independently enabled (allowing scan data to flow) or disabled

   (stopping the flow of scan data).

3.2.5 Scanner Control Interpreter

   There is a single Scanner Control Interpreter sub-unit responsible
   for processing of scanner job control data into the appropriate
   scanner state. A scanner may support various forms of job control
   information. The scanner control interpreter sub-unit is represented
   by the Scanner Control Language Group in the Model. The scanner
   control interpreter is typically implemented with software running on
   the System Controller. The Scanner Control Langauge Table has one
   entry per form of job ticket information supported.

3.2.6 Color Space

   The color space information is used by the image sensor to determine
   how to format color values in the output image. The color space
   information is presented in the Color Space Group in the model.

3.3 Read-Write Objects

   Some of the objects in the scanner MIB report on the existence of or
   amount of a given resource used with the scanner, such as the
   existence of certain ODH units. On some scanners there are sensors
   that allow these resources to be sensed. Other scanners, however,
   lack sensors that can detect (all of) the properties of the resource.
   Because the scanner needs to know of the existence or properties of
   these resources for the scanner to function properly some other way
   of providing this information is needed. The chosen way to solve this
   problem is to allow a management application to write into objects
   which hold the descriptive or existence values for scanners that
   cannot sense the values. Thus many of the objects in the MIB are
   given read-write access, but a scanner implementation might only
   permit a management operation to change the value if the scanner
   could not sense the value itself. Therefore, the ability to change
   the value of a read-write object may depend on the implementation of
   the agent. Note that even though some objects explicitly state the
   behavior of conditional ability to change values, any read-write
   object may act that way.

   Generally, an object is given read-write access in the Scanner MIB
   specification if:

   1. The object involves installation of a resource that some
      scanners cannot themselves detect. Therefore, external means are
      needed to inform the scanner of the installation. (Here external
      means include using the operator console, or remote management
      application) and

   2. The scanner will behave differently if the installation of the
      resource is reported than the scanner would if the installation

were not reported; that is, the object is not to be used as a
place to put information not used by the scanner.

It is an implementation-specific matter as to whether or not MIB
object values are persistent across power cycles or cold starts.

3.4 Enumerations

Enumerations (enums) are sets of symbolic values defined for use with
one or more objects. Some common enumeration sets are assigned a
symbolic data type name (textual convention).

3.4.1 Registering Additional Enumerated Values

This working group has defined several type of enumerations. These
enumerations differ in the method employed to control the addition of
new enumerations. Throughout this document, references to
"type n enumeration", where n can be 1, 2 or 3 can be found in the
various tables. The definitions of these types of enumerations are:

Type 1 enumeration

All the values are defined in the Scanner MIB specification (RFC for
the Scanner MIB). Additional enumerated values require a new RFC.

Type 2 enumeration

An initial set of values are defined in the Scanner MIB
specification. Additional enumerated values are registered after
review by this working group. The initial versions of the MIB will
contain the values registered so far. After the MIB is approved,
additional values will be registered through IANA after approval by
this working group.

Type 3 enumeration

An initial set of values are defined in the Scanner MIB
specification. Additional enumerated values are registered without
working group review. The initial versions of the MIB will contain
the values registered so far. After the MIB is approved, additional
values will be registered through IANA without approval by this
working group.

4. Objects from other MIB Specifications

The Scanner MIB represents only one functional piece of a complete
system. The definition of a product that incorporates a scanner
function will require the use of groups from other MIBs. Refer to
the Multifunction Product MIB [MFP-MIB] for complete details
regarding these requirements.

5. NETWORK SCANNER MIB SPECIFICATION

SCANNER-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Counter32 Integer32, enterprises
            FROM SNMPv2-SMI
    TEXTUAL-CONVENTION
            FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
            FROM SNMPv2-CONF
    HrDeviceIndex
            FROM HOST-RESOURCES-MIB
    PrtMediaUnitTC, PrtCapacityUnitTC, PrtSubUnitStatusTC,
    PrtChannelTypeTC, PrtChannelState
            FROM PRINTER-MIB
    MfpColorSpaceTypeTC, MfpImageFormatTC, MfpChannelModeTC
            FROM MFP-MIB;

scannerMIB MODULE-IDENTITY
    LAST-UPDATED "0105060000Z"
    ORGANIZATION "MFPA Scanner MIB Working Group"
    CONTACT-INFO
         "Raymond Lutz
          Postal: Multifunction Products Association
          1010 Old Chase Ave, STE B
          El Cajon, CA, 92020
          Tel: 619-447-1127
          Fax: 619-447-6872
          E-mail: raylutz@mfpa.org"
    DESCRIPTION
         "The MIB module for management of network scanners."
    ::= { mfpMibs 2 }

mfpa   OBJECT IDENTIFIER ::= { enterprises 5335 }
mfpMibs   OBJECT IDENTIFIER ::= { mfpa 1 }

-- Textual conventions for this MIB module
--
--
-- Control Language Group textual-conventions
--

ScnCntrlLangFamilyTC ::= TEXTUAL-CONVENTION
-- This value is a type 2 enumeration
    STATUS   current
    DESCRIPTION
         "Defines the control languages applicable to scanners."
    SYNTAX   INTEGER {

```
        other(1),
        unknown(2),
        scsi(3),
        twain(4),
        isis(5),          -- AIIM Std MS-61
        hpscl(6)
    }

-- Alert Group Textual Conventions

ScnAlertGroupTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration for values in the range
    -- 201 to 229.
    STATUS    current
    DESCRIPTION
        "The type of sub-unit within the scanner model related to this
        alert.  Where possible, these enumerations match the
        sub-identifier that identifies the relevant scanner MIB table."
    SYNTAX    INTEGER {
                generalScanner(201),
                scannerODH (202),
                scannerImageSensor(203),
                scannerColorSpace(204),
                scannerChannel(205),
                scannerControlLanguage(206),
                scannerDataFormat(207)
              }


-- Scanner MIB Objects

scanMIBObjects  OBJECT IDENTIFIER  ::= { scannerMIB 1 }

-- The General Scanner Group

-- The general scanner sub-unit is responsible for the overall
-- control and status of the scanner.  There is exactly one general
-- scanner sub-unit in a scanner.
scnGeneral  OBJECT IDENTIFIER ::= { scanMIBObjects 201 }

scnGeneralTable OBJECT-TYPE
    SYNTAX    SEQUENCE OF ScnGeneralEntry
    MAX-ACCESS not-accessible
    STATUS    current
    DESCRIPTION
        "A table of general information per scanner."
    ::= { scnGeneral 1 }

scnGeneralEntry OBJECT-TYPE
    SYNTAX    ScnGeneralEntry
    MAX-ACCESS  not-accessible
```

```
     STATUS      current
     DESCRIPTION
         "Entries define device default settings and device status."
     INDEX   { hrDeviceIndex }
     ::= { scnGeneralTable 1 }

ScnGeneralEntry ::= SEQUENCE {
     -- Note that not all of the objects in this sequence are in the
     -- general scanner group.

         scnODHDefaultIndex                Integer32,
         scnSensorDefaultIndex             Integer32,
         scnColorSpaceDefaultIndex         Integer32,
         scnImageFormatDefaultIndex        Integer32,
         scnGeneralStatus                  INTEGER
         }

scnODHDefaultIndex OBJECT-TYPE
     SYNTAX      Integer32 (1..65535)
     MAX-ACCESS read-write
     STATUS      current
     DESCRIPTION
         "The value of scnODHIndex corresponding to the default ODH
         sub-unit."
     ::= { scnGeneralEntry 1 }

scnSensorDefaultIndex OBJECT-TYPE
     SYNTAX      Integer32 (1..65535)
     MAX-ACCESS read-write
     STATUS      current
     DESCRIPTION
         "The value of scnSensorIndex corresponding to the default
         sensor sub-unit; that is, this object selects the default
         sensor."
     ::= { scnGeneralEntry 2 }

scnColorSpaceDefaultIndex OBJECT-TYPE
     SYNTAX      Integer32 (1..65535)
     MAX-ACCESS read-write
     STATUS      current
     DESCRIPTION
         "The value of scnColorSpaceIndex corresponding to the default
         sensor color space."
     ::= { scnGeneralEntry 3 }

scnImageFormatDefaultIndex OBJECT-TYPE
     SYNTAX      Integer32 (1..65535)
     MAX-ACCESS read-write
     STATUS      current
```

```
        DESCRIPTION
            "The value of scnImageFormatIndex corresponding to the default
            image format configured for the scanner."
        ::= { scnGeneralEntry 4 }


scnGeneralStatus OBJECT-TYPE
        SYNTAX      INTEGER {
            other(1),
            unknown(2),
            idle(3),
            pending(4),
            scanning(5),
            busy(6),
            fault(7)
            }
        MAX-ACCESS read-only
        STATUS      current
        DESCRIPTION
            "The current status of this scanner device."
        ::= { scnGeneralEntry 5 }


-- The Original Document Handler (ODH) Group

-- Original Document Handler (ODH) sub-units are managed as a tabular,
-- indexed collection of possible devices capable of providing media for
-- input to the scanning process, handling of the original media during
-- scanning, and depositing the scanned original media in an output bin.
-- ODH sub-units typically have a location, a type, an identifier, a set
-- of constraints on possible media sizes and potentially other media
-- characteristics, and may be capable of indicating current status or
-- capacity.


-- Implementation of every object in this group is mandatory.

scnODH   OBJECT IDENTIFIER ::= { scanMIBObjects 202 }

scnODHTable OBJECT-TYPE
        SYNTAX      SEQUENCE OF ScnODHEntry
        MAX-ACCESS not-accessible
        STATUS      current
        DESCRIPTION
            "A table of the devices capable of providing original
            documents for input to the scanning process, handling those
            originals during scanning, and depositing the original
            documents in an output bin."
        ::= { scnODH 1 }

scnODHEntry OBJECT-TYPE
        SYNTAX      ScnODHEntry
        MAX-ACCESS not-accessible
        STATUS      current
```

```
        DESCRIPTION
            "Attributes of a Original Document Handler (ODH) device.
            Entries may exist in the table for each device index whose
            device type is `scanner'."
        INDEX  { hrDeviceIndex, scnODHIndex }
        ::= { scnODHTable 1 }

        ScnODHEntry ::= SEQUENCE {
            scnODHIndex                    Integer32,          -- 1
            scnODHType                     INTEGER,            -- 2
            scnODHDimUnit                  PrtMediaUnitTC,     -- 3
            scnODHMaxDimFeedDir            Integer32,          -- 4
            scnODHMaxDimXFeedDir           Integer32,          -- 5
            scnODHMinDimFeedDir            Integer32,          -- 6
            scnODHMinDimXFeedDir           Integer32,          -- 7
            scnODHCapacityUnit             PrtCapacityUnitTC,  -- 8
            scnODHInputMaxCapacity         Integer32,          -- 9
            scnODHInputCurrentLevel        Integer32,          -- 10
            scnODHOutputMaxCapacity        Integer32,          -- 11
            scnODHOutputRemainingCapacity  Integer32,          -- 12
            scnODHMaxSpeed                 Integer32,          -- 13
            scnODHMaxMediaWeight           Integer32,          -- 14
            scnODHSimplexDuplex            INTEGER,            -- 15
            scnODHDocumentScanOrder        INTEGER,            -- 16
            scnODHInterleaving             INTEGER,            -- 17
            scnODHDescription              OCTET STRING        -- 18
            }

scnODHIndex OBJECT-TYPE
        SYNTAX     Integer32 (1..65535)
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
            "A unique value used by the scanner to identify this ODH sub-
            unit. Although these values may change due to a major
            reconfiguration of the device (e.g. the addition of new ODH
            sub-units to the scanner), values are normally expected to
            remain stable across successive scanner power cycles."
        ::= { scnODHEntry 1 }

scnODHType OBJECT-TYPE
    --  This value is a type 2 enumeration
        SYNTAX     INTEGER {
            other(1),
            unknown(2),
            automaticDocumentFeeder(3),
            automaticBookReader(4),
            flatbedManual(5),
            sheetFeedManual(6),
            handScanner(7),
            digitalCamera(8)
```

            }
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The type of technology employed by the ODH sub-unit."
        ::= { scnODHEntry 2 }

scnODHDimUnit OBJECT-TYPE
        SYNTAX   PrtMediaUnitTC
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The unit of measurement for use calculating and relaying
            dimensional values for this ODH sub-unit."
        ::= { scnODHEntry 3 }

scnODHMaxDimFeedDir OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "This object provides the value of the maximum dimension, in
            the feed direction, of the original document media that is
            accepted by this ODH sub-unit. The feed direction is parallel
            to the direction in which the media moves. This dimension is
            measured in ODH sub-unit dimensional units (scnODHDimUnit).
            This is NOT the size of each original. If the scanner is able
            to sense the size of the original during the scanning process
            of an individual original document, that information may be
            provided in the image data. The value (-1) means other and
            specifically means that this sub-unit places no restriction on
            this parameter. The value (-2) indicates unknown."
        ::= { scnODHEntry 4 }

scnODHMaxDimXFeedDir OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "This object provides the value of the maximum dimension, in
            the cross feed direction, of the media that is accepted by
            this input sub-unit. The cross feed direction is ninety
            degrees relative to direction of media movement associated
            with this sub-unit. This dimension is measured in ODH sub-unit
            dimensional units (scnODHDimUnit). This is NOT the size of
            each original. If the scanner is able to sense the size of the
            original during the scanning process of an individual original
            document, that information may be provided in the image data.
            The value (-1) means other and specifically means that this
            sub-unit places no restriction on this parameter. The value (-
            2) indicates unknown."

         ::= { scnODHEntry 5 }

scnODHMinDimFeedDir OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "This object provides the value of the minimum dimension, in
          the feed direction, of the media that is accepted by this ODH
          sub-unit. This dimension is measured in ODH sub-unit
          dimensional units (scnODHDimUnit). This is NOT the size of
          each original. If the scanner is able to sense the size of the
          original during the scanning process of an individual original
          document, that information may be provided in the image data.
          The value (-1) means other and specifically means that this
          sub-unit places no restriction on this parameter. The value (-
          2) indicates unknown."
     ::= { scnODHEntry 6 }

scnODHMinDimXFeedDir OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "This object provides the value of the minimum dimension, in
          the cross feed direction, of the media that is accepted by
          this input sub-unit. The cross feed direction is ninety
          degrees relative to the feed direction associated with this
          sub-unit. This dimension is measured in ODH sub-unit
          dimensional units (scnODHDimUnit). This is NOT the size of
          each original. If the scanner is able to sense the size of the
          original during the scanning process of an individual original
          document, that information may be provided in the image data.
          The value (-1) means other and specifically means that this
          sub-unit places no restriction on this parameter. The value (-
          2) indicates unknown."
     ::= { scnODHEntry 7 }

scnODHCapacityUnit OBJECT-TYPE
     SYNTAX   PrtCapacityUnitTC
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "The unit of measurement for use in calculating and relaying
          capacity values for this input sub-unit."
     ::= { scnODHEntry 8 }

scnODHInputMaxCapacity OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-write
     STATUS   current

        DESCRIPTION
            "The claimed maximum capacity of the input portion of the ODH
            sub-unit in ODH sub-unit capacity units (scnODHCapacityUnit).
            If this ODH sub-unit can reliably sense this value, the value
            is sensed by the scanner and may not be changed by management
            requests; otherwise, the value may be written (by a Remote
            Control Panel or a Management Application). The value (-1)
            means other and specifically indicates that the sub-unit
            places no restrictions on this parameter. The value (-2)
            means unknown."
        ::= { scnODHEntry 9 }

scnODHInputCurrentLevel OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "The current capacity of the input portion of the ODH sub-unit
            in ODH sub-unit capacity units (scnODHCapacityUnit). If this
            ODH sub-unit can reliably sense this value, the value is
            sensed by the scanner and may not be changed by management
            requests; otherwise, the value may be written (by a Remote
            Control Panel or a Management Application). The value (-1)
            means other and specifically indicates that the sub-unit
            places no restrictions on this parameter. The value (-2)
            means unknown. The value (-3) means that the scanner knows
            that at least one unit remains."
        ::= { scnODHEntry 10 }

```
--                  INPUT MEASUREMENT
--
--        _____   |                     |
--         ^        |                     |
--     |        |                     |                    |
--     |        |_ _ _ _ _ _ _ _ _ _|_____ |direction
--     |        |                     |     ^               v
-- MaxCapacity |                     |     |
--     |        | Sheets left in unit | CurrentLevel
--     |        |                     |     |
--     v        |                     |     v
--        _____ +_____+ _____
```

scnODHOutputMaxCapacity OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-write
        STATUS   current

      DESCRIPTION
          "The claimed maximum capacity of the output portion of the ODH
          sub-unit in ODH sub-unit capacity units (scnODHCapacityUnit).
          If this ODH sub-unit can reliably sense this value, the value
          is sensed by the scanner and may not be changed by management
          requests; otherwise, the value may be written (by a Remote
          Control Panel or a Management Application). The value (-1)
          means other and specifically indicates that the sub-unit
          places no restrictions on this parameter. The value (-2)
          means unknown."
      ::= { scnODHEntry 11 }

scnODHOutputRemainingCapacity OBJECT-TYPE
      SYNTAX   Integer32
      MAX-ACCESS read-write
      STATUS   current
      DESCRIPTION
          "The remaining capacity of output portion of the ODH sub-unit
          in ODH sub-unit capacity units (scnODHCapacityUnit). If this
          ODH sub-unit can reliably sense this value, the value is
          sensed by the scanner and may not be changed by management
          requests; otherwise, the value may be written (by a Remote
          Control Panel or a Management Application). The value (-1)
          means other and specifically indicates that the sub-unit
          places no restrictions on this parameter. The value (-2)
          means unknown. The value (-3) means that the scanner knows
          that there remains capacity for at least one unit."
      ::= { scnODHEntry 12 }

--   OUTPUT MEASUREMENT
--
--   _____ | | _____
--   ^ | | ^
-- | | | |
-- | | | RemainingCapacity
-- MaxCapacity | | |
-- | | | v   ^
-- | |_ _ _ _ _ _ _ _ _ _ _| _____ |direction
-- | | | |
-- | | Sheets in output |
--   v | |
--   _____ +_____+

scnODHMaxSpeed OBJECT-TYPE
      SYNTAX   Integer32
      MAX-ACCESS read-only
      STATUS   current

        DESCRIPTION
            "The maximum speed, in media sides per minute, that this ODH
            can feed input media to the sensor, scan, and then deposit the
            original in the output bin. A value of (-1) implies 'other'
            and specifically indicates that this is a manual ODH device.
            A value of (-2) indicates 'unknown'."
        ::= { scnODHEntry 13 }

scnODHMaxMediaWeight OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-write
        STATUS   current
        DESCRIPTION
            "The maximum weight of the medium that can be handled by this
            input sub-unit in grams per meter squared. The value (-1)
            means other and specifically indicates that the sub-unit
            places no restrictions on this parameter. The value (-2) means
            unknown."
        ::= { scnODHEntry 14 }

scnODHSimplexDuplex OBJECT-TYPE
    --   This value is a type 2 enumeration
        SYNTAX   INTEGER {
            other(1),
            unknown(2),
            simplex(3),
            duplexConcurrent(4),
            duplexSequential(5)
            }
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "The type of scanning performed by this ODH and sensor
            combination. Simplex indicates that one side of the original
            document is sensed. DuplexConcurrent indicates that both sides
            of the document are imaged at the same time using dual
            sensors. DuplexSequential indicates that first one side and
            then the other side is imaged using the same sensor mechanism,
            with automatic flipping of the original document."
        ::= { scnODHEntry 15 }

scnODHDocumentScanOrder OBJECT-TYPE
    --   This value is a type 2 enumeration
        SYNTAX   INTEGER {
            other(1),
            unknown(2),
            firstToLast(3),
            lastToFirst(4)
            }
        MAX-ACCESS read-only

```
     STATUS      current
     DESCRIPTION
          "The order of document traversal performed by this ODH.
          FirstToLast indicates that the first page of the document is
          scanned first and the last page is scanned last, which is
          'Scanner Order' or 'Fax Order'. LastToFirst indicates that the
          last page is scanned first and the first page is scanned last.
          This is 'Copier Order'."
     ::= { scnODHEntry 16 }


scnODHInterleaving OBJECT-TYPE
     SYNTAX      INTEGER (0..32767)
     MAX-ACCESS read-only
     STATUS      current
     DESCRIPTION
          "The number of scans that the duplex pages are offset from
          each other. (0) indicates that the first side and opposite
          side are scanned concurrently. (1) indicates that the opposite
          side is scanned one page after the first side (i.e. 1,2,3. . .
          order). (2) indicates that the first side leads the opposite
          side by 2 pages (1,3,2,5,. . . order). (3) indicates that the
          first side leads the opposite side by 3 pages, and so forth.
          The value (32767) indicates that the entire first side is
          imaged prior to the opposite side. The terms 'first side' and
          'opposite side' are determined by the scnODHScanOrder
          attribute."
     ::= { scnODHEntry 17 }


scnODHDescription OBJECT-TYPE
     SYNTAX      OCTET STRING (SIZE(0..255))
     MAX-ACCESS read-only
     STATUS      current
     DESCRIPTION
          "The manufacturer-provided description of this ODH in the
          localization specified by mfpGeneralCurrentLocalization."
     ::= { scnODHEntry 18 }


-- The Image Sensor Group

-- A sensor is the mechanism that detects surface color on the original
-- documents that are scanned.  The sensor sub-units are represented by
-- the Sensor Group in the model.  A scanner can contain one or more
-- image sensing mechanisms.  Some examples of multiple sensor sub-units
-- are: a scanner with separate sensors each side of the document or for
-- the detection of light of differing frequency ranges, or 'colors'.
-- Each sensor device can have its own set of characteristics such as
-- sensing technology, resolution, image area, and bits-per-pixel depth.

-- Implementation of every object in this group is mandatory.


scnSensor OBJECT IDENTIFIER ::= { scanMIBObjects 203 }
```

   -- The image area margins as listed below define an area of the
   -- original media which is guaranted to be detectable for this
   -- image sensor.

scnSensorTable OBJECT-TYPE
     SYNTAX   SEQUENCE OF ScnSensorEntry
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
         "This table contains information about the various image
         sensor sub-units in the scanner."
     ::= { scnSensor 1 }

scnSensorEntry OBJECT-TYPE
     SYNTAX   ScnSensorEntry
     MAX-ACCESS not-accessible
     STATUS   current
     DESCRIPTION
         "Entries may exist in the table for each device index whose
         device type is `scanner'."
     INDEX   { hrDeviceIndex, scnSensorIndex }
     ::= { scnSensorTable 1 }

     ScnSensorEntry ::= SEQUENCE {
         scnSensorIndex   Integer32,   -- 1
         scnSensorTech   INTEGER,   -- 2
         scnSensorLifeCount   Counter32,   -- 3
         scnSensorPowerOnCount   Counter32,   -- 4
         scnSensorColorSpaceIndex   Integer32,   -- 5
         scnSensorResolutionUnit   INTEGER,   -- 6
         scnSensorOpticalResolFeedDir   Integer32,   -- 7
         scnSensorOpticalResolXFeedDir   Integer32,   -- 8
         scnSensorImageContrast   Integer32,   -- 9
         scnSensorImageBrightness   Integer32,   -- 10
         scnSensorXOffset   Integer32,   -- 11
         scnSensorYOffset   Integer32,   -- 12
         scnSensorOutputResolFeedDir   Integer32,   -- 13
         scnSensorOutputResolXFeedDir   Integer32,   -- 14
         scnSensorOpticalBitsPerPixel   Integer32,   -- 15
         scnSensorOutputBitsPerPixel   Integer32,   -- 16
         scnSensorXMaxSize   Integer32,   -- 17
         scnSensorYMaxSize   Integer32   -- 18
        }

scnSensorIndex OBJECT-TYPE
     SYNTAX   Integer32 (1..65535)
     MAX-ACCESS not-accessible
     STATUS   current

          DESCRIPTION
              "A unique value used by the scanner to identify this sensing
              sub-unit. Although these values may change due to a major
              reconfiguration of the device (e.g. the addition of new
              marking sub-units to the scanner), values are expected to
              remain stable across successive scanner power cycles."
          ::= { scnSensorEntry 1 }

scnSensorTech OBJECT-TYPE
   -- This value is a type 2 enumeration
          SYNTAX   INTEGER {
              other(1),
              unknown(2),
              linearCCD(3),
              rectangularCCD(4),
              contactImageSensor(5),
              laserScanner(6)
          }
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The type of sensing technology used for this sensing sub-
              unit."
          ::= { scnSensorEntry 2 }

scnSensorLifeCount OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The count of the number of images scanned during the life of
              scanner."
          ::= { scnSensorEntry 3 }

scnSensorPowerOnCount OBJECT-TYPE
          SYNTAX   Counter32
          MAX-ACCESS read-only
          STATUS   current
          DESCRIPTION
              "The count of the number of images scanned since the equipment
              was most recently powered on."
          ::= { scnSensorEntry 4 }

scnSensorColorSpaceIndex OBJECT-TYPE
          SYNTAX   Integer32 (0..65535)
          MAX-ACCESS read-write
          STATUS   current
          DESCRIPTION
              "The value of scnColorSpaceIndex that corresponds to the row
              in the scnColorSpaceTable currently currently enabled for the
              sensor."

```
     ::= { scnSensorEntry 5 }


scnSensorResolutionUnit OBJECT-TYPE
   --   This value is a type 1 enumeration
     SYNTAX     INTEGER {
         tenThousandthsOfInches(3),  -- .0001
         micrometers(4)
         }
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
         "The unit of measure of distances related to this sensor
         subunit."
     ::= { scnSensorEntry 6 }


scnSensorOpticalResolFeedDir OBJECT-TYPE
     SYNTAX     Integer32
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
         "The number of addressable optical sensing positions in the
         feed direction per 10000 units of measure specified by
         ResolutionUnit. A value of (-1) implies 'other' or 'infinite'
         while a value of (-2) implies 'unknown'."
     ::= { scnSensorEntry 7 }


scnSensorOpticalResolXFeedDir OBJECT-TYPE
     SYNTAX     Integer32
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
         "The number of addressable optical sensing positions in the
         cross feed direction in 10000 units of measure specified by
         ResolutionUnit. A value of (-1) implies 'other' or 'infinite'
         while a value of (-2) implies 'unknown'."
     ::= { scnSensorEntry 8 }


scnSensorImageContrast OBJECT-TYPE
     SYNTAX     Integer32
     MAX-ACCESS read-write
     STATUS     current
     DESCRIPTION
         "This value indicates the relative sharpness of the image,
         with 0 being the lowest possible and 100 the highest possible
         contrast.  The value of _1 means other and specifically
         indicates that the sensor is using an automatic adjustment
         feature.  For sensors where this setting is not continuously
         variable, a write to this object will set the value to the
         closest implemented value.  For example, a sensor with five
         possible settings can only achieve 0, 25, 50, 75, and 100. A
         write value of 30 will result in a read response of 25."
```

```
     ::= { scnSensorEntry 9 }


scnSensorImageBrightness OBJECT-TYPE
     SYNTAX      Integer32
     MAX-ACCESS read-write
     STATUS      current
     DESCRIPTION
          "This value indicates the relative brightness of the image,
          with 0 being the lightest possible and 100 the darkest
          possible image.  The value of _1 means other and specifically
          indicates that the sensor is using an automatic adjustment
          feature.  For sensors where this setting is not continuously
          variable, a write to this object will set the value to the
          closest implemented value.  For example, a sensor with five
          possible settings can only achieve 0, 25, 50, 75, and 100. A
          write with a value of 30 will result in a read response of
          25."
     ::= { scnSensorEntry 10 }



     --          Image Sensor Dimensions
     --                                                       |
     --                                                       V
     --       +===================================+ =================
     --       |             original image        | Y offset      ^
     --       |    +===========================+ = |=========      |
     --       |    | /   /   /   /   /   /   / |    |    ^          |
     --       |    | /   /   /   /   /   /   / |    |    |      leading
     --       |    |/   /   /   /   /   /   /  |    |    |       edge
     --       |    |   /   /   /   /   /   /  /|    |    |
     --       |    |  /   /   /   /   /   /   /|    |    |       |
     --       |    |  /    / scanned image /  /|    |    |    direction
     --       |    |/   /   /   /   /   /   /  |    |    |     of scan
     --       |    |   /   /   /   /   /   /  /|    |    |       |
     --       |    |  /   /   /   /   /   /   /|    |    |       |
     --       |    | /   /   /   /   /   /   / |    |    |       V
     --       |    |/   /   /   /   /   /   /  |    | Y size
     --       |    |   /   /   /   /   /   /  /|    |    |
     --       |    |  /   /   /   /   /   /   /|    |    |
     --       |    | /   /   /   /   /   /   / |    |    |
     --       |    |/   /   /   /   /   /   /  |    |    |
     --       |    |   /   /   /   /   /   /  /|    |    V
     --       |    +===========================+ = |=========
     --       |    |                           |    |
     --       +===================================+
     --       |    |<========= X size =========>|
     --   =>|    |<= X offset
     --       |<====== X reference edge
     --
```

scnSensorXOffset OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "The offset, in units identified by ScnSensorResolutionUnit,
          from the X reference edge of the original document to the
          output scanned image. The X reference edge is 270 degrees
          from the leading edge of the original document, as defined by
          the direction of the scan. Negative margin values are typical
          and indicate that extra area is imaged that is never part of
          the original document. Refer to the scan offsets figure."
     ::= { scnSensorEntry 11 }

scnSensorYOffset OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "The offset, in units identified by ScnSensorResolutionUnit,
          from the leading edge of the original document, as defined by
          the direction of the scan, to the output scanned image.
          Negative margin values are typical and indicate that extra
          area is imaged that is never part of the original document.
          Refer to the scan offsets figure."
     ::= { scnSensorEntry 12 }

scnSensorOutputResolFeedDir OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "The maximum number of addressable output image positions in
          the feed direction per 10000 units of measure specified by
          ScnSensorResolutionUnit. A value of (-1) implies 'other' or
          'infinite' while a value of (-2) implies 'unknown'."
     ::= { scnSensorEntry 13 }

scnSensorOutputResolXFeedDir OBJECT-TYPE
     SYNTAX   Integer32
     MAX-ACCESS read-only
     STATUS   current
     DESCRIPTION
          "The maximum number of addressable output image positions in
          the cross feed direction in 10000 units of measure specified
          by ScnSensorResolutionUnit. A value of (-1) implies 'other'
          or 'infinite' while a value of (-2) implies 'unknown'."
     ::= { scnSensorEntry 14 }

scnSensorOpticalBitsPerPixel OBJECT-TYPE
     SYNTAX   Integer32

        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
             "The number of bits used to describe a single pixel, as
             generated by the sensor in a single frequency range sample."
        ::= { scnSensorEntry 15 }

scnSensorOutputBitsPerPixel OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
             "The number of bits used to describe a single pixel, as output
             by the scanner for a single frequency range sample."
        ::= { scnSensorEntry 16 }

scnSensorXMaxSize OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
             "The maximum size of the scannned image measured from the
             scnSensorXOffset in units identified by
             scnSensorResolutionUnit."
        ::= { scnSensorEntry 17 }

scnSensorYMaxSize OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
             "The maximum size of the scannned image measured from the
             scnSensorYOffset in units identified by ResolutionUnit."
        ::= { scnSensorEntry 18 }

-- The Color Space Group

-- A color space determines the meaning of color values and their
-- relation to each other. The Color Space table lists color spaces
-- that are supported by the Image Sensor.

scnColorSpace OBJECT IDENTIFIER ::= { scanMIBObjects 204 }

scnColorSpaceTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF ScnColorSpaceEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
              "A table of color spaces supported by the Image Sensor."
        ::= { scnColorSpace 1 }

scnColorSpaceEntry OBJECT-TYPE

      SYNTAX   ScnColorSpaceEntry
      MAX-ACCESS not-accessible
      STATUS   current
      DESCRIPTION
            "Entries may exist in the table for each color space
             supported by the Image Sensor."
      INDEX { hrDeviceIndex, scnColorSpaceIndex }
      ::= { scnColorSpaceTable 1 }

ScnColorSpaceEntry ::= SEQUENCE {
          scnColorSpaceIndex   Integer32,
          scnColorSpaceType   MfpColorSpaceTypeTC
          }

scnColorSpaceIndex OBJECT-TYPE
      SYNTAX   Integer32 (1..65535)
      MAX-ACCESS not-accessible
      STATUS   current
      DESCRIPTION
            "A unique value used to identify this color space. Although
             these values may change due to a major reconfiguration of
             the device, values are normally expected to remain stable
             across successive image processor power cycles."
      ::= { scnColorSpaceEntry 1 }

scnColorSpaceType OBJECT-TYPE
      SYNTAX   MfpColorSpaceTypeTC
      MAX-ACCESS read-only
      STATUS   current
      DESCRIPTION
            "The Color Space types supported by the image sensor."
      ::= { scnColorSpaceEntry 2 }

-- The Data and Control Channel Group

-- Implementation of every object in this group is mandatory.

-- The methods and paths of communicating with the scanner are
-- significant to scanner management both to identify and manage the
-- features of the capability and to let a prospective user know how to
-- access the scanner.

-- Communication to Scanners for job setup (scanning parameters and job
-- delivery instructions) generally occurs at a different time and often
-- via a different path than the actual delivery of the scanned data.
-- It is therefore necessary to distinguish between Scanner Job Control
-- Communications Channels (control channels) and Scanner Job Data
-- Delivery Communications Channels (data channels).

-- In a given device, the scanner channels are unique to the scanner;
-- the channels will use the system interfaces, which may be shared by
-- various functions within the system. This imposes a level of detail
-- in the scanner communications channel description. For example,
-- Ethernet defines an interface that can be used by multiple functions.
-- TCP/IP defines a protocol, and FTP a service that also may be used by
-- multiple functions. But TCP at a given port number, and FTP at a
-- given depth in the file directory can define a Scanner channel. This
-- information about the channel is given in the Channel information
-- object of the Scanner Communication Channel group. This object is
-- very similar in form to, and is evolved from the Channel information
-- object in the Scanner MIB. However, as shown in the textual
-- convention coding of entries, there is some difference in the
-- required information.

-- There are many kinds of Scanner Communication Channels; some of which
-- are based on networks and others which are not. A channel can be
-- based on a local connection using a EIA232, IEEE1284, or SCSI
-- interface; it can be a network raw TCP connection; it can be a
-- network application such as FTP, offering transfer services. A
-- control channel is often provided from the system console; this may
-- be the primary control input mechanism for the scanner. A data
-- channel could be effected by a disk drive into which a removable
-- medium is inserted to receive the data file. The control panel and
-- disk drives, as devices, would be managed via their own groups in the
-- MIB, just as the interfaces forming the basis for local and network
-- channels are managed via their own MIB.

-- The Scanner Communications channel is not determined by the
-- characteristics of the interface or media. A control channel must
-- provide for the input of job setup, processing and delivery
-- information (possible including device setup and management
-- information) in a form suitable for input to the controller. A data
-- channel must provide for the output of image data. A channel may be
-- independently enabled (allowing data to flow) or disabled (stopping
-- the flow). A scanner may have one or more Communication Channels.

-- Scanner Communication Channels may represent a client application or
-- a server application. For example, a scanner FTP data channel can
-- either be in a client mode (in which case the scanner will connect to
-- a remote server and 'pushes' the file to that server), or it can be
-- in a server mode (the end user connects to the scanner and 'pulls'
-- the file from the scanner. If a connection can be used in either
-- mode, then it must be listed as two channels.

-- Scanner Communication Channel management objects are in the Scanner
-- Communication Channel Group as represented in the Model diagram. The
-- objects are arraigned in tabular fashion, with an equivalent set of
-- objects reported for each channel supported. In keeping with the
-- objective of providing sufficient information to allow user access to

-- the scanner, objects include sufficient information to establish a
-- connection and to identify the current job control language and
-- output data format for this channel. With these exceptions, the
-- Scanner Communication Channel table reflects the capabilities of the
-- scanner, not necessarily what is currently in use.

-- The first seven items in the Scanner Communication Channel Table
-- define the "Communication Channel " itself. Control of a Scanner
-- Communication Channel, when supported, is limited to enabling or
-- disabling the flow of information through the channel; this is
-- reflected in the "state" object. Most of the specifics of the
-- connection are a function of the interface used by the channel, and
-- the basic interface is identified. Note that, in some cases, the
-- channel aspect is inseparable from the interface; this is more often
-- the case with local interfaces.

-- The Scanner Communication Channel Table

-- The scnChannelTable represents the set of communication capabilities
-- supported by the scanner to input control information and output
-- image files.

scnChannel OBJECT IDENTIFIER ::= { scanMIBObjects 205 }

scnChannelTable OBJECT-TYPE
    SYNTAX   SEQUENCE OF ScnChannelEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "A table of supported communication channels."
    ::= { scnChannel 1 }

scnChannelEntry OBJECT-TYPE
    SYNTAX   ScnChannelEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "Entries may exist in the table for each device index
        with a device type of 'scanner'."
    INDEX { hrDeviceIndex, scnChannelIndex }
    ::= { scnChannelTable 1 }

ScnChannelEntry ::= SEQUENCE {
    scnChannelIndex   Integer32,
    scnChannelType   PrtChannelTypeTC,
    scnChannelProtocolVersion   OCTET STRING,
    scnChannelMode   MfpChannelModeTC,
    scnChannelCurrentJobCntrlLangIndex Integer32,
    scnChannelState   PrtChannelStateTC,
    scnChannelIfIndex   Integer32,
    scnChannelStatus   PrtSubUnitStatusTC,

        scnChannelInformation   OCTET STRING
    }

scnChannelIndex OBJECT-TYPE
    SYNTAX   Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "A unique value used by the scanner to identify this data
        Communication Channel. Although these values may change
        because of a major reconfiguration of the device, values are
        normally expected to remain stable across successive scanner
        power cycles."
    ::= { scnChannelEntry 1 }

scnChannelType OBJECT-TYPE
    SYNTAX   PrtChannelTypeTC
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The name of the connection or service forming the
        basis of this scanner Communication Channel."
        ::= { scnChannelEntry 2 }

scnChannelProtocolVersion OBJECT-TYPE
    SYNTAX   OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The version of the connection or service on this
        Communication Channel. The format used for version
        numbering depends on scnChannelType."
    ::= { scnChannelEntry 3 }

scnChannelMode OBJECT-TYPE
    SYNTAX   MfpChannelModeTC
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The channel may be use for control or data delivery, or both.
        The channel may also be capable of initiating a connection with
        a server to obtain Control information or to deliver a data
        file (client mode operation), or it may accept a connection
        from a client that presents control information or recovers the
        data files (server mode operation).
    ::= { scnChannelEntry 4 }

scnChannelCurrentJobCntrlLangIndex OBJECT-TYPE
    SYNTAX   Integer32
    MAX-ACCESS read-write
    STATUS   current

        DESCRIPTION
            "The value of scnCntrlLangIndex corresponding to the
            Control Language currently active for this Communication
            Channel. A value of zero indicates that there is no
            current Control Language for this Communication Channel or the
            channel is not used for control communications."
        ::= { scnChannelEntry 5 }

scnChannelState OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX   PrtChannelStateTC
    MAX-ACCESS read-write
    STATUS   current
    DESCRIPTION
         "The state of this Communication Channel . The value
          determines whether this Communication Channel is enabled
          or whether it is disabled."
    ::= { scnChannelEntry 6 }

scnChannelIfIndex OBJECT-TYPE
    SYNTAX   Integer32
    MAX-ACCESS read-write
    STATUS   current
    DESCRIPTION
         "The value of ifIndex (in the ifTable; see the interface
          section of MIB-2/RFC 1213) which corresponds to this
          Communication Channel. If more than one row of the ifTable is
          relevant, this is the index of the row representing the
          topmost layer in the interface hierarchy. A value of
          zero indicates that no interface is associated with this
          Communication Channel ."
    ::= { scnChannelEntry 7 }

scnChannelStatus OBJECT-TYPE
    SYNTAX   PrtSubUnitStatusTC
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "The current status of the Communication Channel ."
    ::= { scnChannelEntry 8 }

scnChannelInformation OBJECT-TYPE
    SYNTAX   OCTET STRING (SIZE (0..255))
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
         "Auxiliary information to allow a scanning application
         to use this Communication Channel to setup the scanner
         or to recover image data. In the case of channels to server
         functions, scnChannelInformation will include the URL by
         which the server is addressedm inckuding user name, password

and directory if appropriate. In the case of channels from
client functions, scnChannelInformation will include the URI
information for the default servers, if any. The
encoding and interpretation of the scnChannelInformation
object is specific to Communication Channel type. The
description of each ScnChannelType enum value
for which scnChannelInformation is defined specifies the
appropriate encoding and interpretation, including
interaction with other objects. For Communication Channel
types for which there is no applicable scnChannelInformation
value, its value shall be null (0 length).

When a new ScnChannelType enumeration value is
registered, its accompanying description must specify
the encoding and interpretation of the scnChannelInformation
value structure for that Communication Channel type.
scnChannelInformation semantics for an existing
ScnChannelType may be added or amended in the same
manner as described for type 2 enumeration values.

The scnChannelInformation specifies values for a
collection of Communication Channel attributes, represented
as text according to the following rules:

1. The scnChannelInformation is not affected by localization.

2. The scnChannelInformation is a list of entries
representing the attribute values. Each entry consists
of the following items, in order:

a. a keyword, composed of alphabetic characters (A-Z,
a-z) represented by their NVT ASCII [NVT ASCII] codes,
that identifies a Communication Channel attribute

b. the NVT ASCII code for an Equals Sign (=) (code 61)
to delimit the keyword,

c. a data value encoded using rules specific to the
ScnChannelType to which the scnChannelInformation applies.
The value must in no case include an octet with value 10
(the NVT ASCII Line Feed code),

d. the NVT ASCII code for a Line Feed character (code
10) to delimit the data value.

No other octets shall be present.

Keywords are case-sensitive. Conventionally, keywords
are capitalized (including each word of a multi-word
keyword) and since they occupy space in the
scnChannelInformation, they are kept short.

3. If a Communication Channel attribute has multiple values,
it is represented by multiple entries with the same keyword,
each specifying one value. Otherwise, there shall be at
most one entry for each attribute.

4. By default, entries may appear in any order. If
there are ordering constraints for particular entries,
these must be specified in their definitions.

5. The scnChannelInformation value by default consists
of text represented by NVT ASCII graphics character
codes. However, other representations may be specified:

a. In cases where the scnChannelInformation value
contains information not normally coded in textual form,
whatever symbolic representation is conventionally used
for the information should be used for encoding the
scnChannelInformation value. (For instance, a binary
port value might be represented as a decimal number
using NVT ASCII codes.) Such encoding must be specified
in the definition of the value.

b. The value may contain textual information in a
character set other than NVT ASCII graphics characters.
(For instance, an identifier might consist of ISO 10646
text encoded using the UTF-8 encoding scheme.) Such a
character set and its encoding must be specified in the
definition of the value.

6. For each ScnChannelType for which
scnChannelInformation entries are defined, the
descriptive text associated with the ScnChannelType
enumeration value shall specify the following
information for each entry:

Title: Brief description phrase, e.g.: 'Port
              name', 'Service Name', etc.

Keyword: The keyword value, e.g.: 'Port' or
              'Service'

Syntax: The encoding of the entry value if it
              cannot be directly represented by NVT
              ASCII.

Status: 'Mandatory', 'Optional', or 'Conditionally
              Mandatory'

Multiplicity: 'Single' or 'Multiple' to indicate whether
              the entry may be present multiple times.

         Description: Description of the use of the entry, other
                       information required to complete the
                       definition (e.g.: ordering constraints,
                       interactions between entries).

         Applications that interpret scnChannelInformation should
         ignore unrecognized entries, so they are not affected if
         new entry types are added."
      ::= { scnChannelEntry 9 }

-- The Control Language Group
--
-- The Control Language sub-units are responsible for setting up
-- scanning parameters. A scanner may support one or more
-- Control Languages. The Control Language sub-units are
-- represented by the Control Language Group in the Model.
-- Each Control Language is generally implemented by software
-- running on the System Controller sub-unit. The Control
-- Language Table has one entry per Control Language.
--
-- Implementation of every object in this group is mandatory.

scnCntrlLang OBJECT IDENTIFIER ::= { scanMIBObjects 206 }

-- The Control Language Table
--
-- The scnCntrlLangTable is a table representing the
-- Control Languages in the scanner. An entry shall be placed in the
-- CntrlLang table for each Control Language on the scanner.

scnCntrlLangTable OBJECT-TYPE
    SYNTAX   SEQUENCE OF ScnCntrlLangEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "A table defining the supported scanner control languages."
    ::= { scnCntrlLang 1 }

scnCntrlLangEntry OBJECT-TYPE
    SYNTAX   ScnCntrlLangEntry
    MAX-ACCESS not-accessible
    STATUS   current
    DESCRIPTION
        "Entries may exist in the table for each device index
        with a device type of 'scanner'."
    INDEX { hrDeviceIndex, scnCntrlLangIndex }
    ::= { scnCntrlLangTable 1 }

ScnCntrlLangEntry ::= SEQUENCE {
        scnCntrlLangIndex   Integer32,

```
        scnCntrlLangFamily                    ScnCntrlLangFamilyTC,
        scnCntrlLangLevel                     OCTET STRING,
        scnCntrlLangVersion                   OCTET STRING,
        scnCntrlLangDescription               OCTET STRING,
        }

scnCntrlLangIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value for each control language in the
        scanner. The value is used to identify this Control Language.
        Although these values may change due to a major
        reconfiguration of the device (e.g. the addition of new
        Control Languages to the scanner), values are expected to
        remain stable across successive scanner power cycles."
    ::= { scnCntrlLangEntry 1 }

scnCntrlLangFamily OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     ScnCntrlLangFamilyTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The family name of a Scanner Control Language
        which the scanner can interpret and implement."
    ::= { scnCntrlLangEntry 2 }

scnCntrlLangLevel OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..31))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The level of the Control Language which the scanner
        supports."
    ::= { scnCntrlLangEntry 3 }

scnCntrlLangVersion OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..31))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The date code, version number, or other product
        specific information tied to this Control Language.  This
        value is associated with the Control Language, rather than
        with the version of the language which is being
        interpreted or emulated."
    ::= { scnCntrlLangEntry 4 }

scnCntrlLangDescription OBJECT-TYPE
```

         SYNTAX   OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
             "A string to identify this Control Language in the
             localization specified by prtGeneralCurrentLocalization
             as opposed to the language which is being interpreted.
             It is anticipated that this string will allow
             manufacturers to unambiguously identify their
             Control Languages."
        ::= { scnCntrlLangEntry 5 }

-- The Image Format Group

-- An image format defines the data encoding used in the scanned image
-- output file. The Image Format table lists the image formats that are
-- supported by the Scanner.

scnImageFormat OBJECT IDENTIFIER ::= { scanMIBObjects 207 }

scnImageFormatTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF ScnImageFormatEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
             "A table of image formats supported by the Scanner."
        ::= { scnImageFormat 1 }

scnImageFormatEntry OBJECT-TYPE
        SYNTAX   ScnImageFormatEntry
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
             "Entries may exist in the table for each image format
              supported by the Scanner."
        INDEX { hrDeviceIndex, scnImageFormatIndex }
        ::= { scnImageFormatTable 1 }

ScnImageFormatEntry ::= SEQUENCE {
          scnImageFormatIndex   Integer32,
          scnImageFormatType   MfpImageFormatTC
          }

scnImageFormatIndex OBJECT-TYPE
        SYNTAX   Integer32 (1..65535)
        MAX-ACCESS not-accessible
        STATUS   current
        DESCRIPTION
             "A unique value used to identify this image format. Although
              these values may change due to a major reconfiguration of

```
          the device, values are normally expected to remain stable
          across successive scanner power cycles."
     ::= { scnImageFormatEntry 1 }


scnImageFormatType OBJECT-TYPE
     SYNTAX     MfpImageFormatTC
     MAX-ACCESS read-only
     STATUS     current
     DESCRIPTION
         "The image format types supported by the scanner."
     ::= { scnImageFormatEntry 2 }



-- Notifications and Trapping  (reserved for future use)

scnMIBNotifications  OBJECT IDENTIFIER  ::= { scannerMIB 2 }



-- Conformance Information

scnMIBConformance OBJECT IDENTIFIER ::= { scannerMIB 3 }

-- compliance statements

scnMIBCompliance MODULE-COMPLIANCE
     STATUS  current
     DESCRIPTION
         "The compliance statement for agents that implement the
          scanner MIB."
     MODULE -- this module
     MANDATORY-GROUPS { scnGeneralGroup, scnODHGroup, scnSensorGroup,
         scnColorSpaceGroup, scnChannelGroup, scnControlLanguageGroup,
         scnImageFormatGroup }

     OBJECT     scnODHDefaultIndex
     MIN-ACCESS read-only
     DESCRIPTION
        "It is conformant to implement this object as read-only"

     OBJECT     scnSensorDefaultIndex
     MIN-ACCESS read-only
     DESCRIPTION
        "It is conformant to implement this object as read-only"

     OBJECT     scnColorSpaceDefaultIndex
     MIN-ACCESS read-only
     DESCRIPTION
        "It is conformant to implement this object as read-only"

     OBJECT     scnImageFormatDefaultIndex
     MIN-ACCESS read-only
```

        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHMaxDimFeedDir
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHMaxDimXFeedDir
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHInputMaxCapacity
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHInputCurrentLevel
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHOutputMaxCapacity
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHOutputRemainingCapacity
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnODHMaxMediaWeight
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnSensorColorSpaceIndex
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnSensorImageContrast
        MIN-ACCESS read-only
        DESCRIPTION
           "It is conformant to implement this object as read-only"

        OBJECT   scnSensorImageBrightness
        MIN-ACCESS read-only

```
     DESCRIPTION
        "It is conformant to implement this object as read-only"


     OBJECT     scnChannelCurrentJobCntrlLangIndex
     MIN-ACCESS  read-only
     DESCRIPTION
        "It is conformant to implement this object as read-only"


     OBJECT     scnChannelState
     MIN-ACCESS  read-only
     DESCRIPTION
        "It is conformant to implement this object as read-only"


     OBJECT     scnChannelIfIndex
     MIN-ACCESS  read-only
     DESCRIPTION
        "It is conformant to implement this object as read-only"

::= { scnMIBConformance 1 }



scnMIBGroups       OBJECT IDENTIFIER ::= { scnMIBConformance 2 }

scnGeneralGroup OBJECT-GROUP
     OBJECTS { scnODHDefaultIndex, scnSensorDefaultIndex,
               scnColorSpaceDefaultIndex, scnImageFormatDefaultIndex,
               scnGeneralStatus }
     STATUS  current
     DESCRIPTION
          "The general scanner group."
     ::= { scnMIBGroups 1 }



scnODHGroup OBJECT-GROUP
     OBJECTS { scnODHType, scnODHDimUnit, scnODHMaxDimFeedDir,
               scnODHMaxDimXFeedDir, scnODHMinDimFeedDir,
               scnODHMinDimXFeedDir, scnODHCapacityUnit,
               scnODHInputMaxCapacity, scnODHInputCurrentLevel,
               scnODHOutputMaxCapacity, scnODHOutputRemainingCapacity,
               scnODHMaxSpeed, scnODHMaxMediaWeight,
               scnODHSimplexDuplex, scnODHDocumentScanOrder,
               scnODHInterleaving, scnODHDescription }
     STATUS  current
     DESCRIPTION
          "The ODH group."
     ::= { scnMIBGroups 2 }

scnSensorGroup OBJECT-GROUP
```

```
     OBJECTS { scnSensorTech, scnSensorLifeCount,
               scnSensorPowerOnCount, scnSensorColorSpaceIndex,
               scnSensorResolutionUnit, scnSensorOpticalResolFeedDir,
               scnSensorOpticalResolXFeedDir, scnSensorImageContrast,
               scnSensorImageBrightness, scnSensorXOffset,
               scnSensorYOffset, scnSensorOutputResolFeedDir,
               scnSensorOutputResolXFeedDir,
               scnSensorOpticalBitsPerPixel,
               scnSensorOutputBitsPerPixel, scnSensorXMaxSize,
               scnSensorYMaxSize }
     STATUS  current
     DESCRIPTION
         "The Scanner Sensor group."
     ::= { scnMIBGroups 3 }

scnColorSpaceGroup OBJECT-GROUP
     OBJECTS { scnColorSpaceType }
     STATUS  current
     DESCRIPTION
         "The color space group."
     ::= { scnMIBGroups 4 }

scnChannelGroup OBJECT-GROUP
     OBJECTS { scnChannelType, scnChannelProtocolVersion,
               scnChannelMode, scnChannelCurrentJobCntrlLangIndex,
               scnChannelState, scnChannelIfIndex, scnChannelStatus,
               scnChannelInformation }
     STATUS  current
     DESCRIPTION
         "The channel group."
     ::= { scnMIBGroups 5 }

scnControlLanguageGroup OBJECT-GROUP
     OBJECTS { scnCntrlLangFamily, scnCntrlLangLevel,
               scnCntrlLangVersion, scnCntrlLangDescription }
     STATUS  current
     DESCRIPTION
         "The JobControl group."
     ::= { scnMIBGroups 6 }

scnImageFormatGroup OBJECT-GROUP
     OBJECTS { scnImageFormatType }
     STATUS  current
     DESCRIPTION
         "The JobControl group."
     ::= { scnMIBGroups 7 }


END
```


6. SECURITY CONSIDERATIONS

There are a number of management objects defined in this MIB that
have a MAX-ACCESS clause of read-write and/or read-create. Such
objects may be considered sensitive or vulnerable in some network
environments. The support for SET operations in a non-secure
environment without proper protection can have a negative effect on
network operations.

SNMPv1 by itself is not a secure environment. Even if the network
itself is secure (for example by using IPSec), even then, there is no
control as to who on the secure network is allowed to access and
GET/SET (read/change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security
features as provided by the SNMPv3 framework. Specifically, the use
of the User-based Security Model RFC 2574 [RFC2574] and the View-
based Access Control Model RFC 2575 [RFC2575] is recommended.

It is then a customer/user responsibility to ensure that the SNMP
entity giving access to an instance of this MIB, is properly
configured to give access to the objects only to those principals
(users) that have legitimate rights to indeed GET or SET
(change/create/delete) them.

7. REFERENCES

[RFC2571]   Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture
             for Describing SNMP Management Frameworks", RFC 2571, April
             1999.

[RFC1155]   Rose, M., and K. McCloghrie, "Structure and Identification
             of Management Information for TCP/IP-based Internets", STD
             16, RFC 1155, May 1990.

[RFC1212]   Rose, M., and K. McCloghrie, "Concise MIB Definitions", STD
             16, RFC 1212, March 1991.

[RFC1215]   M. Rose, "A Convention for Defining Traps for use with the
             SNMP", RFC 1215, March 1991.

[RFC2578]   McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J.,
             Rose, M., and S. Waldbusser, "Structure of Management
             Information Version 2 (SMIv2)", STD 58, RFC 2578, April
             1999.

[RFC2579]   McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J.,
             Rose, M., and S. Waldbusser, "Textual Conventions for
             SMIv2", STD 58, RFC 2579, April 1999.

[RFC2580]   McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J.,
             Rose, M., and S. Waldbusser, "Conformance Statements for

                SMIv2", STD 58, RFC 2580, April 1999.

[RFC1157]   Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple
             Network Management Protocol", STD 15, RFC 1157, May 1990.

[RFC1901]   Case, J., McCloghrie, K., Rose, M., and S. Waldbusser,
             "Introduction to Community-based SNMPv2", RFC 1901, January
             1996.

[RFC1906]   Case, J., McCloghrie, K., Rose, M., and S. Waldbusser,
             "Transport Mappings for Version 2 of the Simple Network
             Management Protocol (SNMPv2)", RFC 1906, January 1996.

[RFC2572]   Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message
             Processing and Dispatching for the Simple Network Management
             Protocol (SNMP)", RFC 2572, April 1999.

[RFC2574]   Blumenthal, U., and B. Wijnen, "User-based Security Model
             (USM) for version 3 of the Simple Network Management
             Protocol (SNMPv3)", RFC 2574, April 1999.

[RFC1905]   Case, J., McCloghrie, K., Rose, M., and S. Waldbusser,
             "Protocol Operations for Version 2 of the Simple Network
             Management Protocol (SNMPv2)", RFC 1905, January 1996.

[RFC2573]   Levi, D., Meyer, P., and B. Stewart, "SNMPv3 Applications",
             RFC 2573, April 1999.

[RFC2575]   Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based
             Access Control Model (VACM) for the Simple Network
             Management Protocol (SNMP)", RFC 2575, April 1999.

[RFC2570]   Case, J., Mundy, R., Partain, D., and B. Stewart,
             "Introduction to Version 3 of the Internet-standard Network
             Management Framework", RFC 2570, April 1999.

[MFP-MIB]   Lutz, R. "Multifunction Product MIB", Work in progress.

8. TERMINOLOGY

   Alert -- a reportable event for which there is an entry in the alert
   table.

   Channel -- A term used to describe a single source of data which is
   presented to a scanner. The model that we use in describing a
   scanner allows for an arbitrary number of channels. Multiple
   channels can exist on the same physical port. This is commonly done
   over Ethernet ports where EtherTalk, TCP/IP, and SPX/IPX protocols
   can be supplying different data streams simultaneously to a single
   scanner on the same physical port.

Control Language - a data syntax or language for controlling the
scanner through the scan data channel.

Critical Alert -- an alert triggered by an event which leads to a
state in which scanning is no longer possible; the scanner is
stopped.

Description -- information about the configuration and capabilities
of the scanner and its various sub-units.

Endorser -- A marking mechanism specifically adapted to print on the
scanned originals. The endorsing mechanism must be capable of
printing on various original document types, and can occur before or
after the scanning process. The endorsement will typically show the
time and date of scanning so that the original can be later destroyed
or recycled.

Event - a state change in the scanner.

Group -- a collection of objects that represent a type of sub-unit of
the scanner.

IANA - Internet Assigned Numbers Authority. See STD 2, RFC 1700.

Idempotent -- Idempotence is the property of an operation that
results in the same state no matter how many times it is executed (at
least once). This is a property that is shared by true databases in
which operations on data items only change the state of the data item
and do not have other side effects. Because the SNMP data model is
that of operations on a database, SNMP MIB objects should be assumed
to be idempotent. If a MIB object is defined in a non-idempotent
way, the this data model can break in subtle ways when faced with
packet loss, multiple managers, and other common conditions.

In order to fulfill the common need for actions to result from SNMP
Set operations, SNMP MIB objects can be modeled such that the change
in state from one state to another has the side effect of causing an
action. It is important to note that with this model, an SNMP
operation that sets a value equal to its current value will cause no
action. This retains the idempotence of a single command, while
allowing actions to be initiated by SNMP SET requests.

For example, a switch like the foot switch that changes from high
beams to low beams is not idempotent. If the command is received
multiple times the result may be different than if the command was
received a single time. In the SNMP world preferred commands would
be "set lights to high beam" and "set lights to low beam". These
commands yield predictable results when executed perhaps multiple
times. A command like "press foot toggle switch", is not idempotent
because when executed an unknown number of times, it yields an
indeterminate result.

Input -- a tray or bin from which instances of original documents are obtained for scanning.

Localization -- the specification of human language, country, and character set needed to present information to people in their native languages.

Management Application (a.k.a. Manager) -- a program which queries and controls one or more managed nodes.

Management Station -- a physical computer on which one or more management applications can run.

Media Path -- the mechanisms that transport instances of the media from an input, through the marker, possibly through media buffers and duplexing pathways, out to the output. The inputs and outputs are not part of the Media Path.

MIB - Management Information Base - the specification for a set of management objects to be managed using SNMP or other management protocol; also an instance of the data for such a set.

Non-critical Alert -- an alert triggered by a reportable event which does not lead to a state in which scanning is no longer possible; such an alert may lead to a state from which scanning may no longer be possible in the future, such as the low toner state or the alert may be pure informational, such as a configuration change at the scanner.

Object - a data item that has a name, a syntax, and a value.

Original Document Handler -- the mechanism which includes the Input, Media Path, and Output and serves to process the original documents for scanning.

Output -- a bin or stacker which accepts instances of original documents that have been processed by a scanner.

Resolution -- on the sensing unit, the natural separation of the photodetectors combined with the gradient depth of each measurement, in terms of pixels-per-unit dimension in each of the x and y directions combined with bits-per-pixel.

Scanner -- a physical device that takes original documents from an input bin, produces illuminates and detects marks on the surface of the documents creating an image file, and then depositing the original documents in an output bin. In some scanners, the original documents are also 'endorsed' or marked on by the scanner either before or after the scanning process to indicate that the document

has been processed. In some scanners, the input and output 'bin' is
the same and can be as simple as a flatbed window.

Scanning -- the entire process of producing an image file from an
original doucment from selection of a scanner, choosing scanning
properties, generation of the image file from the original document,
and then routing or notifying the user.

Reportable event -- an event that is deemed of interest to a
management station watching the scanner.

Status -- information regarding the current operating state of the
scanner and its various sub-units. This is an abstraction of the
exact physical condition of the scanner.

Sub-mechanism -- a distinguishable part of a sub-unit.

Sub-unit -- a part of the scanner which may be a physical part, such
as one of the ODHs or a logical part such as the image processor.

Visible state -- that portion of the state of the scanner that can be
examined by a management application.

9. FULL COPYRIGHT STATEMENT

10. AUTHORS

   This document was created with significant contributions from the
   following individuals.

   Raymond Lutz
   Cognisys
   1010 Old Chase Avenue
   Suite B
   El Cajon, CA 92020-7739

   Phone: 619-447-3246
   Fax: 619-447-6872
   Email: raylutz@cognisys.com

   Ron Bergman (Editor)
   Hitachi Koki Imaging Solutions
   1757 Tapo Canyon Road
   Simi Valley, CA 93063-3394

   Phone: 805-578-4421
   Fax: 805-578-4001
   Email: rbergma@hitachi-hkis.com

   William Wagner
   NETsilicon, INC.
   411 Waverley Oaks Road
   Waltham, MA 02154

   Phone: 617-647-1234
   Fax: 617-398-4888
   Email: wwagner@digprod.com

11. CHANGE HISTORY

Version 13.0
- Multiple changes to the MIB format to correct compiler problems.
- Added "enterprises" to IMPORTS.
- Removed "MfpChannelStateTC" from IMPORTS.
- Changed "scanmib" to "scanMIBObjects".
- "scanMIBObjects 203" was "scanmib 202".

Version 12.0
- Section 3.4.1 "type n enumeration" was "enumeration (n)". (4 places)
- Moved scannerMIB into { mibs 2 } in the OID tree. The MFP MIB will use
{ mibs 1 }.

- In ScnCntrlLangFamilyTC added "hpscl(6)" and removed the issue "Are
APIs appropriate here"; agreed to keep all enumerations for now.
- Added ScnAlertGroupTC.
- Renumbered all MIB Groups: (200 will not be used)
   The General Scanner Group "scanmib 201" was "scanmib 200"
   The ODH Group "scanmib 202" was "scanmib 201"
   The Image Sensor Group "scanmib 203" was "scanmib 202"
   The Color Space Group "scanmib 204" was "scanmib 203"
   The Data and Control Channel Group "scanmib 205" was "scanmib 204"
   The Control Language Group "scanmib 206" was "scanmib 205"
- Added text to the DESCRIPTION clause in scnGeneralEntry.
- Added scnImageFormatDefaultIndex to the General Scanner Group.
- Added scnGeneralStatus to the General Scanner Group.
- In scnODHMaxSpeed revised description and removed the issue "What is
scans? Is a textual convention needed to define more values? Is other
applicable? What about unknown(-2)?"
   New text:
        "The maximum speed, in media sides per minute, that this ODH
         can feed input media to the sensor, scan, and then deposit the
         original in the output bin. A value of (-1) implies 'other'
         and specifically indicates that this is a manual ODH device.
         A value of (-2) indicates 'unknown'."
   Old text:
        "The maximum scanning speed of this ODH expressed in scans. A
         value of (-1) implies 'other'."
- Changed "scnInput" to "scnODH" 3 places in the ODH Group.
- Changed "scnMediaPathEntry" to "scnODHEntry" in scnODHDescription.
- In scnODHSimplexDuplex "scnODHEntry 15" was "scnODHEntry 9"
- In scnODHDescription "mfpGeneralCurrentLocalization." Was
"scnGeneralCurrentLocalization." Removed the issue "The localization is
defined in the MFP MIB, change name."
- In Image Sensor Dimensions figure "Y size" was "Y default offset" and
"X size" was "X default offset".
- In scnSensorOutputResolFeedDir and scnSensorOutputResolFeedDir
"read-only" was "read-write" and "...maximum number..." was "...default
number..."
- In scnSensorOpticalBitsPerPixel and scnSensorOutputBitsPerPixel
"read-only" was "read-write".
- "scnSensorXMaxSize" was "scnSensorXDefaultSize"
- "scnSensorYMaxSize" was "scnSensorYDefaultSize"
- In "scnSensorXMaxSize" and "scnSensorYMaxSize" "read-only" was "read-
write"; "...maximum size of the scanned image measured..." was
"...extent of the active data..."; removed the issue " Do the above
default size objects properly represent what is desired for the size
demensions? Would scnSensorXSize be a more appropriate name?"
- Added scnColorSpaceEntry and corrected the scnColorSpaceTable object.
- Added text to the DESCRIPTION clause in scnChannelTable.
- Removed the scnChannelOutputFormat object. All subsequent object
entries have been renumbered.
- Added text to the DESCRIPTION clause in scnCntrlLangTable.
- Added Image Format Group (scanmib 207).

- Updated the conformance section.
- Resolved numerous compile errors.

Version 11.0
- In Module Identity "Multifunction Products Association" was
"Multifunction Peripheral Association"
- Removed ScnColorSpaceTypeTC, added an import for and replaced
references with MfpColorSpaceTypeTC.
- Removed ScnChannelModeTC, added an import for and replaced references
with MfpChannelModeTC.
- Removed ScnChannelStateTC, added an import for and replaced references
with MfpChannelStateTC.
- Removed ScnChannelTypeTC, added an import for and replaced references
with PrtChannelTypeTC.
- Removed ScnChannelOutputFormatTC, added an import for and replaced
references with MfpImageFormatTC.
- Added "isis(5) -- AIIM Std MS-61" to ScnCntrlLangFamilyTC.
- In scnODHEntry: scnOdhIndex was scnInputIndex.
- In scnODHIndex: "...values are normally expected..." was "...values
are expected..."
- In scnODHMaxSpeed: Added an issue with 4 questions.
- In scnODHMaxMediaWeight: "The maximum weight of the medium that can be
handled by this input sub-unit in grams per meter squared." was "The
max weight of the medium associated with this input sub-unit in grams /
per meter squared."
- In scnODHDescription: Added an issue.
- In scnSensorResolutionUnit: "The unit of measure of distances related
to this sensor subunit." was "The unit of measure of distances."
- In scnSensorXOffset, scnSensorYOffset, scnSensorOutoutResolFeedDir,
scnSensorOutoutResolXFeedDir: Changed "ResolutionUnit" to
"scnSensorResolutionUnit".
- In Color Space Group: "Image Sensor" was "image processor Image
Processor".
- In scnColorSpaceTable: "Entries may exist in the table for each color
space supported by the Image Sensor." was "Entries may exist in the
table for each device index whose device type is 'image processor'."
- In scnColorSpaceIndex: "A unique value used to identify..." was "A
unique value used by the image processor to identify..." Also
"...values are normally expected..." was "...values are expected..."
- In scnColorSpaceType: "image sensor" was "image processor"
- Changed "scnChannelCurrentJobCntlLangIndex" to
"scnChannelCurrentJobCntrlLangIndex"
- In scnChannelIndex: "Although these values may change because..." was
"Although these values may because..." Also "...values are normally
expected..." was "...values are expected..."
- In scnChannelMode "The channel may be use for control or data
delivery, or both. The channel may also be capable of initiating a
connection with a server to obtain Control information or to deliver a
data file (client mode operation), or it may accept a connection from a
client that presents control information or recovers the data files
(server mode operation)." was "The channel can be for control or data

delivery, or both. The channel can initiate a connection with a server
to obtain Control information or to deliver a data file (client mode
operation), or it can accept a connection from a client that presents
control information or recovers the data files."
- In scnChannelCurrentJobCntrlLangIndex "...or the channel is not used
for control communications." was   "[This assumes that there is a
scnCntlLang group, or something equivalent. If there is not, this can
just refer to an enumeration in a table of values"
-   There were two objects called "scnCntrlLangVersion". The second was
deleted and the Description section from the second was moved into the
first.

Version 10.0:
- Changed "Internet Society" to "Multifunction Products Associate" on
copyright notice on the cover page and in section 9. Section 9 modified
to remove "defined in the Internet Standards process".
- Modified figure 1a so that the scanner and colocated workstation
appears as a single unit to the walk-up user.
- Removed "chAppleTalkPAP(7)", "chPOP3(xx)", and "chIMAP(xx)" from
ScnChannelTypeTC.
- Added a reference to the leading edge in the "scan offset" figure in
the Image Sensor group.
- Changed 180 to 270 in "scnSensorXOffset.
- In "scnSensorOutputResolFeedDir" and "scnSensorOutputResolXFeedDir",
changed "read-only" to "read-write" and "The number of..." to " The
default number of..."
- Moved enums in scnColorSpaceType to ScnColorSpaceTypeTC. Change
"ColorSpacesRGB(4)" to "ColorSpaceSRGB(4)".
- Changed "scnChannel1" to "scnChannel 1".
- Changed "scnChannelOutputFormatTC" to "ScnChannelOutputFormatTC".
- In "scnChannelOutputFormat", changed "The value of
scnChannelOutputFormatT code corresponding to..." to "Defines the..."
- In "scnCntrlLangLangFamily", changed "ScnCntrlLangLangFamilyTC" to
"ScnCntrlLangFamilyTC".
- In ScnChannelEntry, changed "ScnSubUnitStatusTC" to
"PrtSubUnitStatusTC" and added "PrtSubUnitStatusTC" to the IMPORTS.
- Moved "imgSizeXDefault" and "imgSizeYDefault" to the Image Sensor
Group and renamed to "scnSensorXDefaultSize" and
"scnSensorYDefaultSize". Modified description and changed the scan
offsets figure to show these dimensions. Renamed the figure to "Image
Sensor Dimensions".

Version 9.0:
- Added "Table of Contents"
- Added "1.1 Terminology for Conformance"
- Added "2. THE SNMP MANAGEMENT FRAMEWORK"
- Added a "Notifications and Trapping" subtree for possible future use.
- Updated the Conformance Information section.
- Added "6. SECURITY CONSIDERATIONS"
- Added "7. REFERENCES"

- Changed "Appendix A _ Glossary of Terms" to "8. TERMINOLOGY"
- Added "9. FULL COPYRIGHT STATEMENT"
- Added "10. AUTHORS"
- Added proper names to enums in ScnChannelModeTC and ScnChannelStateTC.
- Added enums 13-15, 19, 27, 34, 35, 37, 38, 41, 42, chSMTP, chPOP3 and
  chIMAP to ScnChannelTypeTC.
- Revised first paragraph of scnChannelInformation description.
- In IMPORTS section, removed experimental, Counter32, TimeTicks,
  NOTIFICATION-TYPES, OBJECT-IDENTITY, CodedCharSet, Boolean, and
  Kbytes.
- Revised OBJECT tree and modified all group OIDs.
- Changed "LangLang" to "Lang" in the Control Language Group.

Version 8.0:
- Changed format for an internet draft. Added ID boiler plate.
- Added new paragraph immediately under "1. Introduction".
- Revised figure 1 and changed into figure 1a and figure 1b.
- Removed most of section 1.3.3 and added reference to the MFP MIB.
- Rewrote introductory paragraph is section 2. To refer to the MFP MIB.
- Revised figure 2 to show only the scanner block from the MFP MIB.
- Added Color Space block to figure 2.
- Change figure 2 block names to match rest of MIB.
- Minor changes to sections 2.1 and 2.2 introductory paragraph.
- Major rewrite of section 2.2.1, most of this text moved to MFP MIB.
- Section 2.2.3 no longer has a separate section number.
- Section 2.2.4 is now 2.2.3.
- Section 2.2.7 is now 2.2.4.
- Section 2.2.8 is now 2.2.5.
- Deleted sections 2.2.5, 2.2.6, 2.2.9, 2.2.10, and all 2.2.11 sections.
- Revised the enumeration names (were just text) for ScnChannelModeTC
  and ScnChannelStateTC.
- Total rewrite of section 3 and deleted all sub-sections. This text
  will be incorporated into the MFP MIB.
- Removed the alert group definitions and the device type registrations.
  These items will be added to the MFP MIB.
- Removed all entries in the General table that are to be in the MFP
  MIB and added the scnColorSpaceDefaultIndex.
- Removed the scnSensorDropout object. Will be added to the MFP MIB.
- Removed the Job Control group. (Has been replaced by the Control
  Language group.)
- Removed the Console group. Will be added to the MFP MIB.
- Removed the scnSensorMargin objects (4) and replaced with the
  scnSensorXOffset and scnSensorXOffset. Added a reference figure.

Version 7.0:
- Revised section 1.1. _Scanners have been typically either been
vertically integrated into larger systems or have been desktop devices
connected directly to a workstation__
was _Scanners have been typically a desktop device, connected directly
to a workstation__

- Added a paragraph to section 1.3.3 that briefly describes how the
Printer MIB is used to provide the Alert Table functionality.
- Revised section 2.2.5. _The Scanner Controller sub-unit is the general
processing part of the scanner, containing the standard computing
components of CPU, memory, instruction store and the software and
firmware of the Scanner._ Was _The Scanner Controller sub-unit contains
the software and firmware components of the Scanner._
- Major revision of section 2.2.7.
- Total rewrite of section 3 to include a better description of how and
why other MIBs are to be used with the Scanner MIB. Much of this
information was derived from the new Printer MIB. Additional text was
added relative to the required use of the Printer MIB for the cover
table, localization table, storage reference table, console display
buffer table, console light table, and the alert table.
- Added the scnColorSpaceTable, which was moved from the MFP MIB.
- Deleted the console button table.
- Added ScnChannelModeTC, ScnChannelStateTC, and ScnChannelTypeTC.
- ISSUE: Should the enums in ScnChannelTypeTC be aligned with the
Printer MIB?
- ISSUE: Channel types are now different from version 6.
- Added PrtAlertGroupTC from the Printer MIB and added new group
definitions for use by the Scanner MIB.
- Defined the MIB structure as _enterprises mfpa(5335) mibs(1)
scannerMIB(1)_.
- Changed _MediaUnit_ to _PrtMediaUnitTC_ and _CapacityUnit_ to
PrtCapacityUnitTC to align with the new Printer MIB.
- Changed source of Boolean and KBytes to _HOST-RESOURCES MIB_, was
PRINTER-MIB.
- Defined an OID for use with hrDeviceType as _scannerMIB
scannerMIBTypes(1) scannerDeviceTypes(1).
- Changed _scnGeneralIndex_ to _hrDeviceIndex_.
- Removed "scnGeneralCurrentOperator" and
"scnGeneralCurrentServicePerson".
- Deleted _scnSensorSamplesPerPel_ and _scnSensorBitsPerSample_.
- Added "scnSensorImageContrast" and "scnSensorImageBrightness".
- Renamed "scnSensorResolutionFeedDir" to "scnSensorOpticalResolFeedDir"
(same change to "scnSensorResolutionXFeedDir"). Also added "optical" to
text.
- Added "scnSensorOutputResolFeedDir" and
"scnSensorOutputResolXFeedDir".
- Added _scnSensorOpticalBitsPerPixel_ and
scnSensorOutputBitsPerPixel.
- The Channels group is replaced with new text from Bill Wagner.
- ISSUE: Should Console Group be moved to the MFP MIB? This MIB can be
used to define which devices in a multifunction product have a unique
control panel and which share a common panel.
- Added _scnSensorColorDropout_ to the scnSensor Group.
- ISSUE: Are additional colors possible for _scnSensorColorDropout_
enums.

- Changed _scnSensorColors_ to _scnSensorColorSpaceIndex_ to indicate
which entry in scnColorSpaceTable is currently used by the scanner
sensor.
- Added Control Language Group from Bill Wagner
- ISSUE: Need to add ScnCntrlLangFamilyTC as referenced by Control
Language Group.
- NOTE: The Conformance Group has not been updated.

Version 6.0:
- Removed details of Image Processor subsystem. This avoids most of the
"new" structures of the scanner and should expedite completion. Block
diagram reduced to single block in this area. Image Processing groups
moved to another document.
- Merged in channels section as proposed by Ron Bergman. Revised to omit
channel status.
- Modified Control Language Type to enumeration instead of MIME type.
- Added reference to front piece in comments regarding dual console.
- OPEN: There is still some trouble with embedded storage. Don Wright
suggests that we divorce the scanner mib from the host resources mib.
Needs further review.
- OPEN: Need to express the maximum size of the file that can result
from a single document scan -- perhaps part of the storage section that
is brought in from the hr mib. Needs further review.
- OPEN: Need to add job submission and workflow to another set of MIB-
like definitions. Use SNMP mibs to the extent that default or static
configuration and capabilities is concerned, use Job-Submission and
WorkFlow structures for job-specific information.
- OPEN: Need object of URL of destination location -- this perhaps in
job
control "ticket" or workflow structure.

Version 5.0:
- Changed model in Figure 2 and associated text to reflect unifying
input/media path/output into single group "Original Document Handling"
and other substantial changes, including adding the Formatter and Image
Processor sub-units, and reorganizing the blocks to effectively show the
system controller.
- Modified the Status approach to avoid the Host Resources MIB and to
simplify the status states.
- Removed hr.. sections that were pasted on at the end for reference in
version 4.
- Used imports of textual conventions from RFC1759 instead of repeating
them here.
- Fixed System Resources Tables since printer MIB needed to deal with
some state that was included in the Host Resources MIB, and scanner MIB
does not need to do this.
- Changed the philosophy regarding the Job Control Group so that only
one interpreter would exist that supports various forms of Job Control
"Ticket" information.
- reduced entries in systems resources tables, eliminating "DeviceRef"
which was used to index the hr MIB groups that referenced printers.

- Modified the Image Processing group to include the file format, dithering mode, and any barcode recognition mode.
- Change console group to include bitmapped display. I am worried about this and would like to consider other options, such as HTML. Also added buttons.
- Cleanup of introductory text.
- Simplified the Image Processing group and added several contributory tables: Formats, Color, Dither, BarCode, Zoom. Now the Image processing group assumes that the images are only taken from the scanner, and the table of settings will allow us to establish various profiles for different operations, such as scan to disk or scan for fax, which require significantly different image organizations. I imagine we will need some additional tables for other settings, but the basic philosophy is shown here.

Version 4.0:
Change network model, Figure 1 per 6/18/1999 meeting
     Change nomenclature of Data Store, Add CO-located workstation
     Show internal data store
     Eliminate 'supervisor'
     Fix arrows to the right direction
Change scanner block diagram, Figure 2 per 6/18/1999 meeting
     Change 'Marker' to 'Media Path'
     Change 'interpreter' to 'command interpreter'
     Delete ref. to host MIB.
     Add internal data store block
Remove references to 'Marking Subsystem' and replace with 'Media Path' smartly.
Remove reliance on Host Resources MIB -- This was partially attempted but some confusion remains. The Host Resources MIB was appended to the bottom of this file for further discussion of how to incorporate the groups of the HR MIB if it is not included by reference.

The following comment is from Ron Bergman:
  Remove all references to the Host Resources MIB. Section 2.2.13.2
  [Overall Scanner Status](and the two sub-sections) should be "TBD".
  I recommend that 'hrDeviceIndex' be changed to 'scnDeviceIndex' for
  now. I can help you with a formal definition later if you are not
  sure have to define this object. Dependence upon the HR MIB is one
  of the current weaknesses of the Printer MIB, as was mentioned by
  Bill Wagner. This was a requirement from the IETF advisors when the
  Printer MIB was developed. As long as there is no intention of
  publishing the MIB as an IETF Standards Track document, which would
  be near impossible anyway, this should not be an issue. The document
  can still be published as an IETF Informational or Experimental MIB.
  (In general this status in not important except to the IETF.)

The term 'hrDeviceIndex' was changed to 'scnDeviceIndex'.