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Printer MIB

~~Printer MIB~~

Status of this Memo

Abstract

This document provides definitions of models and manageable objects for printing environments. The objects included in this MIB apply to physical, as well as logical entities within a printing device. This MIB definition makes explicit references to the Host Resources MIB (RFC 1514), as well as the Interfaces Group of MIB-II (RFC 1213).

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1. Introduction

1.1. Network Printing Environment

The management of producing a printed document, in any computer environment, is a complex subject. Basically, the task can be divided into two overlapping pieces, the management of printing and the management of the printer. Printing encompasses the entire process of producing a printed document from generation of the file to be printed, selection of a printer, choosing printing properties, routing, queuing, resource management, scheduling, and final printing including notifying the user. Most of the printing process is outside the scope of the model presented here; only the management of the printer is covered.

```
               Figure 1 - One Printer's View of the Network

    system   printer    asset     user          user           user
    manager  operator   manager
      O         O         O         O             O              O
     /|\       /|\       /|\       /|\           /|\            /|\
     / \       / \       / \       / \           / \            / \
      |         |         |         |             |              |
+---------+ +-------+ +-------+ +-------+   +-----------+ +-----------+
|configur-| |printer| | asset | |printer|   |   user    | |   user    |
|ator     | |manager| |manager| |browser|   |application| |application|
+---------+ +-------+ +-------+ +-------+   +-----------+ +-----------+
   ^            ^         ^         ^             |             |
   |R/W         |R/W      |R        |R      +-----------+ +-----------+
   |            |         |         |       |  spooler  | |  spooler  |
   |            |         |         |       +-----------+ +-----------+
   |            |         |         |             |             |
   |            |         |         |       +-----------+ +-----------+
   |            |         |         |       |supervisor | |supervisor |
   |            |         |         |       +-----------+ +-----------+
   |            |         |         |        ^       ^     ^       ^
   |            |         |         |        |R      |R/W  |R      |R/W
   v            v         |         |        |       |     |       |
==================================================   |   =====     |
                     |                          print|        print|
                     |SNMP                       data|         data|
  +-----+        +-------+                        PCL|          PCL|
  | MIB |<------>| agent |                 PostScript|   PostScript|
  +-----+        +-------+                       NPAP|         NPAP|
                     |unspecified                etc.|         etc.|
              +=============+  +-----------------+   |             |
              |             |--|channel/interface|<--+             |
              |             |  +-----------------+                 |
              |   PRINTER   |                                      |
              |             |  +-----------------+                 |
              |             |--|channel/interface|<----------------+
              +=============+  +-----------------+
```

1.2. Printer Device Overview

A printer is the physical device that takes media from an input source, produces marks on that media according to some page description or page control language and puts the result in some output destination, possibly with finishing applied. Printers are complex devices that consume supplies, produce waste and have mechanical problems. In the management of the physical printing device the description, status and alert information concerning the printer and its various subparts has to be made available to the management application so that it can be reported to the end user, key operators for the replenishment of supplies or the repair or maintenance of the device. The information needed in the management of the physical printer and the management of a printing job overlap highly and many of the tasks in each management area require the same or similar information.

1.3. Categories of Printer Information

Information about printers is classified into three basic categories:~~,~~ descriptions, status and alerts.

1.3.1. Descriptions

Descriptions convey information about the configuration and capabilities of the printer 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 printer is repaired, reconfigured or upgraded. The descriptions are one part of the visible state of the printer where state means the condition of being of the printer at any point in time.

1.3.2. Status

Status is the information regarding the current operating state of the printer and its various sub-units. Status is the rest of the visible state of the printer. As an example of the use of status, a management application must be able to determine if the various sub-units are ready to print or are in some state that prevents printing or may prevent printing in the future.

1.3.3. Alerts

An Alert is the representation of a reportable event in the printer. An event is a change in the state of the printer. Some of those state changes are of interest to a management application and are therefore reportable. Typically, these are the events that affect the printer's ability to print. Alerts usually occur asynchronously to the operation of the computer system(s) to which the printer is attached. For convenience below, "alert" will be used for both the event caused by a change in the printer's state and for the representation of that event.

Alerts can be classified into two basic categories, critical and non-critical. A critical alert is one that is triggered by entry into a state in which the printer is stopped and printing can not continue until the condition that caused critical alert is eliminated. "Out of paper", "toner empty" and "output bin full" are examples of critical alerts. Non-critical alerts are triggered by those events that enter a state in which printing is not stopped. Such a non-critical state may, at some future time, lead to a state in which printing may be stopped. Examples of this kind of non-critical alerts are "input media low", "toner low" and "output bin nearly full". Or, a non-critical alert may simply provide information, such as signaling a configuration changed in the printer.

Description, status and alert information about the printer can be thought of as a data base describing the printer. The management application for a printer will want to view the printer data base differently depending on how and for what purposes the information in the data base is needed.

2. Printer Model

In order to accomplish the management of the printer, an abstract model of the printer is needed to represent the sub-units from which the printer is composed. A printer can be described as consisting of 13 types of sub-units. It is important to note that the sub-units of a printer do not necessarily relate directly to any physically identifiable mechanism. Sub-units can also be a set of definable logical processes, such as interpreters for page description languages or command processors that set various operating modes of the printer.

   Figure 2 shows a block diagram of the printer and its basic 13 sub-
   units.

```
                     Figure 2 - Printer  Block Diagram

                           Physical Connections
                                   |
                                +-----------+
                                |           |
                            +-------------+ |
                            | Interface   |-+
                            | (RFC1213)   |
                            +-------------+
                                   |
                                +-----------+
                                |           |
                            +-------------+ |    +-----------+
                            | Channel     |-+    | Operator  |
                            |             |      |  Console  |
                            +-------------+      +-----------+
                                   |
                                +-----------+        +---------+
                                |           |        |         |
        +-----------+       +-------------+ |    +-----------+ |
        |  General  |       | Interpreter |-+    |  Alerts   |-+
        |  Printer  |       |             |      |           |
        +-----------+       +-------------+      +-----------+
                                   |
                   +-------------------------------+
                   |        System Controller      |
                   |     (This is the Host MIB)    |
                   +-------------------------------+

   +------+                    +--------+                  +--------+
   |      |                    |        |                  |        |
+-------+ |    +-------+    +---------+ |    +-------+   +--------+ |
| Input |-+  +--------+|    |  Marker |-+  +--------+|   | Output |-+
|       |===>|        |+<==>|         |<==>|        |+==>|        |
+-------+    +--+  +--+     +---------+    +--+  +--+    +--------+
   \            |  ||                         |  ||         \
    \           |  ||                         |  ||          \
     \          |  ||                         |  ||           \
    +--------+  |  |+-------------------------|  ||         +---------+
    |        |  |  +--------------------------+  ||         |         |
+----------+ |  |            Media Path          |+      +----------+ |
|  Media   |-+  +--------------------------------+       | Finisher |-+
|(optional)|                                             |(optional)|
+----------+                                             +----------+
```

2.1. Overview of the Printer Model

The model has three basic parts: (1) the flow of a print file into an interpreter and onto the marker, (2) the flow of media through the marker and (3) the auxiliary sub-units that control and facilitate the two prior flows. The flow of the print data comes through a physical connection on which some form of transport protocol stack is running. The data provided by the transport protocol (interface) appears on a channel which is the input to an interpreter. The interpreter converts the print data into a form suitable for marking on the media.

The media resides in Input sub-units from which the media is selected and then transported via a Media Path first to a Marking sub-unit and then onto an Output sub-unit with (optionally) some finishing operations being performed. The auxiliary sub-units facilitate control of the printer, inquiry/control of the operator panel, reporting of alerts, and the adaptation of the printer 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 Printer. Each of the sub-units is discussed in more detail below.

All of the sub-units other than the Alerts report only state information, either a description or a status. The Alerts sub-unit reports event information.

2.2. Printer Sub-Units

A printer is composed of 13 types of sub-units, called groups. The following sections describe the different types of sub-units.

2.2.1. General Printer

The general printer sub-unit is responsible for the overall control and status of the printer. There is exactly one general printer sub-unit in a printer. The general printer sub-unit is represented by the General Printer Group in the model. In addition to the providing the status of the whole printer and allowing the printer to be reset, this Group provides information on the status of the packaging of the printer, in particular, the covers. The general printer sub-unit is usually implemented on the system controller.

The localization portion of the general printer sub-unit is responsible for identifying the natural language, country, and character set in which character strings are expressed. There may be one or more localizations supported per printer. The available localizations are represented by the Localization table.

Localization is only performed on those strings in the MIB that are explicitly~~ely~~ marked as being localized. All other character strings are returned in ASCII.

The character set portion of the general printer sub-unit is responsible for identifying the possible character sets that are used by the interpreters, the operator console, and in network management requests for display objects. There may be one or more character sets per printer. The understood character sets are represented by the Character Set Table.

2.2.2. Inputs

Input sub-units are mechanisms that feed media to be marked on into the printer. A printer contains one or more input sub-units. These are represented by the Input Group in the model. The model does not distinguish fixed input bins from removable trays, except to report when a removable tray has been removed.

There are as many input sub-units as there are distinctly selectable input "addresses". For example, if a tray has an option for manually feeding paper as well as automatically feeding from the tray, then this is two input sub-units if these two sources can be (must be) separately selected and is one input sub-unit if putting a sheet in the manual feed slot overrides feeding from the contents of the tray; that is, in the second case there is no way to separately select or address the manual feed slot.

2.2.3. Media

An input sub-unit can hold one or more instances of the media on which marking is to be done. Typically, there is a large set of possible media that can be associated with an input. The Media Group is an extension of the Input Group which represents that media that is in an input sub-unit. The Media Group only describes the current contents of each input and not the possible content of the input sub-unit.

2.2.4. Outputs

Output sub-units are mechanisms that receive media that has been marked on. A printer contains one or more output mechanisms. These are represented by the Output Group in the model. The model does not distinguish fixed output bins from removable output bins, except to report when a removable bin has been removed.

There are as many output sub-units as there are distinctly selectable output "addresses". Output sub-units can be addressed in two different ways: (1) as a set of "mailboxes" which are addressed by a specific mailbox selector such as a bin number or a bin name, or (2) as a set of "slots" into which multiple copies are collated. Sometimes both modes of using the output sub-units can be used on the same printer. All that is important from the viewpoint of the model is that the output units can be separately selected.

2.2.5. Finishers

A finisher is a sub-unit that performs some operations on the media other than marking. The finisher sub-units are represented by the Finisher Group in the model. Some examples of finishing processes are stapling, punching, binding, inserting, or folding. Finishing processes may have supplies associated~~asssociated~~ with the process. Stapling, binding, and punching are examples of processes that have supplies. A printer may have more than one finishing sub-unit and each finishing sub-unit may be associated with one or more output sub-units. Finishers are not described in this MIB.

The exact interaction and sequencing between an output device and its associated finisher is not specified by the model. It depends on the type of finishing process and the exact implementation of the printer system. This standard allows for the logical association of a finishing process with an output device but does not put any restrictions on the exact sequence or interaction with the associated output device. The output and finisher sub-units may or may not be separate identifiable physical mechanisms depending on the exact implementation of a printer. In addition, a single output device may be associated with multiple finishing sub-units and a single finishing sub-unit may be associated with multiple output devices.

2.2.6. Markers

A marker is the mechanism that produces marks on the print media. The marker sub-units and their associated supplies are represented by the Marker Group in the model. A printer can contain one or more marking mechanisms. Some examples of multiple marker sub-units are: a printer with separate markers for normal and magnetic ink or an imagesetter that can output to both a proofing device and final film. Each marking device can have its own set of characteristics associated with it, such as marking technology and resolution.

In this model the marker sub-unit is viewed as very generalized and encompasses all aspects of a marking process. For example, in a xero~~-~~graphic process, the marking process as well as the fusing process would be included in the generalized concept of the marker. With the generalized concept of a marking process, the concept of multiple marking supplies associated with a single marking sub-unit results. For example, in the xerographic process, there is not only a supply of toner, but there can also be other supplies such as a fuser supply (e.g., fuser oil) that can be consumed and replaced separately. In addition there can be multiple supplies of toner for a single ~~single~~ marker ~~d~~device, as in a color process.

2.2.7. Media Paths

The media paths encompass the mechanisms in the printer that move the media through the printer and connect all other media related sub-units: inputs, outputs, markers and finishers. A printer contains one or more media paths. These are represented by the Media Path Group in the model. The Media Path group has some objects that apply to all paths plus a table of the separate media paths.

In general, the design of the media paths determines the maximum speed of the printer as well as the maximum media size that the printer can handle. Media paths are complex mechanisms and can contain many different identifiable sub-mechanisms such as media movement devices, media buffers, duplexing units and interlocks. Not all of the various sub-mechanisms reside on every media path. For example, one media path may provide printing only on one surface of the media (a simplex path) and another media path may have a sub-mechanism that turns the media over and feeds it a second time through the marker sub-unit (a duplex path). The duplex path may even have a buffer sub-mechanism that allows multiple copies of the obverse side to be held before the reverse side of all the copies are marked.

2.2.8. System Controller

The System Controller is the sub-unit upon which the software components of the Printer run. The System Controller is represented in the model by the Host MIB. This MIB allows for the specification of the processor(s), memory, disk storage, file system and other underlying sub-mechanisms of the printer. The controller can range from simple single processor systems to multiprocessor systems. In addition, controllers can have a full range of resources such as hard disks. The printer is modeled to have one system controller even though it may have more than one processor and multiple other resources associated with it.

2.2.9. Interfaces

An interface is the communications port and associated protocols that are responsible for the transport of data to the printer. A printer has one or more interface sub-units. The interfaces are represented by the Interfaces Group of MIB-II (RFC 1213). Some examples of interfaces are serial ports (with little or no protocol) and EtherNet ports on which one might run InterNet IP, Novell IPX, etc.

2.2.10. Print Job Delivery Channels

The print job delivery channel sub-units identify the independent sources of print data (here print data is the information that is used to construct ~~printed~~ printed pages and may have both data and control aspects). A printer may have one or more channels. The channel sub-units are represented by the Print Job Delivery Channel Group in the Model. Each channel is typically identified ~~typically identified~~ by the electronic path and service protocol used to ~~deliver print~~ deliver print data to the printer. A channel sub-unit may be independently ~~enabled~~ enabled (allowing print data to flow) or disabled (stopping the flow of print data). It has a current Control Language which can be used to specify which interpreter is to be used for the print data and to query and change environment variables used by the interpreters (and SNMP). There is also a default interpreter that is to be used if an interpreter is not explicitly specified using the Control Language. Print Job Delivery Channel sub-units can, and usually are, ~~are~~ based on an underlying interface.

2.2.11. Interpreters

The interpreter sub-units are responsible for the conversion of a description of intended print instances into images that are to be marked on the media. A printer may have one or more interpreters. The interpreter sub-units are represented by the Interpreter Group in the Model. Each interpreter is generally implemented with software running on the System Controller sub-unit. The Interpreter Table has one entry per interpreter where the interpreters include both Page Description Language (PDL) Interpreters and Control Language Interpreters.

2.2.12. Console

Many printers have a console on the printer, the operator console, that is used to display and modify the state of the printer. The console can be as simple as a few indicators and switches or as complicated as full screen displays and keyboards. There can be at most one such console. This console sub-unit is represented by the Console Group in the model. Although most of the information displayed there is also available in the state of the printer as represented by the various Groups, it is useful to be able to query and modify the operator console remotely. For example, a management application might like to display to its user the current message on the operator console of the remote printer or the management application user might like to modify the current message on the operators console of the remote printer. As another example, one might have a remote application that puts up a pseudo console on a workstation screen. Since the rules by which the printer state is mapped onto the console and vice versa are not standardized, it is not possible to reproduce the console state or the action of console buttons and menus. Therefore, the Console Group provides access to the console. The operator console is usually implemented on the system controller with additional hardware for input and display.

2.2.13. Alerts

The alert sub-unit is responsible for detecting reportable events, making an entry in the alert table and, if and only if the event is a critical event, initiating a trap. The exception to this rule is when the “alert alert” trap is generated. The alert sub-unit is represented by the Alerts Group and, in particular, the Alert Table. This table contains information on the severity, sub-unit, detailed location within the sub-unit, alert code and description of each critical alert that is currently active within the printer. Each reportable event causes an entry to be made in the Alert Table.

2.2.13.1. Status and Alerts

Summary information about the state of the printer is reported at three separate levels: (1) there is the status of the printer as a whole reported in the Host MIB, (2) there is the status of various sub-units reported in the principle table of the Group that represents the sub-unit, and (3) there are alert codes reported in the Alert Table.

2.2.13.2. Overall Printer Status

Of the many states a printer can be in, certain states are more "interesting" because of the distinct actions they are likely to provoke in the administrator. These states may be applied to the printer as a whole, or to a particular sub-unit of the printer. These named states are:

Non Critical Alert Active - For the printer this means that one or more sub-units have a non-critical alert active. For a sub-unit, this means that the sub-unit has a non-critical alert active.

Critical Alert Active - For the printer this means that one or more sub-units have a critical alert active. For a sub-unit, this means that the sub-unit has a critical alert active.

Unavailable - The printer or sub-unit is unavailable for use (this is the same as "broken" or "down" in other terminologies). A trained service person is typically necessary to make it available.

Busy / Temporarily Unavailable - The printer or sub-unit is operational but currently occupied with a request for activity. The sub-unit will become available without the need of human interaction.

Moving on-line or off-line - The printer is either off-line, in the process of moving off-line or in the process of moving back on-line; for example on high end printers reloading paper involves a transition to off-line to open the paper bin, it is then filled and, finally, there is a transition back to on-line as the paper bin is repositioned for printing.

Standby - The printer or sub-unit is unavailable for use because it is partially powered down and may need some period of time to become fully operational again. A unit in Standby state shall respond to network management requests.

Available - The printer or subunit is functioning normally.

Idle - The printer or subunit is not processing any print jobs

Active - The printer or subunit is working on one or more print jobs

Busy - The printer or subunit is “Active” and has also reached a resource threshold whereby it will not accept any new print jobs for a finite period of time. The expected next state transition from the “busy” state is to the “active” state, implying that resources are again available to accept new print jobs.

The Host MIB provides three status objects that can be used to describe the status of a printer: (1) hrDeviceStatus in the entry in the Host MIB hrDeviceTable; (2) hrPrinterStatus in the hrPrinterTable; and (3) hrPrinterDetectedErrorState in the hrPrinterTable. These objects describe many of the states that a printer can be in. The following table shows how the "interesting" states named above can be recognized by inspecting the values of the three printer-related objects in the Host MIB:

Printer Status	hrDeviceStatus	hrPrinterStatus	hrPrinterDetectedErrorState
Normal	running(2)	idle(3)	none set
Busy/ Temporarily Unavailable	running(2)	printing(4)	
Non Critical Alert Active	warning(3)	idle(3) or printing(4)	could be: lowPaper, lowToner, or serviceRequested
Critical Alert Active	down(5)	other(1)	could be: jammed, noPaper, noToner, coverOpen, or serviceRequested
Unavailable	down(5)	other(1)	
Moving off-line	warning(3)	idle(3) or printing(4)	offline

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Off-line	down(5)	other(1)	offline
Moving on-line	down(5)	warmup(5)	
Standby	running(2)	other(1)	

These named states are only a subset of the possible states - they are not an exhaustive list of the possible states. Nevertheless, several things should be noted. When using these states, it is not possible to detect when both critical and non-critical alerts are pending - if both are pending, the Critical Alert Active state will prevail. In addition, a printer in the Standby state will be represented in the Host MIB with a device status of running(2) and a printer status of other(1), a set of states that don't uniquely distinguish this important printer state.

Although the above mapping is workable, it would be improved with a few additions to hrDeviceStatus and hrPrinterStatus in the Host Resources MIB. In particular, it would be appropriate to add a "standby" enumeration to hrDeviceStatus. Similarly, it would be useful to add the following states to hrPrinterStatus: "offline" to indicate that reason for the printer being down (instead of having to use "other") which allows both "warning" and "offline" to indicate going offline and "down" and "offline" to indicate offline and "notApplicable" to cover cases, such as "standby", where the device state completely describes the state of the device.

Detailed status per sub-unit is reported in the sub-unit status fields.

2.2.13.2.1. Host MIB Printer Status

For completeness, the definitions of the Printer Status objects of the Host MIB are given below:

```
hrDeviceStatus OBJECT-TYPE
     SYNTAX  INTEGER {
          unknown(1),
          running(2),
          warning(3),
          testing(4),
          down(5)
     }
     ACCESS  read-only
     STATUS  mandatory
     DESCRIPTION
           "The current operational state of the device
```

```
                    described by this row of the table.  A value
                    unknown(1) indicates that the current state of the
                    device is unknown.  running(2) indicates that the
                    device is up and running and that no unusual error
                    conditions are known.  The warning(3) state
                    indicates that agent has been informed of an
                    unusual error condition by the operational software
                    (e.g., a disk device driver) but that the device is
                    still 'operational'.  An example would be high
                    number of soft errors on a disk.  A value of
                    testing(4), indicates that the device is not
                    available for use because it is in the testing
                    state.  The state of down(5) is used only when the
                    agent has been informed that the device is not
                    available for any use."
             ::= { hrDeviceEntry 5 }

   hrPrinterStatus OBJECT-TYPE
          SYNTAX INTEGER {
              other(1),
              unknown(2),
              idle(3),
              printing(4),
              warmup(5)
          }
          ACCESS read-only
          STATUS mandatory
          DESCRIPTION
                  "The current status of this printer device.  When
                  in the idle(1), printing(2), or warmup(3) state,
                  the corresponding hrDeviceStatus should be
                  running(2) or warning(3).  When in the unknown
                  state, the corresponding hrDeviceStatus should be
                  unknown(1)."
          ::= { hrPrinterEntry 1 }

      hrPrinterDetectedErrorState OBJECT-TYPE
          SYNTAX OCTET STRING
          ACCESS read-only
          STATUS mandatory
          DESCRIPTION
                  "This object represents any error conditions
                  detected by the printer.  The error conditions are
                  encoded as bits in an octet string, with the
                  following definitions:

                       Condition         Bit #    hrDeviceStatus
```

```
                         lowPaper          0        warning(3)
                         noPaper           1        down(5)
                         lowToner          2        warning(3)
                         noToner           3        down(5)
                         coverdoorOpen         4        down(5)
                         jammed            5        down(5)
                         offline           6        down(5)
                         serviceRequested  7        warning(3)

                    If multiple conditions are currently detected and
                    the hrDeviceStatus would not otherwise be
                    unknown(1) or testing(4), the hrDeviceStatus shall
                    correspond to the worst state of those indicated,
                    where down(5) is worse than warning(3) which is
                    worse than running(2).

                    Bits are numbered starting with the most
                    significant bit of the first byte being bit 0, the
                    least significant bit of the first byte being bit
                    7, the most significant bit of the second byte
                    being bit 8, and so on.  A one bit encodes that
                    the condition was detected, while a zero bit
                    encodes that the condition was not detected.

                    This object is useful for alerting an operator to
                    specific warning or error conditions that may
                    occur, especially those requiring human
                    intervention."
            ::= { hrPrinterEntry 2 }
```

2.2.13.2.2. Sub-unit Status

Sub-unit status is reported in the entries of the principle table in the Group that represents the sub-unit. For sub-units that report a status, there is a status column in the table and the value of this column is always an integer formed in the following way.

The SubUnitStatus is an integer that is the sum of 5 distinct values, Availability, Non-Critical, Critical, On-line, and Transitioning. These values are:

Availability	value	
Available and Idle	0	000’b
Available and Standby	2	010’b
Available and Active	4	100’b
Available and Busy	6	110’b
Unavailable and OnRequest	1	001’b

```
                Unavailable because Broken      3       011'b
        Unknown                         5       101'b

    Non-Critical

        No Non-Critical Alerts          0
        Non-Critical Alerts             8

    Critical

        No Critical Alerts              0
        Critical Alerts                 16

    On-Line

        Intended state is On-Line       0
        Intended state is Off-Line      32

    Transitioning

        At intended state               0
        Transitioning to intended state 64
```

For example, an input (tray) that jammed on the next to the last page may show a status of 27 (unavailable because broken (3) + a critical state (16), jammed, and a noncritical state (8), low paper).

2.2.13.3. Alert Tables

The Alert Group consists of a single table in which all active alerts are represented. This section provides and overview of the table and a description of how it is managed. The basic content of the alert table is the severity (critical or non-critical) of the alert, the Group and entry where a state change caused the alert, additional information about the alert (a more detailed location, an alert code, and a description), and an indication of the level of training needed to service the alert.

The Alert Table contains some information that is redundant, for example that an event has occurred, and some information that is only represented in the Alert Table, for example the additional information. A single table was used because a single entry in a Group could cause more than one alert, for example paper jams in more than one place in a media path. Associating the additional information with the entry in the affected group would only allow one report where associating the additional information with the alert makes multiple reports possible.

Every time an alert occurs in the printer, the printer makes one or more entries into the Alert Table. The printer determines if an event is to be classified as critical or non-critical. If the severity of the Alert is "critical", the printer sends a trap or event notification to the host indicating that the table has changed. Whether or not a trap is sent, the management application is expected to poll the printer on a regular basis and to read and parse the table to determine what conditions have changed, in order to provide reliable information to the management application user.

2.2.13.4. Alert Table Management

The alert tables are sparsely populated tables. This means the tables will only contain entries of the alerts that are currently active and the number of rows, or entries in the table will be dynamic. More than one event can be added or removed from the event tables at a time depending on the implementation of the printer.

There are basically two kinds of events that produce alerts: binary change events and unary~~simple~~ change events. Binary change events come in pairs: the leading edge event and the trailing edge event. The leading edge event enters a state from which there is only one exit; for example, going from running to stopped with a paper jam. The only exit from this state is fixing the paper jam and it is clear when that is accomplished. The trailing edge event is the event which exits the state that~~e~~ was entered by the leading edge event; in the example above fixing the paper jam is the trailing edge event.

It is relatively straightforward to manage binary change events in the Alert Table. Only the leading edge event makes an entry in the alert table. This entry persists in the Alert Table until the trailing edge event occurs at which point this event is signaled by the removal of the leading edge event entry in the Alert Table. That is, a trailing edge event does not create an entry; it removes the corresponding leading edge event. Removing the leading edge entry may cause the unary change event "alertRemovalofBinaryChangeEntry" to be added to the table. With binary change events it is possible to compute the maximum number that can occur at the same time and construct an Alert Table that would hold that many events. There would be no possibility of table overflow and no information about outstanding events would be lost.

Unfortunately, there are some events that are not binary changes. This other category of event, the unary~~simple~~ change event, is illustrated by the configuration change event. With this kind of event the state of the machine has changed, but to a state which is (often) just as valid as the state that was left and from which no return is necessary. For example, an operator may change the paper that is in the primary input source from letter to legal. At some time in the future the paper may be changed back to letter, but it might be changed to executive instead. This is where the problem occurs. It is not obvious how long to keep simple change event entries in the Alert Table. If~~t~~ they were never removed, the Alert Table would continue to grow indefinitely.

The agent needs to have an algorithm implemented for the management of the alert table, especially in the face of combinations of binary and simple alerts that would overflow the storage capacity~~capaciity~~ of the table. When the table is full and a new alert needs to be added, an old alert needs to be deleted. The alert to be deleted should be chosen using the following rules:

1. Find a non-critical simple alert and delete it. If there are multiple non-critical simple alerts, it is suggested that the oldest one be chosen. If there are no non-critical simple alerts, then,

2. Find a non-critical binary alert and delete it. If there are multiple non-critical binary alerts, it is suggested that the oldest one be chosen. If there are no non-critical binary alerts, then,

3. Find a critical (binary) alert and delete it. If there are multiple critical alerts, it is suggested that the oldest one be chosen. Agent implementors are encouraged to provide at least enough storage space for the maximum number of critical alerts that could occur simultaneously. Note that all critical alerts are binary.

Note that because the Alert Index is a monotonically increasing integer there will be gaps in the values in the table when an alert is deleted. Such gaps can be detected by the management application to indicate that the management application may want to re-acquire the Printer state and check for state changes it did not observe in the Alert Table.

2.2.13.5. Traversing Alert Table

2.3. Read-Write Objects

Some of the objects in the printer MIB report on the existence of or amount of a given resource used with the printer. Some examples of such resources are the size and number of sheets of paper in a paper tray or the existence of certain output options. On some printers there are sensors that allow these resources to be sensed. Other printers, however, lack sensors that can detect (all of) the properties of the resource. Because the printer needs to know of the existence or properties of these resources for the printer 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 printers that cannot sense the values. Thus many of the objects in the MIB are given read-write access, but a printer implementation might only permit a management operation to change the value if the printer 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 explicitely state the behaviour of conditional ability to change values, any read-write object may act that way.

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

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

2. The printer will behave differently if the installation of the resource is reported than the printer 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 printer, i.e., not a "PostIt". Another way of saying this is that the printer believes that information given it and acts as if the information were true. For example, on a printer that cannot sense the size, if one paper size is loaded, but another size is set into the paper size object, then the printer will use the size that was set as its current paper size in its imaging and paper handling.

The printer may get hints that it may not know about the existence or properties of certain resources. For example, a paper tray may be removed and re-inserted. When this removal and insertion happens, the printer may either assume that a property, such as the size of paper in the tray, has not changed or the printer may change the value of the associated object to "unknown", as might be done for the amount of paper in the tray. As long as the printer acts according to the value in the object either strategy is acceptable.

It is an implementation-specific matter as to whether or not MIB object values are persistent across power cycles or cold starts. It is particularly important that the values of the prtMarkerLifeCount object persist throughout the lifetime of the printer. Therefore, if the value of any MIB object persists across power cycles, then the prtMarkerLifeCount object must also persist.

2.4. 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). These enumerations are listed at the beginning of this specification.

2.4.1. 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 "enumeration (n)", where n can be 1, 2 or 3 can be found in the various tables. The definitions of these types of enumerations are:

enumeration (1) All the values are defined in the Printer MIB specification (RFC for the Printer MIB). Additional enumerated values require a new RFC. Type 1 enumerations are typically used where changes to the enumeration are either unlikely or will have a significant impact on the structure of the MIB or implementation of the MIB in management applications.

Some criteria that suggest using a type 1 enumeration are:

a) the set of values in the enumeration is thought to be known, e.g., faceUp and faceDown

b) the enumeration defines a set of units of measure which must be understood by a management application to be able to correctly display the value of an object that measurement unit controls; and

c) the enumeration is tied to the structure of the MIB or the model on which the MIB is based, e.g., the prtAlertGroup enumeration is tied to the OIDs for the related tables.

enumeration (2) An initial set of values are defined in the Printer 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 ~~registered through~~ IANA after approval by this working group. The current set of approved values should always be obtained from the IANA registry. Type 2 enumerations are typically used where it is important to insure consistent usage of the enumeration values; that is, to insure that the same entity does not get two different enumerations values, or two different entities do not get the same enum value.

enumeration (3) An initial set of values are defined in the Printer 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. The current set of approved values should always be obtained from the IANA registry. Type 3 enumerations are used for enumerations that can be extended without any controls; an example is the prtMarkerSuppliesType, which can be extended as needed by any manufacturer to describe the supplies required by a new printer.

3. Groups ~~Objects~~ from other MIB Specifications

~~This section lists the objects from other IETF MIB specifications~~

~~that are mandatory for conformance to this Printer MIB specification.~~
This section identifies the grups from other MIBs that shall be supported to supplement and complete a printer MIB implementation. The section also describes some of the less obvious characteristics of the Printer MIB structure that are related to the inclusion of these other MIB groups and/or objects.

3.1. System Group ~~objects~~

All objects in the system group of MIB-II (RFC 1213) shall be implemented; however, as described in paragraph 3.4, implementers should carefully consider what constitutes the "system".
~~must be~~
~~implemented.~~

3.2. System Controller

The System Controller is represented by the Storage and Device Groups of the Host Resources MIB (RFC 1514). These are the only groups that are required to be implemented. Other Groups (System, Running Software, Running Software Performance, and Installed Software) may be implemented at the discretion of the implementor.

3.3. Interface Group objects

All objects in the Interfaces Group of MIB-II (RFC 1213) shall be implemented.

```
Printer-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, experimental, Counter32, Integer32,
        TimeTicks, NOTIFICATION-TYPE, OBJECT-IDENTITY FROM SNMPv2-SMI
    TEXTUAL-CONVENTION FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF
    hrDeviceIndex, hrStorageIndex FROM HOST-RESOURCES-MIB;

printmib MODULE-IDENTITY
    LAST-UPDATED "9411250000Z"
    ORGANIZATION "IETF Printer MIB Working Group"
    CONTACT-INFO
            "  "      Steven Waldbusser
          Postal: Carnegie Mellon University
                       4910 Forbes Ave
                      Pittsburgh, PA, 15213

                    Tel: 412-268-6628
                    Fax: 412-268-4987
                 E-mail: waldbusser@cmu.edu"
    DESCRIPTION
            "The MIB module for management of printers."
    ::= { mib-2 43 }

--
-- Textual conventions for this MIB module
--
--
-- Generic unspecific textual conventions
--

PrtMediaUnitTC ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
            "Units of measure for media dimensions."
    -- This is a type 1 enumeration.
    SYNTAX       INTEGER {
                     tenThousandthsOfInches(3),  -- .0001
                     micrometers(4)
                 }
```

```
                  }

PrtCapacityUnitTC ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
            "Units of measure for media capacity."
    -- This is a type 1 enumeration.
    SYNTAX       INTEGER {
                     tenThousandthsOfInches(3),  -- .0001
                     micrometers(4),
                     sheets(8),
                     feet(16),
                     meters(17)
                 }

PrtSupplementaryPageContentTC ::= TEXTUAL-CONVENTION
    STATUS     current
    DESCRIPTION
         "Supplementary pages are added by the printing system and are
          not part of the actual print job. Examples include error and
          banner pages. This textual convention is used to specify the
          information content of these pages."
    SYNTAX     INTEGER {
                   noPage(3),            -- no page will be produced
                   concise(4),           -- content of page is concise
                   verbose(5)            -- content of page is verbose
               }


PrtPrintOrientationTC ::= TEXTUAL-CONVENTION
  -- This value is a type 1 enumeration
  STATUS  current
  DESCRIPTION
     "A generic representation for printing orientation on a "page"."
  SYNTAX  INTEGER {
              other(1),
              portrait(3),
              landscape(4)
          }


PrtCoverStatusTC ::= TEXTUAL-CONVENTION
    STATUS     current
    DESCRIPTION
       "Values for encoding the state of a particular cover or access panel
        on the printer case or enclosure."
    SYNTAX INTEGER {
                      other(1),
                      coverOpen(3),
                      coverClosed(4),
                      interlockOpen(5),
                      interlockClosed(6)
                   }

PrtSubUnitStatusTC ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
            "Status of a printer sub-unit.

             The SubUnitStatus is an integer that is the sum of 5
             distinct values, Availability, Non-Critical, Critical,
             On-line, and Transitioning. These values are:
```

```
 Availability                           value

        Available and Idle              0       000'b
        Available and Standby           2       010'b
        Available and Active            4       100'b
        Available and Busy              6       110'b
        Unavailable and OnRequest       1       001'b
        Unavailable because Broken      3       011'b
        Unknown                         5       101'b

    Non-Critical

        No Non-Critical Alerts          0
        Non-Critical Alerts             8

    Critical

        No Critical Alerts              0
        Critical Alerts                 16

    On-Line

        Intended state is On-Line       0
        Intended state is Off-Line      32
```

```
    Transitioning

            At intended state               0
            Transitioning to intended state 64
    "

    SYNTAX       INTEGER (0..126)

PresentOnOff ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
            "Presence and configuration of a device or feature."
    -- This is a type 1 enumeration.
    SYNTAX       INTEGER {
                     other(1),
                     on(3),
                     off(4),
                     notPresent(5)
                 }

CodedCharSet ::= TEXTUAL-CONVENTION
      STATUS     current
      DESCRIPTION
         "A coded character set value that specifies both a set of
          characters that may be used and an encoding (as one or more
          octets) that is used to represent the characters in the
          set. These values are to be used to identify the encoding
          employed for strings in the MIB where this is not fixed by
          the MIB.

          Some objects that allow a choice of coded character set
          are: the prtLocalizationCharacterSet object in the
          LocalizationTable and prtInterpreterDefaultCharSetIn.
          The prtGeneralCurrentLocalization and prtConsoleLocalization
          objects in turn contain the index in the LocalizationTable
          of the current localization (country, language, and coded
          character set) of the 'description' objects and the console,
          respectively.

          The space of the coded character set enumeration has been
          divide into three regions. The first region (3-999) consists
          of coded character sets that have been standardized by some
          standard setting organization. This region is intended for
          standards that do not have subset implementations. The
          second region (1000-1999) is for the Unicode and ISO/IEC 10646
          coded character sets together with a specification of a (set
          of) sub-repetoires that may occur.  The third region (>1999)
          is intended for vendor specific coded character sets.

NOTE: Unicode and ISO 10646 character coded data may be
          processed and stored in either Big Endian (most significant
          octet first) or Little Endian (least significant octet
          first) order.  Intel x86, VAX, and Alpha/AXP architectures are
          examples of Little Endian processor architectures.
          Furthermore, in environments where either order may occur,
          so-called Unicode BYTE ORDER MARK (BOM) character (which is
          ISO 10646 ZERO WIDTH NO BREAK SPACE), coded as FEFF in two
          octets and 0000FEFF in four octets is used at the beginning
          of the data as a signature to indicate the order of the
          following data (See ISO 10646 Annex F).  Thus either
          ordering and BOM may occur in print data streams sent to the
          interpreter.  However, ISO 8824/8825 (ASN.1/BER) used by
          SNMP is quite clear that Big Endian order shall be used and
```

```
          BOM shall NOT be used in transmission in the protocol.
          Transmitting Unicode in Big Endian order in SNMP should
          not prove to be a hardship for Little Endian machines,
          since SNMP ASN.1/BER requires integers to be transmitted
          in Big Endian order as well.  So SNMP implementations on
          Little Endian machines are already reversing the order of
          integers to make them Big Endian for transmission via
          SNMP.  Also Unicode characters are usually treated as
          two-octet integers, not short text strings, so that it will
          be straightforward for Little Endian machines to reverse the
          order of Unicode character octets as well before
          transmitting them and after receiving them via the SNMP
          protocol.

          Where a given coded character set may be known by more than
          one name, the most commonly known name is used as the name
          of the enumeration and other names are shown in the
          comments.  The comments also indicate where to find detailed
          information on the coded character set and briefly
          characterize its relationship to other similar coded
          character sets.

          The current list of character sets and their enumerated
          values used to reference them is contained in the IANA
          Character Set registry.  The enum value is indicated by
          the MIBenum entry in the registry.  The enum symbol is
          indicated by the Alias that starts with 'cs' for character
          set.

          The IANA character sets registry is available via
          anonymous ftp.

          The ftp server is ftp.isi.edu.
          The subdirectory is /in-notes/iana/assignments/.

          The file name is character-sets.

          To add a character set to the IANA Registry:

             1. Format an entry like those in the current list,
                omitting the MIBenum value.
             2. Send the entry with a request to add the entry
                to the character set list to iana@ISI.EDU.
             3. The IANA will supply a unique MIBenum value
                and update the list."

      -- This is a type 3 enumeration.

      SYNTAX     INTEGER {
        other(1)               -- used if the designated coded
                               -- character set is not currently in
                               -- the enumeration

      -- See IANA Registry for standard character sets in the
      -- MIBenum range of 3-999.

      -- See IANA Registry for Unicode and vendor-supplied
      -- combinations of ISO collections and character sets based
      -- on Unicode in the MIBenum range of 1000-1999.
      -- See IANA Registry for vendor developed character sets
      -- in the MIBenum range of 2000-xxxx.
    }


--
-- General Group textual-conventions
--
```

```
PrtGeneralResetTC ::= TEXTUAL-CONVENTION
    STATUS     current
    DESCRIPTION
           "Values for reading and writing the prtGeneralReset object.

           This value is a type 3 enumeration.

If a device does not have NVRAM, the device shall none the less respond
to a SET with the value resetToNVRAM(5) with some sort of "warm reset"
that resets the device to some implementation-defined state that is
preferaby under control of the system administrator by some means
outside the scope of this MIB specification."
"
    SYNTAX     INTEGER {
                   notResetting(3),
                   powerCycleReset(4), -- Cold Start
                   resetToNVRAM(5), -- Warm Start
                   resetToFactoryDefaults(6) -- Reset contents of
                                             -- NVRAM to factory
                                             -- defaults
               }

""
""
--
```

~~CodedCharSet ::= TEXTUAL-CONVENTION~~
~~STATUS current~~
~~DESCRIPTION~~
~~"A coded character set value that specifies both a set of characters that may be used and an encoding (as one or more octets) that is used to represent the characters in the set. These values are to be used to identify the encoding employed for strings in the MIB where this is not fixed by the MIB.~~

~~Some objects that allow a choice of coded character set are: the prtLocalizationCharacterSet object in the LocalizationTable and prtInterpreterDefaultCharSetIn. The prtGeneralCurrentLocalization and prtConsoleLocalization objects in turn contain the index in the LocalizationTable of the current localization (country, language, and coded character set) of the 'description' objects and the console, respectively.~~

~~The space of the coded character set enumeration has been divide into three regions. The first region (3-999) consists of coded character sets that have been standardized by some standard setting organization. This region is intended for standards that do not have subset implementations. The second region (1000-1999) is for the Unicode and ISO/IEC 10646 coded character sets together with a specification of a (set of) sub-repetoires that may occur. The third region (>1999) is intended for vendor specific coded character sets.~~

~~NOTE: Unicode and ISO 10646 character coded data may be processed and stored in either Big Endian (most significant octet first) or Little Endian (least significant octet first) order. Intel x86, VAX, and Alpha/AXP architectures are examples of Little Endian processor architectures. Furthermore, in environments where either order may occur, so-called Unicode BYTE ORDER MARK (BOM) character (which is ISO 10646 ZERO WIDTH NO BREAK SPACE), coded as FEFF in two octets and 0000FEFF in four octets is used at the beginning of the data as a signature to indicate the order of the following data (See ISO 10646 Annex F). Thus either ordering and BOM may occur in print data streams sent to the interpreter. However, ISO 8824/8825 (ASN.1/BER) used by SNMP is quite clear that Big Endian order shall be used and BOM shall NOT be used in transmission in the protocol. Transmitting Unicode in Big Endian order in SNMP should not prove to be a hardship for Little Endian machines, since SNMP ASN.1/BER requires integers to be transmitted in Big Endian order as well. So SNMP implementations on Little Endian machines are already reversing the order of integers to make them Big Endian for transmission via SNMP. Also Unicode characters are usually treated as two-octet integers, not short text strings, so that it will be straightforward for Little Endian machines to reverse the order of Unicode character octets as well before transmitting them and after receiving them via the SNMP protocol.~~

~~Where a given coded character set may be known by more than one name, the most commonly known name is used as the name of the enumeration and other names are shown in the comments. The comments also indicate where to find detailed information on the coded character set and briefly characterize its relationship to other similar coded character sets.~~

~~The current list of character sets and their enumerated values used to reference them is contained in the IANA Character Set registry. The enum value is indicated by the MIBenum entry in the registry. The enum symbol is indicated by the Alias that starts with ‘cs’ for character set.~~

~~The IANA character sets registry is available via anonymous ftp.~~

~~The ftp server is ftp.isi.edu.~~
~~The subdirectory is /in-notes/iana/assignments/.~~

```
~~          The file name is character-sets.~~

~~          To add a character set to the IANA Registry:~~

~~             1. Format an entry like those in the current list,~~
~~                omitting the MIBenum value.~~
~~             2. Send the entry with a request to add the entry~~
~~                to the character set list to iana@ISI.EDU.~~
~~             3. The IANA will supply a unique MIBenum value~~
~~                and update the list."~~

~~      -- This is a type 3 enumeration.~~

~~      SYNTAX     INTEGER {~~
~~        other(1)                -- used if the designated coded~~
~~                                -- character set is not currently in~~
~~                                -- the enumeration~~

~~      -- See IANA Registry for standard character sets in the~~
~~      -- MIBenum range of 3-999.~~

~~      -- See IANA Registry for Unicode and vendor-supplied~~
~~      -- combinations of ISO collections and character sets based~~
~~      -- on Unicode in the MIBenum range of 1000-1999.~~
~~      -- See IANA Registry for vendor developed character sets~~
~~      -- in the MIBenum range of 2000-xxxx.~~
~~   }~~
-- Channel Group textual-conventions
--

PrtChannelStateTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
       "The state of this print job delivery channel. The value determines
        whether control information and print data is allowed
        through this channel."
    SYNTAX     INTEGER {
                   other(1),
                   printDataAccepted(3),
                   noDataAccepted(4)
               }


PrtChannelTypeTC ::= TEXTUAL-CONVENTION
    STATUS     current
    DESCRIPTION
        "This enumeration indicates the type of channel that is
        receiving jobs.

        This is a type 2 enum."
    SYNTAX     INTEGER {
                   other(1),
                   chSerialPort(3),
                   chParallelPort(4),
                   chIEEE1284Port(5),
                   chSCSIPort(6),
                   chAppleTalkPAP(7),     -- AppleTalk Printer Access
                                          -- Protocol (PAP)
                                  -- prtChannelInformation Keywords:
                                  --
                                  -- Printer Name
                                  --
```

```
                                -- Keyword:          "Name"
                                -- Status:           Optional
                                -- Multiplicity      Single
                                -- Description: The name of the printer within
                                -- the AppleTalk naming scope
                   chLPDServer(8),        -- RFC 1179
                   chNetwareRPrinter(9),  -- Novell, Inc.
                             -- prtChannelInformation keywords:
                             -- Print Server Name
                             -- Keyword:      "PServer"
                             -- Syntax:       Name
                             -- Status:       Mandatory
                             -- Multiplicity: Single
                             -- Description: The Pserver's SAP name
                             --
                             -- Printer Number
                             -- Keyword:      "Printer"
                             -- Syntax:       Integer
                             -- Status:       Mandatory
                             -- Multiplicity  Single
                             -- Description: The printer number
                             -- There must be one Pserver and one Printer
                          entryetware
                   chNetwarePServer(10),  -- Novell, Inc.
                             -- prtChannelInformation keywords:
                             -- Server Name
                             -- Keyword:      "Server"
                             -- Syntax:       Name
                             -- Status:       Mandatory
                             -- Multiplicity  Single
                             -- Description: The name of the server on which
                             -- theetware queue resides.
                             --
                             -- Queue
                             --
                             -- Name:         "Queue"
                             -- Syntax:       Name
                             -- Status:       Mandatory
                             -- Multiplicity  Single
                             -- Description: The name of the queue on the
                             -- server
                             --
                             -- NDS Tree
                             --
                             -- Keyword:      "NDSTree"
                             -- Syntax:       Name
                             -- Status:       Mandatory
                             -- Multiplicity  Multiple
                             -- Description: The NDS Tree SAP name
                             --
                             -- NDS Queue
                             --
                             -- Keyword:      "NDSQueue"
                             -- Syntax:       Name
                             -- Status:       Mandatory
                             -- Multiplicity  Single
                             -- Description: The name of the queue object in
                             -- the associated NDS Tree
                             -- There must be exactly one Server and one Queue
                             -- entry or exactly one NDSTree and one NDSQueue
                             -- Entry.
                   chPort9100(11),        -- Bi-directional printing protocol
                                          -- utilizing TCP port 9101 for control
                                          -- and TCP port 9100 for data.
```

```
                  chAppSocket(12),        -- Adobe Systems, Inc.~~a bi-
~~directional, LPD-like~~
                                          ~~-- protocol using 9101 for~~
                                          ~~-- control and 9100 for data.~~
                                          ~~-- Adobe Systems, Inc.~~
                  chFTP(13),              -- RFC 959~~FTP "PUT" to printer~~
                  chTFTP(14),             -- RFC 1350
                  chDLCLLCPort(15),
                  chIBM3270(16),          -- IBM Coax
                  chIBM5250(17),          -- IBM Twinax
                  chFax(18),

                               chIEEE1394(19),
                  chTransport1(20),           -- TCP port 35, see reserved
                                              -- TCP port list in RFC 1700
                                              -- or current “Assigned Numbers”
                                              -- RFC. This RFC should also be
                                              -- referenced for other channel
                                              -- enumerations utilizing TCP
                                              -- port numbers 0 through 1024.
                  chCPAP(21),                 -- TCP port 170, Digital
                                              -- Equipment Corp.
                                  ~~chDCERemoteProcCall(22),   -- OSF~~
                  ~~chONCRemoteProcCall(23),    -- Sun Microsystems~~
                  ~~chOLE(24),                  -- Microsoft~~
                  ~~chNamedPipe(25),~~
                  chPCPrint(26),              -- Banyan
                  chServerMessageBlock(27),
                       -- File/Print sharing protocol used by
                       -- various network operating systems
                       -- from IBM 3Com, Microsoft and others
                       -- prtChannelInformation Keywords:
                       --
                       -- Service Name
                       --
                       -- Keyword:              "Name"
                       -- Status:               Optional
                       -- Multiplicity          Single
                       -- Description:          The service name of the printer

                  chPSM(28),          -- Printing Systems Manager, IBM
                                      ~~chDLLAPI(29),              -- Microsoft~~
                  ~~chVxDAPI(30),               -- Microsoft~~
                  chSystemObjectManager(31), -- IBM
                  chDECLAT(32),               -- Digital Equipment Corp.
                  chNPAP(33),
                    chUSB(34),                   -- Universal Serial Bus
                  chIRDA(35),                  -- Infrared Data Assoc. Prot.
                  chPrintXChange(36),          -- PrintXChange Protocol
                  chPortTCP(37),        -- A unidirectional "raw" TCP
                                        -- channel that uses an
                                        -- administratively assigned TCP
                                        -- port address.
                  chBidirPortTCP(38),   -- A bidirectional version of chPortTCP
                  chUNPP(39),           -- Universal Network Printing Protocol
                                        -- (UNPP). A bi-directional, multiport
                                        -- network printing application
                                        -- protocol available on multiple
                                        -- transport protocols.
                                        -- Underscore, Inc.
                                        -- Contact: info@underscore.com
             chAppleTalkADSP(40),       -- AppleTalk Data Stream
                                        -- Protocol.
                                        -- ADSP is part of the AppleTalk
                                        -- suite of protocols.
                             -- It is a symmetric, connection-oriented
                             -- protocol that makes possible
```

```
                                    -- the establishment and maintenance of
                                    -- full-duplex streams of data bytes
                                    -- between two sockets in an AppleTalk
                                       -- internet.
                                    -- See Inside AppleTalk, second Edition, by
                                    -- Sidhu, Andrews and Oppenheimer.
          chPortSPX(41),            -- Sequenced Packet Exchange (SPX) socket.
                                       -- Novell, Inc. Similar to TCP, a
                                    -- bi-directional data pipe using Novell
                                    -- SPX as a transport.
                                    --
                                    -- prtChannelInformation keywords:
                                    --
                                    -- Network Number
                                    --
                                    -- Keyword:       "Net"
                                    -- Syntax:        HexString
                                    -- Status:        Mandatory
                                    -- Multiplicity   Single
                                    -- Description:   The network number
                                    --
                                    -- Node Number
                                    --
                                    -- Keyword:       "Node"
                                    -- Syntax:        HexString
                                    -- Status:        Mandatory
                                    -- Multiplicity   Single
                                    -- Description:   The Node Number
                                    --
                                    -- Socket Number
                                    --
                                    -- Keyword:       "Socket"
                                    -- Syntax:        HexString
                                    -- Status:        Mandatory
                                    -- Multiplicity   Single
                                    -- Description: The SPX socket number
                                    -- There must be exactly one "Net" and one "Node"
                                    -- and one "Socket" entry. A HexString is a binary
                                    -- value represented as a string of ASCII
                                    -- characters using hexadecimal notation.
          chPortHTTP(42)               -- Hypertext Transfer Protocol. See IETF
                                       -- documents relating to HTTP 1.0/1.1
                                       -- (RFCs XXXX,etc.)
          chNDPS(43)                -- Novell, Inc.
                                    -- prtChannelInformation keywords:
                                    --
                                    -- Printer Agent Name
                                    --
                                    -- Keyword:     "PA"
                                    -- Syntax:      Name
                                    -- Status:      Mandatory
                                    -- Multiplicity Single
                                    -- Description: The NDPS Printer Agent Name
     }

                }

-- Interpreter Group textual conventions

PrtInterpreterLangFamilyTC ::= TEXTUAL-CONVENTION
    STATUS     current
    DESCRIPTION
        "This enumeration indicates the type of interpreter that is
        receiving jobs.
```

```
        This value is a type 2 enumeration."
    SYNTAX     INTEGER {
          other(1),
          langPCL(3),          -- PCL.  Starting with PCL version 5,
                               -- HP-GL/2 is included as part of the
                               -- PCL language.
                               -- PCL and HP-GL/2 are registered
                               -- trademarks of Hewlett-Packard Company.
          langHPGL(4),         -- Hewlett-Packard Graphics Language.
                               -- HP-GL is a registered trademark of
                               -- Hewlett-Packard Company.
          langPJL(5),          -- Peripheral Job Language. Appears in the
                               -- data stream between data intended for a
                               -- page description language.
                               -- Hewlett-Packard Co.
          langPS(6),           -- PostScript Language (tm)
                               -- Postscript - a trademark of Adobe
                               -- Systems Incorporated which may be
                               --                               -- registered in
                               certain jurisdictions

          langPSPrinter(42), -- The PostScript Language used for
                               -- control (with any PDLs)
                               -- Adobe Systems Incorporated
          langIPDS(7),         -- Intelligent Printer Data Stream
                               -- Bi-directional print data stream for
                               -- documents consisting of data objects
                               -- (text, image, graphics, bar codes),
                               -- resources (fonts, overlays) and page,
                               -- form and finishing instructions.
                               -- Facilitates system level device
                               -- control, document tracking and error
                               -- recovery throughout the print process.
                               -- Pennant Systems, IBM
          langPPDS(8),         -- IBM Personal Printer Data Stream.
                               -- Originally called IBM ASCII, the name
                               -- was changed to PPDS when the Laser
                               -- Printer was introduced in 1989.
                               -- Lexmark International, Inc.
          langEscapeP(9),      -- Epson Corp.
          langEpson(10),
          langDDIF(11),        -- Digital Document Interchange Format
                               -- Digital Equipment Corp., Maynard MA
          langInterpress(12),  -- Xerox Corp.
          langISO6429(13),     -- ISO 6429.  Control functions for Coded
                               -- Character Sets (has ASCII control
                               -- characters, plus additional controls for
                               -- character imaging devices.)
                               -- ISO Standard, Geneva, Switzerland
          langLineData(14),    -- line-data:  Lines of data as separate
                               -- ASCII or EBCDIC records and containing
                               -- no control functions (no CR, LF, HT, FF,
                               -- etc.). For use with traditional line
                               -- printers.  May use CR and/or LF to
                               -- delimit lines, instead of records.  See
                               -- ISO 10175 Document Printing Application
                               -- (DPA)
                               -- ISO standard, Geneva, Switzerland
          langMODCA(15),       -- Mixed Object Document Content
                               -- Architecture
                               -- Definitions that allow the composition,
                               -- interchange, and presentation of final
                               -- form documents as a collection of data
                               -- objects (text, image, graphics, bar
                               -- codes), resources (fonts, overlays) and
                               -- page, form and finishing instructions.
                               -- Pennant Systems, IBM
```

```
            langREGIS(16),      -- Remote Graphics Instruction Set,
                                -- Digital Equipment Corp., Maynard MA
            langSCS(17),        -- SNA Character String
                                -- Bi-directional print data stream for SNA
                                -- LU-1 mode of communications
                                -- IBM
            langSPDL(18),       -- ISO 10180 Standard Page Description
                                -- Language
                                -- ISO Standard
            langTEK4014(19),    -- Tektronix Corp.
            langPDS(20),
            langIGP(21),        -- Printronix Corp.
            langCodeV(22),      -- Magnum Code-V, Image and printer control
                                -- language used to control impact/dot-
                                -- matrix printers.
                                -- QMS, Inc., Mobile AL
            langDSCDSE(23),     -- DSC-DSE:  Data Stream Compatible and
                                -- Emulation Bi-directional print data
                                -- stream for non-SNA (DSC) and SNA LU-3
                                -- 3270 controller (DSE) communications
                                -- IBM

            langWPS(24),        -- Windows Printing System, Resource based
                                -- command/data stream used by Microsoft At
                                -- Work Peripherals.
                                -- Developed by the Microsoft Corporation.
            langLN03(25),       -- Early DEC-PPL3, Digital Equipment Corp.
            langCCITT(26),
            langQUIC(27),       -- QUIC (Quality Information Code), Page
                                -- Description Language for laser printers.
                                -- Included graphics, printer control
                                -- capability and emulation of other well-
                                -- known printer .
                                -- QMS, Inc.
            langCPAP(28),       -- Common Printer Access Protocol
                                -- Digital Equipment Corp.
            langDecPPL(29),     -- Digital ANSI-Compliant Printing Protocol
                                -- (DEC-PPL)
                                -- Digital Equipment Corp.
            langSimpleText(30), -- simple-text:  character coded data,
                                -- including NUL, CR , LF, HT, and FF
                                -- control characters.  See ISO 10175
                                -- Document Printing Application (DPA)
                                -- ISO standard, Geneva, Switzerland

            langNPAP(31),       -- Network Printer Alliance Protocol (NPAP).
                                --    IEEE 1284.1This protocol has been superseded
                                -- by the IEEE 1284.1 TIPSI standard.
                                -- (ref. LangTIPSI(49)).

            langDOC(32),        -- Document Option Commands, Appears in the
                                -- data stream between data intended for a
                                -- page description .
                                -- QMS, Inc.
            langimPress(33),    -- imPRESS, Page description language
                                -- originally developed for the ImageServer
                                -- line of systems. A binary language
                                -- providing representations for text,
                                -- simple graphics (rules, lines, conic
                                -- sections), and some large forms (simple
                                -- bit-map and CCITT group 3/4 encoded).The
                                -- language was intended to be sent over an
                                -- 8-bit channel and supported early
                                -- document preparation languages (e.g. TeX
                                -- and TROFF).
                                -- QMS, Inc.
            langPinwriter(34),  -- 24 wire dot matrix printer  for
```

```
                             -- USA, Europe, and Asia except Japan.
                             -- More widely used in Germany, and some
                             -- Asian countries than in US.
                             -- NEC
          langNPDL(35),      -- Page printer  for Japanese
                             -- market.
                             -- NEC
          langNEC201PL(36),  -- Serial printer language used in the
                             -- Japanese market.
                             -- NEC
          langAutomatic(37), -- Automatic PDL sensing.  Automatic
                             -- sensing of the interpreter language
                             -- family by the printer examining the
                             -- document content.  Which actual
                             -- interpreter language families are sensed
                             -- depends on the printer implementation.
          langPages(38),     -- Page printer Advanced Graphic Escape Set
                             -- IBM Japan

          langLIPS(39),      -- LBP Image Processing System
          langTIFF(40),      -- Tagged Image File Format (Aldus)
          langDiagnostic(41),-- A hex dump of the input to the
                             -- interpreter
          langPSPrinter(42), -- The PostScript Language used for
                             -- control (with any PDLs)
                             -- Adobe Systems Incorporated
          langCaPSL(43),     -- Canon Print Systems Language
          langEXCL(44),      -- Extended Command Language
                             -- Talaris Systems Inc.
          langLCDS(45),      -- Line Conditioned Data Stream
                             -- Xerox Corporation
          langXES(46),       -- Xerox Escape Sequences
                             -- Xerox Corporation
          langPCLXL(47),     -- Printer Control Language. Extended
                             -- language features for printing, and
                             -- printer control. Technical reference
                             -- manual # TBD.
                             -- Hewlett-Packard Co.
          langART(48),       -- Advanced Rendering Tools (ART). Page
                             -- Description language originally
                             -- developed for the Laser Press printers.
                             -- Tehnical reference manual: "ART IV
                             -- Reference Manual", No F33M.
                             -- Fuji Xerox Co., Ltd.
          langTIPSI(49),     -- Transport Independent Printer System
                             -- Interface (ref. IEEE Std. 1284.1)
          langPrescribe(50),  -- Page description and printer control
                             -- language. It can be described with
                             -- ordinary ASCII characters.
                             -- Technical reference manual:
                             -- "PRESCRIBE II Programming Manual"
          langLinePrinter(51),   -- A simple-text character stream which
                             -- supports the control codes LF, VT,
                             -- FF and CR plus Centronics or
                             -- Dataproducts Vertical Format
                             -- Unit (VFU).
                             -- language is commonly used on many
                             -- older model line and matrix printers.
          langIDP(52),        -- Imaging Device Protocol
                             -- Apple Computer. ~~Tech Reference:~~
          LangXJCL(53)        --  Xerox Corp.
                             -- "IEEE Std. 1284.1".
          }
```

--

```
-- Input/Output Group Textual Conventions
--

PrtInputTypeTC ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
      "The type of technology (discriminated primarily according to feeder
       mechanism type) employed by a specific component or components."
    SYNTAX INTEGER {
                     other(1),
                     unknown(2),
                     sheetFeedAutoRemovableTray(3),
                     sheetFeedAutoNonRemovableTray(4),
                     sheetFeedManual(5),
                     continuousRoll(6),
                     continuousFanFold(7)
                   }


PrtOutputTypeTC ::= TEXTUAL-CONVENTION
-- This is a type 2 enumeration
       STATUS current
       DESCRIPTION
       "The Type of technology supported by this output sub-unit"
       SYNTAX INTEGER {
                           other(1),
                           unknown(2),
                           removableBin(3),
                           unRemovableBin(4),
                           continuousRollDevice(5),
                           mailBox(6),
                           continousFanFold(7)
                      }

PrtOutputStackingOrderTC ::= TEXTUAL-CONVENTION
-- This is a type 1 enumeration
       STATUS current
       DESCRIPTION
       "The current state of the stacking order for the associated output
        sub-unit. 'firstToLast' means that as pages are output, the front
        of the next page is placed against the back of the previous page.
        'lastToFirst' means that as pages are output, the back of the next
        page is placed against the front of the previous page."
       SYNTAX INTEGER {
                           unknown(2),
                           firstToLast(3),
                           lastToFirst(4)
                      }



PrtOutputPageDeliveryOrientationTC ::= TEXTUAL-CONVENTION
-- This is a type 1 enumeration
       STATUS current
       DESCRIPTION
       "The reading surface that will be 'up' when pages are delivered to
        the associated output sub-unit. Values are Face-Up and Face-Down.
        (Note: interpretation of these values is, in general, context-
        dependent based on locale; presentation of these values to an
        end-user should be normalized to the expectations of the user."
       SYNTAX INTEGER {
                           faceUp(3),
                           faceDown(4)
                      }

--
-- Marker Group Textual Conventions
```

```
--

PrtMarkerMarkTechTC ::= TEXTUAL-CONVENTION
-- This value is a type 2 enumeration
STATUS current
DESCRIPTION
"The type of marking technology used for this marking sub-unit"
SYNTAX     INTEGER {
                   other(1),
                   unknown(2),
                   electrophotographicLED(3),
                   electrophotographicLaser(4),
                   electrophotographicOther(5),
                   impactMovingHeadDotMatrix9pin(6),
                   impactMovingHeadDotMatrix24pin(7),
                   impactMovingHeadDotMatrixOther(8),
                   impactMovingHeadFullyFormed(9),
                   impactBand(10),
                   impactOther(11),
                   inkjetAqueous(12),
                   inkjetSolid(13),
                   inkjetOther(14),
                   pen(15),
                   thermalTransfer(16),
                   thermalSensitive(17),
                   thermalDiffusion(18),
                   thermalOther(19),
                   electroerosion(20),
                   electrostatic(21),
                   photographicMicrofiche(22),
                   photographicImagesetter(23),
                   photographicOther(24),
                   ionDeposition(25),
                   eBeam(26),
                   typesetter(27)
               }

PrtMarkerCounterUnitTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
        "The unit that will be used by the printer when reporting
        counter values for this marking sub-unit.  The
        time units of measure are provided for a device like a
        strip recorder that does not or cannot track the physical
        dimensions of the media and does not use characters,
        lines or sheets."

    SYNTAX     INTEGER {
                   tenThousandthsOfInches(3),  -- .0001
                   micrometers(4),
                   characters(5),
                   lines(6),
                   impressions(7),
                   sheets(8),
                   dotRow(9),
                   hours(11),
                   feet(16),
                   meters(17)
               }

PrtMarkerSuppliesTypeTC ::= TEXTUAL-CONVENTION
    --   This value is a type 3 enumeration
    STATUS     current
    DESCRIPTION
        "The type of this supply."
```

```
    SYNTAX     INTEGER {
                   other(1),
                   unknown(2),
                   toner(3),
                   wasteToner(4),
                   ink(5),
                   inkCartridge(6),
                   inkRibbon(7),
                   wasteInk(8),
                   opc(9), -- photo conductor
                   developer(10),
                   fuserOil(11),
                   solidWax(12),
                   ribbonWax(13),
                   wasteWax(14),
                   fuser(15),
                   coronaWire(16),
                   fuserOilWick(17),
                   cleanerUnit(18),
                   fuserCleaningPad(19),
                   transferUnit(20),
                   tonerCartridge(21),
                   fuserOiler(22)
               }

PrtMarkerSuppliesSupplyUnitTC ::= TEXTUAL-CONVENTION
-- This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
        "Unit of this marker supply container/receptacle."
    SYNTAX     INTEGER {
                   tenThousandthsOfInches(3),  -- .0001
                   micrometers(4),
                   impressions(7),
                   sheets(8),
                   thousandthsOfOunces(12),
                   hours(11),
                   tenthsOfGrams(13),
                   hundrethsOfFluidOunces(14),
                   tenthsOfMilliliters(15),
                   feet(16),
                   meters(17)
               }

PrtMarkerSuppliesClassTC ::= TEXTUAL-CONVENTION
    --  This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
        "Indicates whether this supply entity represents a supply
        that is consumed or a receptacle that is filled."
    SYNTAX     INTEGER {
                   other(1),
                   supplyThatIsConsumed(3),
                   receptacleThatIsFilled(4)
               }

PrtMarkerColorantRoleTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
       "The role played by this colorant."
    SYNTAX     INTEGER { --  Colorant Role
                   other(1),
                   process(3),
                   spot(4)
               }
```

```
--
-- Media Path Textual Conventions
--

PrtMediaPathMaxSpeedPrintUnitTC OBJECT-TYPE
    -- This value is a type 1 enumeration
    STATUS      current
    DESCRIPTION
       "The unit of measure used in specifying the speed of all
        media paths in the printer."
    SYNTAX     INTEGER {
                   tenThousandthsOfInchesPerHour(3),   -- .0001/hour
                   micrometersPerHour(4),
                   charactersPerHour(5),
                   linesPerHour(6),
                   impressionsPerHour(7),
                   sheetsPerHour(8),
                   dotRowPerHour(9),
                   feetPerHour(16),
                   metersPerHour(17)
               }

PrtMediaPathTypeTC ::= TEXTUAL-CONVENTION
    --   This value is a type 2 enumeration
    STATUS     current
    DESCRIPTION
        "The type of the media path for this media path."
    SYNTAX     INTEGER {
                   other(1),
                   unknown(2),
                   longEdgeBindingDuplex(3),
                   shortEdgeBindingDuplex(4),
                   simplex(5)
               }

--
-- Interpreter Group Textual Conventions
--""

PrtInterpreterDefaultOrientationTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
        "The current orientation default for this interpreter.  This
        value may be overridden for a particular job (e.g., by a
        command in the input data stream)."
    SYNTAX     INTEGER {
                   other(1),
                   portrait(3),
                   landscape(4)
               }

PrtInterpreterTwoWayTC ::= TEXTUAL-CONVENTION
-- This is a type 1 enumeration
STATUS current
DESCRIPTION
        "Indicates whether or not this interpreter returns information
        back to the host."
SYNTAX       INTEGER {
                          yes(3),
                          no(4)
                    }


--
-- Console Group Textual Conventions
--
```

```
PrtConsoleColorTC ::= TEXTUAL-CONVENTION
    -- This value is a type 2 enumeration
    STATUS     current
    DESCRIPTION
        "The color of this light."
    SYNTAX     INTEGER {
                   other(1),
                   unknown(2),
                   white(3),
                   red(4),
                   green(5),
                   blue(6),
                   cyan(7),
                   magenta(8),
                   yellow(9)
               }

""
--
-- Alert Group Textual Conventions
--

PrtAlertSeverityLevelTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration
    STATUS     current
    DESCRIPTION
        "The level of severity of this alert table entry.  The printer
        determines the severity level assigned to each entry into the
        table. A warning is defined to be a non-critical alert. The value
        also indicates whether the event is a binary change event or a unary
        change event."
    SYNTAX     INTEGER {
                   other(1),
                   criticalBinaryChangeEvent(3),
                   warningUnaryChangeEvent(4),
                   warningBinaryChangeEvent(5)
               }

PrtAlertTrainingLevelTC ::= TEXTUAL-CONVENTION
    -- This value is a type 2 enumeration
    STATUS     current
    DESCRIPTION
        "The level of training required to handle this alert, if human
         intervention is required. The noInterventionRequired value should
         be used if the event does not require any human intervention. The
        training level is an enumeration that is determined and
        assigned by the printer manufacturer based on the information
        or the training required to handle this alert.  The printer
        will break alerts into these different training levels.  It is
        the responsibility of the management application in the system
        to determine how a particular alert is handled and how and to
        whom that alert is routed.  The following are the four
        training levels of alerts:

               Field Service - Alerts that typically require advanced
                      training and technical knowledge of the printer
                      and its sub-units. An example of a technical
                      person would be a manufacturer's Field Service
                      representative, or other person formally
                      trained by the manufacturer or similar
                      representative.
               Trained - Alerts that require an intermediate or moderate
                      level of knowledge of the printer and its
                      sub-units. A typical examples of alerts that
                      a trained operator can handle is replacing
                      toner cartridges.
```

```
               Untrained - Alerts that can be fixed without prior
                      training either because the action to correct
                      the alert is obvious or the printer can help the
                      untrained person fix the problem. A typical
                      example of such an alert is reloading paper
                      trays and emptying output bins on a low end
                      printer.
               Management - Alerts that have to do with overall
                      operation of and configuration of the printer.
                      Examples of management events are configuration
                      change of sub-units."
SYNTAX     INTEGER {
                   other(1),
                   unknown(2),
                   untrained(3),
                   trained(4),
                   fieldService(5),
                   management(6),
                   noInterventionRequired(7)
               }


PrtAlertGroupTC ::= TEXTUAL-CONVENTION
    -- This value is a type 1 enumeration for values in the range 1 to 29.
    -- Values of 30 and greater are type 2 enumerations and are for use in
    -- other MIBs that augment tables in the Printer MIB. Therefore, other
    -- MIBs may assign alert codes of 30 or higher to use the alert table
    -- from the Printer MIB without requiring revising and re-publishing this
    -- document.
    STATUS     current
    DESCRIPTION
        "The type of sub-unit within the printer model that this alert
        is related.  Input, output, and markers are examples of
        printer model groups, i.e., examples of types of sub-units.
        Wherever possible, these enumerations match the
        sub-identifier that identifies the relevant table in the
        printmib.

        NOTE: Alert type codes have been added for the host resources MIB
              storage table and device table. These additional types are for
              for situations in which the printer's storage and device objects
              must generate alerts (and possibly traps for critical alerts)."

    SYNTAX     INTEGER {
                   other(1),
                   hostResourcesMIBStorageTable(3),
                   hostResourcesMIBDeviceTable(4),
                   generalPrinter(5),
                   cover(6),
                   localization(7),
                   input(8),
                   output(9),
                   marker(10),
                   markerSupplies(11),
                   markerColorant(12),
                   mediaPath(13),
                   channel(14),
                   interpreter(15),
                   consoleDisplayBuffer(16),
                   consoleLights(17),
                   alert(18)
               }

PrtAlertCodeTC ::= TEXTUAL-CONVENTION
    -- This value is a type 2 enumeration
    STATUS     current
    DESCRIPTION
```

```
        "The code that describes the type of alert for this entry in
        the table. Binary change event alerts describe states of the subunit,
         while unary change event alerts describe a single event. The same
         alert code can be used for a binary change event or a unary change
         event, depending on implementation. Also, the same alert code can be
         used to indicate a critical or a non-critical (warning) alert,
         depending on implementation. The value of prtAlertSeverityLevel
         specifies binary vs. unary and critical vs. non-critical for each
         event for the implementation.

         While there are some specific codes for many subunits, the generic
         codes should be used for most subunit alerts. The network management
         station can then query the subunit specified by prtAlertGroup to
         determine further subunit status and other subunit information.

         An agent shall not add two entries to the alert table for the same
         event, one containing a generic event code and the other containing a
         specific event code; the agent shall add only one entry in the alert
         table for each event; either generic (preferred) or specific, not
         both.

         Implementation of the unary change event
         alertRemovalOfBinaryChangeEntry(1801) is optional. When implemented,
         this alert code shall indicate to network management stations that
         the trailing edge of a binary change event has occurred and the
         corresponding alert entry has been removed from the alert table. As
         with all events, the alertRemovalOfBinaryChangeEntry(1801) alert
         shall be placed at the end of the alert table. Such an alert table
         entry shall specify the following information:

              prtAlertSeverityLevel      warningUnaryChangeEvent(4)
              prtAlertTrainingLevel      noInterventionRequired(7)
              prtAlertGroup              alert(18)
              prtAlertGroupIndex         the index of the row in the alert
                                         table of the binary change event
                                         that this event has removed.
              prtAlertLocation           (-2)
              prtAlertCode               alertRemovalOfBinaryChangeEntry(1801)
              prtAlertDescription        <description or null string>
              prtAlertTime               (Optional) the value of sysUpTime at
                                         the time of the removal of the binary
                                         change event from the alert table.

         Optionally, the agent may generate a trap coincident with removing
         the binary change event and placing the unary change event
         alertRemovalOfBinaryChangeEntry(1801) in the alert table.
         For such a trap, the prtAlertIndex sent with the above trap
         parameters shall be the index of the alertRemovalOfBinaryChangeEvent
         row that was added to the prtAlertTable; not the index of the row
         that was removed from the prtAlertTable."
    SYNTAX     INTEGER {
                    other(1),     -- an event that is not represented by one of
                            -- the alert codes specified below.
                    unknown(2),
                        -- The following generic codes are common to multiple
                        -- groups. The NMS may examine the prtAlertGroup
                  -- object to determine what group to query for further
                        -- information.
                    coverOpened(3),
                    coverClosed(4),
                    interlockOpened(5),
                    interlockClosed(6),
                    configurationChanged(7),
                    jammed(8),
                    subunitMissing(9),          -- The subunit (tray,bin,etc.)
                                                -- has been removed.
                    subunitLifeAlmostOver(10),
```

```
                    subunitLifeOver(11),
                    subunitAlmostEmpty(12),
                    subunitEmpty(13),
                    subunitAlmostFull(14),
                    subunitFull(15),
                    subunitNearLimit(16),
                    subunitAtLimit(17),
                    subunitOpened(18),
                    subunitClosed(19),
                    subunitTurnedOn(20),
                    subunitTurnedOff(21),
                    subunitOffline(22),
                    subunitPowerSaver(23),
                    subunitWarmingUp(24),
                    subunitAdded(25),
                    subunitRemoved(26),
                    subunitResourceAdded(27),
                    subunitResourceRemoved(28),
                    subunitRecoverableFailure(29),
                    subunitUnrecoverableFailure(30),
                    subunitRecoverableStorageError(31),
                    subunitUnrecoverableStorageError(32),
                    subunitMotorFailure(33),
                    subunitMemoryExhausted(34),
                         -- general Printer group
                    coverOpened(501),
                    coverClosed(502),
                    poweredUp(503),
                    poweredDown(504),
                    printerNMSReset(505),  -- The printer has been reset by
                                           -- some network management station
                                           -- (NMS) writing into
                                           -- 'prtGeneralReset'. The value
                                           -- written shall be stored as the
                                           -- value of the prtAlertLocation
                                           -- object indicating the type of
                                           -- reset: powerCycleReset(4),
                                           -- resetToNVRAM(5),
                                           -- resetToFactoryDefaults(6), etc.
                    printerManualReset(506),
                                 -- The printer has been reset manually. The
                                 -- value of prtAlertLocation may be used to
                                 -- indicate the type of reset.
                    printerReadyToPrint(507),
                                 -- The printer is ready to print. (i.e., not
                                 -- warming up, not in power save state, not
                                 -- adjusting print quality, etc.).
                         -- Input Group
                    inputMediaTrayMissing(801),
                    inputMediaSizeChanged(802),
                    inputMediaWeightChanged(803),
                    inputMediaTypeChanged(804),
                    inputMediaColorChanged(805),
                    inputMediaFormPartsChange(806),
                    inputMediaSupplyLow(807),
                    inputMediaSupplyEmpty(808),
                    inputMediaChangeRequest(809),
                                 -- An interpreter has detected that a
                                 -- different medium is need in this input
                                 -- tray subunit. The prtAlertDescription may
                                 -- be used to convey a human readable
                                 -- description of the medium required to
                                 -- satisfy the request.
                    inputManualInputRequest(810),
                                 -- An interpreter has detected that manual
                                 -- input is required in this subunit. The
                                 -- prtAlertDescription may be used to convey
```

```
                                     -- a human readable description of the medium
                                     -- required to satisfy the request.
                      inputTrayPositionFailure(811),
                                     -- The input tray failed to position
                                     -- correctly.
                      inputTrayElevationFailure(812),
                      inputCannotFeedSizeSelected(813),
                           -- Output Group
                      outputMediaTrayMissing(901),
                      outputMediaTrayAlmostFull(902),
                      outputMediaTrayFull(903),
                      outputMailboxSelectFailure(904),
                           -- Marker group
                      markerFuserUnderTemperature(1001),
                      markerFuserOverTemperature(1002),
                      markerFuserTimingFailure(1003),
                      markerFuserThermistorFailure(1004),
                      markerAdjustingPrintQuality(1005),
                           -- Marker Supplies group
                      markerTonerEmpty(1101),
                      markerInkEmpty(1102),
                      markerPrintRibbonEmpty(1103),
                      markerTonerAlmostEmpty(1104),
                      markerInkAlmostEmpty(1105),
                      markerPrintRibbonAlmostEmpty(1106),
                      markerWasteTonerReceptacleAlmostFull(1107),
                      markerWasteInkReceptacleAlmostFull(1108),
                      markerWasteTonerReceptacleFull(1109),
                      markerWasteInkReceptacleFull(1110),
                      markerOpcLifeAlmostOver(1111),
                      markerOpcLifeOver(1112),
                      markerDeveloperAlmostEmpty(1113),
                      markerDeveloperEmpty(1114),
                      markerTonerCartridgeMissing(1115),
                           -- Media Path Device Group
                      mediaPathMediaTrayMissing(1301),
                      mediaPathMediaTrayAlmostFull(1302),
                      mediaPathMediaTrayFull(1303),
                           -- interpreter Group
                      interpreterMemoryIncreased(1501),
                      interpreterMemoryDecreased(1502),
                      interpreterCartridgeAdded(1503),
                      interpreterCartridgeDeleted(1504),
                      interpreterResourceAdded(1505),
                      interpreterResourceDeleted(1506),
                      interpreterResourceUnavailable(1507),
                      interpreterComplexPageEncountered(1509),
                              -- The interpreter has encountered a page that
                              -- is too complex for the resources that are
                              -- available.
                          --
                          -- Alert Group
                          --
                      alertRemovalOfBinaryChangeEntry(1801)
                              -- A binary change event entry has been removed
                              -- from the alert table. This unary change alert
                              -- table entry is added to the end of the alert
                              -- table.
                 }
```

```
-- The General Printer Group
--
-- The general printer sub-unit is responsible for the overall control
-- and status of the printer.  There is exactly one general printer
-- sub-unit in a printer.
```

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

prtGeneral  OBJECT IDENTIFIER ::= { printmib 5 }

prtGeneralTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtGeneralEntry
    MAX-ACCESS not-accessible
    STATUS     current

    DESCRIPTION
        "A table of general information per printer.
        Objects in this table are defined in various
        places in the MIB, nearby the groups to
        which they apply.  They are all defined
```

~~Smith, Wright, Hastings, Zilles & Gyllenskog [Page 27]~~

```
        here to minimize the number of tables that would
        otherwise need to exist."
    ::= { prtGeneral 1 }

prtGeneralEntry OBJECT-TYPE
    SYNTAX      PrtGeneralEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry exists in this table for each
        device entry in the hostmib device table with a device type~~whosewho's~~
~~type~~
        of~~is~~ 'printer'"
    INDEX  { hrDeviceIndex }
    ::= { prtGeneralTable 1 }

PrtGeneralEntry ::= SEQUENCE {
    -- Note that not all of the objects in this sequence are in the
    -- general printer group.
    prtGeneralConfigChanges         Counter32,
    prtGeneralCurrentLocalization   Integer32,
    prtGeneralReset                 PrtGeneralResetTC~~INTEGER~~,
    prtGeneralCurrentOperator       OCTET STRING,
    prtGeneralServicePerson         OCTET STRING,
    prtInputDefaultIndex            Integer32,
    prtOutputDefaultIndex           Integer32,
    prtMarkerDefaultIndex           Integer32,
    prtMediaPathDefaultIndex        Integer32,
    prtConsoleLocalization          Integer32,
    prtConsoleNumberOfDisplayLines  Integer32,
    prtConsoleNumberOfDisplayChars  Integer32,
    prtConsoleDisable               INTEGER,
    prtGeneralStartupPage            PresentOnOff,
    prtGeneralBannerPage             PresentOnOff,
    prtGeneralAdminName              OCTET STRING,
    prtGeneralSerialNumber           OCTET STRING,
    prtAlertCriticalEvents           Counter32,
    prtAlertAllEvents                Counter32
}

prtGeneralConfigChanges OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "Counts configuration changes that change the capabilities of
        a printer, such as the addition/deletion of input/output bins,
        the addition/deletion of interpreters, or changes in media
        size.  Such changes will often affect the capability of the
        printer to service certain types of print jobs.

        Management applications may cache infrequently changed
        configuration  information about sub-units on the printer.
        This object should be incremented whenever the agent wishes
        such applications to invalidate that cache and re-download
```

```
        all of this configuration information, thereby signaling~~signalling~~ a
        change in the printer's configuration.

        For example, if an input tray that contained paper of
        different dimensions was added, this counter would be
        incremented.

        As an additional example, this counter would not be
        incremented when an input tray is removed or the level of an
        input device changes."
    ::= { prtGeneralEntry 1 }

prtGeneralCurrentLocalization OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of the prtLocalizationIndex corresponding to the
        current language, country, and character set to be used for
        localized string values that are identified as being dependent
        on the value of this object.  Note that this object does not
        apply to localized strings in the prtConsole group or to any
        object that is not explicitly identified as being localized
        according to prtGeneralCurrentLocalization~~is not identified as above~~."
    ::= { prtGeneralEntry 2 }

prtGeneralReset OBJECT-TYPE
    -- This value is a type 3 enumeration
    SYNTAX     PrtGeneralResetTC~~INTEGER~~ ~~{~~
                   ~~notResetting(3),~~
                   ~~powerCycleReset(4), -- Cold Start~~
                   ~~resetToNVRAM(5), -- Warm Start~~
                   ~~resetToFactoryDefaults(6) -- Reset contents of~~
                                              ~~-- NVRAM to factory defaults~~

    MAX-ACCESS read-write
    STATUS     current
    DESCRIPTION
        "Setting this value to 'powerCycleReset', 'resetToNVRAM', or
        'resetToFactoryDefaults' will result in the resetting of the
        printer.  When read, this object will always have the value
        'notResetting(3)', and a SET of the value 'notResetting' shall
        have no effect on the printer.  Some of the defined values are
        optional.  However, every implementation must support at least
        the values 'notResetting' and 'resetToNVRAM'."
    ::= { prtGeneralEntry 3 }
```

```
-- The Cover Table
--
-- The cover portion of the General print sub-unit describes the
-- covers and interlocks of the printer.  The Cover Table has an
-- entry for each cover and interlock.

prtCover    OBJECT IDENTIFIER ::= { printmib 6 }

prtCoverTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtCoverEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A table of the covers and interlocks of the printer."
    ::= { prtCover 1 }

prtCoverEntry OBJECT-TYPE
    SYNTAX     PrtCoverEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Information about a cover or interlock.
        Entries may exist in the table for each device
        index with ahose device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtCoverIndex }
    ::= { prtCoverTable 1 }

PrtCoverEntry ::= SEQUENCE {
    prtCoverIndex           Integer32,
    prtCoverDescription     OCTET STRING,
    prtCoverStatus          INTEGER
}

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

prtCoverDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
```

```
    STATUS     current
    DESCRIPTION
        "The manufacturer provided cover sub-mechanism  name in the
        localization specified by prtGeneralCurrentLocalization."
    ::= { prtCoverEntry 2 }

prtCoverStatus  OBJECT-TYPE
    SYNTAX     PrtCoverStatusTC
prtCoverStatus  OBJECT-TYPE
    --  This value is is a type 2 enumeration
        SYNTAX     INTEGER {
                       other(1),
                       doorOpen(3),
                       doorClosed(4),
                       interlockOpen(5),
                       interlockClosed(6)
                   }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The status of this cover sub-unit."
    ::= { prtCoverEntry 3 }

-- The Localization Table
--

-- The localization portion of the General printer sub-unit is

-- responsible for identifying the natural language, country, and
-- character set in which character strings are expressed. There
-- may be one or more localizations supported per printer. The
-- available localizations are represented by the Localization table.

prtLocalization  OBJECT IDENTIFIER ::= { printmib 7 }

prtLocalizationTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtLocalizationEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "The available localizations in this printer."
    ::= { prtLocalization 1 }

prtLocalizationEntry OBJECT-TYPE
    SYNTAX     PrtLocalizationEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A description of a localization.
```

```
        Entries may exist in the table for each device
        index with a whosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtLocalizationIndex }
    ::= { prtLocalizationTable 1 }

PrtLocalizationEntry ::= SEQUENCE {
        prtLocalizationIndex                Integer32,
        prtLocalizationLanguage             OCTET STRING,
        prtLocalizationCountry              OCTET STRING,
        prtLocalizationCharacterSet         CodedCharSet
}

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

prtLocalizationLanguage OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..2))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "A two character language code from ISO 639.  Examples EN, GB,
        CA, FR, DE."
    ::= { prtLocalizationEntry 2 }

prtLocalizationCountry OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..2))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "A two character country code from ISO 3166, a blank string
        (two space characters) shall indicate that the country is
        not defined.  Examples: US, FR, DE, ..."
    ::= { prtLocalizationEntry 3 }

prtLocalizationCharacterSet OBJECT-TYPE
    SYNTAX     CodedCharSet
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
```

```
        "The coded character set used for this localization."
    ::= { prtLocalizationEntry 4 }

-- The System Resources Tables

-- The Printer MIB makes use of the Host MIB to
-- define system resources by referencing the storage
-- and device groups of the print group.  In order to
-- determine, amongst multiple printers serviced by
-- one agent, which printer owns a particular
-- resource, the prtStorageRef and prtDeviceRef tables
-- associate particular storage and device entries to
-- printers.

prtStorageRefTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtStorageRefEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtGeneral 2 }

prtStorageRefEntry OBJECT-TYPE
    SYNTAX     PrtStorageRefEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "This table will have an entry for each entry in
        the host MIB storage table that represents storage associated
        with a printer managed by this agent."
    INDEX      { hrStorageIndex, prtStorageRefSeqNumber }
    ::= { prtStorageRefTable 1 }

PrtStorageRefEntry ::= SEQUENCE {
    prtStorageRefSeqNumber  Integer32,
    prtStorageRefIndex      Integer32
}

prtStorageRefSeqNumber OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "This value will be unique amongst all entries with a common
        value of hrStorageIndex.

        This object allows a storage entry to point to the multiple
        printer devices with which it is associated."
```

```
    ::= { prtStorageRefEntry 1 }

prtStorageRefIndex OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of the hrDeviceIndex of the printer device that this
        storageEntry is associated with."
    ::= { prtStorageRefEntry 2 }

prtDeviceRefTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtDeviceRefEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtGeneral 3 }

prtDeviceRefEntry OBJECT-TYPE
    SYNTAX     PrtDeviceRefEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "This table will have an entry for each entry in
        the host MIB device table that represents a device associated
        with a printer managed by this agent."
    INDEX      { hrDeviceIndex, prtDeviceRefSeqNumber }
    ::= { prtDeviceRefTable 1 }

PrtDeviceRefEntry ::= SEQUENCE {
    prtDeviceRefSeqNumber   Integer32,
    prtDeviceRefIndex       Integer32
}

prtDeviceRefSeqNumber OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "This value will be unique amongst all entries with a common
        value of hrDeviceIndex.

        This object allows a device entry to point to the multiple
        printer devices with which it is associated."
    ::= { prtDeviceRefEntry 1 }

prtDeviceRefIndex OBJECT-TYPE
```

```
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of the hrDeviceIndex of the printer device that this
        deviceEntry is associated with."
    ::= { prtDeviceRefEntry 2 }

-- The Responsible Party group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtGeneralCurrentOperator OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..127))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name of the current human operator responsible for
        operating this printer. It is suggested that this string
        include information that would enable other humans to reach
        the operator, such as a phone number. As a convention to
        facilitate automatic notification of the operator by the
        agent or the network management station, the phone number,
        fax number or email address should be placed on a separate line
        starting with ASCII LF (hex 0C) and the ASCII text string
        (without the quotes): 'phone: ', 'fax: ', and 'email: ',
        respectively. Phone numbers may contain digits, whitespace and
        parentheses, which shall be ignored. Phone numbers may also include
'       ASCII comma characters(hex 2C) that are used to indicate a half-second
        pause during the dialing sequence.

        NOTE: For interoperability purposes, it is advisable to use
              email addresses formatted according to RFC 822
              requirements.""
    ::= { prtGeneralEntry 4 }

prtGeneralServicePerson OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..127))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name of the last human responsible for servicing
        this printer. It is suggested that this string
        include information that would enable other humans to reach
        the service person, such as a phone number. As a convention
        to facilitate automatic notification of the service person
        by the agent or a network management station, the phone
        number, fax number or email address should be placed on a
        separate line starting with ASCII LF (hex 0C) and the ASCII
        text string (without the quotes):
        'phone: ', 'fax: ', and 'email: ', respectively. Phone numbers
        may contain digits, whitespace and parentheses, which shall be ignored.
        Phone numbers can also include one or more ASCII comma characters
        (hex 2C) to indicate a half-second pause during the dialing
        sequence.

        NOTE: For interoperability purposes, it is advisable to use
              email addresses formatted according to RFC 822
              requirements."
"
```

```
    ::= { prtGeneralEntry 5 }

-- The Auxiliary Sheet Group
--
-- The auxiliary sheet group allows the administrator to control the
-- production of auxiliary sheets by the printer.
--
-- This group is optional. However, to claim conformance to this group,
-- it is necessary to implement every object in the group.

prtGeneralStartupPage OBJECT-TYPE
       SYNTAX        PresentOnOff
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
              "Used to enable or disable printing a startup page. If
               enabled, a startup page will be printed shortly after
               power-up, when the device is ready. Typical startup
               pages include test patterns and/or printer configuration
               information."
::= { prtGeneralEntry 16 }

prtGeneralBannerPage OBJECT-TYPE
       SYNTAX        PresentOnOff
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
              "Used to enable or disable printing banner pages at the
               beginning of jobs. This is a master switch which applies
               to all jobs, regardless of interpreter."
::= { prtGeneralEntry 17 }

prtGeneralAdminName OBJECT-TYPE
       SYNTAX        PresentOnOff
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
              "An administrator-specified name for an individual that maintains
               authoratative control over this device with regards to device
               operation and/or configuration."
::= { prtGeneralEntry 18 }

prtGeneralSerialNumber OBJECT-TYPE
       SYNTAX        PresentOnOff
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
              "A recorded serial number for this device that indexes some type
               device catalog or inventory. This value is usually set by the
               device manufacturer but the MIB supports the option of
               writeability for this object for site-specific administration of
               device inventory or tracking."

::= { prtGeneralEntry 19 }

prtAlertCriticalEvents OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
    “A running counter of the number of critical alert events that
     have been recorded in the alert table”
:== { prtGeneralEntry 20 }
```

```
prtAlertAllEvents OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
    "A running counter of the total number of alert event entries
     (critical and non-critical) that have been recorded in the
     alert table"
:== { prtGeneralEntry 21 }


-- The Input Group
--
-- Input sub-units are managed as a tabular, indexed collection of
-- possible devices capable of providing media for input to the printing
-- process.  Input 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.

prtInput   OBJECT IDENTIFIER ::= { printmib 8 }
```

```
prtInputDefaultIndex OBJECT-TYPE
    SYNTAX     Integer322 (1..65535)
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
       "The value of prtInputIndex corresponding to the default input
        sub-unit: that is, this object selects the default source of
        input media.

   This value shall be -1 if there is no default input subunit specified
   for the printer as a whole.  In this case, the actual default
   input subunit may be specified by means outside the scope of this
   MIB, such as by each interpreter in a printer with multiple
   interpreters."
"
    ::= { prtGeneralEntry 6 }

prtInputTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtInputEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A table of the devices capable of providing media for input
        to the printing process."
    ::= { prtInput 2 }

prtInputEntry OBJECT-TYPE
    SYNTAX     PrtInputEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Attributes of a device capable of providing media for input
        to the printing process.

        Entries may exist in the table for each device
        index with awhosewho's device type ofis ''printer''."
    INDEX  { hrDeviceIndex, prtInputIndex }
    ::= { prtInputTable 1 }

PrtInputEntry ::= SEQUENCE {
        prtInputIndex                    Integer32,
        prtInputType                     PrtInputTypeTCINTEGER,
        prtInputDimUnit                  PrtMediaUnitTC,
        prtInputMediaDimFeedDirDeclared  Integer32,
        prtInputMediaDimXFeedDirDeclared Integer32,
        prtInputMediaDimFeedDirChosen    Integer32,
        prtInputMediaDimXFeedDirChosen   Integer32,
        prtInputCapacityUnit             PrtCapacityUnitTC,
        prtInputMaxCapacity              Integer32,
        prtInputCurrentLevel             Integer32,
        prtInputStatus                   PrtSubUnitStatusTC,
        prtInputMediaName                OCTET STRING,
        prtInputName                     OCTET STRING,
        prtInputVendorName               OCTET STRING,
        prtInputModel                    OCTET STRING,
```

```
        prtInputVersion                  OCTET STRING,
        prtInputSerialNumber             OCTET STRING,
        prtInputDescription              OCTET STRING,
        prtInputSecurity                 PresentOnOff,
        prtInputMediaWeight              Integer32,
        prtInputMediaType                OCTET STRING,
        prtInputMediaColor               OCTET STRING,
        prtInputMediaFormParts           Integer32,
        prtInputManualFeedTimeout        Integer32,
        prtInputAutoSwitch               PresentOnOff,
        prtInputNextIndex                Integer32
}

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

prtInputType OBJECT-TYPE
    SYNTAX PrtInputTypeTC
        --  This value is a type 2 enumeration
    SYNTAX     INTEGER {
                   other(1),
                   unknown(2),
                   sheetFeedAutoRemovableTray(3),
                   sheetFeedAutoNonRemovableTray(4),
                   sheetFeedManual(5),
                   continuousRoll(6),
                   continuousFanFold(7)
               }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of technology (discriminated primarily according to
        feeder mechanism type) employed by the input sub-unit.  Note,
        the Optional Input Class provides for a descriptor field to
        further qualify the other choice."
    ::= { prtInputEntry 2 }

prtInputDimUnit OBJECT-TYPE
    SYNTAX     PrtMediaUnitTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The unit of measurement for use calculating and relaying
```

```
        dimensional values for this input sub-unit."
    ::= { prtInputEntry 3 }

prtInputMediaDimFeedDirDeclared OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "This object provides the value of the declared dimension, in
        the feed direction, of the media that is (or, if empty, was or
        will be) in this input sub-unit.  The feed direction is the
        direction in which the media is fed on this sub-unit.  This
        dimension is measured in input sub-unit dimensional units
        (prtInputDimUnit).  If this input sub-unit can reliably sense
        this value, the value is sensed by the printer and may not be
        changed by management requests.  Otherwise, the value may be
        changed. The value (-1) means other and specifically means
        that this sub-unit places no restriction on this parameter.
        The value (-2) indicates unknown."
    ::= { prtInputEntry 4 }

prtInputMediaDimXFeedDirDeclared OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    STATUS     current
    DESCRIPTION
        "This object provides the value of the declared dimension, in
        the cross feed direction, of the media that is (or, if empty,
        was or will be) in 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
        input sub-unit dimensional units (prtInputDimUnit).  If this
        input sub-unit can reliably sense this value, the value is
        sensed by the printer and may not be changed by management
        requests. Otherwise, the value may be changed. The value (-1)
        means other and specifically means that this sub-unit places
        no restriction on this parameter. The value (-2) indicates
        unknown."
    ::= { prtInputEntry 5 }

prtInputMediaDimFeedDirChosen OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The printer will act as if media of the chosen dimension (in
        the feed direction) is present in this input source.  Note
        that this value will be used even if the input tray is empty.
```

```
        ~~Feed dimension measurements~~
        Feed dimension measurements are taken ~~parallel~~ relative to the feed
~~direction~~
        direction associated with that sub-unit and are in input sub-unit
        dimensional units (Media~~Dim~~Unit). If the printer supports the
        declared dimension, the granted dimension is the same as
        the declared dimension. If not, the granted dimension is
        set to the closest dimension that the printer supports
        when the declared dimension is set. The value (-1) means
        other and specifically indicates that this sub-unit
        places no restriction on this parameter. The value (-2)
        indicates unknown."
    ::= { prtInputEntry 6 }

prtInputMediaDimXFeedDirChosen OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The printer will act as if media of the chosen dimension (in
        the cross feed direction) is present in this input source.
        Note that this value will be used even if the input tray is
        empty.  The cross feed direction is ninety degrees relative
        to the feed direction associated with this sub-unit. This
        dimension is measured in input sub-unit dimensional units
        (Media~~Dim~~Unit).  If the printer supports the declared
        dimension, the granted dimension is the same as the
        declared dimension. If not, the granted dimension is set
        to the closest dimension that the printer supports when
        the declared dimension is set. The value (-1) means other
        and specifically indicates that this sub-unit places no
        restriction on this parameter.  The value (-2) indicates
        unknown."
    ::= { prtInputEntry 7 }

prtInputCapacityUnit 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."
    ::= { prtInputEntry 8 }

prtInputMaxCapacity OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
```

```
        "The maximum capacity of the input sub-unit in input
        sub-unit capacity units (PrtCapacityUnitTC).  There is no
        convention associated with the media itself so this value
        reflects claimed capacity. If this input sub-unit can
        reliably sense this value, the value is sensed by the
        printer 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."
    ::= { prtInputEntry 9 }

prtInputCurrentLevel OBJECT-TYPE
    SYNTAX     Integer32 --    in capacity units (PrtCapacityUnitTC).
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current capacity of the input sub-unit in input
        sub-unit capacity units (PrtCapacityUnitTC). If this input
        sub-unit can reliably sense this value, the value is
        sensed by the printer and may not be changed by
        management requests; otherwise, the value may
        be written (by a Remote Contol 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 printer knows that at least one
        unit remains."
    ::= { prtInputEntry 10 }

prtInputStatus OBJECT-TYPE
    SYNTAX     PrtSubUnitStatusTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current status of this input sub-unit."
    ::= { prtInputEntry 11 }

prtInputMediaName OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "A description of the media contained in this input sub-unit;
        This description is intended for display to a human operator.
        This description is not processed by the printer.  It is used
        to provide information not expressible in terms of the other
```

```
        media attributes (e.g. prtInputMediaDimFeedDirChosen,
        prtInputMediaDimXFeedDirChosen, prtInputMediaWeight,
        prtInputMediaType). An example would be 'legal tender bond
        paper'."
    ::= { prtInputEntry 12 }

--                INPUT MEASUREMENT
--
--      _______ |                     |
--       ^      |                     |
--       |      |                     |                    |
--       |      |_ _ _ _ _ _ _ _ _ _ _| _________________  |direction
--       |      |                     |       ^            v
-- MaxCapacity  |                     |       |
--       |      | Sheets left in tray | CurrentLevel
--       |      |                     |       |
--       v      |                     |       v
--      _______ +_____________________+ _______

-- The Extended Input Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.


prtInputName OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name assigned to this input sub-unit."
    ::= { prtInputEntry 13 }

prtInputVendorName OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The vendor name of this input sub-unit."
    ::= { prtInputEntry 14 }

prtInputModel OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The model name of this input sub-unit."
    ::= { prtInputEntry 15 }
```

```
prtInputVersion OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The version of this input sub-unit."
    ::= { prtInputEntry 16 }

prtInputSerialNumber OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..32))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The serial number assigned to this input sub-unit."
    ::= { prtInputEntry 17 }

prtInputDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "A free-form text description of this input
        sub-unit in the localization specified by
        prtGeneralCurrentLocalization."
    ::= { prtInputEntry 18 }

prtInputSecurity OBJECT-TYPE
    SYNTAX     PresentOnOff
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "Indicates if this input sub-unit has some security
        associated with it."
    ::= { prtInputEntry 19 }

-- The Input Media Group
--
-- The Input Media Group supports identification of media installed
-- or available for use on a printing device. Medium resources are
-- identified by name, and include a collection of characteristic
-- attributes that may further be used for selection and management
-- of them. The Input Media group consists of a set of optional
-- "columns" in the Input Table. In this manner, a minimally
-- conforming implementation may choose to not support reporting
-- of media resources if it cannot do so.
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.
```

```
prtInputMediaWeight  OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The weight of the medium associated with this input
        sub-unit in grams / per meter squared. The value (-2) means
        unknown."
    ::= { prtInputEntry 20 }

prtInputMediaType OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name of the type of medium associated with this input
        sub-unit. This name need not be processed by the printer; it
        might simply be displayed to an operator. The standardized
        string values from ISO 10175 (DPA) and ISO 10180 (SPDL) are:

        stationery       Separately cut sheets of an opaque material
        transparency     Separately cut sheets of a transparent material
        envelope         Envelopes that can be used for conventional
        mailing purposes
        envelope-plain   Envelopes that are not preprinted and have no
                         windows
        envelope-window  Envelopes that have windows for addressing
                         purposes
        continuous-long  Continuously connected sheets of an opaque
                         material connected along the long edge
        continuous-short Continuously connected sheets of an opaque
                         material connected along the short edge
        tab-stock        Media with tabs
        multi-part-form  Form medium composed of multiple layers not
                         pre-attached to one another; each sheet may be
                         drawn separately from an input source
        labels           Label stock
        multi-layer      Form medium composed of multiple layers which
                         are pre-attached to one another; e.g., for
                         use with impact printers.

        Implementors may add additional string values. The naming
        conventions in ISO 9070 are recommended in order to avoid
        potential name clashes."


"
    ::= { prtInputEntry 21 }

prtInputMediaColor OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name of the color of the medium associated with
```

```
        this input sub-unit using standardized string values
        from ISO 10175 (DPA) and ISO 10180 (SPDL) which are:

        other
        unknown
        white
        pink
        yellow
        buff
        goldenrod
        blue
        green
        transparent

        Implementors may add additional string values. The naming
        conventions in ISO 9070 are recommended in order to avoid
        potential name clashes."
    ::= { prtInputEntry 22 }

prtInputMediaFormParts OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
         "The number of parts associated with the medium
         associated with this input sub-unit if the medium is a
         multi-part form.  The value (-1) means other and
         specifically indicates that the device places no
         restrictions on this parameter.  The value (-2) means
         unknown."
    ::= { prtInputEntry 23 }

-- The Input Switching Group
--
-- The input switching group allows the administrator to set the manual
-- input subunit timeout for the printer and to control the automatic
-- input subunit switching by the printer when an input subunit becomes
-- empty.
--
-- This group is optional. However, to claim conformance to this group,
-- it is required to implement every object in the group.

prtInputManualFeedTimeout OBJECT-TYPE
       SYNTAX        Integer32
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
             "The duration (in seconds) after which the printer shall
              either:

                    (a) switch to another input subunit, if the value of
                        prtInputNextIndex is non-zero and prtInputAutoSwitch
                        is on(3)
                    or
                    (b) abort any job waiting for manually fed input, if the
                        value of prtInputNextIndex is zero or
                        prtInputAutoSwitch is off(4) or notPresent(5).

             The event which causes the printer to enter the waiting state
             is product specific. A value of (-1) implies 'other' or
             'infinite' which translates to 'this input subunit doesn't
```

```
             support manual feed'. A value of (-2) implies 'unknown'."
::= { prtInputEntry 24 }

prtInputAutoSwitch OBJECT-TYPE
       SYNTAX        PresentOnOff
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
             "Indicates the state of the auto input switching feature. The
              value notPresent(5) indicates the feature is not currently
              supported. Exact behavior of this feature is product specific."
::= { prtInputEntry 25 }

prtInputNextIndex OBJECT-TYPE
       SYNTAX        Integer32
       MAX-ACCESS    read-write
       MIN-ACCESS    read-only
       STATUS        current
       DESCRIPTION
             "The value of prtInputIndex corresponding to the input subunit
              which will be used when this input subunit is emptied. A value
              of zero(0) indicates that auto input switching will not occur
              when this input subunit is emptied."
::= { prtInputEntry 26 }


-- The Output Group
--
-- Output sub-units are managed as a tabular, indexed collection of
-- possible devices capable of receiving media delivered from the
-- printing process.  Output sub-units typically have a location,
-- a type, an identifier, a set of constraints on possible media
-- sizes and potentially other characteristics, and may be capable
-- of indicating current status or capacity.
--
-- Implementation of every object in this group is mandatory.

prtOutput  OBJECT IDENTIFIER ::= { printmib 9 }

prtOutputDefaultIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
```

```
    STATUS     current
    DESCRIPTION
        "The  value of prtOutputIndex  corresponding to the default
        output sub-unit; that is, this object selects the default
        output destination.

   This value shall be -1 if there is no default output subunit specified
   for the printer as a whole.  In this case, the actual default
   output subunit may be specified by means outside the scope of this
   MIB, such as by each interpreter in a printer with multiple
   interpreters."
"
    ::= { prtGeneralEntry 7 }

prtOutputTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtOutputEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A table of the devices capable of receiving media delivered
        from the printing process."
    ::= { prtOutput 2 }

prtOutputEntry OBJECT-TYPE
    SYNTAX     PrtOutputEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Attributes of a device capable of receiving media delivered
        from the printing process.

        Entries may exist in the table for each device
        index with awhosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtOutputIndex }
    ::= { prtOutputTable 1 }

PrtOutputEntry ::= SEQUENCE {
        prtOutputIndex                    Integer32,
        prtOutputType                     PrtOutputTypeTCINTEGER,
        prtOutputCapacityUnitCapacityUnit
PrtCapacityUnitTCCapacityUnit,
        prtOutputMaxCapacity              Integer32,
        prtOutputRemainingCapacity        Integer32,
        prtOutputStatus                   PrtSubUnitStatusTC,
        prtOutputName                     OCTET STRING,
        prtOutputVendorName               OCTET STRING,
        prtOutputModel                    OCTET STRING,
        prtOutputVersion                  OCTET STRING,
        prtOutputSerialNumber             OCTET STRING,
        prtOutputDescription              OCTET STRING,
        prtOutputSecurity                 PresentOnOff,
        prtOutputDimUnit                  PrtMediaUnitTC,
        prtOutputMaxDimFeedDir            Integer32,
        prtOutputMaxDimXFeedDir           Integer32,
        prtOutputMinDimFeedDir            Integer32,
        prtOutputMinDimXFeedDir           Integer32,
```

```
        prtOutputStackingOrder            PrtOutputStackingOrderTCINTEGER,
        prtOutputPageDeliveryOrientation
PrtOutputPageDeliveryOrientationTCINTEGER,
        prtOutputBursting                 PresentOnOff,
        prtOutputDecollating              PresentOnOff,
        prtOutputPageCollated             PresentOnOff,
        prtOutputOffsetStacking           PresentOnOff
}

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

prtOutputType OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtOutputTypeTCINTEGER {
                   other(1),
                   unknown(2),
                   removableBin(3),
                   unRemovableBin(4),
                   continuousRollDevice(5),
                   mailBox(6),
                   continuousFanFold(7)
               }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of technology supported by this output sub-unit."
    ::= { prtOutputEntry 2 }

prtOutputCapacityUnit 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 output sub-unit."
    ::= { prtOutputEntry 3 }

prtOutputMaxCapacity OBJECT-TYPE
```

```
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum capacity of this output sub-unit in output
        sub-unit capacity units (PrtCapacityUnitTC). There is no
        convention associated with the media itself so this value
        essentially reflects claimed capacity. If this output
        sub-unit can reliably sense this value, the value is
        sensed by the printer and may not be changed by management
        requests; otherwise, the value may be written
        (by a Remote ControlContol 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."
    ::= { prtOutputEntry 4 }

prtOutputRemainingCapacity OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The remaining capacity of the possible output sub-unit
        capacity in output sub-unit capacity units (PrtCapacityUnitTC)
        of this output sub-unit. If this output sub-unit can
        reliably sense this value, the value is sensed by the
        printer and may not be modified by management requests;
        otherwise, the value may be written (by
        a Remote ControlContol 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 printer knows that
        there remains capacity for at least one unit."
    ::= { prtOutputEntry 5 }

prtOutputStatus OBJECT-TYPE
    SYNTAX     PrtSubUnitStatusTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current status of this output sub-unit."
::= { prtOutputEntry 6 }

    ::= { prtOutputEntry 6 }
```

```
--               OUTPUT MEASUREMENT
--
--      _______ |                     | _______
--       ^      |                     |      ^
--       |      |                     |      |
--       |      |                     | RemainingCapacity
-- MaxCapacity  |                     |      |
--       |      |                     |      v             ^
--       |      |_ _ _ _ _ _ _ _ _ _ _| ___________________ |direction
--       |      |                     |                     |
--       |      |  Sheets in output   |
--       v      |                     |
--      _______ +_____________________+

-- The Extended Output Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtOutputName OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name assigned to this output sub-unit."
    ::= { prtOutputEntry 7 }

prtOutputVendorName OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The vendor name of this output sub-unit."
    ::= { prtOutputEntry 8 }

prtOutputModel OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name assigned to this output sub-unit."
    ::= { prtOutputEntry 9 }

prtOutputVersion OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
```

```
        "The version of this output sub-unit."
    ::= { prtOutputEntry 10 }

prtOutputSerialNumber OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The serial number assigned to this output sub-unit."
    ::= { prtOutputEntry 11 }

prtOutputDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "  A free-form text description of this output sub-unit in the
        localization specified by prtGeneralCurrentLocalization."
    ::= { prtOutputEntry 12 }

prtOutputSecurity OBJECT-TYPE
    SYNTAX     PresentOnOff
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "Indicates if this output sub-unit has some security associated
        with it and if that security is enabled or not."
    ::= { prtOutputEntry 13 }

-- The Output Dimensions Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtOutputDimUnit OBJECT-TYPE
    SYNTAX     PrtMediaUnitTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The unit of measurement for use in calculating and relaying
        dimensional values for this output sub-unit."
    ::= { prtOutputEntry 14 }

prtOutputMaxDimFeedDir OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
```

```
            "The maximum dimensions supported by this output sub-unit
            for measurements taken parallel relative to the feed
            direction associated with that sub-unit in output
            sub-unit dimensional units (MediaDimUnit). If this output
            sub-unit can reliably sense this value, the value is
            sensed by the printer and may not be changed with
            management protocol operations."
        ::= { prtOutputEntry 15 }

    prtOutputMaxDimXFeedDir OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-write
        MIN-ACCESS read-only
        STATUS     current
        DESCRIPTION
            "The maximum dimensions supported by this output sub-unit
            for measurements taken ninety degrees relative to the
            feed direction associated with that sub-unit in output
            sub-unit dimensional units (MediaDimUnit). If this output
            sub-unit can reliably sense this value, the value is
            sensed by the printer and may not be changed with
            management protocol operations."
        ::= { prtOutputEntry 16 }

    prtOutputMinDimFeedDir OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-write
        MIN-ACCESS read-only
        STATUS     current
        DESCRIPTION
            "The minimum dimensions supported by this output sub-unit
            for measurements taken parallel relative to the feed
            direction associated with that sub-unit in output
            sub-unit dimensional units (DimUnit).  If this output
            sub-unit can reliably sense this value, the value is
            sensed by the printer and may not be changed with
            management protocol operations."
        ::= { prtOutputEntry 17 }

    prtOutputMinDimXFeedDir OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-write
        MIN-ACCESS read-only
        STATUS     current
        DESCRIPTION
            "The minimum dimensions supported by this output sub-unit
            for measurements taken ninety degrees relative to the
            feed direction associated with that sub-unit in output
            sub-unit dimensional units (DimUnit). If this output
            sub-unit can reliably sense this value, the value is
            sensed by the printer and may not be changed with
```

```
        management protocol operations."
    ::= { prtOutputEntry 18 }

-- The Output Features Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtOutputStackingOrder OBJECT-TYPE
    --  This value is a type 1 enumeration
    SYNTAX     PrtOutputStackingOrderTC~~INTEGER {~~
                   ~~unknown(2),~~
                   ~~firstToLast(3),~~
                   ~~lastToFirst(4)~~
               ~~}~~
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current state of the stacking order for the
        associated output sub-unit. 'FirstToLast' means
        that as pages are output the front of the next page is
        placed against the back of the previous page.
        'LasttoFirst' means that as pages are output the back
        of the next page is placed against the front of the
        previous page."
    ::= { prtOutputEntry 19 }

prtOutputPageDeliveryOrientation OBJECT-TYPE
    --   This value is a type 1 enumeration
    SYNTAX     PrtOutputPageDeliveryOrientationTC~~INTEGER {~~
                   ~~faceUp(3),~~
                   ~~faceDown(4)~~
               ~~}~~
        MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The reading surface that will be 'up' when pages are
        delivered to the associated output sub-unit. Values are
        faceU~~Face-U~~p and faceD~~Face-D~~own. (Note: interpretation of these
        values is in general context-dependent based on locale;
        presentation of these values to an end-user should be
        normalized to the expectations of the user)."
    ::= { prtOutputEntry 20 }

prtOutputBursting OBJECT-TYPE
    SYNTAX     PresentOnOff
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
```

```
    DESCRIPTION
        "This object indicates that the outputtingoutputing sub-unit
        supports bursting, and if so, whether the feature is enabled.
        Bursting is the process by which continuous media is separated
        into individual sheets, typically by bursting along pre-formed
        perforations."
    ::= { prtOutputEntry 21 }

prtOutputDecollating OBJECT-TYPE
    SYNTAX     PresentOnOff
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "This object indicates that the output supports
        supports decollating, and if so, whether the feature
        is enabled. Decollating is the process by which the
        individual parts within a multi-part form are separated
        and sorted into separate stacks for each part."
    ::= { prtOutputEntry 22 }

prtOutputPageCollated OBJECT-TYPE
    SYNTAX     PresentOnOff
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "This object indicates that the output sub-unit
        supports page collation, and if so, whether the feature is
        enabled. See glossary for definition of how this document defines
        collation."
    ::= { prtOutputEntry 23 }

prtOutputOffsetStacking OBJECT-TYPE
    SYNTAX     PresentOnOff
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "This object indicates that the output supports
        supports offset stacking, and if so, whether the feature is
        enabled. See glossary for how Offset Stacking is defined by this
        document."
    ::= { prtOutputEntry 24 }

-- The Marker Group
--
-- A marker is the mechanism that produces marks on the print media.  The
-- marker sub-units and their associated supplies are represented by the
-- Marker Group in the model.  A printer can contain one or more marking
-- mechanisms.  Some examples of multiple marker sub-units are: a printer
-- with separate markers for normal and magnetic ink or an imagesetter
-- that can output to both a proofing device and final film. Each marking
```

```
-- device can have its own set of  characteristics associated with it,
-- such as marking technology and resolution.
--
-- Implementation of every object in this group is mandatory.


prtMarker OBJECT IDENTIFIER ::= { printmib 10 }

prtMarkerDefaultIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtMarkerIndex corresponding to the
        default marker sub-unit; that is, this object selects the
        default marker."
    ::= { prtGeneralEntry 8 }

-- The printable area margins as listed below define an area of the print
-- media which is guaranteed to be printable for all combinations of
-- input, media paths, and interpreters for this marker.

prtMarkerTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtMarkerEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtMarker 2 }

prtMarkerEntry OBJECT-TYPE
    SYNTAX     PrtMarkerEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Entries may exist in the table for each device
        index with a~~whose~~~~who's~~ device type of~~is~~ 'printer'."
    INDEX  { hrDeviceIndex, prtMarkerIndex }
    ::= { prtMarkerTable 1 }

PrtMarkerEntry ::= SEQUENCE {
        prtMarkerIndex                   Integer32,
        prtMarkerMarkTech                PrtMarkerMarkTechTC~~INTEGER~~,
        prtMarkerCounterUnit             PrtMarkerCounterUnitTC~~INTEGER~~,
        prtMarkerLifeCount               Counter32,
        prtMarkerPowerOnCount            Counter32,
        prtMarkerProcessColorants        Integer32,
        prtMarkerSpotColorants           Integer32,
```

```
        prtMarkerAddressabilityUnit     INTEGER,
        prtMarkerAddressabilityFeedDir  Integer32,
        prtMarkerAddressabilityXFeedDir Integer32,
        prtMarkerNorthMargin            Integer32,
        prtMarkerSouthMargin            Integer32,
        prtMarkerWestMargin             Integer32,
        prtMarkerEastMargin             Integer32,
        prtMarkerStatus                 PrtSubUnitStatusTC
}

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

prtMarkerMarkTech OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtMarkerMarkTechTC~~INTEGER {~~
                   ~~other(1),~~
                   ~~unknown(2),~~
                   ~~electrophotographicLED(3),~~
                   ~~electrophotographicLaser(4),~~
                   ~~electrophotographicOther(5),~~
                   ~~impactMovingHeadDotMatrix9pin(6),~~
                   ~~impactMovingHeadDotMatrix24pin(7),~~
                   ~~impactMovingHeadDotMatrixOther(8),~~
                   ~~impactMovingHeadFullyFormed(9),~~
                   ~~impactBand(10),~~
                   ~~impactOther(11),~~
                   ~~inkjetAqueous(12),~~
                   ~~inkjetSolid(13),~~
                   ~~inkjetOther(14),~~
                   ~~pen(15),~~
                   ~~thermalTransfer(16),~~
                   ~~thermalSensitive(17),~~
                   ~~thermalDiffusion(18),~~
                   ~~thermalOther(19),~~
                   ~~electroerosion(20),~~
                   ~~electrostatic(21),~~
                   ~~photographicMicrofiche(22),~~
```

```
                       photographicImagesetter(23),
                       photographicOther(24),
                       ionDeposition(25),
                       eBeam(26),
                       typesetter(27)
                   }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of marking technology used for this marking sub-unit."
    ::= { prtMarkerEntry 2 }

prtMarkerCounterUnit OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtMarkerCounterUnitTCINTEGER {
                           tenThousandthsOfInches(3),  -- .0001
                       micrometers(4),
                       characters(5),
                       lines(6),
                       impressions(7),
                       sheets(8),
                       dotRow(9),
                       hours(11),
                       feet(16),
                       meters(17)
                   }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The unit that will be used by the printer when reporting
        counter values for this marking sub-unit.  The
        time units of measure are provided for a device like a
        strip recorder that does not or cannot track the physical
        dimensions of the media and does not use characters,
        lines or sheets."
    ::= { prtMarkerEntry 3}

prtMarkerLifeCount OBJECT-TYPE
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The count of the number of units of measure counted during
        the life of printer using units of measure as specified by
        prtMarkerCounterUnit."
    ::= { prtMarkerEntry 4 }

prtMarkerPowerOnCount OBJECT-TYPE
```

```
    SYNTAX     Counter32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The count of the number of units of measure counted since the
        equipment was most recently powered on using units of measure as
        specified by prtMarkerCounterUnit."
    ::= { prtMarkerEntry 5 }

prtMarkerProcessColorants OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The number of process colors supported by this marker.  A
        process color of 1 implies monochrome.  The value of this
               object and prtMarkerSpotColorants cannot both be 0.  The value of
       prtMarkerProcessColorants must be 0 or greater."Must be 0 or
        greater."
    ::= { prtMarkerEntry 6 }

prtMarkerSpotColorants OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The number of spot colors supported by this marker.  The
        value of this object and prtMarkerProcessColorants cannot
        both be 0.  Must be 0 or greater."
    ::= { prtMarkerEntry 7 }

prtMarkerAddressabilityUnit 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, as applied to the marker's
         resolution."
    ::= { prtMarkerEntry 8 }

prtMarkerAddressabilityFeedDir OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum number of addressable marking positions in the feed
```

```
        direction per 10000 units of measure specified by
        prtMarkerAddressabilityUnit.  A value of (-1) implies 'other' or
        'infinite' while a value of (-2) implies 'unknown'."
    ::= { prtMarkerEntry 9 }

prtMarkerAddressabilityXFeedDir OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum number of addressable marking positions in the cross
        feed direction in 10000 units of measure specified by
        prtMarkerAddressabilityUnit.  A value of (-1) implies 'other' or
        'infinite' while a value of (-2) implies 'unknown'."
    ::= { prtMarkerEntry 10 }

prtMarkerNorthMargin OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The margin, in units identified by prtMarkerAddressabilityUnit,
        from the leading edge of the medium as the medium flows
        throughthrought the marking engine with the side to be imaged
        facing the observer. The leading edge is the North edge
        and the other edges are defined by the normal compass
        layout of  directions with the compass facing the
        observer.  Printing within the area bounded by all four
        margins is guaranteed for all interpreters.   The value
        (-2) means unknown."
    ::= { prtMarkerEntry 11 }

prtMarkerSouthMargin OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The margin from the South edge  (see prtMarkerNorthMargin)
        of the medium in units identified by
        prtMarkerAddressabilityUnit.  Printing within the area bounded by
        all four margins  is guaranteed for all interpreters.
        The value (-2) means unknown."
    ::= { prtMarkerEntry 12 }

prtMarkerWestMargin OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
```

```
    DESCRIPTION
        "The margin from the West edge (see prtMarkerNorthMargin) of the
        medium in units identified by prtMarkerAddressabilityUnit.
        Printing within the area boundedbouned by all four margins is
        guaranteed for all interpreters.   The value (-2) means
        unknown."
    ::= { prtMarkerEntry 13 }

prtMarkerEastMargin OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The margin from the East edge (see prtMarkerNorthMargin) of the
        medium in units identified by prtMarkerAddressabilityUnit.
        Printing within the area bounded by all four margins is
        guaranteed for all interpreters. The value (-2) means
        unknown."
    ::= { prtMarkerEntry 14 }

prtMarkerStatus OBJECT-TYPE
    SYNTAX     PrtSubUnitStatusTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current status of this marker sub-unit."
        ::= { prtMarkerEntry 15 }

-- The Marker Supplies Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtMarkerSupplies OBJECT IDENTIFIER ::= { printmib 11 }

prtMarkerSuppliesTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtMarkerSuppliesEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A table of the marker supplies available on this printer."
    ::= { prtMarkerSupplies 1 }

prtMarkerSuppliesEntry OBJECT-TYPE
    SYNTAX     PrtMarkerSuppliesEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
```

```
        "Attributes of a marker supply.

        Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtMarkerSuppliesIndex }
    ::= { prtMarkerSuppliesTable 1 }

PrtMarkerSuppliesEntry ::= SEQUENCE {
        prtMarkerSuppliesIndex          Integer32,
        prtMarkerSuppliesMarkerIndex    Integer32,
        prtMarkerSuppliesColorantIndex  Integer32,
        prtMarkerSuppliesClass          PrtMarkerSuppliesClassTCINTEGER,
        prtMarkerSuppliesType           PrtMarkerSuppliesTypeTCINTEGER,
        prtMarkerSuppliesDescription    OCTET STRING,
        prtMarkerSuppliesSupplyUnit     PrtMarkerSuppliesSupplyUnitTCINTEGER,
        prtMarkerSuppliesMaxCapacity    Integer32,
        prtMarkerSuppliesLevel          Integer32
}


prtMarkerSuppliesIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value used by the printer to identify this marker
        supply.  Although these values may change due to a major
        reconfiguration of the device (e.g. the addition of new marker
        supplies to the printer)."
, values are expected to remain stable
        across successive printer power cycles."
    ::= { prtMarkerSuppliesEntry 1 }

prtMarkerSuppliesMarkerIndex OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtMarkerIndex corresponding to the
        marking sub-unit with which this marker supply
        sub-unit is associated."
    ::= { prtMarkerSuppliesEntry 2 }

prtMarkerSuppliesColorantIndex OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtMarkerColorantIndex
```

```
        corresponding to the colorant with which this
        marker supply sub-unit is associated.  This value
        shall be 0 if there is no colorant table."
    ::= { prtMarkerSuppliesEntry 3 }

prtMarkerSuppliesClass OBJECT-TYPE
    --  This value is a type 1 enumeration
    SYNTAX     PrtMarkerSuppliesClassTCINTEGER {
                   other(1),
                   supplyThatIsConsumed(3),
                   receptacleThatIsFilled(4)
               }
        MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "Indicates whether this supply entity represents a supply
        container that is consumed or a receptacle that is filled."
    ::= { prtMarkerSuppliesEntry 4 }

prtMarkerSuppliesType OBJECT-TYPE
    --   This value is a type 3 enumeration
    SYNTAX     PrtMarkerSuppliesTypeTCINTEGER {
                       other(1),
                   unknown(2),
                   toner(3),
                   wasteToner(4),
                   ink(5),
                   inkCartridge(6),
                   inkRibbon(7),
                   wasteInk(8),
                   opc(9),
                   developer(10),
                   fuserOil(11),
                   solidWax(12),
                   ribbonWax(13),
                   wasteWax(14),
                     fuser(15),
                     coronaWire(16)
               }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of this supply."
    ::= { prtMarkerSuppliesEntry 5 }

prtMarkerSuppliesDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
```

```
        "The description of this supply container/receptacle in the
        localization specified by prtGeneralCurrentLocalization."
    ::= { prtMarkerSuppliesEntry 6 }

prtMarkerSuppliesSupplyUnit OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtMarkerSuppliesSupplyUnitTCINTEGER {
                   tenThousandthsOfInches(3),  -- .0001
                   micrometers(4),
                   impressions(7),
                   sheets(8),
                   thousandthsOfOunces(12),
                   hours(11),
                   tenthsOfGrams(13),
                   hundrethsOfFluidOunces(14),
                   tenthsOfMilliliters(15),
                   feet(16),
                   meters(17)
               }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "Unit of measure of this marker supply container/receptacle."
    ::= { prtMarkerSuppliesEntry 7 }

prtMarkerSuppliesMaxCapacity OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum capacity of this supply container/receptacle
        expressed in prtMarkerSuppliesSupplyUnit. If this supply
        container/receptacle can reliably sense this value, the
        value is reportedsensed by the printer and is read-only;
        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."
    ::= { prtMarkerSuppliesEntry 8 }

prtMarkerSuppliesLevel OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current level if this supply is a container; the
        remaining space if this supply is a receptacle. If this
        supply container/receptacle can reliably sense this
        value, the value is reportedsensed by the printer and is
        read-only; 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.  A value of (-3) means that the
        printer knows that there is some supply/remaining space,
        respectively."
    ::= { prtMarkerSuppliesEntry 9 }

-- The Marker Colorant Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtMarkerColorant OBJECT IDENTIFIER ::= { printmib 12 }

prtMarkerColorantTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtMarkerColorantEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A table of all of the colorants available on the printer."
    ::= { prtMarkerColorant 1 }

prtMarkerColorantEntry OBJECT-TYPE
    SYNTAX     PrtMarkerColorantEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Attributes of a colorant available on the printer.

        Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer'."
    INDEX { hrDeviceIndex, prtMarkerColorantIndex }
    ::= { prtMarkerColorantTable 1 }

PrtMarkerColorantEntry ::= SEQUENCE {
        prtMarkerColorantIndex          Integer32,
        prtMarkerColorantMarkerIndex    Integer32,
        prtMarkerColorantRole           PrtMarkerColorantRoleTCINTEGER,
        prtMarkerColorantValue          OCTET STRING,
        prtMarkerColorantTonality       Integer32
}

prtMarkerColorantIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value used by the printer to identify this colorant.
        Although these values may change due to a major
```

```
        reconfiguration of the device (e.g. the addition of new
        colorants to the printer)."
, values are expected to remain
        stable across successive printer power cycles."
    ::= { prtMarkerColorantEntry 1 }

prtMarkerColorantMarkerIndex OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtMarkerIndex corresponding to the
        marker sub-unit with which this colorant entry is
        associated."
    ::= { prtMarkerColorantEntry 2 }

prtMarkerColorantRole OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtMarkerColorantRoleTC
    INTEGER { --  Colorant Role
                   other(1),
                   process(3),
                   spot(4)
               }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The role played by this colorant."
    ::= { prtMarkerColorantEntry 3 }

prtMarkerColorantValue OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..25563))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The name of the color of this The name of the color of this
        colorant using standardized string names from ISO 10175 (DPA)
        and ISO 10180 (SPDL) which are:
          other
          unknown
          white
          red
          green
          blue
          cyan
          magenta
          yellow
          black
        Implementors may add additional string values. The naming
        conventions in ISO 9070 are recommended in order to avoid
```

```
        potential name clashes"
    ::= { prtMarkerColorantEntry 4 }

prtMarkerColorantTonality OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The distinct levels of tonality realizable by a marking
        sub-unit when using this colorant.  This value does not
        include the number of levels of tonal difference that an
        interpreter can obtain by techniques such as half toning.
        This value must be at least 2."
    ::= { prtMarkerColorantEntry 5 }

-- The Media Path Group
--
-- The media paths encompass the mechanisms in the printer that move the
-- media through the printer and connect all other media related sub-
-- units: inputs, outputs, markers and finishers. A printer contains one
-- or more media paths. These are represented by the Media Path Group in
-- the model. The Media Path group has some attributes that apply to all
-- paths plus a table of the separate media paths.

prtMediaPath OBJECT IDENTIFIER ::= { printmib 13 }

prtMediaPathDefaultIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtMediaPathIndex corresponding to
        the default media path; that is, the selection of the
        default media path."
    ::= { prtGeneralEntry 9 }

prtMediaPathTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtMediaPathEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtMediaPath 4 }

prtMediaPathEntry OBJECT-TYPE
    SYNTAX     PrtMediaPathEntry
    MAX-ACCESS not-accessible
    STATUS     current
```

```
    DESCRIPTION
        "Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtMediaPathIndex }
    ::= { prtMediaPathTable 1 }

PrtMediaPathEntry ::= SEQUENCE {
    prtMediaPathIndex               Integer32,
    prtMediaPathMaxSpeedPrintUnit   PrtMediaPathMaxSpeedPrintUnitTCINTEGER,
    prtMediaPathMediaSizeUnit       PrtMediaUnitTC,
    prtMediaPathMaxSpeed            Integer32,
    prtMediaPathMaxMediaFeedDir     Integer32,
    prtMediaPathMaxMediaXFeedDir    Integer32,
    prtMediaPathMinMediaFeedDir     Integer32,
    prtMediaPathMinMediaXFeedDir    Integer32,
    prtMediaPathType                PrtMediaPathTypeTCINTEGER,
    prtMediaPathDescription         OCTET STRING,
    prtMediaPathStatus              PrtSubUnitStatusTC
}


prtMediaPathIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value used by the printer to identify this media
        path. Although these values may change due to a major
        reconfiguration of the device (e.g. the addition of new
        media paths to the printer), values are expected to remain
        stable across successive printer power
        cycles."
    ::= { prtMediaPathEntry 1 }

prtMediaPathMaxSpeedPrintUnit OBJECT-TYPE
    -- This value is a type 1 enumeration
SYNTAX PrtMediaPathMaxSpeedPrintUnitTC
    SYNTAX     INTEGER {
                   tenThousandthsOfInchesPerHour(3),   -- .0001/hour
                   micrometersPerHour(4),
                   charactersPerHour(5),
                   linesPerHour(6),
                   impressionsPerHour(7),
                   sheetsPerHour(8),
                   dotRowPerHour(9),
                   feetPerHour(16),
                   metersPerHour(17)
               }
    MAX-ACCESS read-only
```

```
    STATUS     current
    DESCRIPTION
        "The unit of measure used in specifying the speed of all media
        paths in the printer."
    ::= { prtMediaPathEntry 2 }

prtMediaPathMediaSizeUnit OBJECT-TYPE
    SYNTAX     PrtMediaUnitTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The units of measure of media size for use in calculating and
        relaying dimensional values for all media paths in the printer."
    ::= { prtMediaPathEntry 3 }

prtMediaPathMaxSpeed OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum printing speed of this media path expressed in
        prtMediaPathMaxSpeedUnit's.  A value of (-1) implies
        'other'."
    ::= { prtMediaPathEntry 4 }

prtMediaPathMaxMediaFeedDir OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum physical media size in the feed direction of this
        media path expressed in units of measure specified by
        PrtMediaPathMediaSizeUnit.  A value of (-1) implies 'unlimited',.  A
value
        a value of (-2) implies 'unknown'"
    ::= { prtMediaPathEntry 5 }

prtMediaPathMaxMediaXFeedDir OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum physical media size across the feed direction of
        this media path expressed in units of measure specified by
        prtMediaPathMediaSizeUnit.  A value of (-2) implies 'unknown'."
    ::= { prtMediaPathEntry 6 }

prtMediaPathMinMediaFeedDir OBJECT-TYPE
    SYNTAX     Integer32
```

```
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The minimum physical media size in the feed direction of this
        media path expressed in units of measure specified by
        prtMediaPathMediaSizeUnit. A value of (-2) implies 'unknown'."
    ::= { prtMediaPathEntry 7 }

prtMediaPathMinMediaXFeedDir OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The minimum physical media size across the feed direction of
        this media path expressed in units of measure specified by
        prtMediaPathMediaSizeUnit.  A value of (-2) implies 'unknown'."
    ::= { prtMediaPathEntry 8 }

prtMediaPathType OBJECT-TYPE
    --   This value is a type 2 enumeration
    SYNTAX     PrtMediaPathTypeTC
~~INTEGER {~~
~~                       other(1),~~
~~                       unknown(2),~~
~~                       longEdgeBindingDuplex(3),~~
~~                       shortEdgeBindingDuplex(4),~~
~~                       simplex(5)~~
~~                   }~~
        MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of the media path for this media path."
    ::= { prtMediaPathEntry 9 }

prtMediaPathDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The manufacturer-provided description of this media path in
        the localization specified by prtGeneralCurrentLocalization."
    ::= { prtMediaPathEntry 10 }

prtMediaPathStatus OBJECT-TYPE
    SYNTAX     PrtSubUnitStatusTC
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current status of this media path."
```

::= { prtMediaPathEntry 11 }

-- The Print Job Delivery Channel Group
--
-- Implementation of every object in this group is mandatory.

-- Print Job Delivery Channels are independent sources of print data. Here,
-- print data is the term used for the information that is
-- used to construct printed pages and may have both data
-- and control aspects. The output of a channel is in a form
-- suitable for input to one of the interpreters as a
-- stream. A channel may be independently enabled (allowing
-- print data to flow) or disabled (stopping the flow of
-- ~~--~~ print data). A printer may have one or more channels.
--
-- ~~--~~ The Print Job Delivery Channel table describes the capabilities of the ~~printer,~~
-- printer and not what is currently being performed by the printer.
--
-- Basically, the print job delivery channel abstraction describes~~is intended to cover~~
-- the final processing step~~all the aspects~~ of getting the print data to an
-- interpreter. ~~This might include transporting the data~~
~~-- from one place to another,~~ ~~I~~it might include some level of~~(invisible)~~
-- decompression ~~,~~ or ~~it might include~~ de~~en~~coding of print stream data.~~or packetizing to~~
~~-- provide multiple information sources over a single~~
~~-- physical interface and it might include filtering~~
~~-- characters that were destined for another kind of~~
-- channel. All of these aspects are hidden in the channel
-- abstraction.
--~~(Note some Page Description Languages have~~
~~-- compression built into them so "invisible" compression~~
~~-- refers to compression done by the transport medium and~~
~~-- removed before the data is presented to the interpreter.)~~
~~--~~
-- There are many kinds of print job delivery channels; some of which are based
-- on networks and others which are not. For example, a
-- channel can be a serial (or parallel) connection; it can
-- be a service, such as the Unix Line Printer Daemon (LPD),
-- offering services~~itself~~ over a network connection (interface); or
-- it could be a disk drive into which a floppy disk~~s~~ with
-- the print data is inserted. Each print job delivery channel is typically
-- identified by the electronic path and/or service protocol
-- used to deliver print data to a print data interpreter.~~the printer.~~
--
-- Channel example Implementation
--

-- serial port channel	bi-directional data channel
-- parallel port channel	often uni-directional channel
-- IEEE 1284 port channel	bi-directional channel
-- SCSI port channel	bi-directional
-- Apple PAP channel	may be based on Local-, Ether-or
--	TokenTalk
-- LPD Server channel	typically TCP/IP based, port 515

-- Novell Remote Printer   typically SPX/IPX based channel
-- Novell Print Server   typically SPX/IPX based channel
-- port 9100 channel   HP and friends
-- Adobe AppSocket(9101) channel a bi-directional extension of LPD
--
-- It is easy to note that this is a mixed bag. There are
-- some physical connections over which no (or very meager)
-- protocols are run (e.g. the serial or old parallel ports)
-- and there are services which often have elaborate
-- protocols that run over a number of protocol stacks. In
-- the end, what is important is the delivery of print data
-- thru the channel.
--
-- The print job delivery channel sub-units are represented by the ~~Channel~~
-- Print Job Delivery Channel Group in the Model. It has a current
-- print job control language,~~Control Language~~ which can be used to specify which
~~-- which can be used to specify which~~ interpreter is to be
~~--~~used for the print data and to query and change
-- environment variables used by the interpreters (and
-- Management~~Mangement~~ Applications). There is also a default
-- interpreter that is to be used if an interpreter is not
-- explicitly specified using the Control Language. ~~Channel~~
~~-- sub-units are based on an underlying interface.~~

--   The print job delivery channel table and its underlying structure
--
-- The first seven items in the Print Job Delivery Channel Table define the
-- "channel" itself. A channel typically depends on other
-- protocols and interfaces to provide the data that flows
-- thru the channel.
-- ~~It is necessary to provide control of~~
~~-- the (perhaps complex) process by which print data arrives~~
-- ~~at an interpreter.~~ Control of a print job delivery channel is largely limited to enabling
-- or disabling the entire ~~whole~~ channel itself. It is likely, however,
-- that more control of the process of accessing print data
-- will be needed over time. Thus, the ChannelType will
-- allow type-~~-~~specific data to be associated with each
-- channel (using ChannelType specific groups in a fashion
-- analogous to the media specific MIBs that are associated
-- with the IANAIfType in the Interfaces Table). As a first
-- step in this direction, each channel will identify the
-- underlying Interface on which it is based. This is the
-- eighth object in each row of the table.

~~-- Some examples of the kind of control are where~~
~~-- compression or encoding is used; and whether the data is~~
~~-- filtered to remove file storage anomaliesanomolies such as those~~
~~-- created by using MS-DOS/PC-DOS LPT1:.~~
~~--~~

```
-- The Print Job Delivery Channel Table
--
-- The prtChannelTable represents the set of input data sources which
-- can provide print data to one or more of the interpreters
-- available on a printer


prtChannel OBJECT IDENTIFIER ::= { printmib 14 }

prtChannelTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtChannelEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtChannel 1 }

prtChannelEntry OBJECT-TYPE
    SYNTAX     PrtChannelEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtChannelIndex }
    ::= { prtChannelTable 1 }

PrtChannelEntry ::= SEQUENCE {
    prtChannelIndex                     Integer32,
    prtChannelType                      PrtChannelTypeTCINTEGER,
    prtChannelProtocolVersion           OCTET STRING,
    prtChannelCurrentJobCntlLangIndex   Integer32,
    prtChannelDefaultPageDescLangIndex  Integer32,
    prtChannelState                     INTEGER,
    prtChannelIfIndex                   Integer32,
    prtChannelStatus                    PrtSubUnitStatusTC,
    prtChannelInformation               DisplayString
}

prtChannelIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value used by the printer to identify this data
        channel.  Although these values may change due to a major
        reconfiguration of the device (e.g. the addition of new data
        channels to the printer), values are expected to remain
        stable across successive printer power cycles."
```

```
    ::= { prtChannelEntry 1 }

prtChannelType OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtChannelTypeTCINTEGER {
                   other(1),
                   chSerialPort(3),
                   chParallelPort(4),
                   chIEEE1284Port(5),
                   chSCSIPort(6),
                   chAppleTalkPAP(7), -- AppleTalk Printer Achess Protocol
                   chLPDServer(8),
                   chNetwareRPrinter(9),  -- Netware
                   chNetwarePServer(10),  -- Netware
                   chPort9100(11),
                   chAppSocket(12),       -- a bi-directional, LPD-like
                                          -- protocol using 9101 for
                                          -- control and 9100 for data.
                                          -- Adobe Systems, Inc.
                   chFTP(13),             -- FTP "PUT" to printer
                   chTFTP(14),
                   chDLCLLCPort(15),
                   chIBM3270(16),
                   chIBM5250(17),
                   chFax(18),
                   chIEEE1394(19),
                   chTransport1(20),      -- port 35
                   chCPAP(21),            -- port 170
                   chDCERemoteProcCall(22), -- OSF
                   chONCRemoteProcCall(23), -- Sun Microsystems
                   chOLE(24),               -- Microsoft
                   chNamedPipe(25),
                   chPCPrint(26),           -- Banyan
                   chServerMessageBlock(27),
                        -- File/Print sharing protocol used by
                        -- various network operating systems
                        -- from IBM 3Com, Microsoft and others
                   chDPMF(28),  -- Distributed Print Mgt. Framework, IBM
                   chDLLAPI(29), -- Microsoft
                   chVxDAPI(30), -- Microsoft
                   chSystemObjectManager(31), -- IBM
                   chDECLAT(32),          -- Digital Equipment Corp.
                   chNPAP(33)
               }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of this print data channel.  This
```

```
        object provides the linkage to ChannelType-specific
        groups that may (conceptually) extend the prtChannelTable
        with additional details about that channel."
    ::= { prtChannelEntry 2 }

prtChannelProtocolVersion OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..63))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The version of the protocol used on this
        channel.  The format used for version numbering depends
        on prtChannelType."
    ::= { prtChannelEntry 3 }

prtChannelCurrentJobCntlLangIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtInterpreterIndex  corresponding to the
        Control Language Interpreter for this channel. This
        interpreter defines the syntax used for control
        functions, such as querying or changing environment
        variables and identifying job boundaries (e.g. PJL,
        PostScript, NPAP). Must be 1 or greater."
    ::= { prtChannelEntry 4 }

prtChannelDefaultPageDescLangIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of prtInterpreterIndex  corresponding to the
        Page Description Language Interpreter for this channel.
        This interpreter defines the default Page Description
        Language interpreter to be used for the print data unless
        the Control Language is used to select a specific
        interpreter (e.g.,  PCL, PostScript Language,
        auto-sense). Must be 1 or greater."
    ::= { prtChannelEntry 5 }

prtChannelState OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtChannelStateTCINTEGER {
                           other(1),
                       printDataAccepted(3),
                       noDataAccepted(4)
```

```
                    }
        MAX-ACCESS read-write
        MIN-ACCESS read-only
        STATUS     current
        DESCRIPTION
            "The state of this print data channel.  The value determines
            whether control information and print data is allowed through
            this channel or not."
        ::= { prtChannelEntry 6 }

prtChannelIfIndex OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-write
        MIN-ACCESS read-only
        STATUS     current
        DESCRIPTION
            "The value of ifIndex (in the ifTable; see the interface
            section of MIB-2/RFC 1213) which corresponds to this channel.
            When 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 channel."
        ::= { prtChannelEntry 7 }

prtChannelStatus OBJECT-TYPE
        SYNTAX     PrtSubUnitStatusTC
        MAX-ACCESS read-only
        STATUS     current
        DESCRIPTION
            "The current status of the channel."
        ::= { prtChannelEntry 8 }


prtChannelInformation OBJECT-TYPE
    SYNTAX     DisplayString (SIZE (0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
          "Auxiliary information to allow a printing application to use
            the channel for data submission to the printer.  An application
            capable of using a specific PrtChannelType should be able to use
            the combined information from the prtChannelInformation and
            other channel and interface group objects to 'bootstrap' its use
            of the channel.  prtChannelInformation is not intended to
            provide a general channel description, nor to provide
            information that is available once the channel is in use.

            The encoding and interpretation of the prtChannelInformation
            object is specific to channel type.  The description of each
            PrtChannelType enum value for which prtChannelInformation is
            defined specifies the appropriate encoding and interpretation,
            including interaction with other objects.  For channel types
            that do not specify a prtChannelInformation value, its value
            shall be null (0 length).

            When a new PrtChannelType enumeration value is registered, its
            accompanying description must specify the encoding and
            interpretation of the prtChannelInformation value for the
            channel type.  prtChannelInformation semantics for an existing
            PrtChannelType may be added or amended in the same manner as
            described in section 2.4.1 for type 2 enumeration values.

            The prtChannelInformation specifies values for a collection of
```

```
        channel attributes, represented as text according to the
        following rules:

         1. The prtChannelInformation is coded in the NVT ASCII
            character set.  It is not affected by localization.

         2. The prtChannelInformation 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), that identifies a channel attribute,
             b. an Equals Sign (=) to delimit the keyword,
             c. a data value, consisting of NVT ASCII graphics
                characters (codes 32-126),
             d. a Line Feed character (code 10) to delimit the data
                value.
            No other characters 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 prtChannelInformation,
            they are kept short.

         3. If a 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 prtChannelInformation value may represent information
            that is not normally coded in textual form, or that is coded
            in a character set other than NVT ASCII.  In these cases,
            whatever symbolic representation is conventionally used for
            the information should be used for encoding the
            prtChannelInformation.  (For instance, a binary port value
            might be represented as a decimal number, Unicode would
            be represented in UTF-8 format.)

         6. For each PrtChannelType for which prtChannelInformation
            entries are defined, the descriptive text associated with the
            PrtChannelType enumeration value shall specify the following
            information for each entry:
            Title:          Brief description phrase, e.g.: "Port name,"
                            "Service Name,"
            Keyword:        The keyword value, eg: "Port," "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 contstraints,
                            interactions between entries).

        Applications that interpret prtChannelInformation should ignore
        unrecognized entries, so they are not affected if new entry
        types are added.”

::= { prtChannelEntry 9 }


-- The Interpreter Group
```

```
--
-- The interpreter sub-units are responsible for the conversion of a
-- description of intended print instances into images that are to be
-- marked on the media. A printer may have one or more interpreters. The
-- interpreter sub-units are represented by the Interpreter Group in the
-- Model. Each interpreter is generally implemented with software running
-- on the System Controller sub-unit. The Interpreter Table has one entry
-- per interpreter where the interpreters include both Page Description
-- Language (PDL) Interpreters and Control Language Interpreters.
--
-- Implementation of every object in this group is mandatory.


prtInterpreter OBJECT IDENTIFIER ::= { printmib 15 }

--       Interpreter Table
--
```

```
-- The prtInterpreterTable is a table representing the interpreters in
-- the printer.  An entry shall be placed in the interpreter table for
-- each interpreter on the printer.

prtInterpreterTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtInterpreterEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtInterpreter 1 }

prtInterpreterEntry OBJECT-TYPE
    SYNTAX     PrtInterpreterEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtInterpreterIndex }
    ::= { prtInterpreterTable 1 }

PrtInterpreterEntry ::= SEQUENCE {
    prtInterpreterIndex                Integer32,
    prtInterpreterLangFamily           PrtInterpreterLangFamilyTCINTEGER,
    prtInterpreterLangLevel            OCTET STRING,
    prtInterpreterLangVersion          OCTET STRING,
    prtInterpreterDescription          OCTET STRING,
    prtInterpreterVersion              OCTET STRING,
    prtInterpreterDefaultOrientation   INTEGER,
    prtInterpreterFeedAddressability   Integer32,
    prtInterpreterXFeedAddressability  Integer32,
    prtInterpreterDefaultCharSetIn     CodedCharSet,
    prtInterpreterDefaultCharSetOut    CodedCharSet,
    prtInterpreterTwoWay               INTEGER
}

prtInterpreterIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value for each PDL or control language for which
        there exists an interpreter or emulator in the printer.  The
        value is used to identify this interpreter. Although these
        values may change due to a major reconfiguration of the device
        (e.g. the addition of new interpreters to the printer), values
        are expected to remain stable across successive printer power
```

```
        cycles."

    ::= { prtInterpreterEntry 1 }

prtInterpreterLangFamily OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtInterpreterLangFamilyTCINTEGER {
          other(1),
          langPCL(3),           -- PCL.  Starting with PCL version 5,
                                -- HP-GL/2 is included as part of the
                                -- PCL language.
                                -- PCL and HP-GL/2 are registered
                                -- trademarks of Hewlett-Packard Company.
          langHPGL(4),          -- Hewlett-Packard Graphics Language.
                                -- HP-GL is a registered trademark of
                                -- Hewlett-Packard Company.
          langPJL(5),           -- Peripheral Job Language. Appears in the
                                -- data stream between data intended for a
                                -- page description language.
                                -- Hewlett-Packard Co.
          langPS(6),            -- PostScript Language (tm)
                                -- Postscript - a trademark of Adobe
                                -- Systems Incorporated which may be
                                -- registered in certain jurisdictions
          langPSPrinter(42),    -- The PostScript Language used for
                                -- control (with any PDLs)
                                -- Adobe Systems Incorporated
          langIPDS(7),          -- Intelligent Printer Data Stream
                                -- Bi-directional print data stream for
                                -- documents consisting of data objects
                                -- (text, image, graphics, bar codes),
                                -- resources (fonts, overlays) and page,
                                -- form and finishing instructions.
                                -- Facilitates system level device
                                -- control, document tracking and error
                                -- recovery throughout the print process.
                                -- Pennant Systems, IBM
          langPPDS(8),          -- IBM Personal Printer Data Stream.
                                -- Originally called IBM ASCII, the name
                                -- was changed to PPDS when the Laser
                                -- Printer was introduced in 1989.
                                -- Lexmark International, Inc.
          langEscapeP(9),
          langEpson(10),
          langDDIF(11),         -- Digital Document Interchange Format
                                -- Digital Equipment Corp., Maynard MA
          langInterpress(12),
          langISO6429(13),      -- ISO 6429.  Control functions for Coded
                                -- Character Sets (has ASCII control
```

```
                                  -- characters, plus additional controls for
                                  -- character imaging devices.)
                                  -- ISO Standard, Geneva, Switzerland
           langLineData(14),      -- line-data:  Lines of data as separate
                                  -- ASCII or EBCDIC records and containing
                                  -- no control functions (no CR, LF, HT, FF,
                                  -- etc.). For use with traditional line
                                  -- printers.  May use CR and/or LF to
                                  -- delimit lines, instead of records.  See
                                  -- ISO 10175 Document Printing Application
                                  -- (DPA)
                                  -- ISO standard, Geneva, Switzerland
           langMODCA(15),         -- Mixed Object Document Content Architecture
                                  -- Definitions that allow the composition,
                                  -- interchange, and presentation of final
                                  -- form documents as a collection of data
                                  -- objects (text, image, graphics, bar
                                  -- codes), resources (fonts, overlays) and
                                  -- page, form and finishing instructions.
                                  -- Pennant Systems, IBM
           langREGIS(16),         -- Remote Graphics Instruction Set,
                                  -- Digital Equipment Corp., Maynard MA
           langSCS(17),           -- SNA Character String
                                  -- Bi-directional print data stream for SNA
                                  -- LU-1 mode of communications
                                  -- IBM
           langSPDL(18),          -- ISO 10180 Standard Page Description
                                  -- Language
                                  -- ISO Standard
           langTEK4014(19),
           langPDS(20),
           langIGP(21),
           langCodeV(22),         -- Magnum Code-V, Image and printer control
                                  -- language used to control impact/dot-
                                  -- matrix printers.
                                  -- QMS, Inc., Mobile AL
           langDSCDSE(23),        -- DSC-DSE:  Data Stream Compatible and
                                  -- Emulation Bi-directional print data
                                  -- stream for non-SNA (DSC) and SNA LU-3
                                  -- 3270 controller (DSE) communications
                                  -- IBM
           langWPS(24),           -- Windows Printing System, Resource based
                                  -- command/data stream used by Microsoft At
                                  -- Work Peripherals.
                                  -- Developed by the Microsoft Corporation.
           langLN03(25),          -- Early DEC-PPL3, Digital Equipment Corp.
           langCCITT(26),
           langQUIC(27),          -- QUIC (Quality Information Code), Page
```

```
                                   -- Description Language for laser printers.
                                   -- Included graphics, printer control
                                   -- capability and emulation of other well-
                                   -- known printer .
                                   -- QMS, Inc.
            langCPAP(28),          -- Common Printer Access Protocol
                                   -- Digital Equipment Corp.
            langDecPPL(29),        -- Digital ANSI-Compliant Printing Protocol
                                   -- (DEC-PPL)
                                   -- Digital Equipment Corp.
            langSimpleText(30),-- simple-text:  character coded data,
                                   -- including NUL, CR , LF, HT, and FF
                                   -- control characters.  See ISO 10175
                                   -- Document Printing Application (DPA)
                                   -- ISO standard, Geneva, Switzerland
            langNPAP(31),          -- Network Printer Alliance Protocol
                                   -- IEEE 1284.1
            langDOC(32),           -- Document Option Commands, Appears in the
                                   -- data stream between data intended for a
                                   -- page description .
                                   -- QMS, Inc.
            langimPress(33),       -- imPRESS, Page description language
                                   -- originally developed for the ImageServer
                                   -- line of systems. A binary language
                                   -- providing representations for text,
                                   -- simple graphics (rules, lines, conic
                                   -- sections), and some large forms (simple
                                   -- bit-map and CCITT group 3/4 encoded).The
                                   -- language was intended to be sent over an
                                   -- 8-bit channel and supported early
                                   -- document preparation languages (e.g. TeX
                                   -- and TROFF).
                                   -- QMS, Inc.
            langPinwriter(34), -- 24 wire dot matrix printer  for
                                   -- USA, Europe, and Asia except Japan.
                                   -- More widely used in Germany, and some
                                   -- Asian countries than in US.
                                   -- NEC
            langNPDL(35),          -- Page printer  for Japanese
                                   -- market.
                                   -- NEC
            langNEC201PL(36),      -- Serial printer language used in the
                                   -- Japanese market.
                                   -- NEC
            langAutomatic(37), -- Automatic PDL sensing.  Automatic
                                   -- sensing of the interpreter language
                                   -- family by the printer examining the
                                   -- document content.  Which actual
```

```
                                    -- interpreter language families are sensed
                                    -- depends on the printer implementation.
            langPages(38),          -- Page printer Advanced Graphic Escape Set
                                    -- IBM Japan
            langLIPS(39),           -- LBP Image Processing System
            langTIFF(40),           -- Tagged Image File Format (Aldus)
            langDiagnostic(41),     -- A hex dump of the input to the
                                    -- interpreter
            langCaPSL(43),          -- Canon Print Systems Language
            langEXCL(44),           -- Extended Command Language
                                    -- Talaris Systems Inc.
            langLCDS(45),           -- Line Conditioned Data Stream
                                    -- Xerox Corporation
            langXES(46)             -- Xerox Escape Sequences
                                    -- Xerox Corporation
                  }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The family name of a Page Description Language (PDL) or
        control language which this interpreter in the printer can
        interpret or emulate.  This type 2 list of enumerations
        requires review before additional entries are made."
    ::= { prtInterpreterEntry 2 }

prtInterpreterLangLevel OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..31))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The level of the language which this interpreter is
        interpreting or emulating.  This might contain a value like
        '5e' for an interpreter which is emulating level 5e of the PCL
        language.  It might contain '2' for an interpreter which is
        emulating level 2 of the PostScript language.  Similarly it
        might contain '2' for an interpreter which is emulating level
        2 of the HPGL language."
    ::= { prtInterpreterEntry 3 }

prtInterpreterLangVersion OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..31))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The date code or version of the language which this interpreter
        is interpreting or emulating."
    ::= { prtInterpreterEntry 4 }
```

```
prtInterpreterDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "A string to identify this interpreter 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 interpreters."
    ::= { prtInterpreterEntry 5 }

prtInterpreterVersion 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 interpreter.  This value is
        associated with the interpreter, rather than with the version
        of the language which is being interpreted or emulated."
    ::= { prtInterpreterEntry 6 }

prtInterpreterDefaultOrientation OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtInterpreterDefaultOrientationTC~~INTEGER {~~
                   ~~other(1),~~
                   ~~portrait(3),~~
                   ~~landscape(4)~~
               ~~}~~
        MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The current orientation default for this interpreter.  This
        value may be overridden for a particular job (e.g., by a
        command in the input data stream)."
    ::= { prtInterpreterEntry 7 }

prtInterpreterFeedAddressability OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum interpreter addressability in the feed
        direction in 10000 prtMarkerAddressabilityUnit-s (see
        prtMarkerAddressabilityFeedDir ) for this interpreter.
        The value (-1) means other and specifically indicates
        that the sub-unit places no restrictions on this parameter."
```

```
    ::= { prtInterpreterEntry 8 }

prtInterpreterXFeedAddressability OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The maximum interpreter addressability in the cross feed
        direction in 10000 prtMarkerAddressabilityUnits (see
        prtMarkerAddressabilityXFeedDir) for this interpreter.
        The value (-1) means other and specifically indicates
        that the sub-unit places no restrictions on this
        parameter."
    ::= { prtInterpreterEntry 9 }

prtInterpreterDefaultCharSetIn OBJECT-TYPE
    SYNTAX     CodedCharSet
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The default coded character set for input octets
         encountered outside a context in which the Page
         Description Language established the interpretation
         of the octets. (Input octets are presented to the
         interpreter through a path defined in the channel group.)
         This value shall be (2) if there is no default."
~~        "The default coded character set for input octets
        encountered outside a context in which the Page
        Description Language established the interpretation
        of the octets.

        This value shall be (2) if there is no default."~~
    ::= { prtInterpreterEntry 10 }

prtInterpreterDefaultCharSetOut OBJECT-TYPE
    SYNTAX     CodedCharSet
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
       "The default character set for data coming from this interpreter
         through the printer's output channel (i.e. the "backchannel").
         This value shall be (2) if there is no default."
~~        "The default character set for data coming from this interpreter
        through the printer's output channel.


        This value shall be (2) if there is no default."~~
    ::= { prtInterpreterEntry 11 }

prtInterpreterTwoWay OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtInterpreterTwoWayTC~~INTEGER {~~
~~                       yes(3),~~
~~                   no(4)~~
~~               }~~
    MAX-ACCESS read-only
    STATUS     current
```

```
    DESCRIPTION
        "Indicates whether or not this interpreter returns information
        back to the host."
    ::= { prtInterpreterEntry 12 }

-- The Console Group
--
-- Many printers have a console on the printer, the operator console,
-- that is used to display and modify the state of the printer. The
-- console can be as simple as a few indicators and switches or as
-- complicated as full screen displays and keyboards. There can be
-- at most one such console.
--
-- Implementation of every object in this group is mandatory.

prtConsoleLocalization OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of the prtLocalizationIndex corresponding to
        the language, country, and character set to be used for the
        console.  This localization applies both to the actual display
        on the console as well as the encoding of these console
        objects in management operations."
    ::= { prtGeneralEntry 10 }

prtConsoleNumberOfDisplayLines OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The number of lines on the printer's physical
        display.  This value is 0 if there are no lines on the
        physical display or if there is no physical display"
    ::= { prtGeneralEntry 11 }

prtConsoleNumberOfDisplayChars OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The number of characters per line displayed on the physical
        display.  This value is 0 if there are no lines on the
        physical display or if there is no physical display"
    ::= { prtGeneralEntry 12 }

prtConsoleDisable OBJECT-TYPE
```

```
    SYNTAX     INTEGER {
                   operatorConsoleEnabled ~~enabled~~(3),
                   operatorConsoleDisabled ~~disabled~~(4)
               }
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "If the object prtConsoleDisable has value
        "operatorConsoleDisabled" then input is not accepted from the
        operator console. If the object prtConsoleDisable has the value
        "operatorConsoleEnabled" then input is accepted from the
        operator console.
        ~~This object enables or disables manual input from the~~
        ~~operators console.~~"
    ::= { prtGeneralEntry 13 }

-- The Display Buffer Table

prtConsoleDisplayBuffer OBJECT IDENTIFIER ::= { printmib 16 }

prtConsoleDisplayBufferTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtConsoleDisplayBufferEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtConsoleDisplayBuffer 5 }

prtConsoleDisplayBufferEntry OBJECT-TYPE
    SYNTAX     PrtConsoleDisplayBufferEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "This table contains one entry for each physical line on
        the display.  Lines cannot be added or deleted.

        Entries may exist in the table for each device
        index with a~~hose~~~~who's~~ device type of~~is~~ 'printer'."
    INDEX  { hrDeviceIndex, prtConsoleDisplayBufferIndex }
    ::= { prtConsoleDisplayBufferTable 1 }

PrtConsoleDisplayBufferEntry ::= SEQUENCE {
    prtConsoleDisplayBufferIndex    Integer32,
    prtConsoleDisplayBufferText     OCTET STRING
}

prtConsoleDisplayBufferIndex OBJECT-TYPE
    SYNTAX     Integer32 (1..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value for each console line in the printer.  The
        value is used to identify this console line. Although
```

```
                 these values may change due to a major reconfiguration of
        the device (e.g. the addition of new console lines to the
        printer), values are expected to remain stable across
        successive printer power cycles."
    ::= { prtConsoleDisplayBufferEntry 1 }

prtConsoleDisplayBufferText OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The content of a line in the logical display buffer of
        the operator's console of the printer.  When a write
        operation occurs, normally a critical message, to one of
        the LineText strings, the agent should make that line
        displayable if a physical display is present.  Writing
        a zero length string clears the line.  It is an
        implementation-specific matter as to whether the agent allows
        a line to be overwritten before it has been cleared.
        Printer generated strings shall be in the localization
        specified by prtConsoleLocalization.  Management Application
        generated strings should be localized by the Management
        Application."
    ::= { prtConsoleDisplayBufferEntry 2 }

-- The Console Light Table

prtConsoleLights OBJECT IDENTIFIER ::= { printmib 17 }

prtConsoleLightTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtConsoleLightEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtConsoleLights 6 }

prtConsoleLightEntry OBJECT-TYPE
    SYNTAX     PrtConsoleLightEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer'."
    INDEX  { hrDeviceIndex, prtConsoleLightIndex }
    ::= { prtConsoleLightTable 1 }

PrtConsoleLightEntry ::= SEQUENCE {
```

```
    prtConsoleLightIndex           Integer32,
    prtConsoleOnTime               Integer32,
    prtConsoleOffTime              Integer32,
    prtConsoleColor                INTEGER,
    prtConsoleDescription          OCTET STRING
}

prtConsoleLightIndex OBJECT-TYPE
    SYNTAX     Integer32 (0..65535)
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "A unique value used by the printer to identify this light.
        Although these values may change due to a major
        reconfiguration of the device (e.g. the addition of new lights
        to the printer), values are expected to remain stable across
        successive printer power cycles."
    ::= { prtConsoleLightEntry 1 }

prtConsoleOnTime OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "This object, in conjunction with prtConsoleOffTime, defines
         the current status of the light.  If both prtConsoleOnTime and
         prtConsoleOffTime are non-zero, the lamp is blinking and the
         values presented define the on time and off time, respectively,
         in milliseconds.  If prtConsoleOnTime is zero and
         prtConsoleOffTime is non-zero, the lamp is off.  If
         prtConsoleOffTime is zero and prtConsoleOnTime is non-zero,
         the lamp is on.  If both values are zero the status of the
         lamp is undefined."

        "The on time in milliseconds of blinking of this light; 0
        indicates off always.  If both prtConsoleOnTime
        and prtConsoleOffTime are 0, then the light is
        always off."
    ::= { prtConsoleLightEntry 2 }

prtConsoleOffTime OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-write
    MIN-ACCESS read-only
    STATUS     current
    DESCRIPTION
       "This object, in conjunction with prtConsoleOnTime, defines
         the current status of the light.  If both prtConsoleOnTime and
         prtConsoleOffTime are non-zero, the lamp is blinking and the
         values presented define the on time and off time, respectively,
         in milliseconds.  If prtConsoleOnTime is zero and
         prtConsoleOffTime is non-zero, the lamp is off.  If
         prtConsoleOffTime is zero and prtConsoleOnTime is non-zero,
         the lamp is on.  If both values are zero the status of the
         lamp is undefined."
    DESCRIPTION
        "The off time in milliseconds of blinking of this light; 0
        indicates on always.  If both prtConsoleOnTime
        and prtConsoleOffTime are 0, then the light is
        always off."
```

```
    ::= { prtConsoleLightEntry 3 }

prtConsoleColor OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtConsoleColorTCINTEGER {
    d                  other(1),
                   unknown(2),
                   white(3),
                   red(4),
```

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```
                        ~~green(5),~~
                        ~~blue(6),~~
                        ~~cyan(7),~~
                        ~~magenta(8),~~
                        ~~yellow(9)~~
                    ~~}~~
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The color of this light."
    ::= { prtConsoleLightEntry 4 }

prtConsoleDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The vendor description or label of this light in the
        localization specified by prtConsoleLocalization."
    ::= { prtConsoleLightEntry 5 }


-- The Alerts Group
--
-- The prtAlertTable lists all the critical and non-critical alerts
-- currently active in the printer.  A critical alert is one that stops
-- the printer from printing immediately and printing can not continue
-- until the critical alert condition is eliminated.  Non-critical
-- alerts are those items that do not stop printing but may at some
-- future time.
-- The table contains information on the severity, component, detail
-- location within the component, alert code and description of each
-- critical alert that is currently active within the printer.  See
-- 2.2.13 for a more complete description of the alerts table and
-- its management.
--
-- Implementation of every object in this group is mandatory.

prtAlert OBJECT IDENTIFIER ::= { printmib 18 }

prtAlertTable OBJECT-TYPE
    SYNTAX     SEQUENCE OF PrtAlertEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        ""
    ::= { prtAlert 1 }
```

```
prtAlertEntry OBJECT-TYPE
    SYNTAX     PrtAlertEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Entries may exist in the table for each device
        index with ahosewho's device type ofis 'printer''."
    INDEX  { hrDeviceIndex, prtAlertIndex }
    ::= { prtAlertTable 1 }

PrtAlertEntry ::= SEQUENCE {
    prtAlertIndex                Integer32,
    prtAlertSeverityLevel        PrtSeverityLevelTC,INTEGER,
    prtAlertTrainingLevel        PrtAlertTrainingLevelTCINTEGER,
    prtAlertGroup                PrtAlertGroupTCINTEGER,
    prtAlertGroupIndex           Integer32,
    prtAlertLocation             Integer32,
    prtAlertCode                 INTEGER,
    prtAlertDescription          OCTET STRING,
    prtAlertTime                 TimeTicks
}

prtAlertIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "The index value used to determine which alerts
        have been added or removed from the alert table.
        This is an incrementing integer starting from zero
        every time the printer is reset.  When the printer
        adds an alert to the table, that alert is assigned
        the next higher integer value from the last item
        entered into the table.  If the index value reaches
        its maximum value, the next item entered will cause
        the index value to roll over and start at zero
        again.  The first event placed in the alert table
        after a reset of the printer shall
        have an index value of 1.  NOTE: The management
        application will read the alert table when a trap
        or event notification occurs or at a periodic rate
        and then parse the table to determine if any new
        entries were added by comparing the last known index
        value with the current highest index value. The
        management application will then update its copy of
        the alert table.  When the printer discovers that
        an alert is no longer active, the printer shall
        remove the row for that alert from the table and
```

```
                shall reduce the number of rows in the table.  The
        printer may add or delete any number of rows from
        the table at any time.  The management station
        can detect when binary change alerts have been deleted by
        requesting an attribute of each alert, and noting
        alerts as deleted when that retrieval is not possible."
    ::= { prtAlertEntry 1 }

prtAlertSeverityLevel OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtAlertSeverityLevelTC~~INTEGER {~~
                   ~~other(1),~~
                   ~~critical(3),~~
                   ~~warning(4)~~
               ~~}~~
        MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The level of severity of this alert table entry.  The printer
        determines the severity level assigned to each entry into the
        table."
    ::= { prtAlertEntry 2 }

prtAlertTrainingLevel OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtAlertTrainingLevelTC~~INTEGER {~~
                   ~~other(1),~~
                   ~~unknown(2),~~
                   ~~untrained(3),~~
                   ~~trained(4),~~
                   ~~fieldService(5),~~
                   ~~management(6),~~
                   ~~noInterventionRequired(7)~~
               ~~}~~
        MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "See textual convention PrtAlertTrainingLevelTC"
    ::= { prtAlertEntry 3 }

~~The level of training required to handle this alert. The~~
        ~~training level is an enumeration that is determined and~~
        ~~assigned by the printer manufacturer based on the information~~
        ~~or the training required to handle this alert.  The printer~~
        ~~will break alerts into these different training levels.  It is~~
        ~~the responsibility of the management application in the system~~
        ~~to determine how a particular alert is handled and how and to~~
        ~~whom that alert is routed.  The following are the four~~
        ~~training levels of alerts:~~

               ~~Field Service - Alerts that typically require advanced~~
                             ~~training and technical knowledge of the printer~~
```

```
                           and its sub-units. An example of a technical
                           person would be a manufacture's Field Service
                           representative, or other person formally
                           trained by the manufacturer or similar
                           representative.
                  Trained - Alerts that require an intermediate or moderate
                           level of knowledge of the printer and its
                           sub-units. A typical examples of alerts that
                           a trained operator can handle is replacing
                           toner cartridges.
                  Untrained - Alerts that can be fixed without prior
                           training either because the action to correct
                           the alert is obvious or the printer can help the
                           untrained person fix the problem. A typical
                           example of such an alert is reloading paper
                           trays and emptying output bins on a low end
                           printer.
                  Management - Alerts that have to do with overall
                           operation of and configuration of the printer.
                           Examples of management events are configuration
                           change of sub-units."
    ::= { prtAlertEntry 3 }

prtAlertGroup OBJECT-TYPE
    -- This value is a type 1 enumeration
    SYNTAX     PrtAlertGroupTCINTEGER {
                       other(1),
                       hostResourcesMIBStorageTable(3),
                       hostResourcesMIBDeviceTable(4),
                       generalPrinter(5),
                       cover(6),
                       localization(7),
                       input(8),
                       output(9),
                       marker(10),
                       markerSupplies(11),
                       markerColorant(12),
                       mediaPath(13),
                       channel(14),
                       interpreter(15),
                       consoleDisplayBuffer(16),
                       consoleLights(17)
                   }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The type of sub-unit within the printer model that this alert
        is related.  Input, output, and markers are examples of
```

```
         printer model groups, i.e., examples of types of sub-units.

         WhereverWhereever possible, these enumerations match the
         sub-identifier that identifies the relevant table in the
         printmib."
    ::= { prtAlertEntry 4 }

prtAlertGroupIndex OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "An index of the row within the principle table in the
        group identified by prtAlertGroup that represents the
        sub-unit of the printer that caused this alert.  The
        combination of the prtAlertGroup and the prtAlertGroupIndex defines
        exactly which printer sub-unit caused the alert.; for
        example, Input #3, Output #2, and Marker #1.

        Every object in this MIB is indexed with hrDeviceIndex and
        optionally, another index variable.  If this other index
        variable is present in the table that generated the alert, it
        will be used as the value for this object.  Otherwise, this
        value shall be -1."
    ::= { prtAlertEntry 5 }

prtAlertLocation OBJECT-TYPE
    SYNTAX     Integer32
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The sub-unit location that is defined by the printer
        manufacturer to further refine the location of this alert
        within the designated sub-unit.  The location is used in
        conjunction with the Group and GroupIndex values; for
        example, there is an alert in Input #2 at location number 7.
        The value (-2) indicates unknown"
    ::= { prtAlertEntry 6 }

prtAlertCode OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     PrtAlertCodeTCINTEGER {
                   other(1),
                   unknown(2),
                        -- codes common to serveral groups
                   coverOpen(3),
                   coverClosed(4),
                   interlockOpen(5),
                   interlockClosed(6),
```

```
                    configurationChange(7),
                    jam(8),
                         -- general Printer group
                    doorOpen(501),
                    doorClosed(502),
                    powerUp(503),
                    powerDown(504),
                         -- Input Group
                    inputMediaTrayMissing(801),
                    inputMediaSizeChanged(802),
                    inputMediaWeightChanged(803),
                    inputMediaTypeChanged(804),
                    inputMediaColorChanged(805),
                    inputMediaFormPartsChange(806),
                    inputMediaSupplyLow(807),
                    inputMediaSupplyEmpty(808),
                         -- Output Group
                    outputMediaTrayMissing(901),
                    outputMediaTrayAlmostFull(902),
                    outputMediaTrayFull(903),
                         -- Marker group
                    markerFuserUnderTemperature(1001),
                    markerFuserOverTemperature(1002),
                         -- Marker Supplies group
                    markerTonerEmpty(1101),
                    markerInkEmpty(1102),
                    markerPrintRibbonEmpty(1103),
                    markerTonerAlmostEmpty(1104),
                    markerInkAlmostEmpty(1105),
                    markerPrintRibbonAlmostEmpty(1106),
                    markerWasteTonerReceptacleAlmostFull(1107),
                    markerWasteInkReceptacleAlmostFull(1108),
                    markerWasteTonerReceptacleFull(1109),
                    markerWasteInkReceptacleFull(1110),
                    markerOpcLifeAlmostOver(1111),
                    markerOpcLifeOver(1112),
                    markerDeveloperAlmostEmpty(1113),
                    markerDeveloperEmpty(1114),
                         -- Media Path Device Group
                    mediaPathMediaTrayMissing(1301),
                    mediaPathMediaTrayAlmostFull(1302),
                    mediaPathMediaTrayFull(1303),
                         -- interpreter Group
                    interpreterMemoryIncrease(1501),
                    interpreterMemoryDecrease(1502),
                    interpreterCartridgeAdded(1503),
                    interpreterCartridgeDeleted(1504),
                    interpreterResourceAdded(1505),
```

```
                       ~~interpreterResourceDeleted(1506),~~
                       ~~interpreterResourceUnavailable(1507)~~
                  ~~}~~
        M~~M~~AX-ACCESS read-only
    STATUS     current
    DESCRIPTION
       "See associated textual convention PrtAlertCodeTC"
        ~~"The code that describes the type of alert for this entry in~~
        ~~the table.  There are different codes for each~~
        ~~sub-unit type: for example, Media Supply Low and Media~~
        ~~Supply Empty are Alert codes for the Input sub-unit."~~
    ::= { prtAlertEntry 7}

prtAlertDescription OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..255))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "A description of this alert entry in the localization
        specified by prtGeneralCurrentLocalization.  The description is
        provided by the printer to further elaborate on the enumerated
        alert or provide information in the case where the code is
        classified as~~k~~ 'other' or 'unknown'.  The printer is required
        to return a description string but the string may be a null
        string."
    ::= { prtAlertEntry 8 }

prtAlertTime OBJECT-TYPE
    SYNTAX     TimeTicks
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of sysUpTime at the time that this alert was
        generated."
    ::= { prtAlertEntry 9 }


printerV1Alert OBJECT-IDENTITY
    STATUS  current
    DESCRIPTION
        "The value of the enterprise-specific oid in an SNMPv1 trap sent
        signal~~l~~ing a critical event in the prtAlertTable."
    ::= { prtAlert 2 }


printerV2AlertPrefix OBJECT IDENTIFIER ::= { printerV1Alert 0 }

printerV2Alert NOTIFICATION-TYPE
    OBJECTS { prtAlertIndex, prtAlertSeverityLevel, prtAlertGroup,
              prtAlertGroupIndex, prtAlertLocation, prtAlertCode,
              hrDeviceIndex }
    STATUS  current
    DESCRIPTION
        "This trap is sent whenever a critical event is added to the
        prtAlertTable."
    ::= { printerV2AlertPrefix 1 }


-- Note that the SNMPv2 to SNMPv1 translation rules dictate that the
-- preceding structure will result in SNMPv1 traps of the following
-- form:
```

--

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```
-- printerAlert TRAP-TYPE
--     ENTERPRISE printerV1Alert
--     VARIABLES { prtAlertIndex, prtAlertSeverityLevel, prtAlertGroup,
--                 prtAlertGroupIndex, prtAlertLocation, prtAlertCode,
                   hrDeviceIndex }
--     DESCRIPTION
--        "This trap is sent whenever a critical event is added to the
--        prtAlertTable."
--     ::= 1


--
-- The Alert Time Group
--
-- This group is optional.  However, to claim conformance to this
-- group, it is necessary to implement every object in the group.

prtAlertTime OBJECT-TYPE
    SYNTAX     TimeTicks
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The value of sysUpTime at the time that this alert was
        generated."
    ::= { prtAlertEntry 9 }


-- Conformance Information

prtMIBConformance OBJECT IDENTIFIER ::= { printmib 2 }

-- compliance statements
prtMIBCompliance MODULE-COMPLIANCE
    STATUS  current
    DESCRIPTION
        "The compliance statement for agents that implement the
        printer MIB."
    MODULE -- this module
    MANDATORY-GROUPS { prtGeneralGroup, prtInputGroup, prtOutputGroup,
                       prtMarkerGroup, prtMediaPathGroup,
                       prtChannelGroup, prtInterpreterGroup,
                       prtConsoleGroup, prtAlertTableGroup }

        OBJECT      prtGeneralReset
        SYNTAX      INTEGER {
                        notResetting(3),
                        resetToNVRAM(5)
                    }
        DESCRIPTION
```

```
                "It is conformant to implement just these two states in
            this object.  Any additional states are optional."

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

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

    -- the prtResponsiblePartyGroup, prtExtendedInputGroup,
    -- prtInputMediaGroup, prtExtendedOutputGroup,
    -- prtOutputDimensionsGroup, prtOutputFeaturesGroup,
    -- prtMarkerSuppliesGroup, prtMarkerColorantGroup,
    -- and the prtAlertTimeGroup, prtAuxiliarySheetGroup, and the
    -- prtInputSwitchingGroup are completely optional. are
 completely optional.
    ::= { prtMIBConformance 1 }

prtMIBGroups      OBJECT IDENTIFIER ::= { prtMIBConformance 2 }

prtGeneralGroup OBJECT-GROUP
    OBJECTS { prtGeneralConfigChanges, prtGeneralCurrentLocalization,
              prtGeneralReset, prtCoverDescription, prtCoverStatus,
              prtLocalizationLanguage, prtLocalizationCountry,
              prtLocalizationCharacterSet, prtStorageRefIndex,
              prtDeviceRefIndex }
    STATUS  current
    DESCRIPTION
        "The general printer group."
    ::= { prtMIBGroups 1 }

prtResponsiblePartyGroup OBJECT-GROUP
    OBJECTS { prtGeneralCurrentOperator, prtGeneralServicePerson }
    STATUS  current
    DESCRIPTION
        "The responsible party group contains contact information for
        humans responsible for the printer."
    ::= { prtMIBGroups 2 }

prtInputGroup OBJECT-GROUP
    OBJECTS { prtInputDefaultIndex, prtInputType, prtInputDimUnit,
              prtInputMediaDimFeedDirDeclared,
              prtInputMediaDimXFeedDirDeclared,
              prtInputMediaDimFeedDirChosen,
              prtInputMediaDimXFeedDirChosen, prtInputCapacityUnit,
              prtInputMaxCapacity, prtInputCurrentLevel,
```

```
                            prtInputStatus, prtInputMediaName }
    STATUS  current
    DESCRIPTION
        "The input group."
    ::= { prtMIBGroups 3 }

prtExtendedInputGroup OBJECT-GROUP
    OBJECTS { prtInputName, prtInputVendorName, prtInputModel,
              prtInputVersion, prtInputSerialNumber,
              prtInputDescription, prtInputSecurity }
    STATUS  current
    DESCRIPTION
        "The extended input group."
    ::= { prtMIBGroups 4 }

prtInputMediaGroup OBJECT-GROUP
    OBJECTS { prtInputMediaWeight, prtInputMediaType,
              prtInputMediaColor, prtInputMediaFormParts }
    STATUS  current
    DESCRIPTION
        "The input media group."
    ::= { prtMIBGroups 5 }

prtOutputGroup OBJECT-GROUP
    OBJECTS { prtOutputDefaultIndex, prtOutputType,
              prtOutputCapacityUnit, prtOutputMaxCapacity,
              prtOutputRemainingCapacity,  prtOutputStatus }
    STATUS  current
    DESCRIPTION
        "The output group."
    ::= { prtMIBGroups 6 }

prtExtendedOutputGroup OBJECT-GROUP
    OBJECTS { prtOutputName, prtOutputVendorName, prtOutputModel,
              prtOutputVersion, prtOutputSerialNumber,
              prtOutputDescription, prtOutputSecurity }
    STATUS  current
    DESCRIPTION
        "The extended output group."
    ::= { prtMIBGroups 7 }

prtOutputDimensionsGroup OBJECT-GROUP
    OBJECTS { prtOutputDimUnit, prtOutputMaxDimFeedDir,
              prtOutputMaxDimXFeedDir, prtOutputMinDimFeedDir,
              prtOutputMinDimXFeedDir }
    STATUS  current
    DESCRIPTION
        "The output dimensions group"
```

```
    ::= { prtMIBGroups 8 }

prtOutputFeaturesGroup OBJECT-GROUP
    OBJECTS { prtOutputStackingOrder,
              prtOutputPageDeliveryOrientation, prtOutputBursting,
              prtOutputDecollating, prtOutputPageCollated,
              prtOutputOffsetStacking }
    STATUS  current
    DESCRIPTION
        "The output features group."
    ::= { prtMIBGroups 9 }

prtMarkerGroup OBJECT-GROUP
    OBJECTS { prtMarkerDefaultIndex, prtMarkerMarkTech,
              prtMarkerCounterUnit, prtMarkerLifeCount,
              prtMarkerPowerOnCount, prtMarkerProcessColorants,
              prtMarkerSpotColorants, prtMarkerAddressabilityUnit,
              prtMarkerAddressabilityFeedDir,
              prtMarkerAddressabilityXFeedDir, prtMarkerNorthMargin,
              prtMarkerSouthMargin, prtMarkerWestMargin,
              prtMarkerEastMargin, prtMarkerStatus }
    STATUS  current
    DESCRIPTION
        "The marker group."
    ::= { prtMIBGroups 10 }

prtMarkerSuppliesGroup OBJECT-GROUP
    OBJECTS { prtMarkerSuppliesMarkerIndex,
              prtMarkerSuppliesColorantIndex, prtMarkerSuppliesClass,
              prtMarkerSuppliesType, prtMarkerSuppliesDescription,
              prtMarkerSuppliesSupplyUnit,
              prtMarkerSuppliesMaxCapacity, prtMarkerSuppliesLevel }
    STATUS  current
    DESCRIPTION
        "The marker supplies group."
    ::= { prtMIBGroups 11 }

prtMarkerColorantGroup OBJECT-GROUP
    OBJECTS { prtMarkerColorantMarkerIndex, prtMarkerColorantRole,
              prtMarkerColorantValue, prtMarkerColorantTonality }
    STATUS  current
    DESCRIPTION
        "The marker colorant group."
    ::= { prtMIBGroups 12 }

prtMediaPathGroup OBJECT-GROUP
    OBJECTS { prtMediaPathDefaultIndex, prtMediaPathMaxSpeedPrintUnit,
              prtMediaPathMediaSizeUnit, prtMediaPathMaxSpeed,
```

```
              prtMediaPathMaxMediaFeedDir,
              prtMediaPathMaxMediaXFeedDir,
              prtMediaPathMinMediaFeedDir,
              prtMediaPathMinMediaXFeedDir, prtMediaPathType,
              prtMediaPathDescription, prtMediaPathStatus}
    STATUS  current
    DESCRIPTION
        "The media path group."
    ::= { prtMIBGroups 13 }

prtChannelGroup OBJECT-GROUP
    OBJECTS { prtChannelType, prtChannelProtocolVersion,
              prtChannelCurrentJobCntlLangIndex,
              prtChannelDefaultPageDescLangIndex, prtChannelState,
              prtChannelIfIndex, prtChannelStatus }
    STATUS  current
    DESCRIPTION
        "The channel group."
    ::= { prtMIBGroups 14 }

prtInterpreterGroup OBJECT-GROUP
    OBJECTS { prtInterpreterLangFamily, prtInterpreterLangLevel,
              prtInterpreterLangVersion, prtInterpreterDescription,
              prtInterpreterVersion, prtInterpreterDefaultOrientation,
              prtInterpreterFeedAddressability,
              prtInterpreterXFeedAddressability,
              prtInterpreterDefaultCharSetIn,
              prtInterpreterDefaultCharSetOut, prtInterpreterTwoWay }
    STATUS  current
    DESCRIPTION
        "The interpreter group."
    ::= { prtMIBGroups 15 }

prtConsoleGroup OBJECT-GROUP
    OBJECTS { prtConsoleLocalization, prtConsoleNumberOfDisplayLines,
              prtConsoleNumberOfDisplayChars, prtConsoleDisable,
              prtConsoleDisplayBufferText, prtConsoleOnTime,
              prtConsoleOffTime, prtConsoleColor,
              prtConsoleDescription }
    STATUS  current
    DESCRIPTION
        "The console group."
    ::= { prtMIBGroups 16 }

prtAlertTableGroup OBJECT-GROUP
    OBJECTS { prtAlertSeverityLevel, prtAlertTrainingLevel,
              prtAlertGroup, prtAlertGroupIndex, prtAlertLocation,
              prtAlertCode, prtAlertDescription }
```

```
    STATUS  current
    DESCRIPTION
        "The alert table group."
    ::= { prtMIBGroups 17 }

prtAlertTimeGroup OBJECT-GROUP
    OBJECTS { prtAlertTime }
    STATUS  current
    DESCRIPTION
        "The alert time group."
    ::= { prtMIBGroups 18 }

prtAuxiliarySheetGroup OBJECT-GROUP
    OBJECTS { prtGeneralStartupPage, prtGeneralBannerPage }
    STATUS  current
    DESCRIPTION
       "The auxiliary sheet group."
    ::= { prtMIBGroups 19 }

prtInputSwitchingGroup OBJECT-GROUP
    OBJECTS { prtInputManualFeedTimeout, prtInputAutoSwitch,
              prtInputNextIndex }
    STATUS  current
    DESCRIPTION
      "The input switching group."
::= { prtMIBGroups 20 }

END
```

Appendix A - Glossary of Terms

Addressability -~~-~~ on the marker, the number of distinctly setable marking units (pels) per unit of addressability unit; for example, 300 dots per inch is expressed as 300 per 1000 Thousandths Of Inches and 4 dots per millimeter is 4 per 1000 Micrometers. Addressability is not resolution because marks that are one addressability position apart may not be independently resolvable by the eye due to factors such as gain in the area of marks so they overlap or nearly touch.

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

Bin -~~-~~ an output sub-unit which may or may not be removable

Binary Change Event - an event which comes in pairs; the leading edge event and the trailing edge event. The leading edge event enters a state from which there is only one exit. A binary change event may be critical or non-critical. See unary change event.

Bursting -~~-~~ the process by which continuous media is separated into individual sheets, typically by bursting along pre-formed perforations.

Channel -~~-~~ A term used to describe a single source of data which is presented to a printer. The model that we use in describing a printer 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 printer on the same physical port.

Collation -~~-~~ in multiple copy output, placing the pages from separate copies into separate~~separte~~ ordered sets, ready for binding.~~output bins.~~

Control Language - a data syntax or language for controlling the printer through the print data channel.

Critical Alert -~~-~~ an alert triggered by an event which leads to a state in which printing is no longer possible; the printer is stopped

Decollating -~~-~~ the process by which the individual parts within a multi-part form are separated and sorted into separate stacks for each part.

Description -~~-~~ information about the configuration and capabilities of the printer and its various sub-units

DPA - ISO 10175 Document Printing Application standard. A standard for a client server protocol for a print system, including (1) submitting print jobs to and (2) managing print jobs in a spooler

Event - a state change in the printer

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

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 the media are obtained and fed into the Media Path

Interpreter - the embodiment of an algorithm that processes a data stream consisting of a Page Description Language (PDL) and/or a Control Language.

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 with optional finishing applied. 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 printing is no longer possible; such an alert may lead to a state from which printing 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 printer.

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

Output -- a bin or stacker which accepts instances of media that have been processed by a printer

Page Description Language (PDL) - a data syntax or language for the electronic representation of a document as a sequence of page images.

Printer -- a physical device that takes media from an input source, produces marks on that media according to some page description or page control language and puts the result in some output destination, possibly with finishing applied.

Printing -- the entire process of producing a printed document from gen-eration of the file to be printed, choosing printing properties, selection of a printer, routing, queuing, resource management, scheduling, and finally printing including notifying the user

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

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

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

Sub-unit -- a part of the printer which may be a physical part, such as one of the input sources or a logical part such as an interpreter.

Tray -~~-~~ an input sub-unit which is typically removable

Unary Change Event - an event that indicates a change of state of the printer, but to a state which is (often) just as valid as the state that was left, and from which no return is necessary. See binary change event.

Visible state -~~-~~ that portion of the state of the printer that can be examined by a management application

Warning - a non-critical alert. See non-critical alert.

Appendix B - Media Size Names from ISO/IEC 10175 Document Printing Architecture

For the convenience of management application developers, this appendix lists the standardized media size names from ISO/IEC 10175 Document Printing Application (DPA). Management applications that present a dialogue for choosing or displaying media size are encouraged to present relevant names from this list to avoid requiring the user to remember the physical dimensions used to describe the size of the media. A printer implementing the Printer MIB has no knowledge of these names, however; all media sizes in the MIB are given in terms of media dimensions as the values of prt~~InputChosen~~MediaDimFeedDir and prtInputChosen~~-~~MediaDimXFeedDir.

String name	Description
other	
unknown	
na-letter or letter	North American letter size: 8.5 by 11 inches
na-legal or legal	North American legal size: 8.5 by 14 inches
na-10x13-envelope	North American 10x13 envelope size: 10 by 13 inches
na-9x12-envelope	North American 9x12 envelope size: 9 by 12 inches
na-number-10-envelope	North American number 10 business envelope size: 4.125 by 9.5 inches
na-7x9-envelope	North American 7x9 size: 7 by 9 inches
na-9x11-envelope	North American 9x11 size: 9 by 11 inches
na-10x14-envelope	North American 10x14 envelope size: 10 by 14 inches
na-number-9-envelope	North American number 9 business envelope
na-6x9-envelope	North American 6x9 envelope size: 6 by 9 inches
na-10x15-envelope	North American 10x15 envelope size: 10 by 15 inches
a	engineering A size 8.5 inches by 11 inches
b	engineering B size 11 inches by 17 inches
c	engineering C size 17 inches by 22 inches
d	engineering D size 22 inches by 34 inches
e	engineering E size 34 inches by 44 inches

```
iso-a0                  ISO A0  size:  841 mm by 1189 mm
iso-a1                  ISO A1  size:  594 mm by  841 mm
iso-a2                  ISO A2  size:  420 mm by  594 mm
iso-a3                  ISO A3  size:  297 mm by  420 mm
iso-a4                  ISO A4  size:  210 mm by  297 mm
iso-a5                  ISO A5  size:  148 mm by  210 mm
iso-a6                  ISO A6  size:  105 mm by  148 mm
iso-a7                  ISO A7  size:   74 mm by  105 mm
iso-a8                  ISO A8  size:   52 mm by   74 mm
iso-a9                  ISO A9  size:   37 mm by   52 mm
iso-a10                 ISO A10 size:   26 mm by   37 mm
iso-b0                  ISO B0  size: 1000 mm by 1414 mm
iso-b1                  ISO B1  size:  707 mm by 1000 mm
iso-b2                  ISO B2  size:  500 mm by  707 mm
iso-b3                  ISO B3  size:  353 mm by  500 mm
iso-b4                  ISO B4  size:  250 mm by  353 mm
iso-b5                  ISO B5  size:  176 mm by  250 mm
iso-b6                  ISO B6  size:  125 mm by  176 mm
iso-b7                  ISO B7  size:   88 mm by  125 mm
iso-b8                  ISO B8  size:   62 mm by   88 mm
iso-b9                  ISO B9  size:   44 mm by   62 mm
iso-b10                 ISO B10 size:   31 mm by   44 mm
iso-c0                  ISO C0 size:   917 mm by 1297 mm
iso-c1                  ISO C1 size:   648 mm by  917 mm
iso-c2                  ISO C2 size:   458 mm by  648 mm
iso-c3                  ISO C3 size:   324 mm by  458 mm
iso-c4                  ISO C4 size:   229 mm by  324 mm
iso-c5                  ISO C5 size:   162 mm by  229 mm
iso-c6                  ISO C6 size:   114 mm by  162 mm
iso-c7                  ISO C7 size:    81 mm by  114 mm
iso-c8                  ISO C8 size:    57 mm by   81 mm
iso-designated          ISO Designated Long
                            size:  110 mm by 220 mm
jis-b0                  JIS B0  size  1030 mm by 1456 mm
jis-b1                  JIS B1  size   728 mm by 1030 mm
jis-b2                  JIS B2  size   515 mm by  728 mm
jis-b3                  JIS B3  size   364 mm by  515 mm
jis-b4                  JIS B4  size   257 mm by  364 mm
jis-b5                  JIS B5  size   182 mm by  257 mm
jis-b6                  JIS B6  size   128 mm by  182 mm
jis-b7                  JIS B7  size    91 mm by  128 mm
jis-b8                  JIS B8  size    64 mm by   91 mm
jis-b9                  JIS B9  size    45 mm by   64 mm
jis-b10                 JIS B10 size    32 mm by   45 mm
```

Appendix C - Media Names

For the convenience of management application developers, this appendix lists the standardized media names from ISO/IEC 10175 Document Printing Application (DPA). Management applications that present a dialogue for choosing media may wish to use these names as an alternative to separately specifying, size, color, and/or type. Using standard media names will mean that a single management application dealing with printers from different vendors and under different system mangers will tend to use the same names for the same media. If selection of media by name is used, the attributes (size, type or color) implied by the name must be explicitly mapped to the appropriate object (prtInputDeclared-MediaDimFeedDir, prtInputDeclaredMediaDimXFeedDir, prtInputMediaType and prtInputMediaColor) in the MIB. The object prtInputMediaName is intended for display to an operator and is purely descriptive. The value in prtInputMediaName is not interpreted by the printer so using a standard name for this value will not change any of the other media attributes nor will it cause an alert if the media in the input sub-unit does not match the name.

```
Simple Name                 Descriptor Text

other
unknown
iso-a4-white        Specifies the ISO A4 white medium with
                      size: 210 mm by 297 mm as defined in ISO 216
iso-a4-coloured     Specifies the ISO A4 coloured medium with
                      size: 210 mm by 297 mm as defined in ISO 216
iso-a4-transparent  Specifies the ISO A4 transparent medium with
                      size: 210 mm by 297 mm as defined in ISO 216
iso-a3-white        Specifies the ISO A3 white medium with
                      size: 297 mm by 420 mm as defined in ISO 216
iso-a3-coloured     Specifies the ISO A3 coloured medium with
                      size: 297 mm by 420 mm as defined in ISO 216
iso-a5-white        Specifies the ISO A5 white medium with
                      size: 148 mm by 210 mm as defined in ISO 216
iso-a5-coloured     Specifies the ISO A5 coloured medium with
                      size: 148 mm by 210 mm as defined in ISO 216
iso-b4-white        Specifies the ISO B4 white medium with
                      size: 250 mm by 353 mm as defined in ISO 216
iso-b4-coloured     Specifies the ISO B4 coloured medium with
                      size: 250 mm by 353 mm as defined in ISO 216
iso-b5-white        Specifies the ISO B5 white medium with
                      size: 176 mm by 250 mm as defined in ISO 216
iso-b5-coloured     Specifies the ISO B5 coloured medium with
                      size: 176 mm by 250 mm as defined in ISO 216
jis-b4-white        Specifies the JIS B4 white medium with
```

```
                         size: 257 mm by 364 mm as defined in JIS P0138
  jis-b4-coloured      Specifies the JIS B4 coloured medium with
                         size: 257 mm by 364 mm as defined in JIS P0138
  jis-b5-white         Specifies the JIS B5 white medium with
                         size: 182 mm by 257 mm as defined in JIS P0138
  jis-b5-coloured      Specifies the JIS B5 coloured medium with
                         size: 182 mm by 257 mm as defined in JIS P0138
```

The following standard values are defined for North American media:

```
  na-letter-white     Specifies the North American letter white
                         medium with size: 8.5 inches by 11 inches
  na-letter-coloured  Specifies the North American letter coloured
                         medium with size: 8.5 inches by 11 inches
  na-letter-transparent
                      Specifies the North American letter transparent
                         medium with size: 8.5 inches by 11 inches
  na-legal-white      Specifies the North American legal white
                         medium with size: 8.5 inches by 14 inches
  na-legal-coloured   Specifies the North American legal coloured
                         medium with size: 8.5 inches by 14 inches
```

The following standard values are defined for envelopes:

```
  iso-b5-envelope     Specifies the ISO B5 envelope medium
                         with size: 176 mm by 250 mm
                         as defined in ISO 216 and ISO 269
  iso-b4-envelope     Specifies the ISO B4 envelope medium
                         with size: 250 mm by 353 mm
                         as defined in ISO 216
  iso-c4-envelope     Specifies the ISO C4 envelope medium
                         with size: 229 mm by 324 mm
                         as defined in ISO 216 and ISO 269
  iso-c5-envelope     Specifies the ISO C5 envelope medium
                         with size: 162 mm by 229 mm
                         as defined in ISO 269
  iso-designated-long-envelope
                      Specifies the ISO Designated Long envelope medium
                         with size: 110 mm by 220 mm
                         as defined in ISO 269

  na-10x13-envelope   Specifies the North American 10x13 envelope medium
                         with size: 10 inches by 13 inches
  na-9x12-envelope    Specifies the North American 9x12 envelope medium
                         with size: 9 inches by 12 inches
  na-number-10-envelope
                      Specifies the North American number 10 business
                      envelope medium
```

```
                        with size: 4.125 inches by 9.5 inches
  na-7x9-envelope    Specifies the North American 7x9 inch envelope

  na-9x11-envelope   Specifies the North American 9x11 inch envelope

  na-10x14-envelope  Specifies the North American 10x14 inch envelope

  na-number-9-envelope
                     Specifies the North American number 9 business
                     envelope
  na-6x9-envelope    Specifies the North American 6x9 inch envelope

  na-10x15-envelope  Specifies the North American 10x15 inch envelope


  The following standard values are defined for the less commonly used
  media (white-only):

  iso-a0-white  Specifies the ISO A0 white medium
                  with size:  841 mm by 1189 mm
                  as defined in ISO 216
  iso-a1-white  Specifies the ISO A1 white medium
                  with size:  594 mm by 841 mm
                  as defined in ISO 216
  iso-a2-white  Specifies the ISO A2 white medium
                  with size:  420 mm by 594 mm
                  as defined in ISO 216
  iso-a6-white  Specifies the ISO A6 white medium
                  with size:  105 mm by 148 mm
                  as defined in ISO 216
  iso-a7-white  Specifies the ISO A7 white medium
                  with size:  74 mm by 105 mm
                  as defined in ISO 216
  iso-a8-white  Specifies the ISO A8 white medium
                  with size:  52 mm by 74 mm
                  as defined in ISO 216
  iso-a9-white  Specifies the ISO A9 white medium
                  with size:  39 mm by 52 mm
                  as defined in ISO 216
  iso-10-white  Specifies the ISO A10 white medium
                  with size:  26 mm by 37 mm
                  as defined in ISO 216
  iso-b0-white  Specifies the ISO B0 white medium
                  with size: 1000 mm by 1414 mm
                  as defined in ISO 216
  iso-b1-white  Specifies the ISO B1 white medium
                  with size:  707 mm by 1000 mm
                  as defined in ISO 216
```

```
  iso-b2-white  Specifies the ISO B2 white medium
                  with size:  500 mm by 707 mm
                  as defined in ISO 216
  iso-b3-white  Specifies the ISO B3 white medium
                  with size:  353 mm by 500 mm
                  as defined in ISO 216
  iso-b6-white  Specifies the ISO B6 white medium
                  with size:  125 mm by 176 mm i
                  as defined in ISO 216
  iso-b7-white  Specifies the ISO B7 white medium
                  with size:  88 mm by 125 mm
                  as defined in ISO 216
  iso-b8-white  Specifies the ISO B8 white medium
                  with size:  62 mm by 88 mm
                  as defined in ISO 216
  iso-b9-white  Specifies the ISO B9 white medium
                  with size:  44 mm by 62 mm
                  as defined in ISO 216
  iso-b10-white Specifies the ISO B10 white medium
                  with size:  31 mm by 44 mm
                  as defined in ISO 216

  jis-b0-white  Specifies the JIS B0 white medium with size:
                  1030 mm by 1456 mm
  jis-b1-white  Specifies the JIS B1 white medium with size:
                  728 mm by 1030 mm
  jis-b2-white  Specifies the JIS B2 white medium with size:
                  515 mm by 728 mm
  jis-b3-white  Specifies the JIS B3 white medium with size:
                  364 mm by 515 mm
  jis-b6-white  Specifies the JIS B6 white medium with size:
                  257 mm by 364 mm
  jis-b7-white  Specifies the JIS B7 white medium with size:
                  182 mm by 257 mm
  jis-b8-white  Specifies the JIS B8 white medium with size:
                  128 mm by 182 mm
  jis-b9-white  Specifies the JIS B9 white medium with size:
                  91 mm by 128 mm
  jis-b10-white Specifies the JIS B10 white medium with size:
                  64 mm by 91 mm

  The following standard values are defined for engineering media:
       a        Specifies the engineering A size medium with size:
                  8.5 inches by 11 inches
       b        Specifies the engineering B size medium with size:
                  11 inches by 17 inches
       c        Specifies the engineering C size medium with size:
                  17 inches by 22 inches
```

```
d        Specifies the engineering D size medium with size:
           22 inches by 34 inches
e        Specifies the engineering E size medium with size:
           34 inches by 44 inches
```

Appendix D - Roles of Users

Background

The need for "Role Models" stemmed in large part from the need to understand the importance of any given proposed object for the MIB. Many times the real world need for a proposed object would be debated within the group; the debate would typically result in the need to describe the potential usage of the object in terms of a "live" person performing some type of printing-related task.

Determining the value of a proposed object through identification of the associated human users was found to be so common that a more formalized model was required for consistent analysis. The model describing categories of human-oriented tasks is called "Role Models" in this document.

In developing the Role Models it was necessary to identify the common, primary tasks that humans typically face when interacting with a printer and its related printing system(s). It was expected that certain kinds of tasks would serve to identify the various Role Models.

In presenting the set of Role Models, the set of "Common Print System Tasks" are first presented, followed by the set of Role Model definitions. Finally, a simple matrix is presented in which Role Models and Tasks are cross-compared.

Common Print System Tasks

Upon researching the many tasks encountered by humans in dealing with printers and printing systems, the following were found to be pervasive within any operating environment:

Printer job state - Determine the status of a job without a printer.
Printer capabilities - Determine the current capabilities of a printer, for example, the available media sizes, two-sided printing, a particular type of interpreter, etc.
Printer job submission - Submit a print job to a printer.
Printer job removal - Remove a job from a printer.
Notification of events - Receive notification of the existence of a defined printer event. An event can be of many types, including warnings, errors, job stage completion (e.g., "job done"), etc.
Printer configuration - Query the current configuration of a printer.
Printer consumables - Determine the current state of any and all consumables within a printer.
Print job identification - Determine the identification of a job within a printer.
Internal printer status - Determine the current status of the printer.
Printer identification - Determine the identity of a printer.
Printer location - Determine the physical location of a printer.
Local system configuration - Determine various aspects of the

current configuration of the local system involved with the operation of a printer.

These "tasks" cover a large spectrum of requirements surrounding the operation of a printer in a network environment. This list serves as the basis for defining the various Role Models described below.

Proposed Role Models

Following is the list of "Role Models" used to evaluate the requirements for any given Printer MIB object. Note that the keyword enclosed in parentheses represents an abbreviation for the particular Role Model in the matrix described later in this document.

User (USER) - A person or application that submits print jobs to the printer; typically viewed as the "end user" within the overall printing environment.

Operator (OP) - A person responsible for maintaining a printer on a day-to-day basis, including such tasks as filling empty media trays, emptying full output trays, replacing toner cartridges, clearing simple paper jams, etc.

Technician (TECH) - A person responsible for repairing a malfunctioning printer, performing routine preventive maintenance, and other tasks that typically require advanced training on the printer internals. An example of a "technician" would be a manufacturer's Field Service representative, or other person formally trained by the manufacturer or similar representative.

System Manager (MGR) - A person responsible for configuration and troubleshooting of components involved in the overall printing environment, including printers, print queues and network connectivity issues. This person is typically responsible for ensuring the overall operational integrity of the print system components, and is typically viewed as the central point of coordination among all other Role Models.

Help Desk (HELP) - A person responsible for supporting Users in their printing needs, including training Users and troubleshooting Users' printing problems.

Asset Manager (AM) - A person responsible for managing an organization's printing system assets (primarily printers). Such a person needs to be able to identify and track the location of printing assets on an ongoing basis.

Capacity Planner (CP) - A person responsible for tracking the usage of printing resources on an ongoing basis for the purpose of planning printer acquisitions and/or placement of printers based on usage trends.

Installer (INST) - A person or application responsible for installing or configuring printing system components on a local system.

Accountant (ACCT) - A person responsible for tracking the usage of printing resources on an ongoing basis for the purpose of charging Users for resources used.

Matrix of Common Print System Tasks and Role Models

To better understand the relationship between the set of defined "Common Print System Tasks" and the various "Role Models," the following matrix is provided.

It is important to recognize that many of the tasks will appear to be applicable to many of the Role Models. However, when considering the actual context of a task, it is very important to realize that often the actual context of a task is such that the Role Model can change.

For example, it is obvious that a "System Manager" must be able to submit print jobs to a printer; however, when submitting a print job, a person identified as a "System Manager" is actually operating in the context of a "User" in this case; hence, the requirement to submit a print job is not listed as a requirement for a System Manager.

Conversely, while a "User" must be able to remove a job previously submitted to a printer, an "Operator" is often expected to be able to remove any print job from any printer; hence, print job removal is a (subtly different) requirement for both the "User" and "Operator" Role Models.

Role Models

Requirement Area	USER	OP	TECH	MGR	HELP	AM	CP	INST	ACCT
Print job status	xx	xx	xx	xx	xx				
Printer capabilities	xx			xx	xx				
Print job submission	xx								
Print job removal	xx	xx							
Notification of events		xx	xx						
Printer configuration				xx				xx	
Printer consumables		xx					xx		xx
Print job identification		xx		xx	xx		xx		xx
Internal printer status		xx	xx	xx					
Printer identification		xx		xx	xx	xx	xx	xx	xx
Printer location							xx		
Local system configuration				xx				xx	

~~Appendix D - Roles of Users~~

~~Background~~

~~The need for Role Models stemmed in large part from the need to understand the importance any given managed object under consideration for inclusion in the specification. Many times the presence or nature of a particular proposed object would be debated within the group; the debate would typically end when one or more persons would describe the potential usage for the object, usually in terms of a "live" person operating in some target environment.~~

~~Steve Zilles (Adobe) first mentioned that he had considered this general problem and had come up with a short list of categories by which the group can evaluate the relative utility of a proposed object. The list Steve described was:~~

- ~~User~~

- ~~Trained Operator~~

- ~~Service~~

~~Upon further examination of the overall problem I found it useful to expand the list of categories, as well as attempt to define a basic set of "requirements areas" that can help define the basic nature of each category.~~

~~Every concept needs a name, and this concept is no different. For lack of better alternatives, I refer to these categories as "Role~~

~~Models" in this document. This name was chosen in light of the fact that many times we try to find a "person" (or similar entity) for which the use of a proposed object is targeted. (I resisted the temptation to use the term "Usage Models," as I felt the term was too generic in nature.)~~

~~In presenting the initial list of Role Models, the initial set of "requirements areas" are presented, followed by the set of Role Model definitions. Finally, a simple matrix is presented in which Role Models and requirements areas are cross-compared.~~

~~It should be emphasized at this point that all of this is proposed as initial information for further discussion. No doubt major changes~~

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~~will be proposed by members of the group as time goes on.~~

~~Proposed Print System Requirements Areas~~

~~Surrounding printers and printing systems, the following list of "requirement areas" is proposed as a "check list" of needs for the various Role Models:~~

~~Printer job state - Determine the status of a job without a printer.~~
~~Printer capabilities - Determine the current capabilities of a printer, for example, the available media sizes, two-sided printing, a particular type of interpreter, etc.~~
~~Printer job submission - Submit a print job to a printer.~~
~~Printer job removal - Remove a job from a printer.~~
~~Notification of events - Receive notification of the existence of a defined printer event. An event can be of many types, including warnings, errors, job stage completion (e.g., "job done"), etc.~~
~~Printer configuration - Query the current configuration of a printer.~~
~~Printer consumables - Determine the current state of any and all consumables within a printer.~~
~~Print job identification - Determine the identification of a job within a printer.~~
~~Internal printer status - Determine the current status of the printer.~~
~~Printer identification - Determine the identify of a printer.~~
~~Printer location - Determine the physical location of a printer.~~
~~Local system configuration - Determine various aspects of the current configuration of the local system involved with the operation of a printer.~~

~~These "requirements" cover a large spectrum of requirements surrounding the operation of a printer in a network environment. This list is by no means complete, but serves as a starting point for assessing major requirements of the various Role Models described below.~~

~~Proposed Role Models~~

~~Following is a proposed list of "Role Models" to be used in evaluating the requirements for any given object defined within the Printer MIB. Note that the keyword enclosed in parentheses represents an abbreviation for the particular Role Model in the matrix described later in this document.~~

~~User (USER) - A person or application that submits print jobs to the printer; typically viewed as the "end user" within the overall printing environment.~~

~~Operator (OP) - A person responsible for maintaining a printer on a day-to-day basis, including such tasks as filling empty media trays, emptying full output trays, replacing toner cartridges, etc.~~

~~Technician (TECH) - A person responsible for repairing a malfunctioning printer, performing routine preventive maintenance, and other tasks that typically require advanced training on the printer internals. An example of a "technician" would be a manufacturer's Field Service representative, or other person formally trained by the manufacturer or similar representative.~~

~~System Manager (MGR) - A person responsible for configuration and troubleshooting of components involved in the overall printing environment, including printers, print queues and network connectivity issues. This person is typically responsible for ensuring the overall operational integrity of the print system components, and is typically viewed as the central point of coordination among all other Role Models.~~

~~Help Desk (HELP) - A person responsible for supporting Users in their printing needs, including training Users and troubleshooting Users' printing problems.~~

~~Asset Manager (AM) - A person responsible for managing an organizations printing system assets (primarily printers). Such a person needs to be able to identify and track the location of printing assets on an ongoing basis.~~

~~Capacity Planner (CP) - A person responsible for tracking the usage of printing resources on an ongoing basis. An optional related activity might be to acquire printing resource utilization information for the purposes of charging Users for resources used.~~

~~Installer (INST) - A person or application responsible for installing or configuring printing system components on a local system.~~

~~The purpose of these Role Models is to evaluate the relative merit of any given managed object. Whenever a managed object is proposed for inclusion into the specification, discussion on its expected value should be geared around which Role Models benefit from its presence and operation.~~

~~Matrix of Requirement Areas and Role Models~~

~~To better understand the relationship between the set of defined "Requirements Areas" and the various "Role Models," the following matrix is offered.~~

~~It is important to recognize that many of the requirements areas will appear to be applicable to many of the Role Models. However, when considering the actual context of a requirement area, it is very important to realize that often the actual context of a requirement~~

~~is such the Role Model can change.~~

~~For example, it is obvious that a "System Manager" must be able to submit print jobs to a printer; however, when submitting a print job a person identified as a "System Manager" is actually operating in the context of a "User" in this case; hence, the requirement to submit a print job is not listed as a requirement for a System Manager.~~

~~Conversely, while a "User" must be able to remove a job previously submitted to a printer, an "Operator" is often expected to be able to remove any print job from any printer; hence, print job removal is a (subtly different) requirement for both "User" and an "Operator" Role Models.~~

~~That being said, I'm sure you'll find some inconsistencies in the following matrix, depending on your particular interpretations of the various requirements areas.~~

	Role Models							
Requirement Area	USER	OP	TECH	MGR	HELP	AM	CP	INST
Print job status	xx	xx	xx	xx	xx			
Printer capabilities	xx			xx	xx			
Print job submission	xx							
Print job removal	xx	xx						
Notification of events		xx	xx					
Printer configuration				xx				xx
Printer consumables		xx					xx	
Print job identification		xx		xx	xx		xx	
Internal printer status		xx	xx	xx				
Printer identification		xx		xx	xx	xx	xx	xx
Printer location							xx	
Local system configuration				xx				xx

Appendix E - Participants

The following people attended at least one meeting of the Printer Working Group meeting; many attended most meetings.

~~Azmy Abouased - Compaq~~
~~Avi Basu - HP~~
~~Kerry Bott - Intel~~
~~Michael Bringmann - QMS~~
~~Ted Brunner - Tektronix~~
~~Jeff Case - SNMP Inc.~~
~~Rong Chang - IBM~~
~~Andy Davidson - Tektronix~~
~~Jack Demcak - Jadtech~~
~~Andria Demetroulakos - Digital Products~~
~~Mike Evans - ESI~~
~~Richard Everman - uci.edu~~
~~Neal Fischer - Fujitsu~~
~~Joseph Flick - HP~~
~~Rod Gerhart - Ricoh~~
~~Christine Gressley - University of Illinois~~
~~Joel Gyllenskog - HP~~
~~Tom Hastings - Xerox Corporation~~
~~Tim Hathaway - Pacific Data~~
~~Mark Held - CMU~~
~~Bob Herriot - SUN~~
~~Jeff Johnson - Cisco~~
~~Jeff Johnson - Microsoft~~
~~Theodore Kearley - QMS~~
~~Barry Kelman - Microsoft~~
~~Charles Kimber - Dataproducts~~
~~Andrew Knutsen - SCO~~
~~Peter Leunig - Leunig GmbH~~
~~Harry Lewis - IBM Pennant Systems~~
~~Bill Lott - QMS~~
~~Mike MacKay - Xerox~~
~~Jay Martin - Underscore~~
~~Mike Mayes - Brother~~
~~Kevin McBride - Underscore~~
~~Stan McConnell - XEROX~~
~~Gaylord Miyata - Underscore~~
~~Michael Moore - Ricoh~~
~~Rudy Nedved - CMU Computer Science Dept.~~
~~Pete Neergaard - CMU~~
~~Bill Norton - merit.edu~~
~~Ron Norton - Printronix~~
~~Roman Orzol - Okidata~~
~~Alan Perelman - Emulex~~

~~Noga Prat - Intel~~
~~Dave Roach - Unisys~~
~~Marshall Rose - Dover Beach Consulting~~
~~John Saperia - BGS Systems Inc.~~
~~Mike Scanlon - FTP Software~~
~~Avi Schlank - Canon~~
~~Ron Smith - TI~~
~~Larry Stein - Farpoint~~
~~Koji Tashiro - NEC Technologies~~
~~Jody Terrill - Extended Systems~~
~~Chris Thomas - Intel Products~~
~~Mike Timperman - Lexmark~~
~~Randy Turner - QMS~~
~~Bill Wagner - Digital Products~~
~~Steve Waldbusser - CMU~~
~~Tim Wells - Microsoft~~
~~Craig Whittle - Compaq~~
~~Don Wright - Lexmark~~
~~Lloyd Young - Lexmark International Inc.~~
~~Steve Zilles - Adobe~~
~~Jim Zuber - Genoa~~ Ron Bergman - Dataproducts
Luis Cubero - Hewlett-Packard
Jay Cummings - Novell
Andy Davidson - Tektronix
Lee Farrell - Canon
Joel Gyllenskog - Microworks
Tom Hastings - Xerox
Scott Isaacson - Novell
Binnur Al-Kazily - Hewlett-Packard
Rick Landau - Digital Equipment Corporation
David Kellerman - Northlake Software
Harry Lewis - IBM
Pete Loya - Hewlett-Packard
Jay Martin - Underscore
Bob Pentecost - Hewlett-Packard
Dave Roach - Unisys
Bob Setterbo - Adobe
Ron Smith - Texas Instruments
Mike Timperman - Lexmark
Randy Turner - Sharp Laboratories
Bill Wagner - Digital Products, Inc.
Chris Wellens - Interworking Labs
Craig Whittle - Novell
Don Wright - Lexmark
Lloyd Young - Lexmark
Atsushi Yuki - Kyocera
Steve Zilles - Adobe

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Security Considerations

Security issues are not discussed in this memo.

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