

29 June 2012  
Candidate Standard



**The Printer Working Group**

## **Printer MIB and IPP MFD Alerts (MFD Alerts)**

**Status: Approved**

Abstract: This document defines an update to the IANA-PRINTER-MIB (originally published in RFC 3805) to provide support for SNMP alerts in a multifunction device (MFD) and an equivalent update to IPP "printer-state-reasons" (RFC 2911) and IPP "printer-alert" (PWG 5100.9). An MFD is typically based on a printer with added scan- and fax-specific components in order to support print, copy, scan, and facsimile (fax) services. This document defines an update to the IANA-PRINTER-MIB to provide support for new MFD components and component-specific alerts and analogous Printer extension alerts for the existing Input, Output, and MediaPath components.

This document is a PWG Candidate Standard. For a definition of a "PWG Candidate Standard ", see:

<ftp://ftp.pwg.org/pub/pwg/general/pwg-process30.pdf>

This document is available at:

<ftp://ftp.pwg.org/pub/pwg/candidates/cs-pmpmfdalerts10-20120629-5107.3.pdf>

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In general, a PWG standard is a specification that is stable, well understood, and is technically competent, has multiple, independent and interoperable implementations with substantial operational experience, and enjoys significant public support.

For additional information regarding the Printer Working Group visit:

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Contact information:

The Printer Working Group  
c/o The IEEE Industry Standards and Technology Organization  
445 Hoes Lane  
Piscataway, NJ 08854  
USA

## About the Workgroup for Imaging Management Solutions

The Workgroup for Imaging Management Solutions (WIMS) is concerned with the definition of new and recasting of previously defined imaging device and service management elements for mapping into standard management semantics and protocols. These protocols include, but are not limited to, SNMP, CIM and Web Services Management. WIMS provides continuing support for printing-related IETF RFCs including the Printer MIB ([RFC 3805](#)), Finisher MIB ([RFC 3806](#)) and the Job Monitoring MIB ([RFC 2707](#)).

WIMS Web Page:

<http://www.pwg.org/wims/>

PMP and WIMS Mailing Lists:

[pmp@pwg.org](mailto:pmp@pwg.org)

[wims@pwg.org](mailto:wims@pwg.org)

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Implementers of this specification are encouraged to join the PMP (SNMP MIBs) and WIMS (all management protocols) mailing lists in order to participate in any discussions of the specification. Suggested additions, changes, or clarification to this specification, should be sent to the PMP and WIMS mailing lists for consideration.

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## 1. Introduction

This document defines simple extensions to the originally printer-specific IETF Printer MIB v2 [RFC3805] (new enumeration values in prtAlertCode) and IETF IPP/1.1 [RFC2911] (new keyword values in “printer-state-reasons”) to add support for alert information for multifunction devices (MFDs), which are now very popular alternatives to using separate printer, copier, and facsimile equipment. Prior to the introduction of MFDs, printer vendors and application developers had already created tools, management systems, and device drivers based upon the Printer MIB v2 [RFC3805] and the prtAlertTable. MFDs are typically less expensive than the equivalent set of individual devices, and have the additional advantage of occupying much less office space.

The printer portion of an MFD is used by the print, copy, and facsimile (fax) functions. Additional scanner and scan media path components are used by the copy and fax functions. The fax function also uses a fax modem component with a PSTN interface.

The Printer Working Group (PWG) developed the IETF Printer MIB v2 [RFC3805], which is now implemented in most network printers sold today and defines the prtAlertTable that may be used, with or without SNMP traps, to implement an effective warning and error reporting system.

## 2. Terminology

### 2.1 Conformance Terminology

Capitalized terms, such as MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, have special meaning relating to conformance as defined in IETF Key words for use in RFCs to Indicate Requirement Levels [RFC2119].

### 2.2 Printing Terminology

Normative definitions and semantics of printing terms are imported from IETF Printer MIB v2 [RFC3805], IETF Finisher MIB [RFC3806], and IETF IPP/1.1 [RFC2911].

This document also defines the following protocol roles in order to specify unambiguous conformance requirements:

IPP Client - Initiator of outgoing IPP session requests and sender of outgoing IPP operation requests (HTTP/1.1 [RFC2616] User Agent).

IPP Printer - Listener for incoming IPP session requests and receiver of incoming IPP operation requests (HTTP/1.1 [RFC2616] Server).

Printer MIB Agent: Listener for incoming SNMP Get and Set management requests and sender of optional outgoing SNMP notifications for a Printer or MFD (i.e., an SNMP Agent).

Printer MIB Client: Initiator of outgoing SNMP Get and Set management requests and receiver of optional incoming SNMP notifications for a Printer or MFD (i.e., an SNMP Manager).



## 3. Requirements

### 3.1 Rationale for MFD Alerts

The IETF, and PWG standards in the printing industry include:

- a) An abstract model of a PrintDevice in section 2.2 of the IETF Printer MIB v2 [RFC3805].
- b) An SNMP Alert table for a PrintDevice to support the service and maintenance functions in section 2.2.13 of the IETF Printer MIB v2 [RFC3805].
- c) A set of design goals for status monitoring in a printing protocol in section 3.1.3 “Viewing the status and capabilities of a printer” (for End User), section 3.2.1 “Alerting” (for Operator), and section 3.3 “Administrator” (the bullet requirement to “administrate billing or other charge-back mechanisms”) of the IETF IPP Design Goals [RFC2567].
- d) A set of MFD service types for Imaging Systems in the JmJobServiceTypesTC textual convention in section 4 of the IETF Job Monitoring MIB [RFC2707].
- e) An abstract model of an MFD job in section 2 of the IETF Job Monitoring MIB [RFC2707].
- f) An abstract model of an MFD in the PWG MFD Model and Common Semantics [PWG5108.1].

In the years since the Printer MIB v2 [RFC3805] was published printers have evolved into MFDs. Prior to the introduction of MFDs, printer vendors and application developers had already created tools, management systems, and device drivers based upon the Printer MIB v2 [RFC3805] and the prtAlertTable. Now that these same vendors are building MFDs, there is an urgent need to leverage these existing tools and management applications.

This document defines a new set of MFD alert groups and MFD component alerts that will allow the applications currently using the prtAlertTable to support MFDs.

### 3.2 Use Cases for MFD Alerts

#### 3.2.1 MFDs with OEM Components

Company A markets complete systems, including a full range of computers, printers, and other office peripheral devices. Most of the equipment included with these systems are manufactured by Company A. The remaining equipment is Company A branded (i.e., OEM), but manufactured by others. All of these systems include a management application that monitors all systems components and automatically initiates service calls.

For printer maintenance, the management system uses the prtAlertTable. New system configurations now offer MFDs as options for printers. By including the MFD Alerts in the MFDs and in Company A's management system, Company A can now offer full management and maintenance support for these new MFDs.

### **3.2.2 MFDs with Alert Messages**

Company B is now adding a new series of MFDs to its extensive line of printers. The current printer families include a deluxe driver that monitors the prtAlertTable to provide status information to the end user. The monitor function does not interpret the prtAlertCode or the prtAlertLocation values, but instead queries and displays the prtAlertDescription value to indicate the fault condition. This feature allows the end user to initiate any action that may be required to complete the user's jobs. The fault information may be related to a job that precedes the user's current job so, if the owner of the previous job is not able or to does not wish to act, the owner of the new job may take the appropriate action so that normal operation can resume. By including the MFD Alerts in their new MFD family, Company B can now offer the monitor function for these new MFDs.

### **3.2.3 MFDs with Web-based Fleet Management**

Company C provides a fleet management system based upon DMTF WS-Management [WS-MGMT], OASIS WSDM [WSDM], or any other web-based protocol that is appropriate for fleet management. The communication between the local fleet management server and the local printers is accomplished via SNMP and the information available in the prtAlertTable is queried to maintain the logs in the remote fleet management server. When MFDs are added to the local network, the fleet management system can monitor all the MFD functions with only minor modifications to support the MFD Alerts.

## **3.3 Out of-Scope for MFD Alerts**

This MFD Alerts specification should not:

- 1) Define any components that are not already defined in the PWG MFD Model and Common Semantics [PWG5108.1].
- 2) Define any semantics for workflow applications.
- 3) Define any semantics for document repositories.
- 4) Define any application-specific semantics for MFD monitoring using MFD Alerts.

### 3.4 Design Requirements for MFD Alerts

This MFD Alerts specification should satisfy the following design requirements:

- a) Define a set of alert groups to provide alert capability for MFDs equivalent to the capability currently provided for printers for registration in the PrtAlertGroupTC in the IANA Printer MIB [IANAPRT].
- b) Define new alert groups for MFD components only where functionally equivalent groups do not already exist for the PrintDevice. For example, a ScanMediaPath is inherently entirely separate from any print MediaPath.
- c) Do not define new alert groups for MFD components where functionally equivalent groups already exist for the PrintDevice. For example, ScanDevice covers should be modeled using the existing Cover group.
- d) Define a set of component-specific alerts for new ScanDevice and FaxDevice components for registration in the PrtAlertCodeTC in the IANA Printer MIB [IANAPRT].
- e) Define a set of component-specific extension alerts for existing Input, Output, and MediaPath alert groups that correspond to extensions for the ScanMediaPath alert group.

## 4. Printer Model Extensions

This section briefly summarizes extensions to the abstract Printer Model, originally defined in section 2 of IETF Printer MIB v2 [RFC3805], based on the PWG MFD Model and Common Semantics [PWG5108.1], to include the ScanDevice and FaxDevice, their additional subunits, and the new OutputChannel subunit. The following two figures are taken directly from [PWG5108.1].

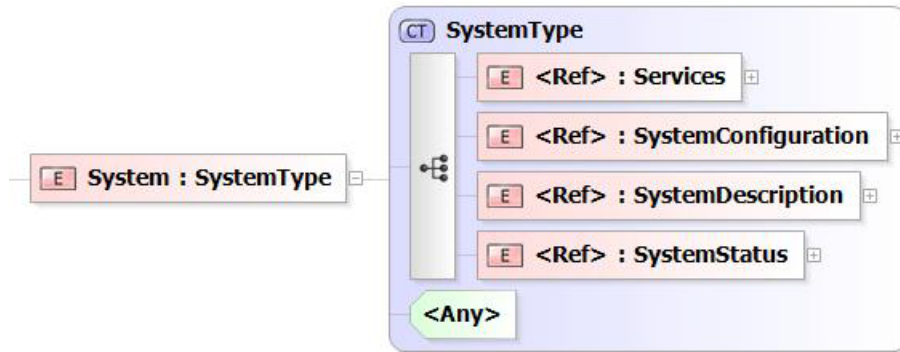


Figure 1 – System Object in MFD Model

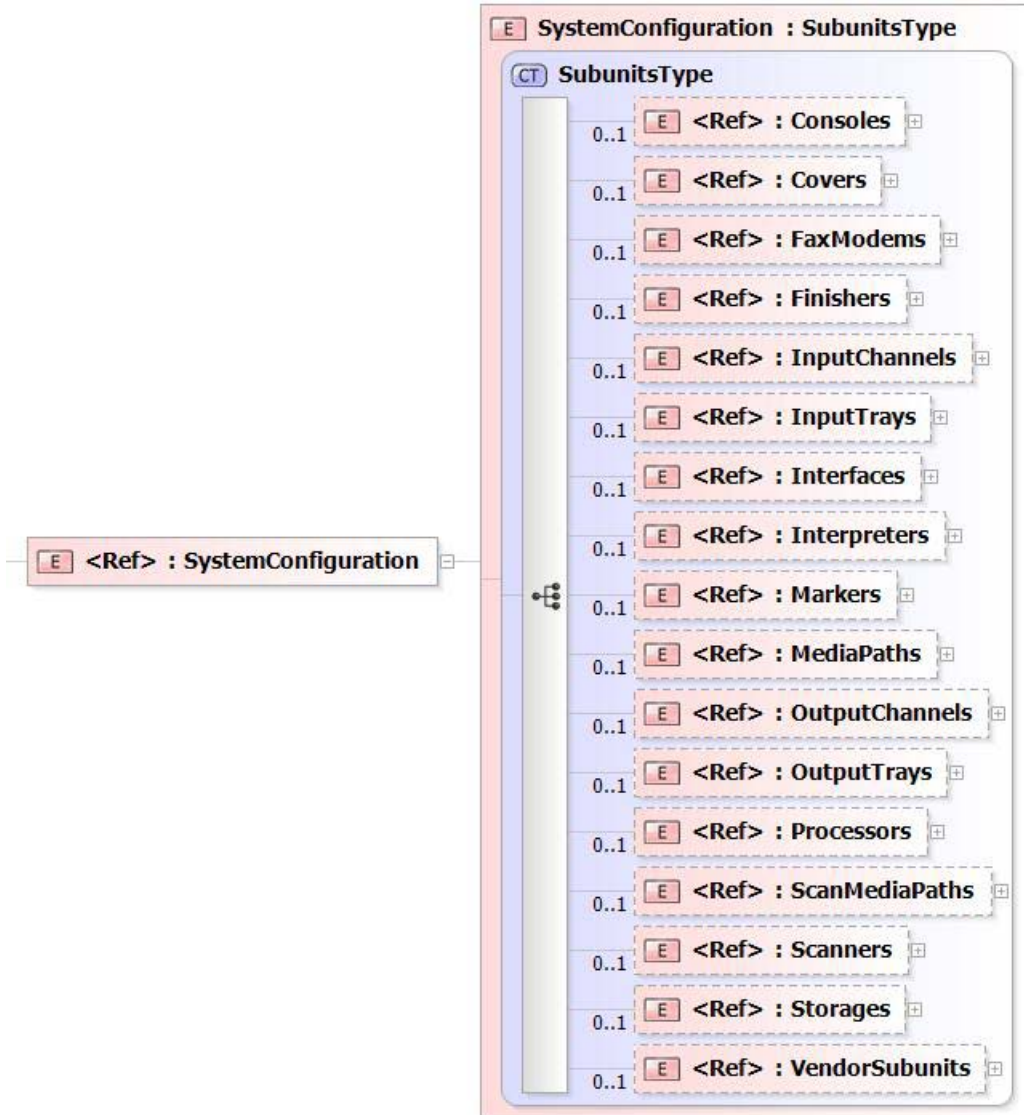


Figure 2 – SystemConfiguration Element in MFD Model

## **4.1 ScanDevice**

The ScanDevice uses the following subunits: Console, Cover, Interface, Interpreter, OutputChannel, Processor, ScanMediaPath, Scanner, Storage, and optionally the VendorSubunit.

## **4.2 FaxDevice**

The FaxDevice uses the following subunits: Console, Cover, FaxModem, Finisher, InputChannel, InputTray, Interface, Interpreter, Marker, MediaPath, OutputChannel, OutputTray, Processor, ScanMediaPath, Scanner, Storage, and optionally the VendorSubunit.

## **4.3 OutputChannel**

An OutputChannel is the opposite of an InputChannel – it sends jobs and user data from an MFD via a configured application protocol (e.g., SMTP) to specified destinations.

## 5. MFD and Printer Extension Alerts

### 5.1 MFD Alert Groups

The new MFD alert groups and the associated alert group values are defined in this section for registration in PrtAlertGroupTC in IANA Printer MIB [IANAPRT].

**Table 1 – MFD Alert Groups**

<b>MFD Alert Group</b>	<b>PrtAlertGroupTC Value</b>
scanDevice	50
scanner	51
scanMediaPath	52
faxDevice	60
faxModem	61
outputChannel	70

## 5.2 MFD and Printer Extension Subunit Alerts

The new MFD and Printer extension subunit alerts and the associated alert values are defined in this section for registration in PrtAlertCodeTC in IANA Printer MIB [IANAPRT].

Note: The original Printer MIB v1 [RFC1759] and subsequent Printer MIB v2 [RFC3805] did not define any (Input)Channel-specific alerts. Therefore this MFD Alerts specification does not define any OutputChannel-specific alerts. The generic alerts (subunitXxx) originally defined in [RFC3805] and registered in [IANAPRT] may be used for both (Input)Channel and OutputChannel subunits.

**Table 2 – MFD and Printer Subunit Alerts**

<b>Subunit Alert</b>	<b>PrtAlertCodeTC</b>
-- Input Group	
inputMediaTrayFeedError	814
inputMediaTrayJam	815
inputMediaTrayFailure	816
inputPickRollerLifeWarn	817
inputPickRollerLifeOver	818
inputPickRollerFailure	819
inputPickRollerMissing	820
-- Output Group	
outputMediaTrayFeedError	905
outputMediaTrayJam	906
outputMediaTrayFailure	907
-- Media Path Group	
mediaPathFailure	1305
mediaPathJam	1306
mediaPathInputRequest	1310
mediaPathInputFeedError	1311
mediaPathInputJam	1312
mediaPathInputEmpty	1313
mediaPathOutputFeedError	1321
mediaPathOutputJam	1322
mediaPathOutputFull	1323
mediaPathPickRollerLifeWarn	1331
mediaPathPickRollerLifeOver	1332
mediaPathPickRollerFailure	1333
mediaPathPickRollerMissing	1334
-- Scanner Group	



scannerLightLifeAlmostOver	5101
scannerLightLifeOver	5102
scannerLightFailure	5103
scannerLightMissing	5104
scannerSensorLifeAlmostOver	5111
scannerSensorLifeOver	5112
scannerSensorFailure	5113
scannerSensorMissing	5114
-- Scan Media Path Group	
scanMediaPathTrayMissing	5201
scanMediaPathTrayAlmostFull	5202
scanMediaPathTrayFull	5203
scanMediaPathFailure	5205
scanMediaPathJam	5206
scanMediaPathInputRequest	5210
scanMediaPathInputFeedError	5211
scanMediaPathInputJam	5212
scanMediaPathInputEmpty	5213
scanMediaPathOutputFeedError	5221
scanMediaPathOutputJam	5222
scanMediaPathOutputFull	5223
scanMediaPathPickRollerLifeWarn	5231
scanMediaPathPickRollerLifeOver	5232
scanMediaPathPickRollerFailure	5233
scanMediaPathPickRollerMissing	5234
-- Fax Modem Group	
faxModemMissing	6101
faxModemLifeAlmostOver	6102
faxModemLifeOver	6103
faxModemTurnedOn	6104
faxModemTurnedOff	6105
faxModemInactivityTimeout	6110
faxModemProtocolError	6111
faxModemEquipmentFailure	6112
faxModemNoDialTone	6113
faxModemLineBusy	6114
faxModemNoAnswer	6115
faxModemVoiceDetected	6116
faxModemCarrierLost	6117
faxModemTrainingFailure	6118

### 5.3 IPP printer-state-reasons (1setOf type2 keyword)

The new MFD alert values of “printer-state-reasons” [RFC2911] are defined in this section for registration in IANA IPP Registry [IANAPRT]. The table below defines new MFD alert values of "printer-state-reasons" [RFC2911] and their mapping to/from new MFD alert values of 'PrtAlertCodeTC' [IANAPRT] defined above in sections 5.2 and 5.3.

**Table 3 – IPP printer-state-reasons**

<b>PrtAlertCodeTC</b>	<b>printer-state-reasons</b>
-- Input Group	
inputMediaTrayFeedError(814)	input-media-tray-feed-error
inputMediaTrayJam(815)	input-media-tray-jam
inputMediaTrayFailure(816)	input-media-tray-failure
inputPickRollerLifeWarn(817)	input-pick-roller-life-warn
inputPickRollerLifeOver(818)	input-pick-roller-life-over
inputPickRollerFailure(819)	input-pick-roller-failure
inputPickRollerMissing(820)	input-pick-roller-missing
-- Output Group	
outputMediaTrayFeedError(905)	output-media-tray-feed-error
outputMediaTrayJam(906)	output-media-tray-jam
outputMediaTrayFailure(907)	output-media-tray-failure
-- Media Path Group	
mediaPathFailure(1305)	media-path-failure
mediaPathJam(1306)	media-path-jam
mediaPathInputRequest(1310)	media-path-input-request
mediaPathInputFeedError(1311)	media-path-input-feed-error
mediaPathInputJam(1312)	media-path-input-jam
mediaPathInputEmpty(1313)	media-path-input-empty
mediaPathOutputFeedError(1321)	media-path-output-feed-error
mediaPathOutputJam(1322)	media-path-output-jam
mediaPathOutputFull(1323)	media-path-output-full
mediaPathPickRollerLifeWarn(1331)	media-path-pick-roller-life-warn
mediaPathPickRollerLifeOver(1332)	media-path-pick-roller-life-over
mediaPathPickRollerFailure(1333)	media-path-pick-roller-failure
mediaPathPickRollerMissing(1334)	media-path-pick-roller-missing
-- Scanner Group	
scannerLightLifeAlmostOver(5101)	scanner-light-life-almost-over
scannerLightLifeOver(5102)	scanner-light-life-over
scannerLightFailure(5103)	scanner-light-failure

scannerSensorLifeAlmostOver(5104)	scanner-sensor-life-almost-over
scannerSensorLifeOver(5105)	scanner-sensor-life-over
scannerSensorFailure(5106)	scanner-sensor-failure
-- Scan Media Path Group	
scanMediaPathTrayMissing(5201)	scan-media-path-tray-missing
scanMediaPathTrayAlmostFull(5202)	scan-media-path-tray-almost-full
scanMediaPathTrayFull(5203)	scan-media-path-tray-full
scanMediaPathFailure(5205)	scan-media-path-failure
scanMediaPathJam(5206)	scan-media-path-jam
scanMediaPathInputRequest(5210)	scan-media-path-input-request
scanMediaPathInputFeedError(5211)	scan-media-pathinput-feed-error
scanMediaPathInputJam(5212)	scan-media-path-input-jam
scanMediaPathInputEmpty(5213)	scan-media-path-input-empty
scanMediaPathOutputFeedError(5221)	scan-media-path-output-feed-error
scanMediaPathOutputJam(5222)	scan-media-path-output-jam
scanMediaPathOutputFull(5223)	scan-media-path-output-full
scanMediaPathPickRollerLifeWarn(5231)	scan-media-path-pick-roller-life-warn
scanMediaPathPickRollerLifeOver(5232)	scan-media-path-pick-roller-life-over
scanMediaPathPickRollerFailure(5233)	scan-media-path-pick-roller-failure
scanMediaPathPickRollerMissing(5234)	scan-media-path-pick-roller-missing
-- Fax Modem Group	
faxModemMissing(6101)	fax-modem-missing
faxModemLifeAlmostOver(6102)	fax-modem-life-almost-over
faxModemLifeOver(6103)	fax-modem-life-over
faxModemTurnedOn(6104)	fax-modem-turned-on
faxModemTurnedOff(6105)	fax-modem-turned-off
faxModemInactivityTimeout(6110)	fax-modem-inactivity-timeout
faxModemProtocolError(6111)	fax-modem-protocol-error
faxModemEquipmentFailure(6112)	fax-modem-equipment-failure
faxModemNoDialTone(6113)	fax-modem-no-dial-tone
faxModemLineBusy(6114)	fax-modem-line-busy
faxModemNoAnswer(6115)	fax-modem-no-answer
faxModemVoiceDetected(6116)	fax-modem-voice-detected
faxModemCarrierLost(6117)	fax-modem-carrier-lost
faxModemTrainingFailure(6118)	fax-modem-training-failure

## 6. Conformance Requirements

### 6.1 Printer MIB Agent Conformance Requirements

To claim conformance to this specification, a Printer MIB Agent implementation for a Multifunction Device:

- (a) MUST implement the prtAlertTable defined in IETF Printer MIB v2;
- (b) SHOULD implement the prtAlertTable defined in IETF Printer MIB v2 [RFC3805] as persistent across power cycles and hardware reconfigurations, for reliable fleet management.
- (c) MUST support the MFD alert groups defined in section 5.1 of this specification which are registered in PrtAlertGroupTC in IANA Printer MIB [IANAPRT], if the corresponding functionality (e.g., scan) is supported on the MFD;
- (d) MUST support the MFD and Printer alert codes defined in section 5.2 of this specification which are registered in PrtAlertCodeTC in IANA Printer MIB [IANAPRT], if the corresponding functionality (e.g., scan) is supported on the MFD;
- (e) MUST encode and interpret values of the prtAlertGroup and prtAlertCode objects defined in IETF Printer MIB v2 [RFC3805] according to the registry in IANA Printer MIB [IANAPRT].

### 6.2 Printer MIB Client Conformance Requirements

To claim conformance to this specification, a Printer MIB Client implementation that supports Multifunction Devices:

- (a) MUST support the prtAlertTable defined in IETF Printer MIB v2;
- (b) MUST support the MFD alert groups defined in section 5.1 of this specification which are registered in PrtAlertGroupTC in IANA Printer MIB [IANAPRT], if the corresponding functionality (e.g., scan) is supported on the Printer MIB Client;
- (c) MUST support the MFD and Printer alert codes defined in section 5.2 of this specification which are registered in PrtAlertCodeTC in IANA Printer MIB [IANAPRT], if the corresponding functionality (e.g., scan) is supported on the Printer MIB Client;
- (d) MUST decode and interpret values of the prtAlertGroup and prtAlertCode objects defined in IETF Printer MIB v2 [RFC3805] according to the registry in IANA Printer MIB [IANAPRT].

### 6.3 IPP Printer Conformance Requirements

To claim conformance to this specification, an IPP Printer implementation for a Multifunction Device:

- (a) MUST support the IPP Printer “printer-alert” and “printer-alert-description” attributes defined in PWG IPP Printer State Extensions [PWG5100.9];
- (b) MUST support the MFD alert groups defined in section 5.1 of this specification which are registered in PrtAlertGroupTC in IANA Printer MIB [IANAPRT] for keyword values in “printer-alert”, if the corresponding functionality (e.g., scan) is supported on the MFD;
- (c) MUST support the MFD and Printer alert codes defined in section 5.2 of this specification which are registered in PrtAlertCodeTC in IANA Printer MIB [IANAPRT] and IANA IPP Registry [IANAIPP] for keyword values in “printer-alert” and “printer-state-reasons”, if the corresponding functionality (e.g., scan) is supported on the MFD;
- (d) MUST encode and interpret values of “printer-alert” and “printer-state-reasons” according to the IANA Printer MIB [IANAPRT] and IANA IPP Registry [IANAIPP];
- (e) MUST implement the prtAlertTable defined in IETF Printer MIB v2, if a Printer MIB Agent is implemented.

### 6.4 IPP Client Conformance Requirements

To claim conformance to this specification, an IPP Client implementation that supports Multifunction Devices:

- (a) MUST support the IPP Printer “printer-alert” and “printer-alert-description” attributes defined in PWG IPP Printer State Extensions [PWG5100.9];
- (b) MUST support the MFD alert groups defined in section 5.1 of this specification which are registered in PrtAlertGroupTC in IANA Printer MIB [IANAPRT] for keyword values in “printer-alert”, if the corresponding functionality (e.g., scan) is supported on the IPP Client;
- (c) MUST support the MFD and Printer alert codes defined in section 5.2 of this specification which are registered in PrtAlertCodeTC in IANA Printer MIB [IANAPRT] and IANA IPP Registry [IANAIPP] for keyword values in “printer-alert” and “printer-state-reasons”, if the corresponding functionality (e.g., scan) is supported on the IPP Client;
- (d) MUST decode and interpret values of “printer-alert” and “printer-state-reasons” according to the IANA Printer MIB [IANAPRT] and IANA IPP Registry [IANAIPP];
- (e) MUST support the prtAlertTable defined in IETF Printer MIB v2, if a Printer MIB Client is implemented.

## 7. Internationalization Considerations

The MFD alert groups and alert codes defined in this document do not add any internationalization considerations beyond those covered in section 8 of the IETF Printer MIB v2 [RFC3805]. The MFD extensions to the IPP Printer “printer-alert” and “printer-state-reasons” attributes defined in this document do not add any internationalization considerations beyond covered in section 7 of IPP/1.1 Model and Semantics [RFC2911].

## 8. Security Considerations

The MFD alert groups and alert codes defined in this document do not add any security considerations beyond those covered in section 9 of the IETF Printer MIB v2 [RFC3805]. The MFD extensions to the IPP Printer “printer-alert” and “printer-state-reasons” attributes defined in this document do not add any security considerations beyond covered in section 8 of IPP/1.1 Model and Semantics [RFC2911].

## 9. IANA Considerations

### 9.1 Alert Groups

This section contains the exact registration information for IANA to update the IANA-PRINTER-MIB PrtAlertGroupTC Registry [IANAPRT], according to the procedures defined in the IETF Printer MIB v2 [RFC3805] section 5, to cover the new alert groups defined in section 5.1 of this document. Add to PrtAlertGroupTC the following:

```
-- Values for the ScanDevice
  scanDevice(50),          -- MFD Extension
  scanner(51),            -- MFD Extension
  scanMediaPath(52),      -- MFD Extension
-- Values (50) to (59) reserved for the ScanDevice
-- Values for the FaxDevice
  faxDevice(60),          -- MFD Extension
  faxModem(61),          -- MFD Extension
-- Values (60) to (69) reserved for the FaxDevice
-- Values for other common subunits
  outputChannel(70),      -- MFD Extension
-- Values (70) to (79) reserved for common subunits
```

## 9.2 Alert Codes

This section contains the exact registration information for IANA to update the IANA-PRINTER-MIB PrtAlertCodeTC Registry [IANAPRT], according to the procedures defined in the IETF Printer MIB v2 [RFC3805] section 5, to cover the new alert codes defined in sections 5.2 and 5.3 of this document. Add to PrtAlertCodeTC the following:

```
-- Input Group
  inputMediaTrayFeedError(814),
  inputMediaTrayJam(815),
  inputMediaTrayFailure(816),
  inputMediaTrayPickRollerLifeWarn(817),
  inputMediaTrayPickRollerLifeOver(818),
  inputMediaTrayPickRollerFailure(819),
  inputMediaTrayPickRollerMissing(820),

-- Output Group
  outputMediaTrayFeedError(905),
  outputMediaTrayJam(906),
  outputMediaTrayFailure(907),

-- Media Path Group
  mediaPathFailure(1305),
  mediaPathJam(1306),
  mediaPathInputRequest(1310),
  mediaPathInputFeedError(1311),
  mediaPathInputJam(1312),
  mediaPathOutputFeedError(1321),
  mediaPathOutputJam(1322),
  mediaPathOutputFull(1323),
  mediaPathPickRollerLifeWarn(1331),
  mediaPathPickRollerLifeOver(1332),
  mediaPathPickRollerFailure(1333),
  mediaPathPickRollerMissing(1334),

-- Scanner Group
  scannerLightLifeAlmostOver(5101),
  scannerLightLifeOver(5102),
  scannerLightFailure(5103),
  scannerSensorLifeAlmostOver(5111),
  scannerSensorLifeOver(5112),
  scannerSensorFailure(5113),

-- Scan Media Path Group
  scanMediaPathTrayMissing(5201),
  scanMediaPathTrayAlmostFull(5202),
```



```
scanMediaPathTrayFull(5203),
scanMediaPathFailure(5205),
scanMediaPathJam(5206),
scanMediaPathInputRequest(5210),
scanMediaPathInputFeedError(5211),
scanMediaPathInputJam(5212),
scanMediaPathOutputFeedError(5221),
scanMediaPathOutputJam(5222),
scanMediaPathOutputFull(5223),
scanMediaPathPickRollerLifeWarn(5231),
scanMediaPathPickRollerLifeOver(5232),
scanMediaPathPickRollerFailure(5233),
scanMediaPathPickRollerMissing(5234),

-- Fax Modem Group
faxModemMissing(6101),
faxModemLifeAlmostOver(6102),
faxModemLifeOver(6103),
faxModemTurnedOn(6104),
faxModemTurnedOff(6105),
faxModemInactivityTimeout(6110),
faxModemProtocolError(6111),
faxModemEquipmentFailure(6112),
faxModemNoDialTone(6113),
faxModemLineBusy(6114),
faxModemNoAnswer(6115),
faxModemVoiceDetected(6116),
faxModemCarrierLost(6117),
faxModemTrainingFailure(6118),
```

### 9.3 IPP Attribute and Keyword Value Registrations

This section contains the exact registration information for IANA to update according to the procedures defined in [RFC2911].

The registry entry will contain the following information:

Section 9 (References)

[PWG5107.3] PWG Multifunction Device Alerts, PWG 5107.3, June 2012.

[ftp://ftp.pwg.org/pub/pwg/candidates/  
cs-pmpmfdalerts10-20120629-5107.3.pdf](ftp://ftp.pwg.org/pub/pwg/candidates/cs-pmpmfdalerts10-20120629-5107.3.pdf)

Section 2 (Keyword Attribute Values)

Attribute Name (attribute syntax)	Reference
-----	-----
printer-state-reasons (1setOf type2 keyword)	[RFC2911]
input-media-tray-feed-error	[PWG5107.3]
input-media-tray-jam	[PWG5107.3]
input-media-tray-failure	[PWG5107.3]
input-pick-roller-life-warn	[PWG5107.3]
input-pick-roller-life-over	[PWG5107.3]
input-pick-roller-failure	[PWG5107.3]
input-pick-roller-missing	[PWG5107.3]
output-media-tray-feed-error	[PWG5107.3]
output-media-tray-jam	[PWG5107.3]
output-media-tray-failure	[PWG5107.3]
media-path-failure	[PWG5107.3]
media-path-jam	[PWG5107.3]
media-path-input-request	[PWG5107.3]
media-path-input-feed-error	[PWG5107.3]
media-path-input-jam	[PWG5107.3]
media-path-input-empty	[PWG5107.3]
media-path-output-feed-error	[PWG5107.3]
media-path-output-jam	[PWG5107.3]
media-path-output-full	[PWG5107.3]
media-path-pick-roller-life-warn	[PWG5107.3]
media-path-pick-roller-life-over	[PWG5107.3]
media-path-pick-roller-failure	[PWG5107.3]
media-path-pick-roller-missing	[PWG5107.3]

scanner-light-life-almost-over	[ PWG5107.3 ]
scanner-light-life-over	[ PWG5107.3 ]
scanner-light-failure	[ PWG5107.3 ]
scanner-sensor-life-almost-over	[ PWG5107.3 ]
scanner-sensor-life-over	[ PWG5107.3 ]
scanner-sensor-failure	[ PWG5107.3 ]
scan-media-path-tray-missing	[ PWG5107.3 ]
scan-media-path-tray-almost-full	[ PWG5107.3 ]
scan-media-path-tray-full	[ PWG5107.3 ]
scan-media-path-failure	[ PWG5107.3 ]
scan-media-path-jam	[ PWG5107.3 ]
scan-media-path-input-request	[ PWG5107.3 ]
scan-media-path-input-feed-error	[ PWG5107.3 ]
scan-media-path-input-jam	[ PWG5107.3 ]
scan-media-path-output-feed-error	[ PWG5107.3 ]
scan-media-path-output-jam	[ PWG5107.3 ]
scan-media-path-output-full	[ PWG5107.3 ]
scan-media-path-pick-roller-life-warn	[ PWG5107.3 ]
scan-media-path-pick-roller-life-over	[ PWG5107.3 ]
scan-media-path-pick-roller-failure	[ PWG5107.3 ]
scan-media-path-pick-roller-missing	[ PWG5107.3 ]
fax-modem-missing	[ PWG5107.3 ]
fax-modem-life-almost-over	[ PWG5107.3 ]
fax-modem-life-over	[ PWG5107.3 ]
fax-modem-turned-on	[ PWG5107.3 ]
fax-modem-turned-off	[ PWG5107.3 ]
fax-modem-inactivity-timeout	[ PWG5107.3 ]
fax-modem-protocol-error	[ PWG5107.3 ]
fax-modem-equipment-failure	[ PWG5107.3 ]
fax-modem-no-dial-tone	[ PWG5107.3 ]
fax-modem-line-busy	[ PWG5107.3 ]
fax-modem-no-answer	[ PWG5107.3 ]
fax-modem-voice-detected	[ PWG5107.3 ]
fax-modem-carrier-lost	[ PWG5107.3 ]
fax-modem-training-failure	[ PWG5107.3 ]

## 10. References

### 10.1 Normative References

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<http://www.iana.org/assignments/ipp-registrations>
- [IANAPRT] “IANA Printer MIB”, IANA Registry,  
<http://www.iana.org/assignments/ianaprinter-mib>
- [PWG5100.9] I. McDonald, C. Whittle, “IPP Printer State Extensions”, PWG 5100.9-2009, July 2009, <ftp://ftp.pwg.org/pub/pwg/candidates/cs-ippstate10-20090731-5100.9.pdf>
- [PWG5108.1] W. Wagner, P. Zehler, “MFD Model and Common Semantics”, PWG 5108.1-2011, April 2011, <ftp://ftp.pwg.org/pub/pwg/candidates/cs-sm20-mfdmodel10-20110415-5108.1.pdf>
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<http://www.ietf.org/rfc/rfc2119.txt>
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<http://www.ietf.org/rfc/rfc2616.txt>
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- [RFC3806] R. Bergman, H. Lewis, I. McDonald, "Printer Finishing MIB", RFC 3806, June 2004, <http://www.ietf.org/rfc/rfc3806.txt>

### 10.2 Informative References

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<http://www.ietf.org/rfc/rfc1759.txt>
- [RFC2567] F.D. Wright, "IETF Design Goals for an Internet Printing Protocol", RFC 2567, April 1999, <http://www.ietf.org/rfc/rfc2567.txt>

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- [WS-MGMT] DMTF, "DMTF Web Services for Management (WS-Management) v1.0.0", DSP0226, February 2008, [http://dmtf.org/sites/default/files/standards/documents/DSP0226\\_1.0.0.pdf](http://dmtf.org/sites/default/files/standards/documents/DSP0226_1.0.0.pdf)
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- [WSDM-MOWS] K. Wilson, I. Sadukin, "OASIS Web Services Distributed Management: Management of Web Services (WSDM-MOWS 1.1)", August 2006, <http://www.oasis-open.org/committees/download.php/20576/wsdm-muws1-1.1-spec-os-01.pdf>
- [WSDM-MUWS1] V. Bullard, W. Vambenepe, "OASIS Web Services Distributed Management: Management Using Web Services (MUWS 1.1) Part 1", August 2006, <http://www.oasis-open.org/committees/download.php/20576/wsdm-muws1-1.1-spec-os-01.pdf>
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## 11. Authors' Addresses

### Ira McDonald

High North Inc

PO Box 221

Grand Marais, MI 49839

Phone: 906-494-2434

Email: [blueroofmusic@gmail.com](mailto:blueroofmusic@gmail.com)

### Ron Bergman

Email: [RGBergman@hotmail.com](mailto:RGBergman@hotmail.com)

**The following individuals also contributed to the development of this document:**

Charles Baxter	Xerox
John Boyd	Toshiba
Lee Farrell	
Walt Filbrich	
Gail Giansiracusa	Kyocera Mita
Sheng Lee	Toshiba
Harry Lewis	InfoPrint Solutions
Stuart Rowley	
Michael Sweet	Apple
Ole Skov	MPI Tech
Thomas Silver	Xerox
Jerry Thrasher	Lexmark
Paul Tykodi	Tykodi Consulting Services
Bill Wagner	TIC
Craig Whittle	Sharp Labs
Peter Zehler	Xerox