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INTERNATIONAL STANDARD

**Information technology – UPnP Device Architecture –
Part 9-11: Imaging Device Control Protocol – Feeder Service**

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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
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INFORMATION TECHNOLOGY – UPNP DEVICE ARCHITECTURE –

Part 9-11: Imaging Device Control Protocol – Feeder Service

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The list of all currently available parts of the ISO/IEC 29341 series, under the general title *Universal plug and play (UPnP) architecture*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

ORIGINAL UPnP DOCUMENTS (informative)

Reference may be made in this document to original UPnP documents. These references are retained in order to maintain consistency between the specifications as published by ISO/IEC and by UPnP Implementers Corporation. The following table indicates the original UPnP document titles and the corresponding part of ISO/IEC 29341:

UPnP Document Title	ISO/IEC 29341 Part
UPnP Device Architecture 1.0	ISO/IEC 29341-1
UPnP Basic:1 Device	ISO/IEC 29341-2
UPnP AV Architecture:1	ISO/IEC 29341-3-1
UPnP MediaRenderer:1 Device	ISO/IEC 29341-3-2
UPnP MediaServer:1 Device	ISO/IEC 29341-3-3
UPnP AVTransport:1 Service	ISO/IEC 29341-3-10
UPnP ConnectionManager:1 Service	ISO/IEC 29341-3-11
UPnP ContentDirectory:1 Service	ISO/IEC 29341-3-12
UPnP RenderingControl:1 Service	ISO/IEC 29341-3-13
UPnP MediaRenderer:2 Device	ISO/IEC 29341-4-2
UPnP MediaServer:2 Device	ISO/IEC 29341-4-3
UPnP AV Datastructure Template:1	ISO/IEC 29341-4-4
UPnP AVTransport:2 Service	ISO/IEC 29341-4-10
UPnP ConnectionManager:2 Service	ISO/IEC 29341-4-11
UPnP ContentDirectory:2 Service	ISO/IEC 29341-4-12
UPnP RenderingControl:2 Service	ISO/IEC 29341-4-13
UPnP ScheduledRecording:1	ISO/IEC 29341-4-14
UPnP DigitalSecurityCamera:1 Device	ISO/IEC 29341-5-1
UPnP DigitalSecurityCameraMotionImage:1 Service	ISO/IEC 29341-5-10
UPnP DigitalSecurityCameraSettings:1 Service	ISO/IEC 29341-5-11
UPnP DigitalSecurityCameraStillImage:1 Service	ISO/IEC 29341-5-12
UPnP HVAC_System:1 Device	ISO/IEC 29341-6-1
UPnP HVAC_ZoneThermostat:1 Device	ISO/IEC 29341-6-2
UPnP ControlValve:1 Service	ISO/IEC 29341-6-10
UPnP HVAC_FanOperatingMode:1 Service	ISO/IEC 29341-6-11
UPnP FanSpeed:1 Service	ISO/IEC 29341-6-12
UPnP HouseStatus:1 Service	ISO/IEC 29341-6-13
UPnP HVAC_SetpointSchedule:1 Service	ISO/IEC 29341-6-14
UPnP TemperatureSensor:1 Service	ISO/IEC 29341-6-15
UPnP TemperatureSetpoint:1 Service	ISO/IEC 29341-6-16
UPnP HVAC_UserOperatingMode:1 Service	ISO/IEC 29341-6-17
UPnP BinaryLight:1 Device	ISO/IEC 29341-7-1
UPnP DimmableLight:1 Device	ISO/IEC 29341-7-2
UPnP Dimming:1 Service	ISO/IEC 29341-7-10
UPnP SwitchPower:1 Service	ISO/IEC 29341-7-11
UPnP InternetGatewayDevice:1 Device	ISO/IEC 29341-8-1
UPnP LANDevice:1 Device	ISO/IEC 29341-8-2
UPnP WANDevice:1 Device	ISO/IEC 29341-8-3
UPnP WANConnectionDevice:1 Device	ISO/IEC 29341-8-4
UPnP WLANAccessPointDevice:1 Device	ISO/IEC 29341-8-5
UPnP LANHostConfigManagement:1 Service	ISO/IEC 29341-8-10
UPnP Layer3Forwarding:1 Service	ISO/IEC 29341-8-11
UPnP LinkAuthentication:1 Service	ISO/IEC 29341-8-12
UPnP RadiusClient:1 Service	ISO/IEC 29341-8-13
UPnP WANCableLinkConfig:1 Service	ISO/IEC 29341-8-14
UPnP WANCommonInterfaceConfig:1 Service	ISO/IEC 29341-8-15
UPnP WANDSLLinkConfig:1 Service	ISO/IEC 29341-8-16
UPnP WANEthernetLinkConfig:1 Service	ISO/IEC 29341-8-17
UPnP WANIPConnection:1 Service	ISO/IEC 29341-8-18
UPnP WANPOTSLinkConfig:1 Service	ISO/IEC 29341-8-19
UPnP WANPPPConnection:1 Service	ISO/IEC 29341-8-20
UPnP WLANConfiguration:1 Service	ISO/IEC 29341-8-21
UPnP Printer:1 Device	ISO/IEC 29341-9-1
UPnP Scanner:1.0 Device	ISO/IEC 29341-9-2
UPnP ExternalActivity:1 Service	ISO/IEC 29341-9-10
UPnP Feeder:1.0 Service	ISO/IEC 29341-9-11
UPnP PrintBasic:1 Service	ISO/IEC 29341-9-12
UPnP Scan:1 Service	ISO/IEC 29341-9-13
UPnP QoS Architecture:1.0	ISO/IEC 29341-10-1
UPnP QoSDevice:1 Service	ISO/IEC 29341-10-10
UPnP QoSManager:1 Service	ISO/IEC 29341-10-11
UPnP QoSPolicyHolder:1 Service	ISO/IEC 29341-10-12
UPnP QoS Architecture:2	ISO/IEC 29341-11-1
UPnP QOS v2 Schema Files	ISO/IEC 29341-11-2

UPnP Document Title	ISO/IEC 29341 Part
UPnP QosDevice:2 Service	ISO/IEC 29341-11-10
UPnP QosManager:2 Service	ISO/IEC 29341-11-11
UPnP QosPolicyHolder:2 Service	ISO/IEC 29341-11-12
UPnP RemoteUIClientDevice:1 Device	ISO/IEC 29341-12-1
UPnP RemoteUIServerDevice:1 Device	ISO/IEC 29341-12-2
UPnP RemoteUIClient:1 Service	ISO/IEC 29341-12-10
UPnP RemoteUIServer:1 Service	ISO/IEC 29341-12-11
UPnP DeviceSecurity:1 Service	ISO/IEC 29341-13-10
UPnP SecurityConsole:1 Service	ISO/IEC 29341-13-11

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1. Overview and Scope

This service definition is compliant with the UPnP Device Architecture version 1.0.

This service-type enables the following functions:

- Document Feeders for Scanners, Faxes, etc.

This service template does not address:

- TBD

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2. Service Modeling Definitions

2.1. ServiceType

A service that is compliant with this template is identified with the following service type:

urn:schemas-upnp-org:service:Feeder:1

2.2. Service State Table

Table 1: State Variables

Variable Name	Req. or Opt. ¹	Data Type	Allowed Value ²	Default Value ²	Eng. Units
<i>Model</i>	<i>O</i>	<i>string</i>	<i>Vendor Specific</i>		
<i>State</i>	<i>R</i>	<i>string</i>	<i>[Unloaded Loaded Busy Erred]</i>	<i>Unloaded</i>	<i>n/a</i>
<i>FailureCode</i>	<i>R</i>	<i>string</i>	<i>[none Jammed Timeout]</i>	<i>none</i>	<i>n/a</i>
<i>MorePages</i>	<i>O</i>	<i>boolean</i>		<i>False (0)</i>	<i>n/a</i>
<i>FeederMode</i>	<i>R</i>	<i>string</i>	<i>[Simplex]</i>	<i>[Simplex]</i>	<i>n/a</i>
<i>SheetWidth</i>	<i>R</i>	<i>ui4</i>			<i>milli-inches</i>
<i>SheetHeight</i>	<i>R</i>	<i>ui4</i>			<i>milli-inches</i>
<i>InputJustification</i>	<i>R</i>	<i>string</i>		<i>vendor specific</i>	<i>n/a</i>
<i>JobID</i>	<i>R</i>	<i>ui4</i>	<i>0-4294967295</i>	<i>0</i>	<i>n/a</i>
<i>EntireDocument</i>	<i>R</i>	<i>string</i>	<i>[device-setting 1 0]</i>	<i>True (1)</i>	<i>n/a</i>
<i>Timeout</i>	<i>R</i>	<i>ui4</i>		<i>vendor-defined</i>	<i>seconds</i>

2.2.1. Model

Gives the model number of the feeder. This variable is not required on devices that have a fixed feeder.

2.2.2. State

Describes the state of the feeder. The possible values include the following:

- *Unloaded* – The feeder does not currently have any sheets loaded.
- *Loaded* – (Simplex Mode) – A sheet is loaded and ready to operate on.

¹ R = Required, O = Optional, X = Non-standard.

² Values listed in this column are required. To specify standard optional values or to delegate assignment of values to the vendor, you must reference a specific instance of an appropriate table below.

- *First-Side-Loaded* – (Duplex Mode) – A sheet is loaded with the top side ready to operate on.
- *Second-Side-Loaded* – (Duplex Mode) – A sheet is loaded with the bottom side ready to operate on.
- *Erred* – The feeder is jammed or erred. No further actions will be accepted until the state is cleared.
- *Busy* – The feeder is currently busy or being used and its state cannot be changed.

Table 1.1 allowedValueList for State

<i>Value</i>	<i>Req. or Opt.</i>
<i>Unloaded</i>	<i>R</i>
<i>Loaded</i>	<i>R</i>
<i>Erred</i>	<i>R</i>
<i>Busy</i>	<i>R</i>
<i>First-Side-Loaded</i>	<i>O</i> ³
<i>Second-Side-Loaded</i>	<i>O</i> ³

2.2.3. FailureCode

A Failure Code indicates a failure, or error, that does not occur as an immediate result of an action and cannot be reported as part of the action response. Error Codes that occur during the execution of an action are not listed as allowed values of the FailureCode unless they can occur outside of the boundary of the action.

Table 1.2 allowedValueList for FailureCode

<i>Value</i>	<i>Req. or Opt.</i>
<i>None</i>	<i>R</i>
<i>Jammed</i>	<i>R</i>
<i>Timeout</i>	<i>R</i>
<i>... (vendor defined)</i>	<i>O</i>

2.2.4. MorePages

Indicates whether there are additional pages in the feeder or not.

2.2.5. FeederMode

Indicates the type of feed to use in operation with the current scan. The allowed values may be a vendor specific subset or superset of the given values. *Note: Simplex indicates one sided sheets, Duplex indicates two sided sheets.*

Table 1.3 allowedValueList for FeederMode

<i>Value</i>	<i>Req. or Opt.</i>
<i>Simplex</i>	<i>R</i>
<i>Duplex</i>	<i>O</i> ⁴
<i>... (vendor defined)</i>	<i>O</i>

2.2.6. SheetWidth

This value is a constant that represents the minimum and maximum values of the sheet width supported by the Feeder. These values are available in the SCPD, but there are no actions defined to provide access to the actual value. The intent of this variable is only to provide the limits of the sheet width supported by the feeder.

Table 1.4 allowedValueRange for SheetWidth

<i>Value</i>	<i>Req. or Opt.</i>
<i>Minimum</i>	<i>VendorUnique</i>
<i>Maximum</i>	<i>VendorUnique</i>

SheetWidth is a constant value. It provides limiting values of the paper size that is supported by the feeder.

³ For use with Duplex Feeders

⁴ For use with a Duplex Feeder

2.2.7. SheetHeight

This value is a constant that represents the minimum and maximum values of the sheet height supported by the Feeder. These values are available in the SCPD, but there are no actions defined to provide access to the actual value. The intent of this variable is only to provide the limits of the sheet height supported by the feeder.

Table 1.5 *allowedValueRange for SheetHeight*

<i>Value</i>		<i>Req. or Opt.</i>
<i>Minimum</i>	<i>VendorUnique</i>	<i>R</i>
<i>Maximum</i>	<i>VendorUnique</i>	

SheetHeight is a constant value. It provides limiting values of the paper size that is supported by the feeder.

2.2.8. InputJustification

This value is a constant that is used to indicate the justification supported by the Feeder. This value is in the SCPD, but the actual value of the state variable is not important.

2.2.9. JobID

An argument placeholder for the JobID type arguments.

2.2.10. EntireDocument

Indicates whether the Eject action should eject one sheet or the entire document..

2.2.11. Timeout

Indicates the timeout value in seconds used to prevent deadlocks in the feeder. This value is for information only and cannot be changed.

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2.3. Eventing and Moderation

Table 2: Event Moderation

Variable Name	Evented	Moderated Event?	Max Event Rate	Logical Combination	Min Delta per Event
			Determined by N Where Rate = (Event)/(N secs)		(N) * (allowed ValueRange Step)
<i>Model</i>	<i>No</i>				
<i>State</i>	<i>No</i>				
<i>FailureCode</i>	<i>No</i>				
<i>MorePages</i>	<i>Yes</i>	<i>No</i>			
<i>FeederMode</i>	<i>No</i>				
<i>SheetWidth</i>	<i>No</i>				
<i>SheetHeight</i>	<i>No</i>				
<i>InputJustification</i>	<i>No</i>				
<i>JobID</i>	<i>No</i>				
<i>EntireDocument</i>	<i>No</i>				
<i>Timeout</i>	<i>No</i>				

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2.4. Actions

Immediately following this table is detailed information about these actions, including short descriptions of the actions, the effects of the actions on state variables, and error codes defined by the actions.

Table 3: Action List

Name	Req. or Opt.
Load	R
Eject	R
Reset	R
GetState	R
SetFeederMode	R
GetFeederMode	R

2.4.1. (void) Load(JobIDIn, StateOut)

2.4.1.1. Arguments

Table 4: Arguments for Load

Argument	Direction	RelatedStateVariable
<u>JobIDIn</u>	<u>IN</u>	<u>JobID</u>
<u>StateOut</u>	<u>OUT</u>	<u>State</u>

2.4.1.2. Effect on State

Attempt to load a sheet. If successful, set the State to **Loaded, First-Side-Loaded, or Second-Side-Loaded**. The resulting state value is returned. See the state diagrams in *Figure 1* and *Figure 2* on page 16. The Load action is not valid in the Busy state. If it is used in the Busy state, then Action Failed (501) is returned and the action is not performed.

2.4.1.3. Errors

Table 5: Errors for Load

errorCode	errorDescription	Description
<u>501</u>	<u>Action Failed</u>	This action cannot be performed in the Busy state
<u>711</u>	<u>Jammed</u>	The device has jammed. Clear the paper path and execute the reset action
<u>713</u>	<u>Feeder Empty</u>	A load was attempted when there were no more pages available.

2.4.2. (void) Eject(JobIDIn, bEntireDocumentIn, StateOut)

2.4.2.1. Arguments

Table 6: Arguments for Eject

Argument	Direction	relatedStateVariable
<u>JobIDIn</u>	<u>IN</u>	<u>JobID</u>
<u>EntireDocumentIn</u>	<u>IN</u>	<u>EntireDocument</u>
<u>StateOut</u>	<u>OUT</u>	<u>State</u>

2.4.2.2. Effect on State

Attempt to eject a sheet. If successful, set the State to **Unloaded**. The resulting state value is returned. The Eject action is not allowed in the Busy state. If Eject is performed while in the Busy state, Action Failed (501) will be returned and the action will not be performed. If *EntireDocumentIn* is true, then all of the documents in the current *Job* are ejected. The normal definition of *Job* is assumed to be all sheets in the feeder. However, vendors may redefine the term to fit the capabilities of the feeder (ex. If a feeder can detect separator sheets, then a job would end at the next separator sheet). If *EntireDocumentIn* is false, then one sheet will be ejected.

2.4.2.3. Errors

Table 7: Errors for Eject

errorCode	errorDescription	Description
<u>501</u>	<u>Action Failed</u>	The Eject action cannot be performed in the Busy state
<u>711</u>	<u>Jammed</u>	The device has jammed. Clear the paper path and execute the reset action

2.4.3. (void) Reset(JobIDIn, StateOut)

2.4.3.1. Arguments

Table 8: Arguments for Reset

Argument	Direction	relatedStateVariable
<u>JobIDIn</u>	<u>IN</u>	<u>JobID</u>
<u>StateOut</u>	<u>OUT</u>	<u>State</u>

2.4.3.2. Effect on State

Attempt to clear a Erred state. If the action is successful, the state will change to **Unloaded**. The resulting state value is returned. The Reset action is not allowed in the Busy state. If Reset is performed while in the Busy state, Action Failed (501) will be returned and the action will not be performed.

Table 9: Errors for Reset

errorCode	errorDescription	Description
<u>501</u>	<u>Action Failed</u>	The Reset action cannot be performed in the Busy state

2.4.4. (void) GetState(StateOut, MorePagesOut, FailureCodeOut)

2.4.4.1. Arguments

Table 10: Arguments for GetState

Argument	Direction	relatedStateVariable
<u>StateOut</u>	<u>OUT</u>	<u>State</u>
<u>MorePagesOut</u>	<u>OUT</u>	<u>MorePages</u>
<u>FailureCodeOut</u>	<u>OUT</u>	<u>FailureCode</u>

2.4.4.2. Effect on State

Get the current operating state of the feeder. No effect on state.

2.4.5. (void) SetFeederMode(JobIDIn, FeederModeIn)

2.4.5.1. Arguments

Table 11: Arguments for SetFeederMode

Argument	Direction	relatedStateVariable
<u>JobIDIn</u>	<u>IN</u>	<u>JobID</u>
<u>FeederModeIn</u>	<u>IN</u>	<u>FeederMode</u>

2.4.5.2. Effect on State

This action changes the FeederModeIn value to enable or disable duplex scanning. This value must only be changed when the State value is Unloaded, otherwise the FeederModeIn value will not be changed and an *InvalidState* error will be returned.

2.4.5.3. Errors

Table 12: Errors for SetFeederMode

errorCode	errorDescription	Description
501	Action Failed	This action can only be executed when the current State value is Unloaded.

2.4.6. (void) GetFeederMode(FeederModeOut)

2.4.6.1. Arguments

Table 13: Arguments for GetFeederMode

Argument	Direction	RelatedStateVariable
<u>FeederModeOut</u>	<u>OUT</u>	<u>FeederMode</u>

2.4.6.2. Effect on State

This action returns the current value of the FeederMode setting. No effect on state.

2.4.7. Common Error Codes

Table 14: Common Error Codes

errorCode	errorDescription	Description
401	Invalid Action	See UPnP Device Architecture section on Control.
402	Invalid Args	See UPnP Device Architecture section on Control.
501	Action Failed	See UPnP Device Architecture section on Control.
600	Argument Value Invalid	The argument value is invalid.
601	Argument Value Out of Range	An argument value is less than the minimum or more than the maximum value of the allowedValueRange , or is not in the allowedValueList .
602	Optional Action Not Implemented	The requested action is optional and is not implemented by the device.
603	Out of Memory	The device does not have sufficient memory available to complete the action. This may be a temporary condition; the control point may choose to retry the unmodified request again later and it may succeed if memory is available.
604 Proposed	Human Intervention Required	The device has encountered an error condition which it cannot resolve itself and requires human intervention such as a reset or power cycle. See the device display or documentation for further guidance.

2.5. Theory of Operation

This service is intended to be used with a Scanner, FAX or other similar service and device. It has a simple state machine shown below:

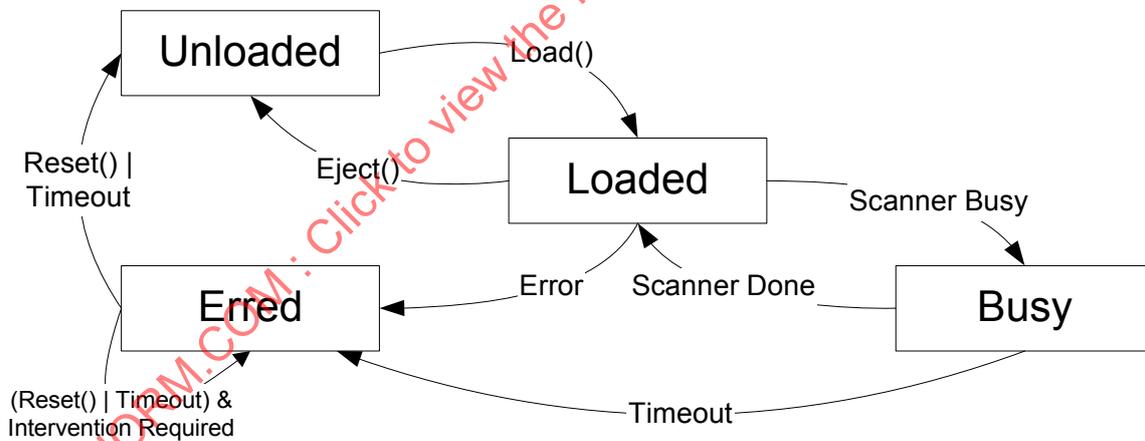


Figure 1 – Simplex Feeder State Diagram

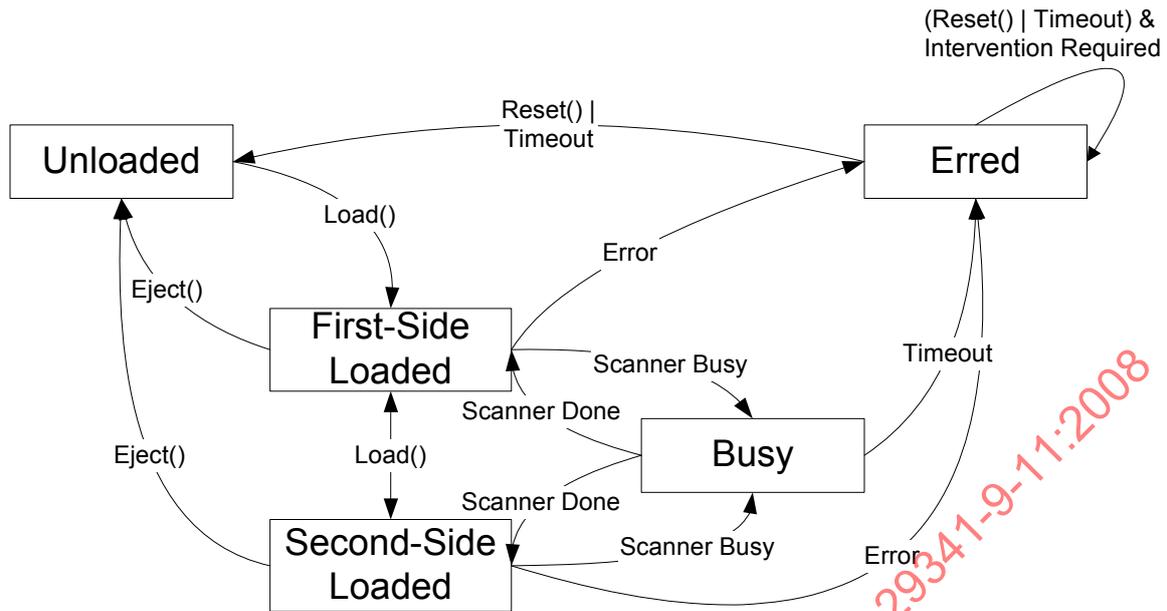


Figure 2 – Duplex Feeder State Diagram

With a Simplex FeederMode value, a load action should always load a new page and end up in the *Loaded* state. An Eject action should always unload any loaded page and end up in the *Unloaded* state. Exceptions would be when there are no pages available (State changes to *Unloaded*) or when a jam occurs (State changes to *Erred*). With a Duplex FeederMode value, a load action should always move from Unloaded to First-Side-Loaded, from First-Side-Loaded to Second-Side-Loaded, or from Second-Side-Loaded to First-Side-Loaded. Exceptions would be when there are no pages available (State changes to *Unloaded*) or when a jam or other error occurs (State changes to *Erred*). The Busy state is a state where no feeder actions should be performed. Entry into and exit from the Busy state are controlled by vendor-specific interactions between the Scanner service and the Feeder service and are not specified in this document.

2.5.1. Enhanced Feeder Operation

The feeder described in this document is a simple feeder. It does not encompass all of the different feeder varieties that the Scanning committee envisioned. Instead, it represents a simple feeder with a simple interface to the scanner. If a vendor has a more complex feeder then they must modify this service to properly represent it. However, care must be taken to keep the same interface for the scanner service.

3. XML Service Template for Feeder:1.0

The XML document below is a sample *Service Control Protocol Document* (SCPD) for a scanner feeder device. It should be modified as needed by a scanner vendor to fully describe the feeder service offered by the scanner device. The scanner device should make the modified document available at the SCPD URL given in the device descriptor. A client will perform an HTTP/GET operation on that URL to get the document. NOTE: The XML comments are for information only and should be removed from the SCPD.

```
<?xml version="1.0"?>
<scpd xmlns="urn:schemas-upnp-org:service-1-0">
  <specVersion>
    <major>1</major>
    <minor>0</minor>
  </specVersion>
  <actionList>
    <action>
      <name>Load</name>
      <argumentList>
        <argument>
          <name>JobIDIn</name>
          <relatedStateVariable>JobID</relatedStateVariable>
          <direction>in</direction>
        </argument>
        <argument>
          <name>StateOut</name>
          <relatedStateVariable>State</relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
    <action>
      <name>Eject</name>
      <argumentList>
        <argument>
          <name>JobIDIn</name>
          <relatedStateVariable>JobID</relatedStateVariable>
          <direction>in</direction>
        </argument>
        <argument>
          <name>EntireDocumentIn</name>
          <relatedStateVariable>EntireDocument</relatedStateVariable>
          <direction>in</direction>
        </argument>
        <argument>
          <name>StateOut</name>
          <relatedStateVariable>State</relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
    <action>
      <name>Reset</name>
      <argumentList>
        <argument>
          <name>JobIDIn</name>
          <relatedStateVariable>JobID</relatedStateVariable>
          <direction>in</direction>
        </argument>
        <argument>
          <name>StateOut</name>
          <relatedStateVariable>State</relatedStateVariable>
          <direction>out</direction>
        </argument>
      </argumentList>
    </action>
  </actionList>
</scpd>
```