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HP 9100C Digital Sender

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Applications and User Interface customisation
with the HP 9100C Digital Sender:**

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HP 9100C Digital Sender

Integration with Third Party Applications and User Interface customisation

INTRODUCTION

Abstract

The HP 9100C Digital Sender is an office communication device with colour scanning capabilities and a built-in network connection. The device components are:

a colour scanning engine; ADF able to stack up to 50 pages; and a control panel to provide the machine with information needed to distribute captured documents over the network. The HP 9100C Digital Sender runs on TCP-IP networks and the supported platforms are Windows NT 4.x/5.0 and Win 95/98.

The Digital Sender distributes documents directly to, or distributes via):

Internet e-mail addresses
Fax numbers
Network PCs and Servers
Network Printers
Integrated third party applications
JetSend devices
Internet Fax Service

Purpose of the document

- To describe the best ways to configure and customise the HP 9100C Digital Sender including its front control panel to achieve integration with third party applications
- Description of how to acquire sent documents
- Outline limitations of the proposed solution

Components

The HP 9100C Digital Sender is shipped with the following components, which enable the third party integration and user interface customisation:

- Address Book Manager application for Windows
- HP 9100C Digital Sender Windows NT Service

Features

The front control panel user interface can be customised easily. Of the 16 control panel function keys, 11 can be customised and labelled with specific application names or lists of destinations and then simply accessed via each function key.

Each destination has attributes such as:

The desired file format for the delivered document

The desired file name

The desired setting to be used when capturing the document

The network address and destination path for document delivery.

The generic string which can be used by your application, such as a command line list of parameters

Control panel function key customisation and assignment is done using the Windows 'Address Book Manager' application which is part of the client software shipped with the HP 9100C Digital Sender.

The specific chapter below describes how documents captured by the Digital Sender can be acquired once they reach the final network destination.

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Architecture

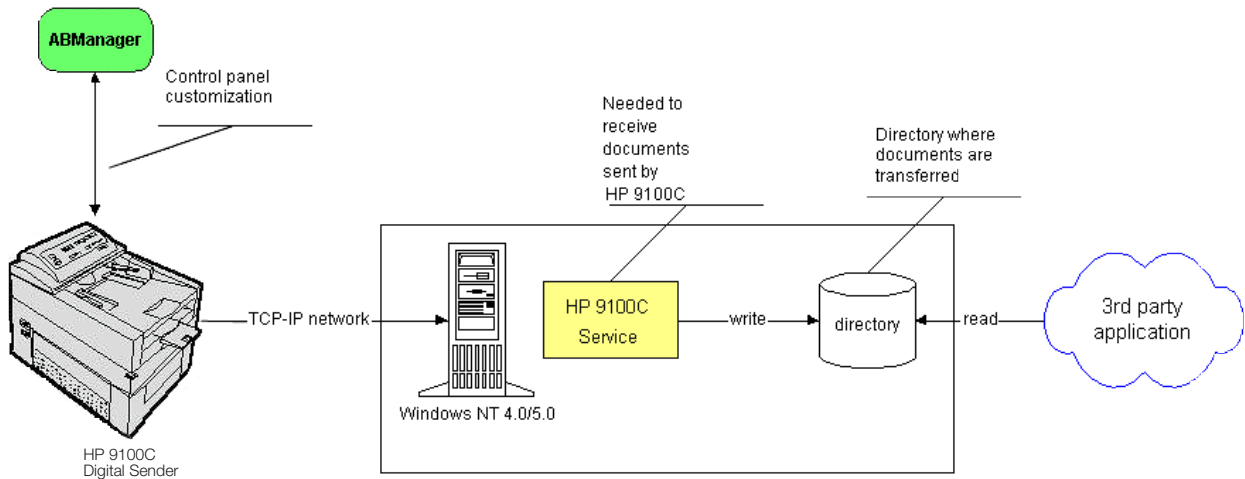


Figure 1. Architecture

The diagram above shows the architecture and major components.

- **‘Address Book Manager’** is a Windows application used to customise the control panel function keys. This application connects directly to the Digital Sender and configures through the TCP-IP network.
 - **HP 9100C Digital Sender Service.** This software must be installed on a networked machine, Windows NT 4.x/5.0 Workstation or Server, in order to receive documents from the Digital Sender and to store them in the specified directory.
- The Digital Sender Service runs as an NT Service. (see ‘A different architecture implementation’ section)
- **3rd Party Application.** Means any application which is able to import the files sent from the HP 9100C Digital Sender and saved in the directory (as shown in Fig 1 above).

The directory used to store incoming documents can either be: 1.) local to the machine where the NT Service is installed, or : 2.) can be a network directory.

With 2.) the only requirement is that the service must have visibility and ‘own’ all the rights to write to that directory.

Example

‘Let’s say I want to integrate a ‘Store & Retrieve’ kind of application called ‘ABC’ with folders to classify documents based on the content, such as ‘public’ and ‘private’, this is what I have to do from ‘Address Book Manager’:

1. Label one of the available function keys with the name ‘ABC’
2. Associate 2 items with that function key. One called ‘To Public Folder’ the other called ‘To Private Folder’. In this case, the network address, file format and setting will probably be the same for the 2 items. The in-box directory path can be different so that ‘ABC’ can manage the archiving of the data correctly.
3. Instruct my ‘ABC’ application to search for documents to upload to those two directories.

The diagram below highlights the interaction at the control panel following the toolkit customisation:

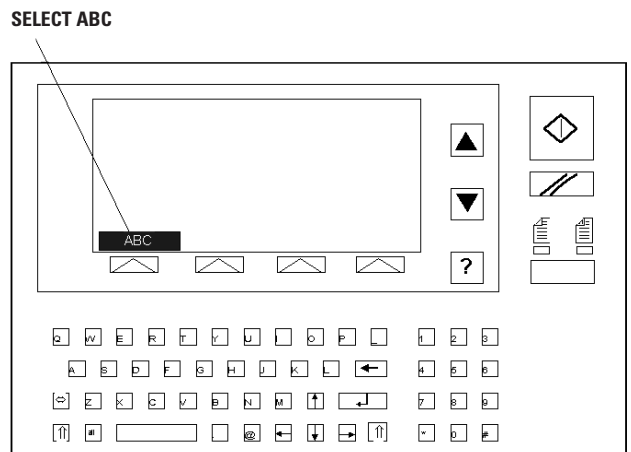


Figure 2: View of control panel, step 1

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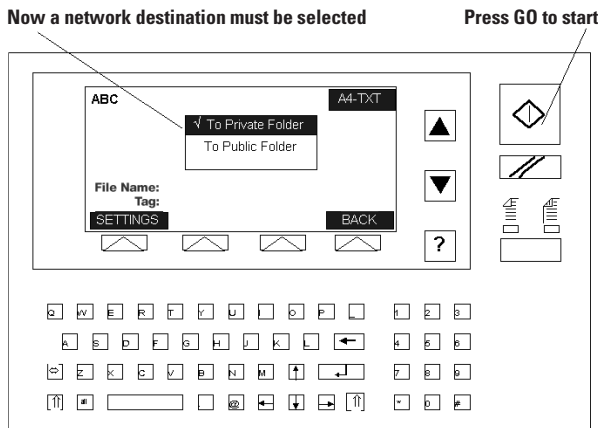


Figure 3: View of control panel, step 2

The **SETTINGS** key allows the user to select **QUALITY** and **PAGE SIZE**. **QUALITY** includes **COLOR DOCUMENT**, **COLOR-B/W PHOTO**, **FINE TEXT OCR** and **HIGH RESOLUTION PHOTO**. **SIZE** includes **A4**, **LETTER** and **LEGAL**.

Technical details

When the Address Book Manager application is used to customise destinations at the control panel, the following alternatives are available:

The HP 9100C Digital Sender delivers these file formats:

- PDF multi-page
- MTIFF B/W & colour uncompressed
- MTIFF 6.0 B/W & colour
- PCL5 PackBits compressed also called PCL5-RLE

The Digital Sender produces only multi-page files.

The HP 9100C Digital Sender has 5 pre-defined settings available at the control panel for ISV destinations:

- **COLOR DOCUMENT** (default)
- **B/W DOCUMENT**
- **COLOR-B/W PHOTO**
- **FINE TEXT (OCR)**
- **HIGH RESOLUTION PHOTO**

Defined as:

COLOR DOCUMENT Original document is a mix of color and B/W background, text, images. (150dpi 24bpp, 1bpp)

B/W DOCUMENT Original document is a B/W document mainly with text or the user is interested in communicating the textual part of the document. (300dpi 1bpp)

COLOR-B/W PHOTO Original is a photo or the user is interested in communicating color/gray shades. (200dpi bpp)

FINE TEXT (OCR) Provide 600dpi 1bpp

HIGH RESOLUTION PHOTO Provide 600dpi 24bpp, only with PDF file format.

These are the available options - customised settings are not available.

The data obtained by the programmed file format and the selected setting is summarised as follows:

	PDF	MTIFF	PCL5	TIFF 6.0
COLOR DOCUMENT	Regular PDF file	Color uncompressed ¹	Moved into a BW image	Regular PDF file
B/W DOCUMENT	Regular PDF file	G4 compressed	PackBits compressed	Regular PDF file
COLOR-B/W PHOTO	Regular PDF file	Color uncompressed ²	Moved into a BW image	Regular PDF file
FINE TEXT (OCR)	Regular PDF file	G4 compressed	PackBits compressed	Regular PDF file
HIGH RESOLUTION PHOTO	Regular PDF file	Moved into a BW image ³	Moved into a BW image	Regular PDF file

¹ WARNING: this is uncompressed data. The number of captured pages must be kept under control.

² WARNING: this is uncompressed data. The number of captured pages must be kept under control.

³ Color 600dpi uncompressed data is not provided with the simple goal of not over killing the network performances and the final storage media with an huge amount of data.

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The NT Service needed to 'connect' to third party applications, can be installed on the following systems:

- Windows NT Server 4.x/5.0 network - connected through TCP/IP
- Windows NT Workstation 4.x/5.0 network - connected through TCP/IP

Programmable function keys: 11

Number of destination items per key: 512

File names entered at the Control Panel can be 32 characters long. If the destination file system does not support long file names, those will be truncated to respect the 8.3 naming scheme.

The "Filename" -at-control-panel-feature is enabled through the configuration menu accessible from the HP 9100C Digital Sender's control panel.

Address Book Manager & front panel customisation

The Address Book Manager (ABM) is a Windows application and part of the software client of the HP 9100C Digital Sender. It runs on Windows NT 4.x/5.0 and Win95 machines. ABM is used to manage all the destinations available at the control panel and one of its functions is to enable customisation of the control panel.

This process can be summarised with the following macro steps:

1. Launch the 'Address Book Manager' (ABM) application
2. Connect / log-in to the target Digital Sender as ADMINISTRATOR
3. Configure one of the available function keys at the control panel
4. Associate a list of items to the function key customized in 3 above

The following picture shows the 'Address Book Manager' main screen as displayed following a successful log-in. Control panel customisation is restricted to the Digital Sender administrator only⁴. In this case the log-in ID must be ADMINISTRATOR, which is a pre-defined ID. A regular user cannot customise the front control panel with the Address Book Manager.

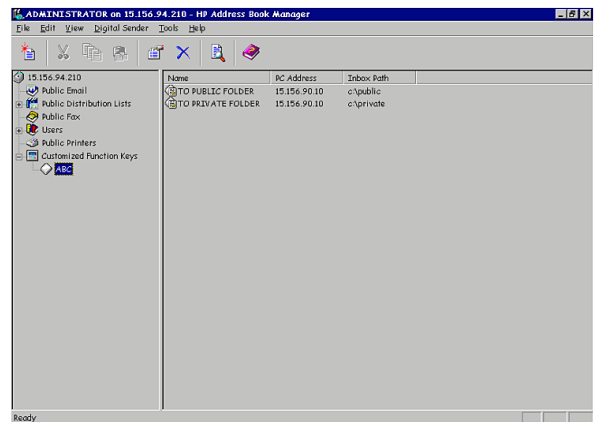


Figure 4:
Main screen of Address Book Manager (ABM)

All the customised control panel function keys are grouped under the 'Customised Function Keys' folder in the left-hand side of the main screen.

To create a new key, the user must select 'Customised Function Key' and then 'File, New' from the top menu bar or simply click the 'New' button. At this point, the application prompts for the name to label the function key. The operation is quite similar to a directory creation within Windows Explorer.

The creation of the destination items associated with the function keys is similar. The function key name displayed on the left hand side must be selected and then, with 'File, New' it is possible to create the items. For each creation operation the following window is displayed:

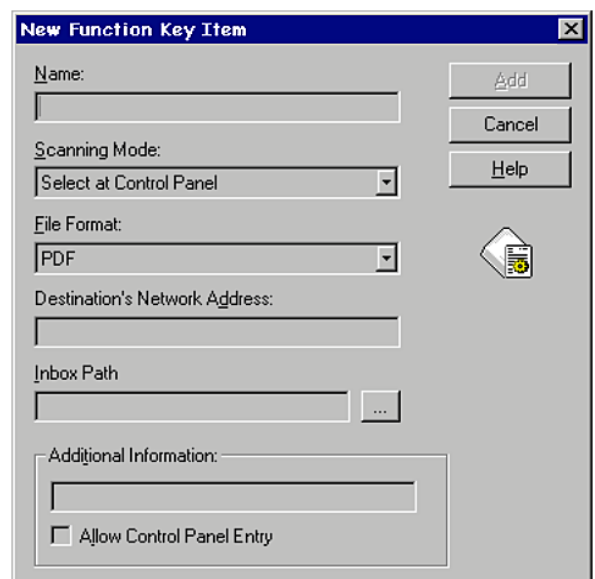


Figure 5:
Create new destination from ABM

⁴ The HP 9100C Digital Sender administrator can be anybody. The device administrator does not have to be the network administrator and viceversa.

Integration with Third Party Applications and User Interface customisation

The user will fill in:

- Name as it will be displayed on the control panel
- Desired setting. Selection of: 'Select at Control Panel', COLOR DOCUMENT, B/W DOCUMENT, COLOR-B/W PHOTO, FINE TEXT (OCR), HIGH RESOLUTION PHOTO. If 'Select at Control Panel' is the choice, the used setting for this destination will be the one selected at the control panel. In the other cases the setting indicated in this window will be used instead of the one chosen at the control panel
- File format. Selection of: PDF, MTIFF (B/W & color unc.), MTIFF 6.0 (B/W & colour), PCL5
- Network destination associated to the item. This information can be an IP address or a DNS name. In order to receive the document the destination must have the HP 9100C Digital Sender Service installed.
- Path to the directory on the network destination where the documents will be stored. UNC paths are supported together with path strings as 'c:\temp'.
- Additional Information. A generic string meaningful to the integrated application. If 'Allow control panel entry' is checked, this field can be edited on-the-fly at the Digital Sender control panel.

This action is then repeated for each item added to the list for each function key. Each item is independent from the others and allows network addresses, file formats and settings to be different for each function key.

'Delete and Rename' functionality is also offered by the 'Address Book Manager' to manage or change items already customised.

Acquisition of documents

Notification that new documents have arrived

The 'Inbox Path', stored as one of the attributes of a destination item on the control panel is used as 'buffer' to exchange documents with the target application. To automate the process, the application must poll the directory for new documents. A special file called NOTIFY.DAT is used as a semaphore to indicate the arrival of new documents. Its presence in the directory and/or the modification of the file date & time, are used as triggers.

The document stored in the 'Inbox Path' is produced by two files. One contains the image, the other contains details on the sent job (HPS Header File). The two files have the same name.

Data file extensions reflect the requested file format:

- 'PDF' for PDF files
- 'TIF' for TIFF files
- 'PCL' for PCL5 files

The information file uses the 'HPS' extension. If not provided by the user at the control panel, file names are generated from the system date and time. Example: 'ab23rt00.HPS' and 'ab23rt00.PDF'.

A simplified version of the algorithm to import documents could be:

1. poll for changes of NOTIFY.DAT file
2. If there are changes, list HPS files in the directory and import the corresponding data files
3. If necessary, delete all the data files already imported

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How to parse HPS files

The HPS file is an ASCII file with a format similar to the Windows .INI format. There is only one section called '(Info)' containing the following keywords:

Version	HPS version number. HP 9100C Digital Sender generates version 2.0 HPS files. Example: ' Version = 2.0 '
Scanner	Digital Sender IP address. The IP address is used when the DNS Digital Sender name is not available. Example: ' Scanner Name = HPNSJ6.italy.hp.com '
Scanner Model Name	Model name. Example: 'Scanner Model Name = HP 9100C Digital Sender'
Sender	Sender name if identified at the control panel. GUEST otherwise. Example: ' Sender = Maurizio Monesi ' ⁵
Title	Document title. It can be set to 'Untitled' or to 'Incomplete' or it can be set to the file name as provided at the control panel. In the first and 3rd case the document is complete, in the second case the transmission has been interrupted due to an error, i.e. destination disk full. Example: ' Title = Untitled '
ScanningSettingType	This parameter is used to classify the used Digital Sender setting. The HP 9100C Digital Sender supports only public settings. This value is always set to 1, which means - public. Example: ' Scanning Setting Type = 1 '
Scanning SettingName	Used Digital Sender setting for this document. Possible values are: <ul style="list-style-type: none">• COLOR DOCUMENT• B/W DOCUMENT• COLOR-B/W PHOTO• FINE TEXT (OCR)• HIGH RESOLUTION PHOTO Example: ' Scanner Setting Name = BW DOCUMENT '
Compression	Data compression used to produce the document file. Values are: <ul style="list-style-type: none">• 0 = no compression• 1 = PackBits• 3 = CCITT G4• 4 = JPEG This field is compiled only with PCL file format. In the other cases (PDF and TIFF) it is always set to 'no compression'. Example: ' Compression = 0 '
Format	File Format. Supported formats are: <ul style="list-style-type: none">• 2 = MTIFF• 4 = PCL5• 5 = PDF Example: ' Format = 5 '
Pages	Number of pages in the document. Example: ' Pages = 7 '
Duplex	This keyword indicates if the document comes from a duplex scanning. <ul style="list-style-type: none">• 0 = False• 1 = True Example: ' Duplex = 0 '
Status	Always set to 0x00. With some applications this parameter has been used to lock the file (0x01). Example: ' Status = 0 '
Application Name	Name of the customised function key used to scan the document. Example: ' Application Name = ABC '
Application Item	Name of the item associated with the function-key selected to scan the document. Example: ' ApplicationItem=To Private Folder '
ApplicationPath	UNC path to the application inbox. This is the same string used as 'Inbox Path' when the item has been defined from the Address Book Manager. Example: ' ApplicationPath=c:\data '
ApplicationTag	Generic 128 chars string associated to the item used to send the document. The content of this string is meaningless to the HP 9100C Digital Sender, but it is meaningful to the third party application that will acquire the document. Example: ' ApplicationTag=Pizza Margherita con doppia mozzarella '

⁵ This information is only meaningful to the interfaced ISV application. The device behaviour is the same when a "scan to ISV application" is executed as GUEST user or as identified users.

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Let's see a full example:

```
[Info]
Version=2.0
ScannerName=Verona.italy.hp.com
ScannerModelName= HP 9100C Digital
Sender
Sender= MAURIZIO MONESI
Title=Meeting notes 980207
ScnSettingType= 1
ScnSettingName= BW DOCUMENT
Pages=7
Compression= 4
Format= 5
Duplex= 0
Status= 0
ApplicationName= ABC
ApplicationItem= To Private Folder
Application Path=c:\data
ApplicationTag=Pizza Margherita con doppia
mozzarella
```

A different architecture implementation

The 'receive' feature of the HP 9100C Digital Sender NT Service used as a gateway to third party applications, is also part of the client software shipped with the product. The client software called HP 9100C Digital Sender Link can be installed on NT Workstations and Win 95 machines.

This suggests an alternative architecture where documents captured for ISV applications go through a network client instead of a network server. This can also be considered as integration with 'personal' applications - running on personal computers - instead of batch applications running on a server.

The major technical difference is that the Digital Sender Service runs as an NT service, which implies unattended mode, and the HP 9100C Digital Sender Link is a common Windows application which needs a user logged to the machine.

Compatibility

A Software Development Kit is available for developing fully integrated solutions with the Digital Sender. There is no compatibility with APIs which have been provided for the HP Network ScanJet 5 and HP ScanJet 4Si.

Compatibility is maintained only in regards to the HPS file format and in the notification mechanism for new documents (NOTIFY.DAT file)

- 2 WARNING: this is uncompressed data. The number of captured pages must be kept under control.
- 3 WARNING this is uncompressed data. The number of captured pages must be kept under control.
- 4 Color 600dpi uncompressed data is not provided with the simple goal of not over killing the network performances and the final storage media with an huge amount of data.
- 5 The HP 9100C Digital Sender administrator can be anybody. The device administrator does not have to be the network administrator and vice-versa.
- 6 This information is only meaningful to the interfaced ISV application. The device behavior is the same when a 'scan to ISV application' is executed as GUEST user or as identified users.