

## *Technical White Paper*

Replacing paper documents with electronic ones results in reduced labor, material expense, and better communication, customer service, and risk management.

### **Introduction**

This white paper will endeavor to describe the benefits associated with document automation and the vast functionality, flexibility and security available to an organization implementing an i5- iSeries based electronic document management solution, specifically S4i Express.

### **Document Automation**

Document automation, more commonly referred to as electronic document management, involves the capture of documents and reports from one or more print queues and systems, electronically bursting the reports into usable segments, bundling sections (segments) from multiple reports so they may be distributed as a single unit, and distributing these report segments and bundles. These reports can be fashioned to look exactly like documents generated using pre printed forms through the use of form overlays. Electronic documents can be viewed online, or printed on local and remotely located printers.

Other common distribution methods include:

- Facsimile
- e-mail (SMTP)
- Outfiles
- Client downloads
- Microfiche
- Client - Integrated File System (IFS) Folders
- FTP Distribution
- Web page - HTML
- Any network attached device or location

By employing a document management solution for the electronic distribution and life cycle management of purchase orders, order confirmations, invoices, statements, and other documents costs associated with labor, paper, consumables, pre-printed forms, document storage, postage, etc. are significantly reduced or eliminated. Life cycle management includes document archiving. Electronically archived documents are much easier to find and access, can be better protected from being lost or destroyed, thereby, mitigating risk, and take much less physical space.

In almost all instances, it is easier to implement a complete document management system than it is to automate any other area of an enterprise. Most organizations see an instant improvement in efficiency, and retrieve their investment in less than one year.

## **S4i Express**

S4i Express is a fully integrated i5- iSeries network-centric report and document management system that can automate all document processing enterprise wide. Industry leaders on several continents use S4i Express to improve internal and external business communications. Because of its scalability and completeness, S4i Express is the preferred i5- iSeries document automation offering.

### **The advanced functionality in S4i Express-**

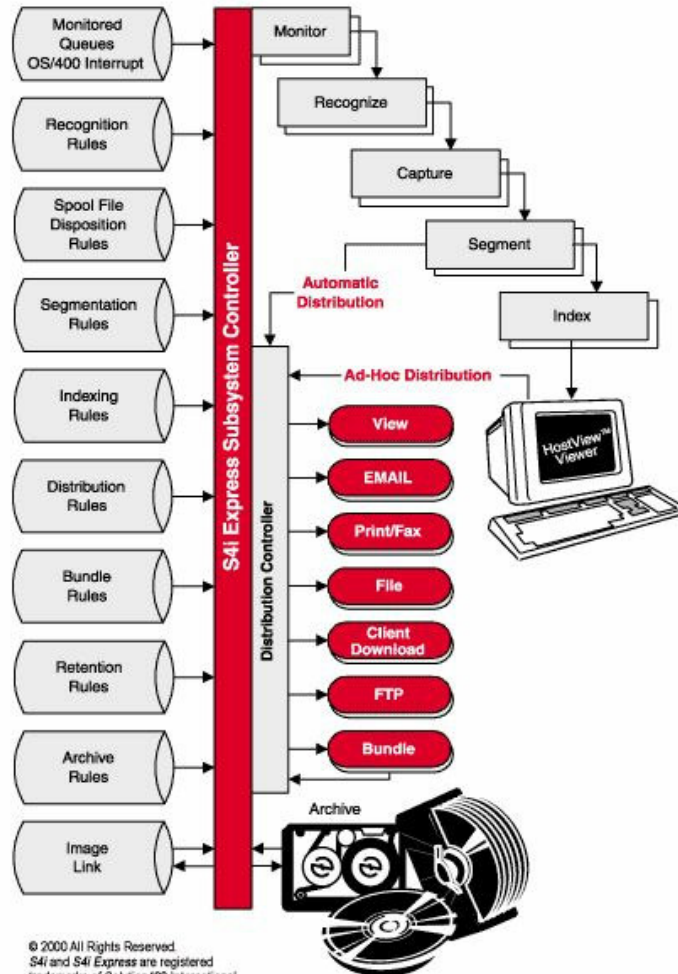
- Captures documents and reports from one or more print queues/systems, the IFS, or other systems.
- Offers bursting and indexing capabilities that are executable through on-screen point-and-select user defined rules.
- Facilitates the creation of document bundles from report segments. These bundles can be comprised of complete reports or segments of multiple reports.
- Presents archiving functionality that manages the entire life cycle of your documents through a variety of archiving methodologies, plans, media; simplifying and automating the management of documents. Organizations' risk management concerns are addressed regardless if your documents are stored locally or off site.
- Provides easy access to one or more related documents through the creation of indexes, linking multiple reports together. A sophisticated search criteria and an interface for adroit i5 users or GUI for the lay person make it easy to find the right document when you need it.
- Complies with organizational requirements for electronic report distribution in multiple formats such as RTF (Word), .CSV (Excel), PDF, TXT, HTML, PostScript, etc.
- Integrates with additional modules to facilitate forms design tools, document scanning and workflow capabilities, therein simplifying the transition from paper.

S4i Express is extremely disk-friendly as compared to other document management products. All captured reports are kept in an online repository in a highly compressed state and generally requires less space than they took in the spool queue. You can spread repositories across an unlimited number of libraries and ASPs. You can also specify how many reports are placed in each repository file.

Designed and written using the latest ILE programming techniques, S4i Express is extremely modular, yet integrated, in its structure. The system is completely Common User Access (CUA) compliant with a consistent use of screen panel design and program function (PF) keys throughout. Where possible, common IBM programs (SEU etc.) are used to select PF key assignments for non-CUA assigned keys.

The low-level repository and archive file management routines (engines) are written using ILE C, and low-level APIs to provide the fastest possible file access, while maintaining compatibility with the OS/400 operating system.

## S4i Express Overview



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## System Setup

System setup consists of defining system control parameters that define: document and report categories, segment categories, bundle categories, subsystem profiles, document and report repository definitions, report destination groups, report and document archive locations and archive plans.

Setup is simplified through use of predefined controls along with automatic creation of OS/400 definitions, e.g., subsystem descriptions and libraries. The use of predefined destination groups, user groups and archive plans makes the daily work of creating and maintaining report definitions a much simpler task.

## Report/Document Definition

Report Definitions define the information necessary to identify and capture each report or document you need to control. The report definition also contains the repository retention rules, archive retention rules, archive plan name and the physical report description (e.g, header lines, footer lines, column headers, page number locations, etc.)

### Important:

The process of identifying reports for recognition or various sections of a report for indexing, etc. is greatly simplified by allowing you to select report areas using the actual report with point and select techniques. Each select area is then displayed in color to insure that the selection was correct. The end-user is never required to directly enter line and column numbers.

The following example shows a spool file external attribute selection screen:

```
SF0801          Select attribute for setting recognition condition

Move cursor down to appropriate attribute and press F21.

Spooled File . . . . . : SALESUSE
User . . . . .       : QSECOFR
Output queue . . . . . : S4IXP
Library . . . . .    : QUSRSYS
Status . . . . .     : *READY

Job . . . . .        : QPADEV0006
User data . . . . . :
Form type . . . . . : *STD
Priority . . . . .   : 5
Number . . . . .    : 1
System . . . . .    : S100006G
Accounting code . . . . . :
Printer device type . . . . . : *SCS
Printer/Device file . . . . . : QSYSPRT
Library . . . . .   : QSYS
Print text . . . . . :

More...
```

*Figure 2: Select spool file attributes screen panel*

*Note: Selected attributes are shown in red on a color terminal*



bursting logic is then automatically generated with minimal input. No special, skills are required.

## Report Indexes

With S4i Express, you have the ability to create an unlimited number of local (single report) and global (multiple report) index paths into your report data. This feature, along with HostView or WebView, gives you the ability to quickly retrieve single or related reports and report pages.

For example, if you define a global index over vendor name in the Parts by Vendor, Vendor Master, Current Inventory, Inventory Receipts, and Parts Orders reports, you may then view the report data for all five reports by vendor name, even though they might have been printed in vendor number sequence. In addition, with S4i Express HostView or WebView, you can have all the reports for a vendor open in a single 5250 display- type viewer or in a web browser window, easily switch between reports, and print, e-mail, fax, FTP, or download any single vendor report with the touch of a button.

## S4i Express Subsystems

Scalability, flexibility, ease-of-use, and speed are the controlling factors in the ongoing design and implementation of S4i Express. The S4i Express subsystem demonstrates all of these design criteria.

The majority of the work performed by S4i Express is accomplished in one or more subsystems by small processor tasks (servers) that are controlled by the S4i Express Subsystem Controller. This technique allows you to precisely manage the amount of computer resources the S4i Express subsystem uses.

You can also specify a maximum and minimum number of concurrent copies of each server and the number of queued requests before an additional server is started. An idle-time parameter controls how long a server can be idle before it is automatically terminated.

The type of servers and server control parameters are contained in Automated Profiles that are accessible from the main menu (EMAIN) using option 3. You can create an unlimited number of Automated Profiles and schedule them to start automatically in order to change the server mix as your workload changes.

Spool queues are never scanned in order to find reports that have been added, further reducing system overhead. All subsystem servers are completely interrupt-driven, starting with the Monitor server, which is interrupted by the OS/400 operating system each time a spool file is written to an S4i Express-monitored out queue.

### **Note:**

The Monitor server is also notified when you change the status of a spool file to Aready@ (RDY). S4i Express will reprocess a spool file if you change its status from ready to hold and back to ready.

The following screen panel shows a subsystem task setup screen panel:

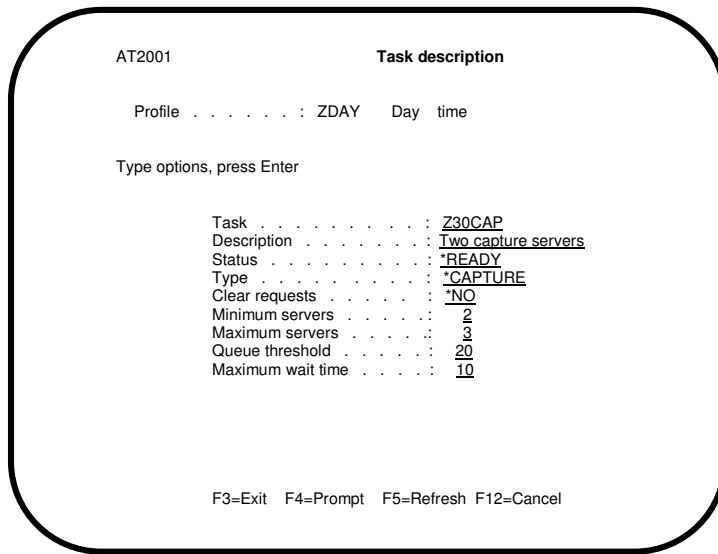


Figure 4: Capture Server Task Setup Screen Panel

## Each Automated Profile can contain the following servers:

### **Subsystem Controller** (required, one per subsystem)

This server monitors the other subsystem servers, controls the starting and stopping of other servers, maintains statistics about subsystem activity, and interfaces with S4i Express tasks running outside the subsystem.

### **Monitor Queues** (max-one per monitored queue)

You can have S4i Express monitor from one to all print queues on your system. The OS/400 operating system notifies the Monitor Queues server each time a spool file is added to a monitored queue and each time the status of a spool file changes to ready.

The Monitor Queues server adds the spool file identifying information to an internal data queue which is then processed by the next free Recognize Reports server.

### **Recognize Reports** (999 maximum)

This server examines both the external spool file attributes and/or spool file contents to determine if it matches the recognition rules of any active Report Definition. The spool file identifying information and Report Definition recognition rules is placed in the Capture Reports server data queue if there is a match between the spool file identifying information and the Report Definition recognition rules.

**Note:** The spool file will be captured under the most precise report definition if the spool file characteristics match more than one Report Definition.

**Capture** (999 maximum)

This server uses low-level OS/400-supplied and S4i-developed APIs to copy and compress the recognized spool file and its attributes from the output queue, and place it in the S4i Express Repository (online database). Then, the server notifies the Segment server that the report file is ready to segment.

**Segment** (999 maximum)

Segmentation is the process of electronically bursting the spool file into groups of lines or pages based on the needs of individual recipients.

**Note:** S4i Express never stores more than one copy of a spool file in the Repository, unless you specifically instruct it to do so.

**Index** (999 maximum)

Index servers read the report version spool file data and create index database records containing page numbers with the associated index value(s).

**Distribute** (999 maximum)

Distribution consists of making the report segments available in the forms defined by the Distribution rules. The distribution function includes a server for each type of destination, e.g., print, view, bundle, etc. This design insures that new distribution destinations (person/function, place or thing) can be added as your requirements change. Groups can also be defined as a function of making implementation easier.

**Note:** This function can also be run as an interactive or batch process.

**Supported distribution methods:**

Optional user-defined exits can be defined for each distribution method. They will be called before and/or after the report segment is processed. You also have the ability to automatically add pre- and/or post-processing data to the output spool file to further direct printing or finishing activities.

**Print**

The print destination server sends report segments to local or remote OS/400 printer output queues.

**View**

The view destination is used to control which groups (people) have the authority to view report segments online using the Work with Segments command, who have the Start HostView command or access to WebView (reports via the web).

**HostView**

In addition to all the functions in Work with User Segments, this command gives you the ability to access report versions by index path and have up to five index items open at the same time. You can also link to other index items, based on data in the current item. For example, a receivables clerk can branch directly from a customer's statement to the same customer's invoice by selecting the customer number key and the other report they want to view.

## **WebView**

Internal or external iSeries-i5 and non-iSeries-i5 users can access reports and report segments via the web using a browser such as Internet Explorer or Netscape Navigator. This user interface can be customized to mirror the organization's terminology or create a look and feel that is consistent with the organization's other websites or portals. Based upon security and rights, users can optionally further customize their views and can redistribute reports via email, print, FTP, download to client or fax. Organizations can authenticate external customers, thereby, providing secure access to documents using tools such as IBM policy director. This robust option allows you to web-enable your reports and documents quickly and inexpensively.

## **Facsimile**

The design of S4i Express allows easy integration with most iSeries configurable fax servers or S4i's fax server option.

## **Outfile**

The outfile distribution server creates or updates a database file with the segment data. A separate row is created for each print line and the row size is determined by the segment print line length.

## **Client**

The client distribution server distributes segments or bundles to any network attached location through Integrated File System in multiple formats.

## **E-mail**

The email distribution server uses the OS/400 send MIME mail API to send a MIME-compliant e-mail file using the OS/400 SMTP facilities.

Note: This server requires that you have SNADS or SMTP configured on your iSeries-i5.

## **FTP**

The FTP distribution server uses the OS/400 FTP facilities to place the segments on remote systems using FTP protocol.

## **Bundle**

The bundle distribution Server distributes multiple segments as a single distribution document. The bundle is then routed to the appropriate distribution server.

## **Rule-Based Archiving: S4i Archiver**

An Archive Plan identifies the physical media locations used to store captured spool files based on user defined rules and controls the lifecycle or movement of documents and reports based on age and/or generation. S4i Spool Archiver automatically returns a requested document or report to the Online Repository from the "nearest" archive location. S4i Archiver automatically switches to backup locations if the primary retrieval location is unavailable.

An index entry is created to identify the document or report attributes and location(s) The index entry is maintained as long as the document or report remains in an Archive or the Online Repository.

Physical media can be categorized as either nearline or offline. Nearline media would be defined as any attached physical device such as DASD or optical server, offline is defined as any type of removable portable media.

Batch commands allow the administrator to run or schedule the archive request, archive capture & associated cleanup options. Often a structured CL program can automate the entire process

## **Report, Segment, Bundle and Archive Location Categories**

S4i Express can control thousands of report/document versions and segments. One of the largest problems end-users experience when using most report and document management systems, is quickly finding the reports, documents or segment(s) they want to view.

S4i Express solves this problem by giving you the ability to add additional system-wide identifying characteristics for Report Definitions, reports, segments and bundles. These characteristics can then be used as additional parameters to select or limit the list of report definitions, reports, segments and bundles the end user views.

Each category parameter is represented by a 10-character field that you assign to report definitions, segments, bundles and archive files. These values are automatically assigned to each spool file as it is captured, each segment as it is identified, each bundle, and each archived report.

### **Report Categories**

You may define up to five categories at the Report Definition level. The title for the category may be changed using the system options.

If you assign values to these fields as you create your Report Definitions, you will be able to select reports by Division, Department and Activity keys in addition to report and Report Definition attributes.

Note: The Activity Category is used to enter application categories, e.g., AP (Accounts Payable), AR (Accounts Receivable), etc.

### **Segment Categories**

You may define three additional categories at the segment level. The categories are generally used to identify which work groups receive a segment.

By assigning values to all default fields you will be able to select report segments by Division, Department, Activity and Work Group keys in addition to report, segment and Report Definition attributes.

### **Bundle Categories**

When a segment is part of a Bundle it takes on the characteristics of the Bundle. Therefore, S4i Express gives you the ability to define five categories to associate with bundled segments. By assigning values to all default fields you will be able to select bundles by Division, Department and Work-Group keys, in addition to other bundle attributes.

## Standard Function Keys

S4i Express uses the Common User Access (CUA) methodology in the design of its display screen panels and function key assignments. It also uses a consistent approach to function-key assignment where the key assignment is not covered by CUA guidelines.

The following list shows the standard function key assignments used by S4i Express. One or more functions can be initiated from a menu or screen panel by pressing a function key. The available function keys (except F1, Help, Home and Print) are listed at the bottom of the screen panel. Only function keys listed in a pop-up window are available if a window is currently displayed over the panel screen or menu. The function keys are described below.

Note: Codes to the left of the key indicate if the key description is for menus (M) or screen panels (O).

### M O F1=Help

This key provides additional information about using the menu or a specific option on the menu. Information about a specific menu option is displayed if the cursor is positioned on a menu option or in the selection field with an option number typed in the field. If the cursor is positioned on a message, the message help is displayed.

### O F2=Mass change

This function works in conjunction with options 20 through 29 and allows you to quickly make changes to multiple entries on a AWork with@ screen panel.

To use this function:

1. Place the option code of the screen panel that contains the data you want to change in the Opt field of each entry that needs changing and press the F2=Mass change key. The following screen panel shows an example of changing the report description of all reports marked.

```
RD1001                                Reports

Type options, press Enter.
 2=Edit  3=Copy  4=Delete  5=Display  6=Print  7=Rename
12=Segments 20=Description 21=Recognition 22=Archival
....

Opt      Report      Description      Owner      Status
-      *DEFAULT  Default report  *PUBLIC   *TEST
20      EJITST    Ed's Test      *PUBLIC   *READY
20      PAYROLL   Select PAY1001 & PAY2001 *PUBLIC   *READY
20      SALESUSE  Sales use tax report *PUBLIC   *READY
20      ZCATCHALL All reports not recognized *PUBLIC   *READY
20      ZDUMPS    System dumps    *PUBLIC   *READY
20      ZJOBLOGS  Job logs        *PUBLIC   *READY
20      ZSURVEYS  DASD-Plus survey reports *PUBLIC   *READY

                                           Bottom

F2=Mass change F3=Exit F5=Refresh F6=Create F11=View2
F12=Cancel F13=Repeat F15=Sort F23=More Options F24=More keys
List is sorted by report
```

Figure 5: Sample F2=Mass change Selection Screen Panel

2. A mass change screen panel corresponding to the option code you enter is displayed:

```

RD2001M                                Report description
Type *YES next to the fields to change, tyoe the new alues, and press Enter.

Report . . . . . *MASSCHG
Description . . . . . *NO _____
Owner . . . . . *NO _____
Status . . . . . *NO _____
Division . . . . . *NO _____
Department . . . . . *NO _____
Product . . . . . *NO _____

F3=Exit  F4=Prompt  F5=Refresh  F12

```

Figure 6: Sample = Mass Change Data Entry Screen Panel

3. Enter the special value \*YES in the first field of each parameter you want to change and enter the new value in the second field. Press the ENTER key to complete the mass change process. Each selected record will reflect the new value.

**M O F3=Exit**

Exits and returns you to the screen panel where you initiated the function.

**M O F4=Prompt**

From a menu this key prompts the specified command if the cursor is on the command line. If no command is specified, pressing this key displays a list of commands from which you can select one to run.

Note: Prompts the screen panel parameter where the cursor resides if on a data-entry panel. Not all data-entry panel parameters support use of the F4 key.

**M O F5=Refresh**

Press F5 to rebuild the screen panel and display it again. When you press F5, the item at the top of the page becomes the top item on the page of the refreshed list. If you create a subset of a list it remains as a subset.

Note: All newly entered screen data will be lost if you press the F5 key before pressing ENTER key.

**M F6=Display messages**

This function displays messages from the work stations message queue if there are any messages on it. After the user exits that screen, messages are shown from the user profile message queue. If there are no messages on the work stations message queue, only messages from the user-profile message queue are shown.

**O F6=Create (are there two F6 commands James?)**

This function starts the process to add a new item. This function will step you through a series of creation screen panels.

**Note:** Each AWork with@ screen panel that contains a F6=Create function also contains a \*DEFAULT line item. The default information shown on creation screen panels is taken from the \*DEFAULT item. You can change the default values by changing the default item entries.

**M F9=Retrieve**

Displays the previous command you entered on the command line. Press this key once to show the last command you ran, twice to show the command you ran before that, etc.

**M F10=Command entry**

Press F10 to show a command entry screen with all of the commands that have been run from the S4i Express command line and the errors that have occurred during the current session.

If you see “More...” on the lower right side of your screen, there is additional information to view. Press Page Down (Roll Up) to move toward the end of the information. Press Page Up (or Roll Down) to move toward the beginning of the information. If you see “Bottom” instead of “More...”, you’re at the end of the list.

**O F10=ConfirmAs**

A final confirmation when submitting jobs, steps or actions, press F10.

**O F11=View n**

Changes the screen panel to display additional information about the list of items displayed. The number represented by An@ shows the next view to display.

**M O F12=Cancel**

Press F12 to cancel processing of any options or changes that you have made to the current screen, and return to the previous screen.

**O F13=Repeat**

Press F13 to repeat any valid option from a particular item downward to the end of the list. Items in the list, above of the item containing the cursor, are left alone.

You can repeat a blank in the same manner as any other valid value. Type a blank in the field using the space bar and press the F13 key. All values in the field in the records below are blanked.

**Note:** The cursor position is very important in using this command. Make sure the cursor is in the correct field.

**O F15=Sort**

This key is used to change the order of a list. Press the F15=Sort key to display a window similar to the following:

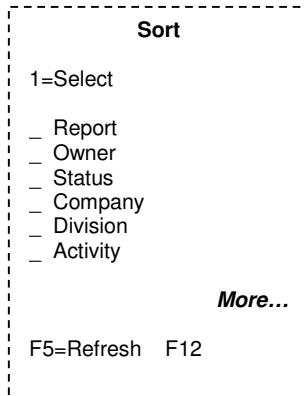


Figure 7: Sort Selection

Place an option 1 code in the entry field of the item on which you want to sort and press the ENTER key to return to the previous screen panel. The screen panel items appear in the selected order.

**O F16=Position to**

Press F16 to open a window where you can enter a value where you want the list positioned. Press the ENTER key to position the list.

**O F17=Subset**

When you press this key a window similar to the following is displayed:

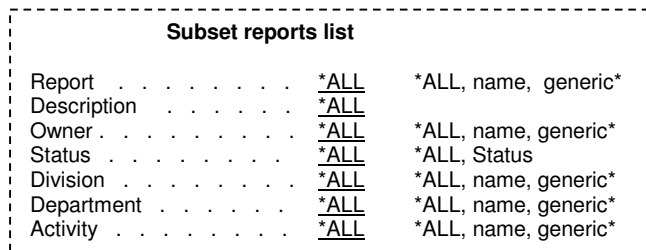


Figure 8: Subset Report Definition List Window

You can use this window to limit the list of report definitions to display. Place the limiting values in the fields provided. Only items that pass the limiting criteria will be displayed. Use the F18=Reset values key from this window panel to reset all subset parameters back to \*ALL.

**O F18=Reset to \*ALL**

Press F18 to reset all subset values to \*ALL and redisplay the complete list.

**M F20=Send a message**

Select this option to send a message to one or more users. The message can be informational, or it can require a reply.

**M F21=Change message delivery**

Select this option to prompt the Change Message Queue (CHGMSGQ) command to change the delivery method and severity filter for the specified message queue. You cannot change any of the other message queue attributes.

**O F23=More options**

This function changes the option display portion of the screen panel to show additional option values.

**M O F24=More keys**

Shows additional function keys.

**M O Enter**

Submits information on the screen for processing. The current panel is redisplayed if changes are made.

**M O Help**

Provides additional information about using the menu or a specific option on the menu. Information about a specific menu option is displayed if the cursor is positioned on a menu option or in the selection field with an option number typed in the field. If the cursor is positioned on a message, the message help is shown.

**M O Home**

Goes to the menu that was shown after you signed on the system. This menu is either the initial menu defined in your user profile, or the menu you requested from the Sign-On screen.

**M O Page Down (Roll Up)**

Moves forward to show additional information for this screen. For screens with multiple list areas, the list area identified by the cursor is moved forward.

**M O Page Up (Roll Down)**

Moves backward to show additional information for this screen. For screens with multiple list areas, the list area identified by the cursor is moved backward.

**M O Print**

Prints the information currently shown on your screen.

### **Standard Options**

In addition to standard function key assignments, S4i Express also uses common options throughout the product. Below is a list of the common option codes:

**2=Edit**

Change an existing item. This option will step you through all screen panels originally used to create the item.

**3=Copy**

Copy an item to create a new one.

**4=Delete**

Delete the item indicated. You will be prompted to confirm this selection.

**5=Display**

Display an item.

**6=Print**

Print the item.

**7=Rename**

Change the item name.

**Product and Documentation Conventions**

If you make a change to a field on a screen panel you will need to press the ENTER key two (2) times in order to register the change. The symbol A?@ indicates that you need to enter values or take an action.

## S4i Express Value Proposition

### Synopsis

S4i Express is a powerful, flexible document management system architected with current technology. Its continually increasing capabilities are simply and centrally configured once to minimize ongoing support requirements by the IT organization. S4i Express will become a dependable and automatic IT team member giving your users:

- What they need...in the format they need
- When they need it...delivered by the most efficient means
- Where they need it

### Cost-Effective Solution

By automating tedious and repetitive document management/distribution tasks, you can count on: Competitive advantage through faster, more concise dissemination of information throughout the organization.

- Increased control over the appearance, destination, and timing of critical corporate information
- Increased consistency of information throughout the organization
- Increased efficiency by department managers and end-users via simplified administration of reports and integrated solutions that help automate workflow
- Faster online document retrieval from client workstations
- Reduced filing labor and storage space required for paper output
- Reduced postage and phone costs
- Delivered by the most efficient electronic faxing and e-mail distribution
- Reduced IT direct labor overhead associated with document handling and support-desk calls
- Reduced consumables consumption organization-wide including: paper, toner, laser printer drums, distribution supplies, etc. and reduced maintenance downtime on centralized printers
- Potential reduction in A/R turn, from rapid report distribution and reduced requirements for callbacks
- Improved system performance via efficient and dynamic use of system resources by S4i Express
- Optimized use of print facilities, balancing output load between local and remote locations