



Oyster Software, Inc.

FormsPro™

The Forms Processing System

Oyster Software's **FormsPro** replaces outdated paper based data entry and older Imaging systems with automated form-based transaction processing to provide state-of-the-art forms processing. Its data capture system utilizes the latest in technology, including OCR/ICR and IFR (Intelligent Form Recognition).

FormsPro:

- Increases timeliness and accuracy of data entry
- Improves data integrity
- Reduces labor costs for data entry personnel
- Improves cash flow from financial transactions
- Enables other image-based applications to enhance billing and customer service
- Provides user configurable, multi-form OCR processing

FormsPro provides many *competitive advantages*, including:

System integration: No proprietary third party hardware or software is required: a **FormsPro** installation can operate using a heterogeneous environment of scanners and recognition engines.

Scalability: Run 1000 to 5,000,000 pages per day simply by adding hardware or software modules to the base system.

Flexibility: Add new forms to the system for processing in a matter of hours. System processes are setup to run unattended at specific intervals; **FormsPro** keeps a detailed log of background processes statistics.

Competitive pricing: Rapid return on investment, within six to twelve months.

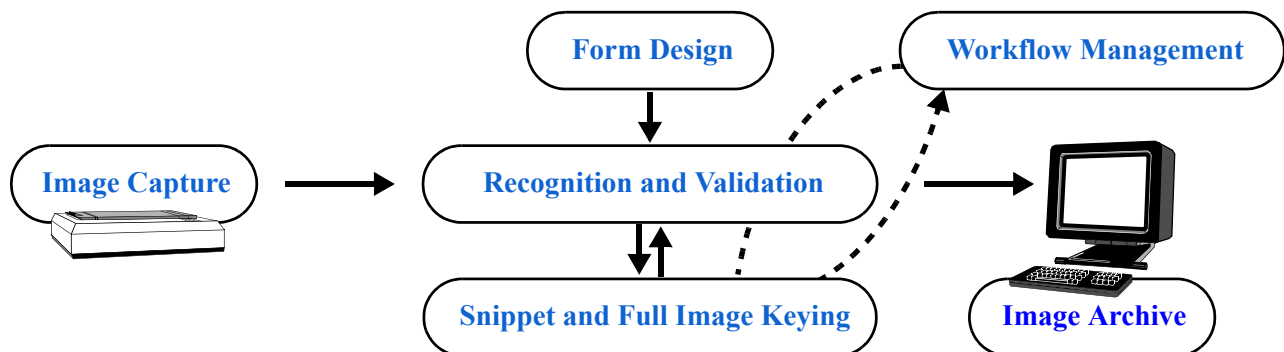
"The performance of our FormsPro system at the Toledo site is exceeding all expectations. The volume of work that used to take 40 people over two shifts now takes 5 people a single shift. Our accuracy of 2 errors in 10,000 fields is 300% better than our manual method. Demonstration of the system has had a very positive impact on selling our services to the point that we will soon need to double our capacity."

SAM OTTENLIPS, SR. VICE PRESIDENT
EMERGING TECHNOLOGIES, MARITZ, INC.

"Training has been simplified because of how FormsPro presents work types to the operators. New form set up is user friendly and has reduced the dependency on the IS department as new forms can be setup without any programming efforts from the IS area. FormsPro has provided us with the needed flexibility to stay competitive in the industry."

DON KRIPPNER, DIRECTOR
OFFICE OPERATION, FINGERHUT CORPORATION.

System Operations



Form Design

Before **FormsPro** can process scanned images, the user must define the graphical and logical aspects of the form using the Form Definition tool. The Form Definition function provides a unique, integrated system in which scanner settings, IFR/OCR/ICR parameters, workflow routing, validation rules, data edits, table lookups, and keying layouts via a simple user interface - without any programming.

The user defines a form by scanning an example and then

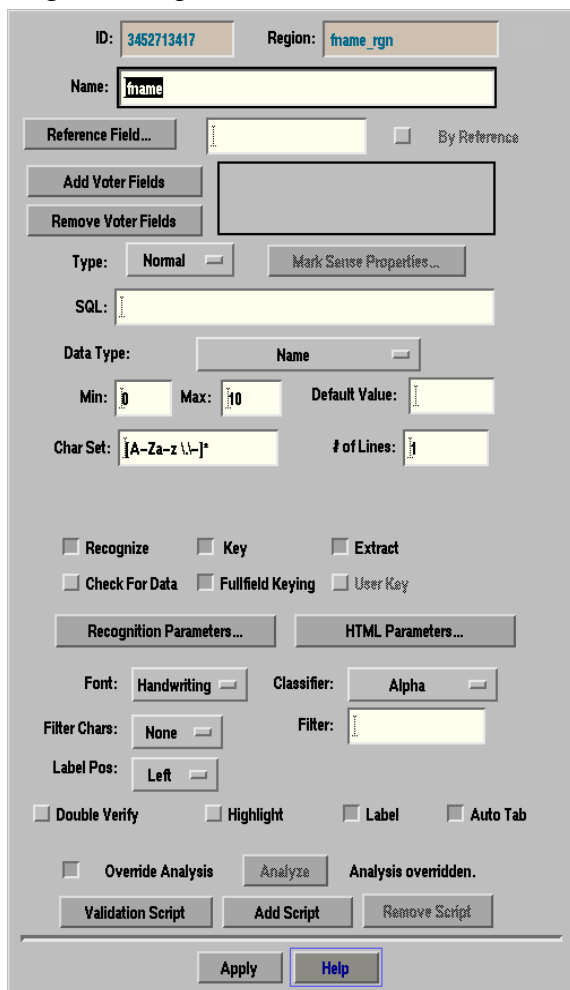
electronically selecting the pertinent **landmarks, regions,** and **fields** of the sample image.

An electronic editor prompts the user to define properties associated with the overall form and each region/field:

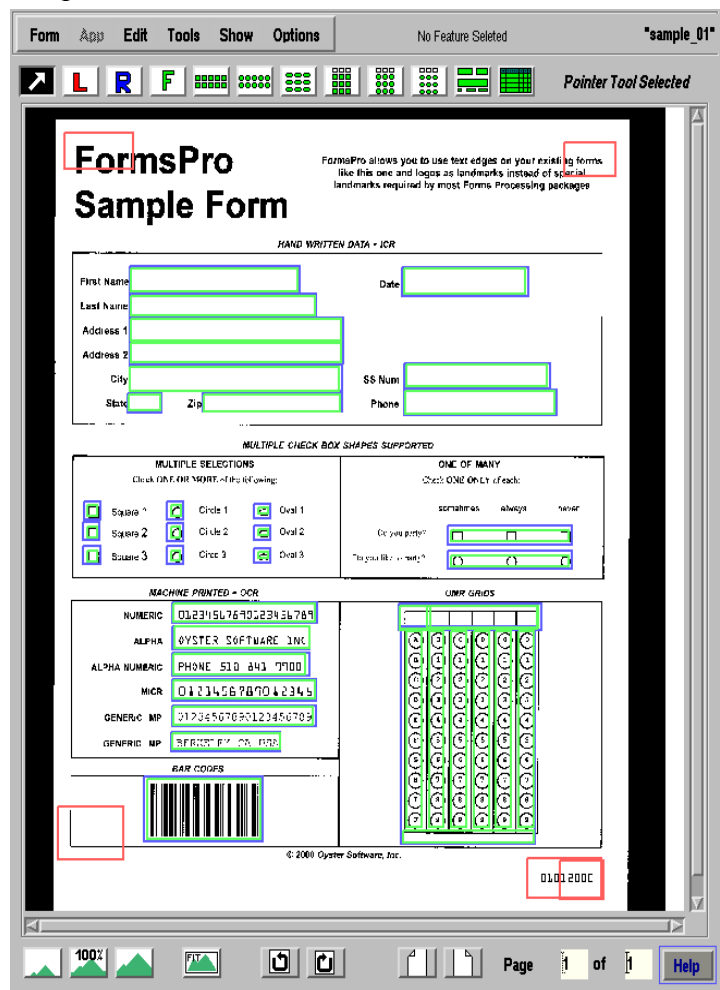
- **Form Properties** - number of pages, single or double sided, page size, scanner settings, routing information, quality control parameters
- **Region Properties** - type of region (e.g. address, signature, data table), image size of subsequent review

work, keying instructions (for default queues, image presentation, and data protection), field variances within regions, keying templates and validation scripts

- **Field Properties** - field type, field size, data type (numeric, alpha, or alphanumeric), character set, number of lines, recognition parameters, confidence level, font, recognition classifiers, line/box removal



Field Properties Screen



Form Definition Tool Screen



Image Capture

Once a form is defined, batches of forms are scanned (or read directly from a fax server) using the Image Capture application.

While all scanner functions are controlled by the Form Definition settings (see “Form Design” on page 2), the Image Capture

function does allow the user to override the standard settings for a specific scan, if desired.

The screenshot displays the 'IMAGE CAPTURE' application window. At the top, it shows the operator 'fpro' at workstation 'tide' on 'Mon Dec 17 12:07'. Below this, a header bar contains fields for 'App ID: Common', 'Job ID: sample', 'Form Type: Unknown', 'MR Date: 12/17/2001', 'Batch: BATCH001', and 'Doc ID: 4'. A 'Logout' button is in the top right corner.

The main area is divided into two panes. The left pane shows a scanned 'FormsPro Sample Form'. The form includes a title 'FormsPro Sample Form' and a note: 'FormsPro allows you to use text edges on your existing forms like this one and logos as landmarks instead of special landmarks required by most Forms Processing packages'. Below this is a section for 'HAND WRITTEN DATA - ICR' with fields for 'First Name: R A M P L E', 'Last Name: F O R M', 'Address 1: A S T R E E T', 'Address 2', 'City: B E R K E L E Y', 'State: C A', 'Zip: 9 4 7 0 4 1 0 5', 'Date: 0 1 0 6 2 0 0 0', 'SS Num: 1 2 3 4 5 6 7 8 9', and 'Phone: 5 1 0 8 9 1 9 5 0 0'. Below the handwritten data is a section for 'MULTIPLE CHECK BOX SHAPES SUPPORTED' with two columns: 'MULTIPLE SELECTIONS' (Check ONE OR MORE of the following) and 'ONE OF MANY' (Check ONE ONLY of each). The 'MULTIPLE SELECTIONS' column has checkboxes for 'Square 1-3', 'Circle 1-3', and 'Oval 1-3'. The 'ONE OF MANY' column has radio buttons for 'sometimes', 'always', and 'never', and a 'Do you want?' section with radio buttons for 'Do you like to party?'. Below this is a section for 'MACHINE PRINTED - OCR' with fields for 'NUMERIC: 111444447881127456789', 'ALPHA: OYSTER SOFTWARE INC', 'ALPHA NUMERIC: -PHONE 550 541 9900', 'MICR: ① 2 3 4 5 6 7 8 9 0 1 2 3 4 5', 'GENERIC MP: 01234567890123456789', and 'GENERIC MP: OYSTER SOFTWARE INC'. To the right of the OCR data is a 'OCR GRID' showing a grid of characters with some marked with circles. Below the OCR data is a 'BAR CODES' section with a barcode and the text '© 2000 Oyster Software, Inc.' and '01012000'.

The right pane is titled 'Current Settings' and contains several settings: 'QC Freq: 100', 'Scanner Id: 01', 'ContainerID: SAMPLE0001', 'Feed: Top Edge First', 'Batches Awaiting Recapture: 0', 'Background: Medium', 'Contrast: Medium', 'Print Position: 5', and 'Mode: Production'. Below the settings are several icons: 'Scan Batch', 'Settings', 'Pause', 'End Batch', 'Abort Batch', 'Recapture', 'Help', and 'Exit'.

At the bottom of the window, a status bar shows 'Image Import mode - waiting for user input ...', 'Scanner: IDLE', and 'Batch: IDLE'.

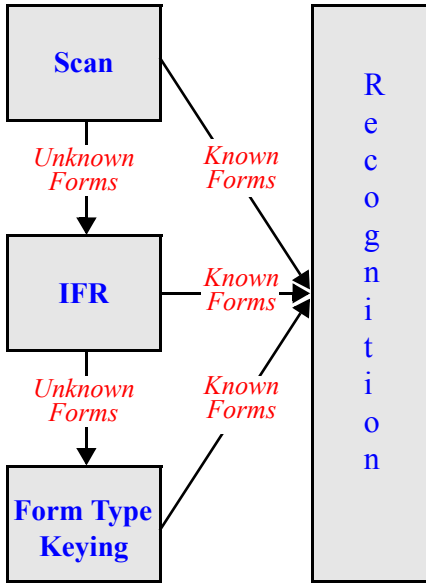
Recognition and Validation

After scanning, the images are processed by the Recognition application. Recognition occurs in two phases. First, **FormsPro**

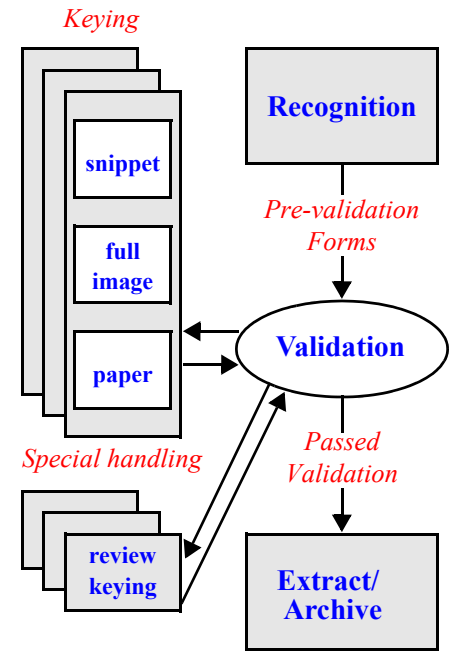
uses Intelligent Form Recognition (IFR) to identify the form and preprocess it. This includes analyzing the form to

locate the landmarks, regions, and fields specified in the Form Definition function.





After form identification and preprocessing, the Recognition application validates the data by applying edit rules to determine if the read was successful. Data extracted from successfully read fields are passed to the data server and stored in the tables associated with the specific form and batch. For unrecognized fields and fields requiring manual verification/encoding, an image of the field (or **snippet**) is stored for subsequent processing.



Operator: **barry** WorkStation: **tide**
RECOGNITION
Mon Dec 17 12:00 Logout

App ID:
Job ID:
Form Type: **sample_01**
MR Date: **12/17/2001**
Batch: **00000001**
Doc ID: **4**

FormsPro Sample Form

FormsPro allows you to use text edges on your existing forms like this one and logos as landmarks instead of special landmarks required by most Forms Processing packages

HAND WRITTEN DATA - OCR

First Name: **SAMPLE** Date: **01 06 2000**
 Last Name: **FORM**
 Address 1: **A STREET**
 Address 2:
 City: **BKKKLEY** SS Num: **1 2 3 4 5 6 7 8 9**
 State: **CA** Zip: **94709 1001** Phone: **510 831 9500**

MULTIPLE CHECK BOX SHAPES SUPPORTED

MULTIPLE SELECTIONS Check ONE OR MORE of the following:			ONE OF MANY Check ONE ONLY of each.		
<input checked="" type="checkbox"/> Square 1	<input type="checkbox"/> Circle 1	<input type="checkbox"/> Oval 1	sometimes	always	never
<input type="checkbox"/> Square 2	<input checked="" type="checkbox"/> Circle 2	<input type="checkbox"/> Oval 2	Do you work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Square 3	<input type="checkbox"/> Circle 3	<input checked="" type="checkbox"/> Oval 3	Do you like to party?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

MACHINE PRINTED - OCR

NUMERIC: **01234567890123456789**
 ALPHA: **OYSTER SOFTWARE INC**
 ALPHA NUMERIC: **PHONE 510 831 9900**
 MIDR: **0123456789012345**
 GENERIC MP: **01234567890123456789**
 GENERIC MP: **00000001 0000**

BAR CODES

© 2000 Oyster Software, Inc. 01.21.2000

Mark Sense - Average Field Confidence

0	0	0	0	0	0	0	4	24	73
0	1	2	3	4	5	6	7	8	9

Machine Print - Average Field Confidence

0	0	0	0	0	0	0	0	0	100
0	1	2	3	4	5	6	7	8	9

Hand Print - Average Field Confidence

0	0	0	0	0	0	0	0	20	80
0	1	2	3	4	5	6	7	8	9

OMR - Average Field Confidence

0	0	0	0	0	0	0	0	0	100
0	1	2	3	4	5	6	7	8	9

Start Time
Mon Dec 17 11:59:31 2001

Up Time
000:00H:01M:10S

Workfiles

Total Documents
5

Total Pages
5

Fields Attempted
175

Fields Validated
172 (98.29)

MS Fields Validated
55 of 55 (100.00)

MP Fields Validated
30 of 30 (100.00)

HP Fields Validated
50 of 60 (83.33)

OMR Fields Validated
30 of 30 (100.00)

?
X

Help
Exit

Recognition App: Looking for more work; no work in pipeline...



Snippet and Full Image Keying

Keying (or “Key from Image” data entry), allows the user to validate and correct information in two forms: by **snippet** and **full image**.

A **snippet** is an image of a field (or group of fields) that has been captured from the scanner. The user can specify a field for snippet keying through the Form Definition tool. Unrecognized

fields are automatically routed to snippet keying.

Snippets may be grouped together by keying characteristics (numeric, zip codes, addresses, etc.) and distributed to keying workstations (see “Workflow Management” on page 6). To produce high keying entry rates, many similar field images are tiled together on a single screen.

Full Image Keying allows the user to view the entire scanned page. When keying full page images, the system automatically highlights the current data entry field for keying. This eliminates the need for users to navigate the image with the keyboard or mouse. This feature alone can save up to 25% in keying labor.

Operator: snip1 WorkStation: uv

SNIPPET KEYING

Wed Dec 24 11:20 Logout

Job ID: 0 Form Type: ar order Mail Rec Date: 09/14/97 Batch: 011000004 Doc ID: 50

M6127229 mail_pr_num: 6137229	M3760519 mail_pr_num: 3760519	M2322980 mail_pr_num: 2322980	M2322980 mail_pr_num:
M3760519 mail_pr_num: 3760519	M6009187 mail_pr_num: 6009187	M2322980 mail_pr_num: 2322980	M2322980 mail_pr_num: 2322980
M6230155 mail_pr_num: 6230155	M3760519 mail_pr_num: 3760519	511517 mail_pr_num: 511517	M2322980 mail_pr_num:
M6131981 mail_pr_num: 6131981	M3760519 mail_pr_num: 3760519	M2322980 mail_pr_num: 2322980	M2322980 mail_pr_num:
M3785532 mail_pr_num: 3785532	5864137 HERNANDEZ mail_pr_num:	M2322980 mail_pr_num:	M2322980 mail_pr_num: 2322980
M6019392 mail_pr_num: 6019392	M2322980 mail_pr_num: 2322980	M2322980 mail_pr_num:	M3760519 mail_pr_num:

Counter: 55

Reroute Help Exit

Snippet Keying: Previous data source: RECP



Workflow Management

FormsPro provides two types of workflow management: standard and Dynamic Workflow Leveling.

Standard workflow management, defined through the Form Definition function,

determines the routing of work to different workstations and queues based on work priority. Work can be routed by type of application, form, field, and field value.

Dynamic Workflow Leveling allows users to monitor and

balance the workload based on system statistics. Users reroute work by changing its priority in the Scan or Workflow application, thereby changing the processing priority of the work in the system.

The screenshot displays the 'SYSTEM MONITOR' interface. At the top, it shows the operator 'fpro' at workstation 'tide' on 'Mon Oct 4 18:36'. The main section is titled 'Queue Information' and contains a table of sub-systems with their respective work counts. A 'Logout' button is in the top right. On the right side, there are controls for 'Show As Histogram', 'Hide Empty Queues', and 'Filters' (All Jobs, All Forms, All Work Types). At the bottom right, there is an 'Update Now' button, an 'Update Interval' set to 2 mins, a 'Chg Priority' button with a hand icon, and 'Help' and 'Exit' buttons. A message bar at the bottom indicates 'Data updated. Waiting for user input ...'.

Sub-System	Work in the System Total/Claimed (Note: Count in docs or snippets)
RECOGNITION	503 / 200
SNIPPET	80055 / 900
QC SNIPPET	10002 / 200
VALIDATION	505 / 200
FULLIMAGE	32428 / 1500
QC FULLIMAGE	4821 / 1200
PAPER	509 / 200
REVIEW	90532 / 913
EXTRACTION	40603 / 600
DELETION	509 / 200



Image Archive

The Image Archive application stores images and keyed data for future retrieval. The user can

configure the number of days to retain images following the data capture. Information is retrieved

by batch number, documents ID, or captured field data e.g. a customer account number.

The screenshot shows the 'Image Archive Viewer' application interface. At the top, there are fields for 'Operator' (fpro), 'WorkStation' (tide), and a 'Logout' button. Below this, document metadata is displayed: 'App ID', 'Doc # 9721300003', 'Arc Index 1232447787', 'Dated 11/23/99', 'Batch 00SAMPLE01', and 'Doc ID 2'. The main content area is divided into several sections:

- HAND WRITTEN DATA - ICR:** A form with fields for 'First Name SAMPLE', 'Last Name FORM', 'Address 1 A STREET', 'Address 2', 'City BERKELEY', 'State CA', 'Zip 94704 1051', 'Date 01 06 2000', 'SS Num 1 2 3 4 5 6 7 8 9', and 'Phone 510 841 9900'.
- MULTIPLE CHECK BOX SHAPES SUPPORTED:** Two columns of selection options. The first column is 'MULTIPLE SELECTIONS' (Check ONE OR MORE of the following) with options for Square 1-3 and Circle 1-3. The second column is 'ONE OF MANY' (Check ONE ONLY of each) with options for 'sometimes', 'always', and 'never'.
- MACHINE PRINTED - OCR:** Fields for 'NUMERIC', 'ALPHA', 'ALPHA NUMERIC', 'MICR', and 'GENERIC MP' with their corresponding values.
- OMR GRIDS:** A grid of circles for data entry, with columns labeled A, 1, 2, 3, 4, 5 and rows labeled A through J.
- BAR CODES:** A barcode at the bottom of the machine printed section.

On the right side, there is an 'Item List' showing a list of document IDs (9721300001 to 9721300005), with '9721300003' highlighted. Below the list are 'Print' and 'Search' buttons, a 'Rem Count' field showing '3 of 5', and 'Previous' and 'Next' navigation buttons. At the bottom of the sidebar are 'Help' and 'Exit' buttons.

Signature Verification

The Signature Verification function stores one or more reference images (snippets) of the customer's signature(s). As documents requiring signature verification come into the system the snippets of signatures from

these documents are compared with bitmaps of the reference signatures. If the images are not similar enough they are routed to a reject queue or to a manual verification queue (similar to Snippet keying on page 5). The

user can specify the threshold (confidence factor) required for accepting a signature.

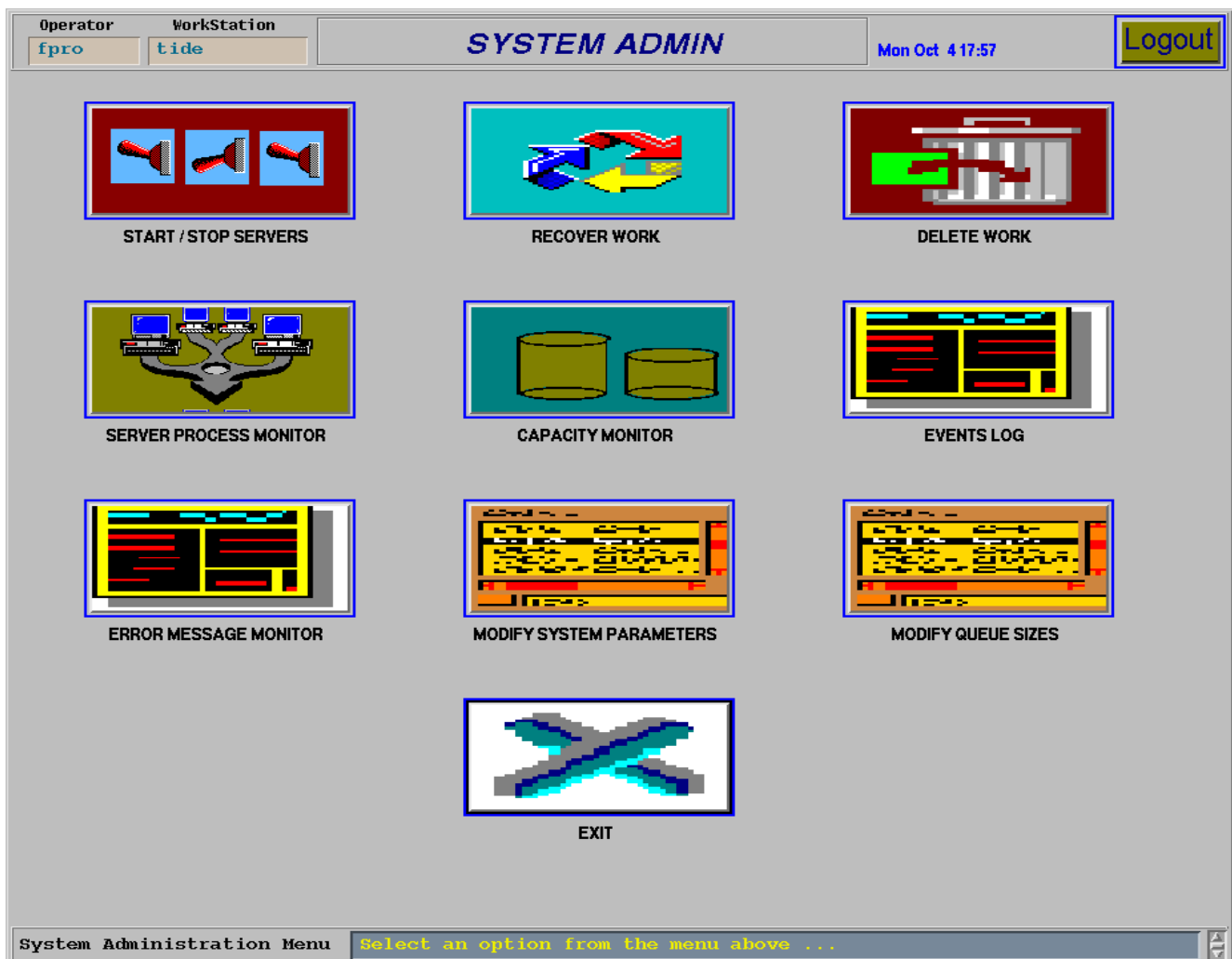


System Administration

The Administration function provides three categories of administration: user, workstation, and system.

- **User Administration** - controls access to the different subsystems and queues by user Id.
- **Workstation Administration** - controls workstation usage by subsystem and background processes.
- **System Administration** - controls the systems ability to start and stop processes, recover work, modify queue size, and set system parameters

The Administration function also generates a variety of reports, including Operator Performance, Workload, System Throughput, and Recognition Rates.



Hardware Requirements

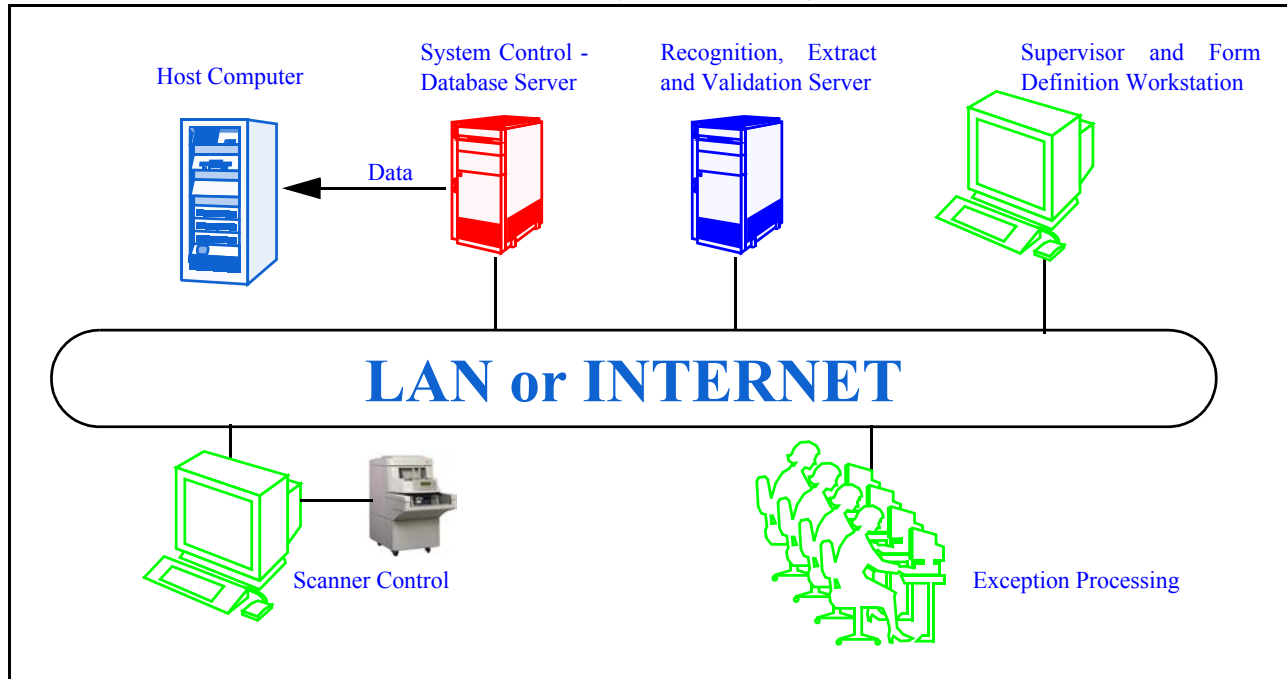
FormsPro runs on a variety of hardware/Operating System configurations, including:

- Servers and Workstations - PCs running Microsoft Windows or Sun Solaris

- Terminals - including PCs running X, NCD, SUN, Tektronics, among others
- Scanners - including Kodak, Bell'n'Howell, Sharp, Ricoh, HP, Fujitsu, among others

- Recognition Classifiers - Calera, Mitek, NIST and Nestor Reader.
- Network - TCP/IP

FormsPro System Configuration



Flexibility in Hardware Configuration

In the diagram above an example configuration is shown, the actual hardware and software selection will depend on the volume and nature of documents per day, which the system needs to support. Since all FormsPro applications run as separate programs, the system can be setup to run all processes on one machine or to run one or more of the applications on separate machines giving the user full flexibility in terms of **scalability**. A starter system can run on one or two PC servers, and can be scaled to run on hundreds of servers and workstations. The system can also be configured to run in a mixed SUN Solaris and Microsoft Windows environment, on an Internal Network (LAN) or on the Internet for remote processing and access, giving the user the flexibility to mix and match existing hardware and remote resources.



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