

MAILMATRIX™

OPERATOR MANUAL



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About this manual...

The Mail Matrix Operator Manual uses the following conventions when describing certain procedures and situations. Please be aware of these conventions when reading the manual and operating the machine:



The **DANGER** notation is used to bring specific attention to a part of the machine or a step in a procedure that, if not followed carefully, can result in fatal or serious personal injury to the operator. Be very careful to follow any guidelines established within the **DANGER** notations to ensure your own safety as well as the safety of other people in your area.



The **CAUTION** notation is used to alert the reader to something that could cause damage to the machine and/or minor injury to the operator. Be aware of the information provided in the **CAUTION** notations to avoid damaging the machine and the possibility of harming yourself and/or other people in your area.



This symbol indicates a potential pinch hazard. The pinch hazard symbols are placed throughout the machine in places where there is the potential for the operator to get a finger or other article squeezed between two devices. **Exercise caution when working in these areas.**

NOTE: Notes often include extra information that is pertinent to the current topic. These notations can often help you avoid minor problems and use the machine more efficiently.

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System Overview

The OPEX Mail Matrix is a mixed mail sorting system that streamlines the sorting process. The Mail Matrix system can process up to 25,000 pieces per shift, into as many as 1,020 destinations, and can easily sort the widest range of media and address formats ever – from letters, flats, magazines and newspapers to small parcels and interoffice mail – all in a single pass.

Unlike traditional inline machines which use pulleys, belts, and conveyors for transporting the mail piece to its destination, Mail Matrix uses iBOTs (intelligent robotic wireless vehicles). Delivery bins are installed on both sides of the stacker section, reducing the amount of space required.

Mail Matrix can be configured for three different modes depending on the desired throughput and options purchased. These modes are manual feed without image - Key from Paper (KFP), manual feed with Key from Image (KFI), and fully automated with Key from Image (KFI). Fully automated incorporates an optional auto-feeder and imaging. Depending on the desired throughput, up to 36 iBOTs can be installed on a machine.

Mail Matrix features include:

- Scalable feed rate: 600–3600 pieces/hour (1 piece/second)
- Expandable delivery bins (30–1020) and iBOT configurations for growth
- Capable of sorting mail into compact front and rear delivery bins
- Unmatched mixed media handling and single pass sorting
- User-friendly Microsoft Windows interface that allows the operator to independently set up sorting jobs as well as modify, update, and maintain a database
- Wide range of options for sorting by name, department, P.O. Box, building, division, mail stop, and more
- Ability to import organizational databases in various formats into the job setup and execute sorting rules
- Easily sorts mail into delivery bins that simplify removal by mailroom sweepers
- Low maintenance
- Operable in such working environments as warehouses and lockbox operations

Specifications

Performance specifications

Maximum throughput	3600 pieces/hour (1 piece/second)
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Physical specifications

Length	60 inches (add 44.5 inches for each 90-bin expansion module)
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Width	143 inches
--------------	------------

Height	88 inches
---------------	-----------

Power requirements	<ul style="list-style-type: none"> • 120/208 VAC, single phase • 60 Hz, 3 wire system • 24 amps
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Envelope/Document size

Mixed media	Letters, flats, magazines, newspapers
--------------------	---------------------------------------

Length	5.0–15 inches
---------------	---------------

Width	2.75–12 inches
--------------	----------------

Maximum weight per piece	32 ounces
---------------------------------	-----------

Thickness	0.007–1.0 inch
------------------	----------------

Environmental specifications

Agency approvals	UL, CE
-------------------------	--------

Sound level	80 dB Maximum
--------------------	---------------

Temperature	50° to 90° F
--------------------	--------------

Humidity	5% to 95% RH
-----------------	--------------

FCC / Industry Canada Statement

The Mail Matrix system incorporates wireless devices:

Transceiver, 2033210

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1 This device may not cause harmful interference, and
- 2 This device must accept any interference received, including interference that may cause undesired operation.

iBOT, 2032610 & 2043210

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1 This device may not cause harmful interference, and
- 2 This device must accept any interference received, including interference that may cause undesired operation.

Any changes/modifications to the wireless devices not approved by OPEX Corporation could void the user's authority to operate the system.

Safety Precautions

Follow these safety precautions to avoid injury when operating the Mail Matrix. Failure to follow these precautions may result in severe personal injury or damage to the machine.

Charging rail. Hands should be kept clear of the charging rails when the doors are closed. Shorting of the charging rails with either a watch or ring may result in electrical shock or death.

Be careful when removing/replacing iBOTs. In order to increase the iBOTs payload capacity, the iBOT was designed to be as light as possible. As a consequence the iBOTs are not indestructible. Care should be taken when removing or installing the iBOTs.

Keep loose objects away from any exposed, moving parts of the machine. The moving parts of the Mail Matrix, such as the conveyor, can become jammed and/or damaged by foreign objects. Also, keep hands, hair, loose clothing or jewelry away from the moving parts.

Do not attempt to clean the machine while it is running. A cloth (or similar material) should never be used to clean moving parts such as belts or rollers. The use of such material on moving mechanisms can result in damage to the machine or severe personal injury. If a belt, roller, gate or similar part needs to be cleaned, hand-crank the part during cleaning or clean it while stationary.

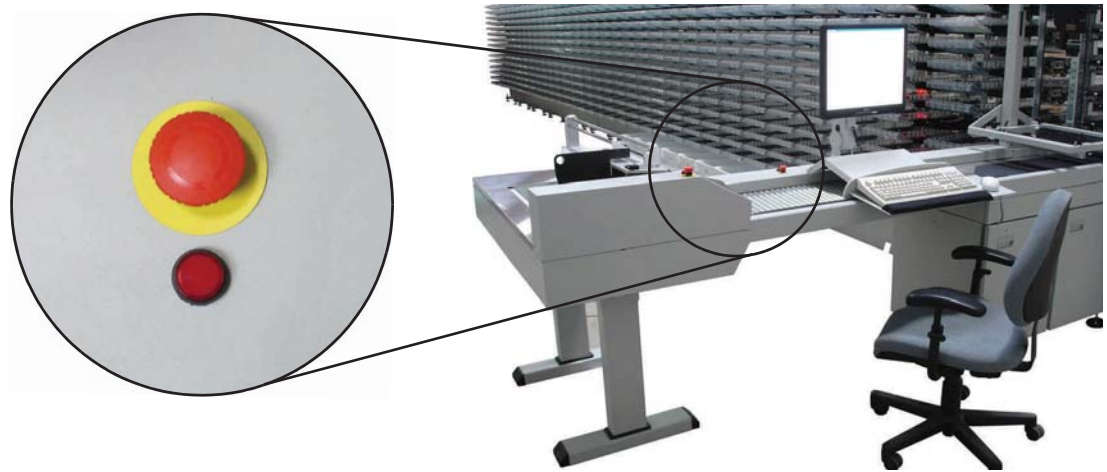
Do not use flammable, high pressure, “canned air” to clean paper scraps and dust from the machine.

Familiarize yourself with the location of machine Emergency Stop Switches. The e-stop is installed on the input conveyor. An e-stop is also installed on the optional auto feeder. E-Stop switches enable a quick stop of all motors in the machine in the event of an emergency involving potential personnel injury.

The Mail Matrix system incorporates emergency-stop buttons and door interlocks to help keep the operator safe.

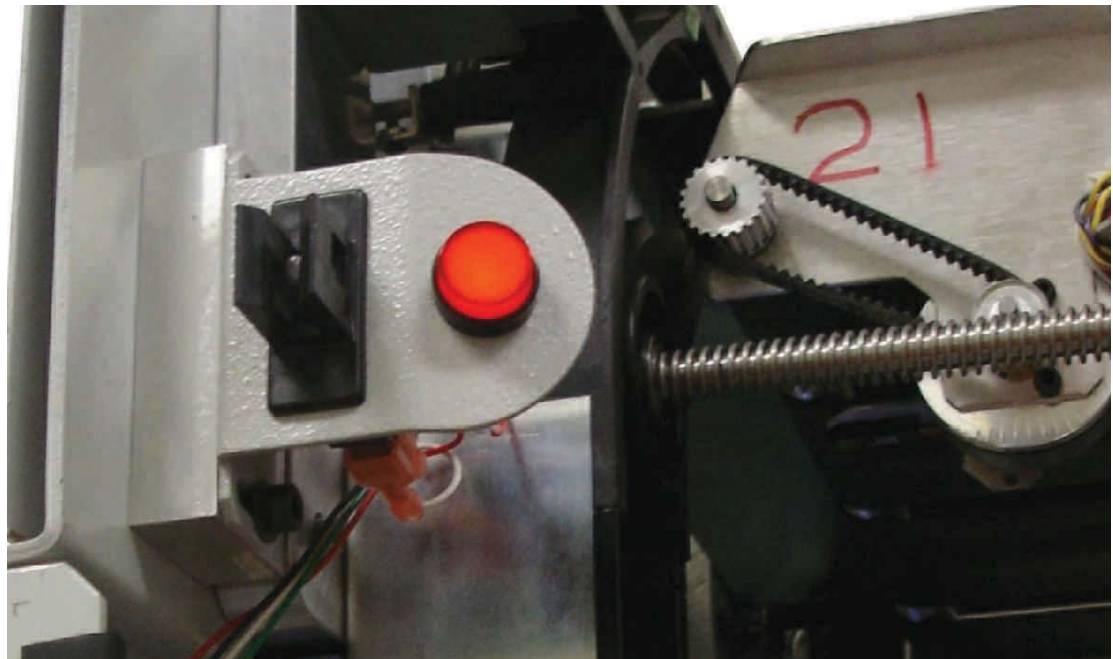
Emergency stop buttons

The big, red, mushroom-shaped emergency stop (e-stop) buttons can be used to stop the machine in an emergency. If necessary, push one of the e-stops and the machine will stop immediately. To restart the machine, twist the knob clockwise, clear the machine, and restart the machine from the Run screen.



Interlock system

When the machine is running, the rapidly-moving iBOTs can pose a safety hazard for the operator. For your safety, magnetic interlocks have been installed on the front and rear doors of the Mail Matrix machine. The interlock system will shut the machine down whenever a door is opened.



Options and Configurations

The Mail Matrix base system includes:

- Key from Paper (KFP) Module with one integrated key-and-drop station
- OPEX DRS (Directory Retrieval System)
- 30 delivery bins
- 3 iBOTs
- 2 large mail tubs
- Host PC with Microsoft Windows® XP

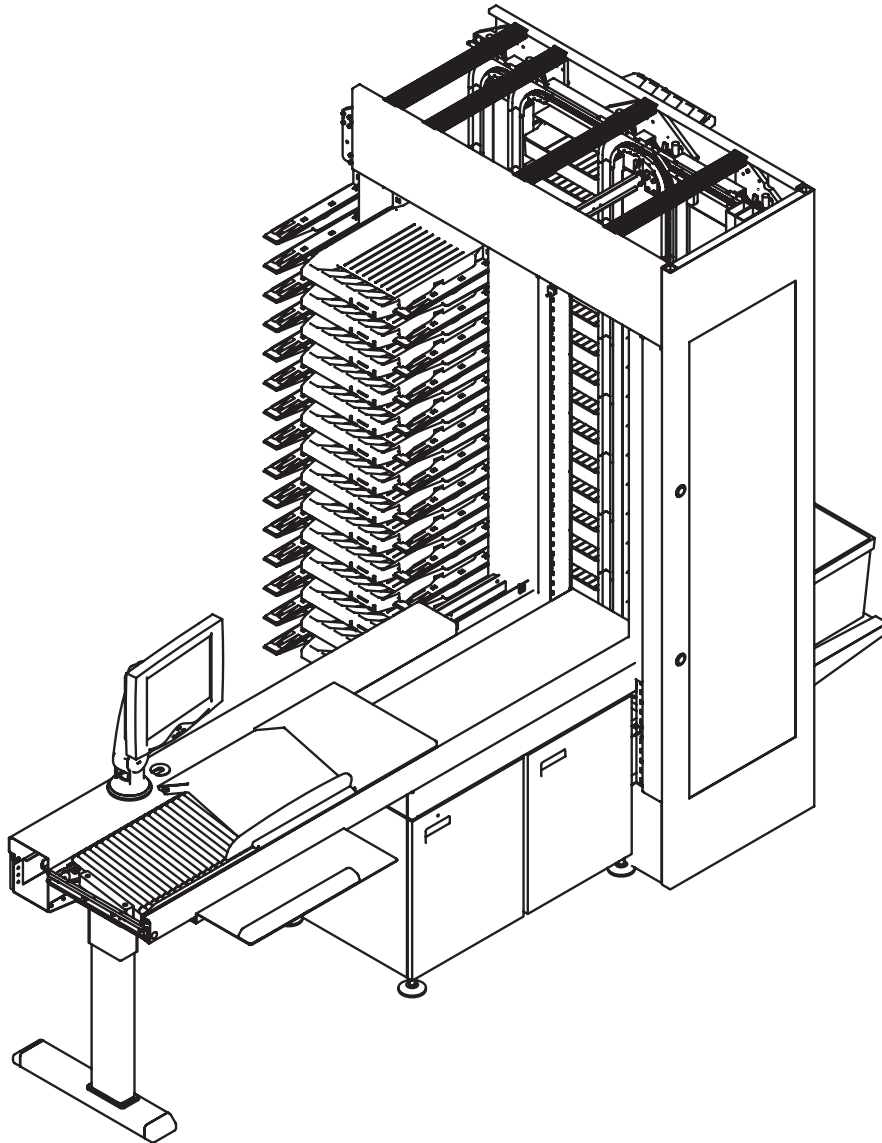
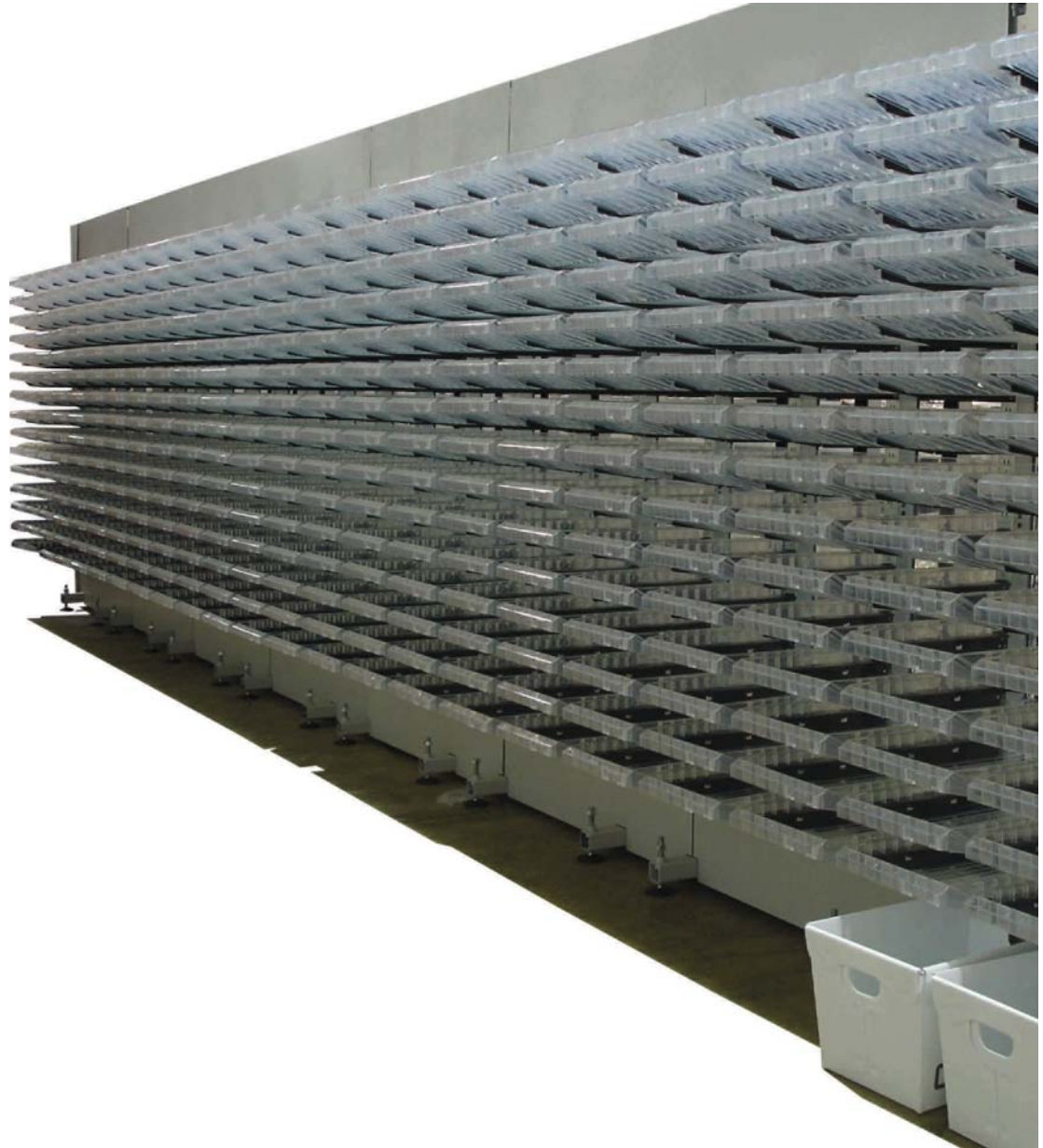


FIGURE 1: Mail Matrix base system

Optional enhancements include:

- **Delivery-bin expansion modules** Up to 11 additional expansion modules (90 bins each) can be installed to increase the bin capacity to 1020 bins.



- **Image capture/MLOCR (Multi-Line Optical Character Recognition)** The image capture/ MLOCR option captures images of mail pieces and automatically determines bin destination. This enhancement is made up of a camera and light arrangement to capture the image of the piece, as well as the MLOCR software, which can interpret the images from the camera and send the necessary addressee information along to the DRS for bin assignment. The image capture/ MLOCR option eliminates the need for the operator to identify the recipient and enter the information for each piece manually.



- **Auto-Feeder** an installed auto-feeder provides automated mail feed to the mail input module. The auto-feeder (along with additional iBOTs) can increase the throughput up to 3600 pieces/hr. (MLOCR required).



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- **Key From Image (KFI) Module** Additional keying stations can be used in conjunction with the image capture/MLOCR option. These KFI (Key From Image) modules allow additional operators to identify pieces that could not be identified by the MLOCR and DRS.



- **Additional iBOTs** Mail Matrix can support a total of 36 iBOTs.



- **Mail Cart(s)** Mail carts are available to aid in the process of sweeping the bins.

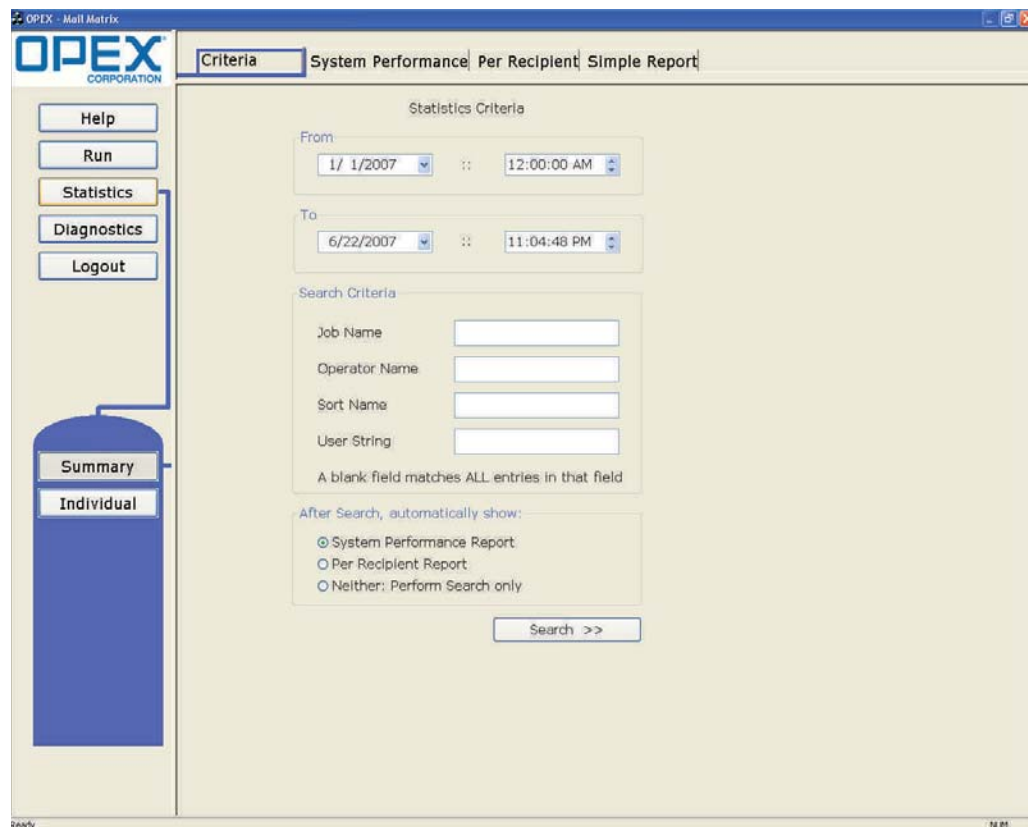
How Mail Matrix Works

The Mail Matrix system uses three software applications to control and run the system: the Host software, the OPEX Directory Retrieval System (DRS), and the Keying Station application.

Mail is input in to the system by either the operator or an installed auto-feeder, which can automatically place mail onto the conveyor. The operator can either look at each piece and use a Keying Station to identify the intended recipient in the site's database, or an installed camera can take an image of each piece and the Mail Matrix can use software to sort it.

Host software

The Mail Matrix Host software provides the operator's main interface with the system's controls. Use the Host software to select and run jobs and view statistical reports on the machine.



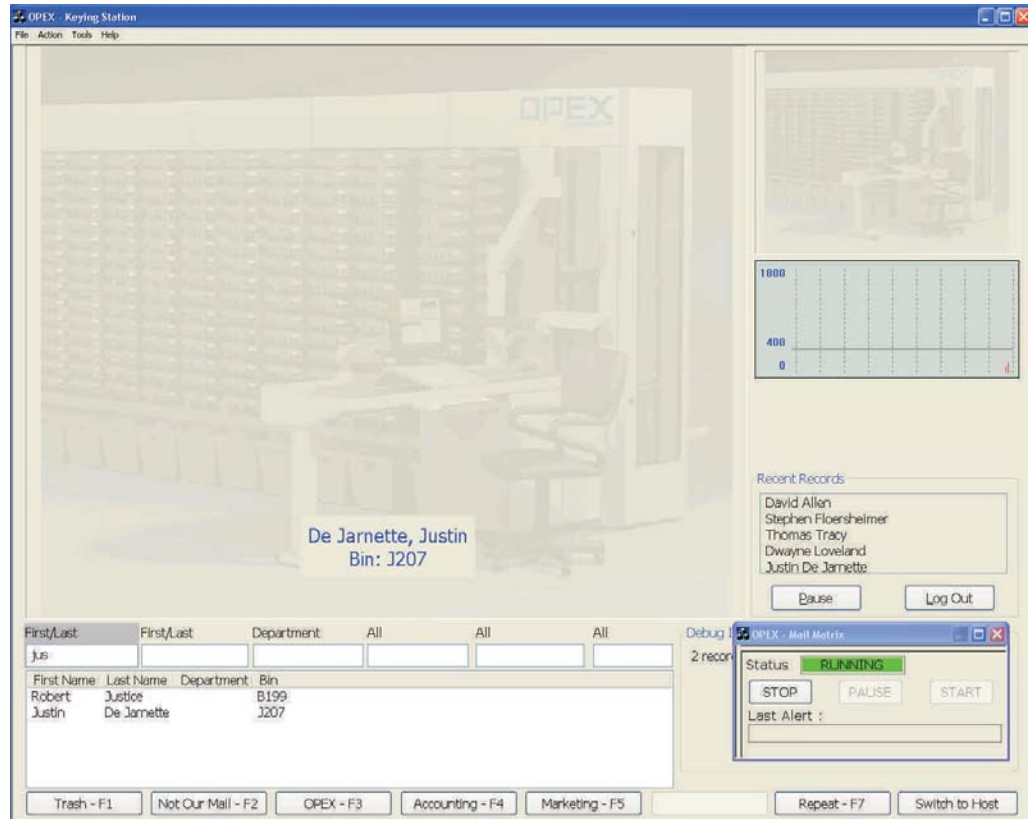
Directory Retrieval System (DRS)

The OPEX Directory Retrieval System (DRS) references a database containing recipient names and bin assignments. The DRS attempts to find a matching recipient for each piece keyed in by the operator (or identified by the image capture/MLOCR system, if installed), then assigns the mail to the bin specified for that recipient.

Keying Station

Use the Keying Station application to enter the names of mail recipients. After the recipient has been identified by the Keying Station, drop the piece onto the conveyor which will the piece to an available iBOT.

The Keying Station software is found on the Host PC (at the operator station), as well as any installed KFI (Key From Image) modules, where remote operators can identify recipients for pieces that the MLOCR software was not able to identify.



Workflow

The Mail Matrix workflow depends greatly on the options you have installed on your machine. The following pages describe the step-by-step methods the Mail Matrix system uses to properly sort your mail.

The first section below provides an overview of what takes place in the basic, “barebones” configuration of the Mail Matrix system, and is followed by the workflows of a fully-configured Mail Matrix.

NOTE: These workflows are intended to give you a better understanding of how the machine works. The operator’s role is described in more detail in Chapter 2.

Basic configuration

The basic Mail Matrix system functions as shown in Figure 2 and described in the following pages:

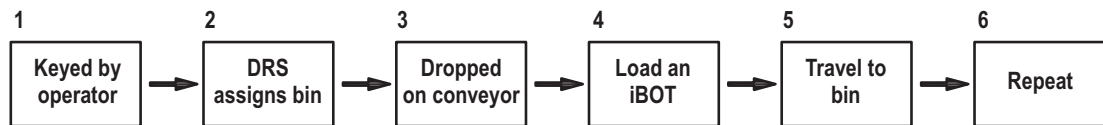


FIGURE 2: Mail Matrix workflow (basic configuration)

- 1 At the operator station, the operator uses the Keying Station application to identify the recipient of a piece.

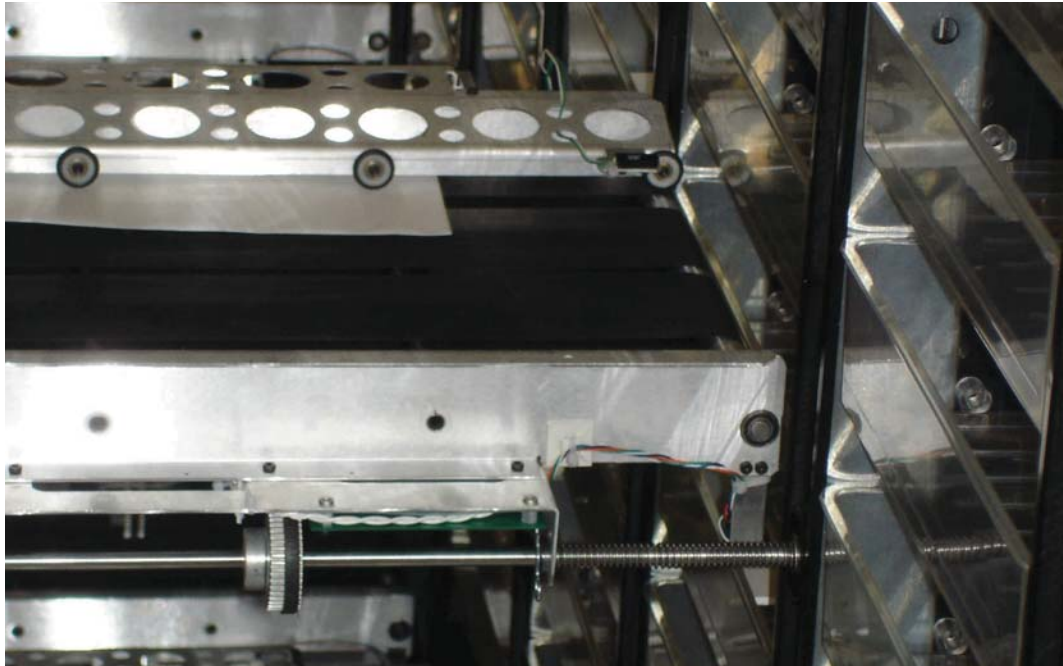


- 2 The OPEX Directory Retrieval System (DRS) determines a bin assignment for the piece, and the software notifies the iBOT of the delivery bin.
- 3 The operator drops the piece onto the conveyor
- 4 The conveyor carries the piece to the awaiting iBOT.



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- 5 The iBOT carries the piece to its destination, releases the piece to the bin, and heads back to the loading column.



- 6 The operator keys in the name of the next recipient, and the process repeats.
NOTE: Keep in mind that the operator does not have to wait until the iBOT returns to drop the next piece. The operator can continue to drop documents as fast as he/she can key them, assuming there are enough iBOTs to deliver the mail.

Fully-configured machine

The Mail Matrix workflow changes according to the options installed. Figure 3 shows the possible workflows of a machine with an auto-feeder and image capture/MLOCR options installed.

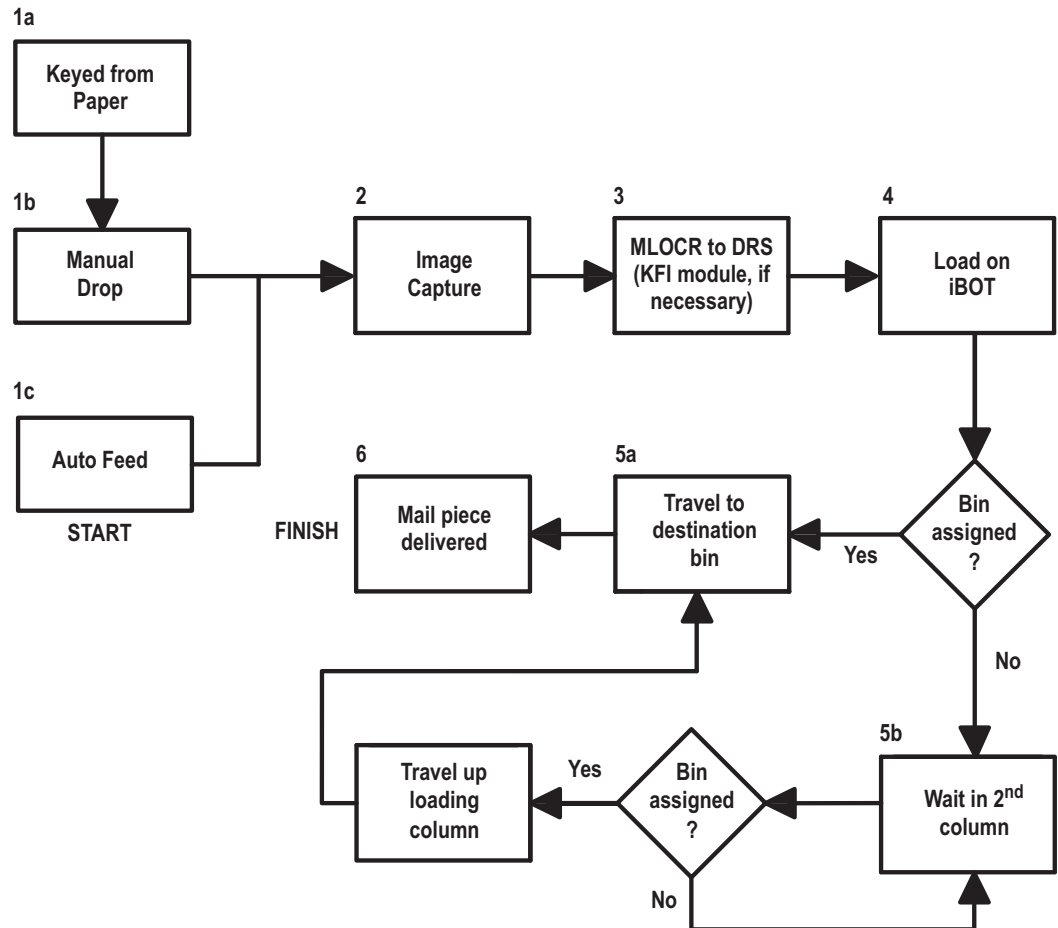
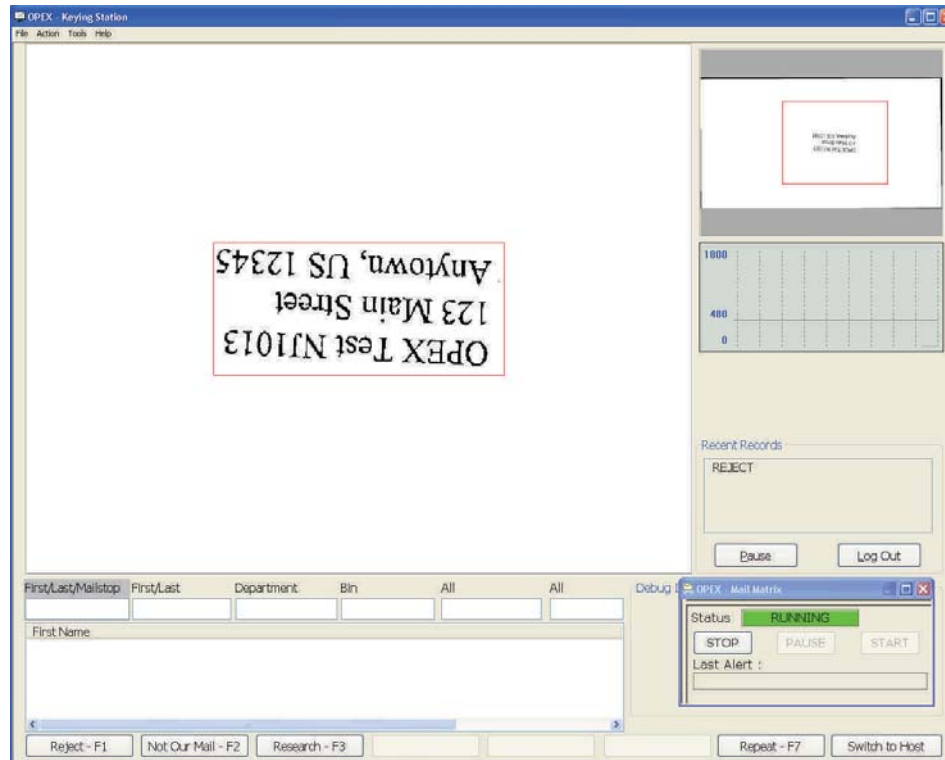


FIGURE 3: Mail Matrix workflow (auto-feeder and image capture/MLOCR installed)

- 1 At a fully-configured machine, a piece of mail can enter the system in one of three ways:
 - a. The operator can look at the piece and enter its recipient into the Keying Station software at the operator station. This is the simplest way to input the piece. After keying the recipient, the operator will manually place the piece on the conveyor. The DRS will assign the bin, and the piece will travel to an awaiting iBOT (skip to step 4).
 - b. The operator can simply drop the piece on the conveyor and let the MLOCR and DRS software determine the recipient and the bin assignment. This method can only be used on machines that have the image capture/MLOCR option installed.
 - c. An installed auto-feeder can automatically feed stacks of mail onto the conveyor.
- 2 Pieces that entered the system without being identified by the operator will have their picture taken by the camera.

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- The image of the piece captured in step 2 is analyzed by the MLOCR software, which reports the characters it found to the DRS software. If the MLOCR and DRS cannot determine a match, the image is sent to an available Keying Station for operator identification.



- The conveyor carries the piece to the awaiting iBOT.
- The next step depends on whether or not the DRS has assigned a bin for the piece on the iBOT:
 - If a bin has been assigned for the mail piece, the iBOT will exit the loading column and deliver the piece to the assigned bin.
 - If a bin has not been assigned, the iBOT will wait in the first delivery column for its bin assignment. Once the destination has been assigned, the iBOT will deliver the piece.

NOTE: If the iBOT does not receive the bin assignment in 30 seconds, the piece will be sent to the reject bin/tub.
- The iBOT carries the piece to the delivery bin, releases the piece to the bin, and heads back to the loading column.

Operation

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Overview

Most functions of the Mail Matrix system are accessible from the operator station, where the operator is within easy reach of the touch-screen monitor, keyboard and mouse, and the conveyor. The touch-screen monitor provides the operator's main interface with the Mail Matrix software, which controls the system.

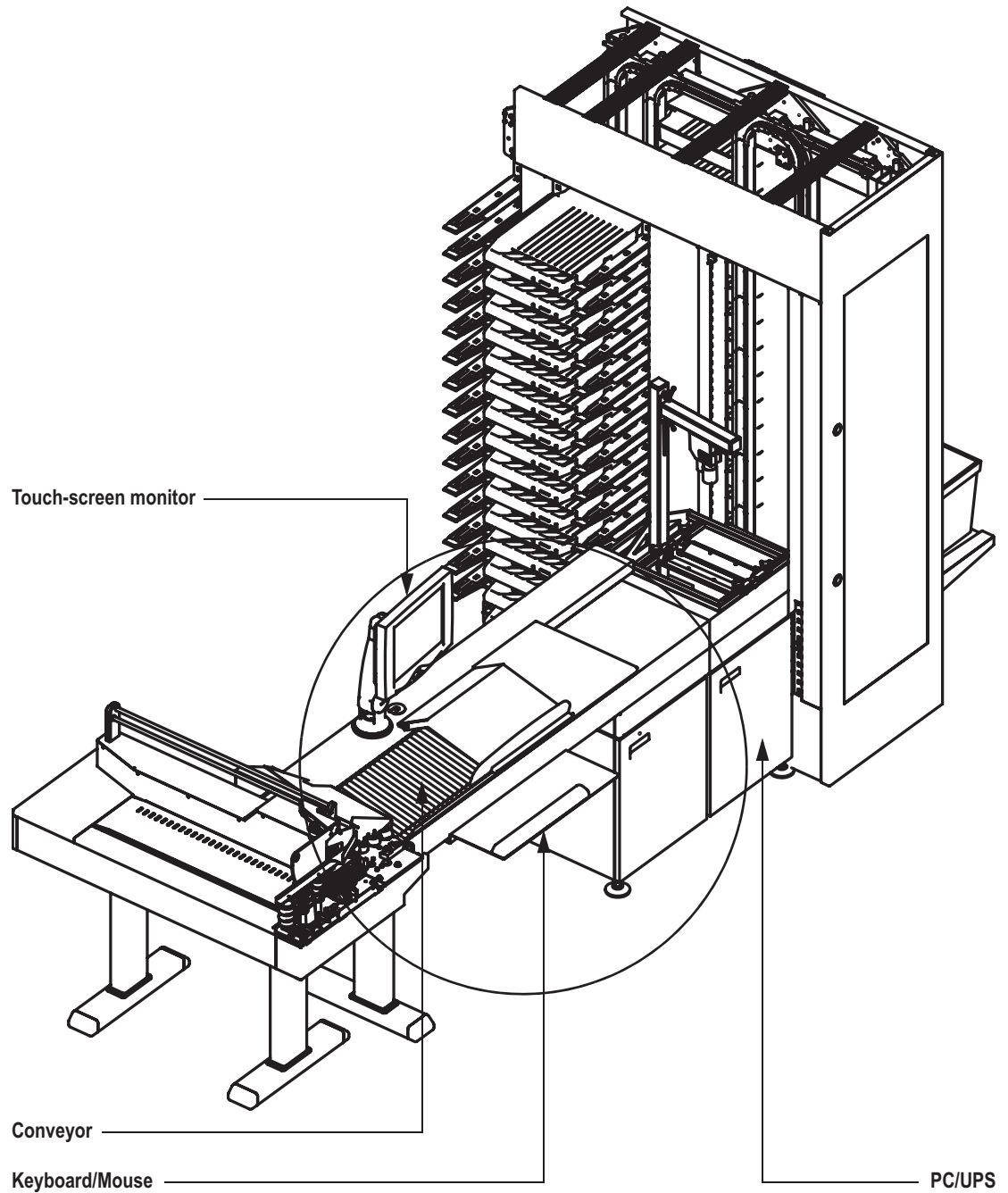


FIGURE 4: Operator station (auto feeder and imaging upgrades installed)

Turning the power on/off

Power up the machine

- 1 Turn the main power switch to the On (up) position.

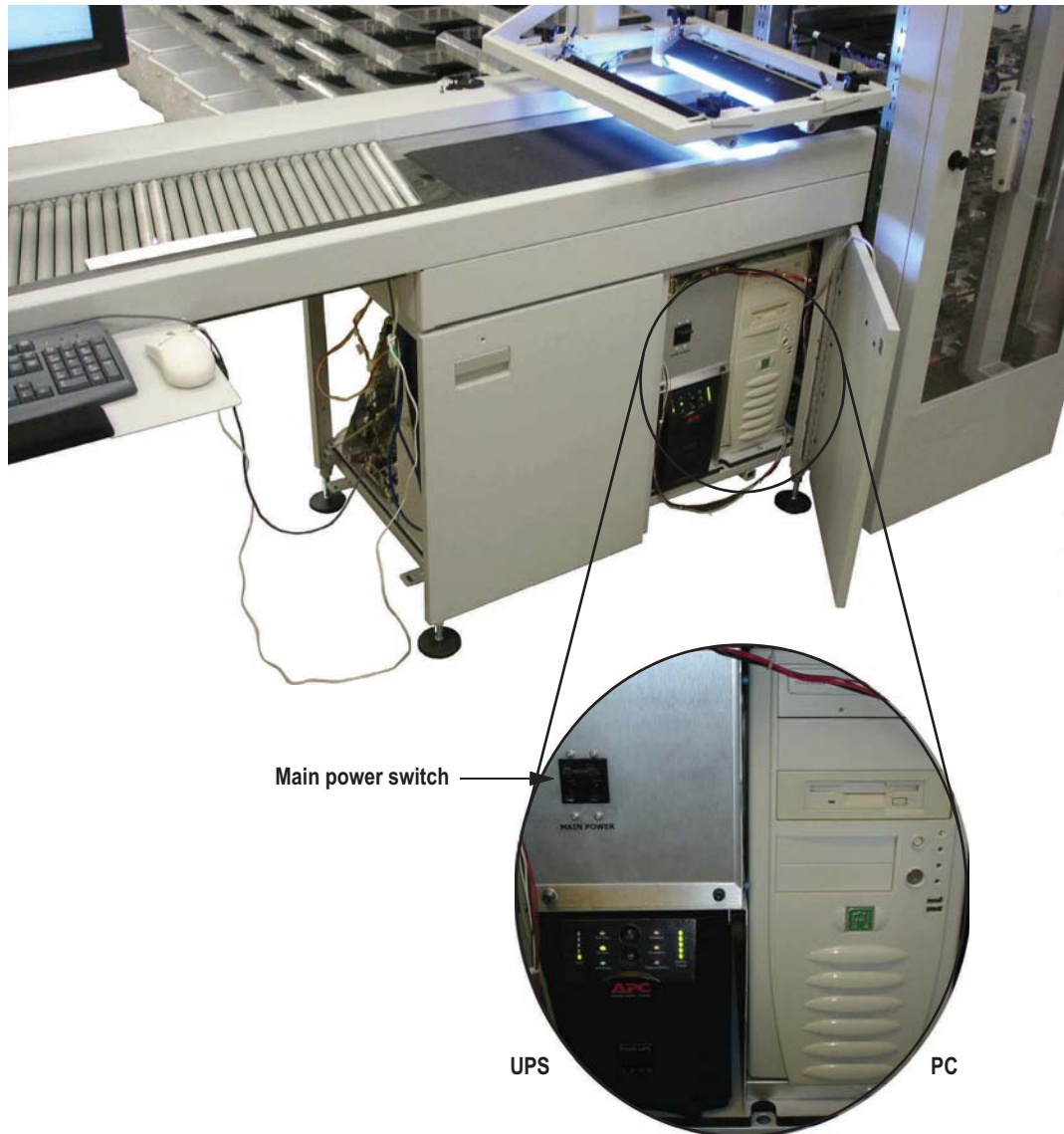


FIGURE 5: PC/UPS/Main power switch locations

- 2 Press the Power button on the front of the UPS. The PC should start with the UPS. If not, press the power button on the front of the PC.
- 3 Log in to Windows with the keyboard and mouse at the operator station.

Turn the machine off

- 1 Shut down the PC.
- 2 Press the Power button on the UPS.
- 3 Turn the main power switch to the Off position.

Logging in to the Host software

The Mail Matrix Host PC will launch the Host software as part of the system's start-up routine. If you mistakenly close the Host software or, for some reason, the Host software does not start with the machine, you can start it manually.

- 1 If the Host software is not already running, double-click on the Mail Matrix icon on the desktop OR click **Start > Programs > OPEX > Mail Matrix** to open it. The Login screen will appear.

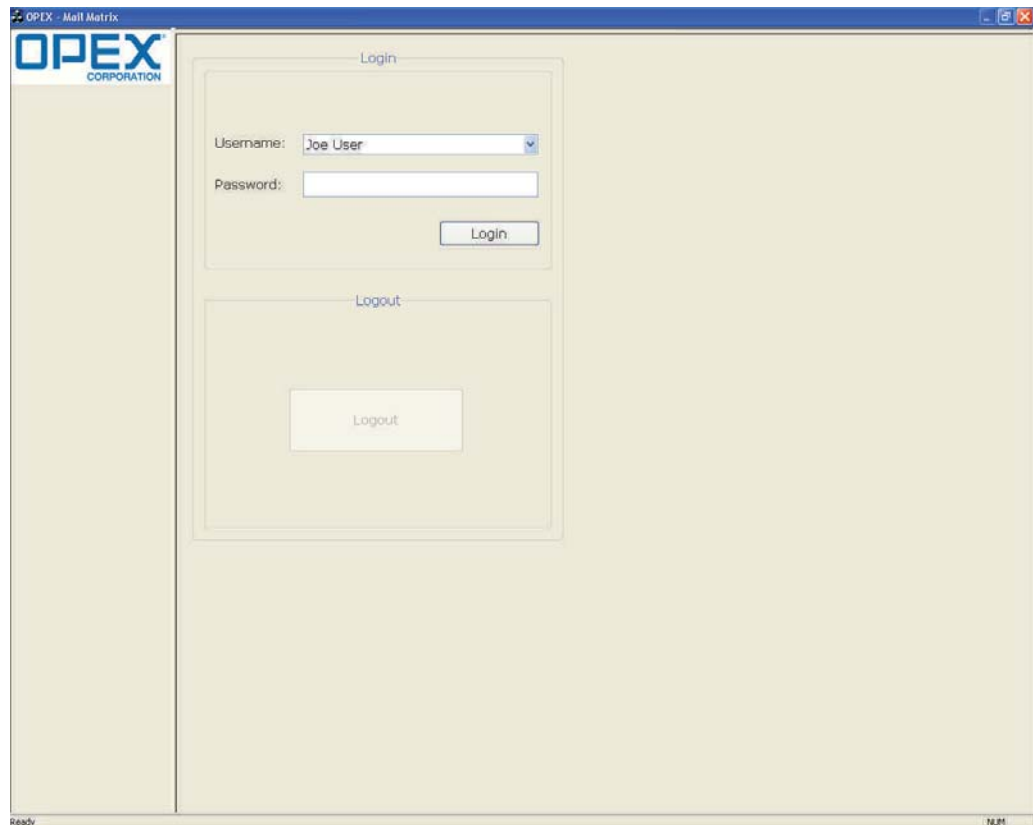


FIGURE 6: Login screen

- 2 Select your username from the dropdown list.
- 3 Enter your password in the appropriate field.
- 4 Click **Login**. The Host software displays the Job Select screen.

Navigating the Host software

The Mail Matrix Host software provides the operator's main interface with the system's controls. Use the Host software to select and run jobs and view statistical reports on the machine.

The Host software interface consists of:

Menu bar The vertical menu bar provides access to the main system functions. Select a category from the menu bar and make selections from the main window or the menu options bar.

Menu options The menu options provide sub-categories for the selections in the menu bar. The menu options bar will change based on the current menu bar selection.

Main window View and adjust settings and make selections in the main window.

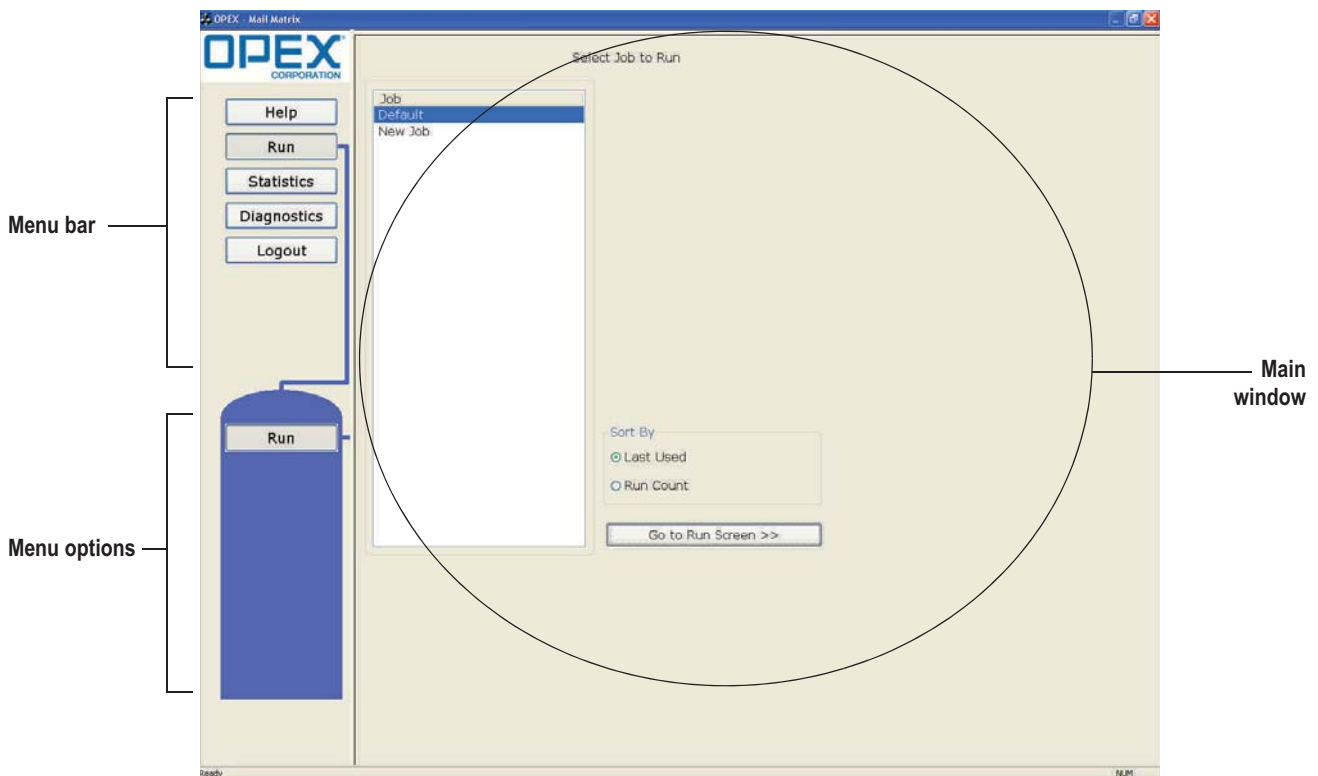


FIGURE 7: Host software interface

Running Jobs

The main components involved in running jobs on the Mail Matrix are the Run screen and the Keying Station application.

Selecting a job

The first step to sorting your mail on the Mail Matrix is to choose the “job” you want to run. A job is a collection of the settings and methods the system will use to process your mail in a similar fashion from run to run. The jobs on your machine should be set up ahead of time, either by an OPEX technician or your site supervisor or IT department.

Highlight the job you want to run from the Job Select screen and click the **Go to Run Screen** button. This will take you to the Run screen, where you can manage your run (described on page 2-6).

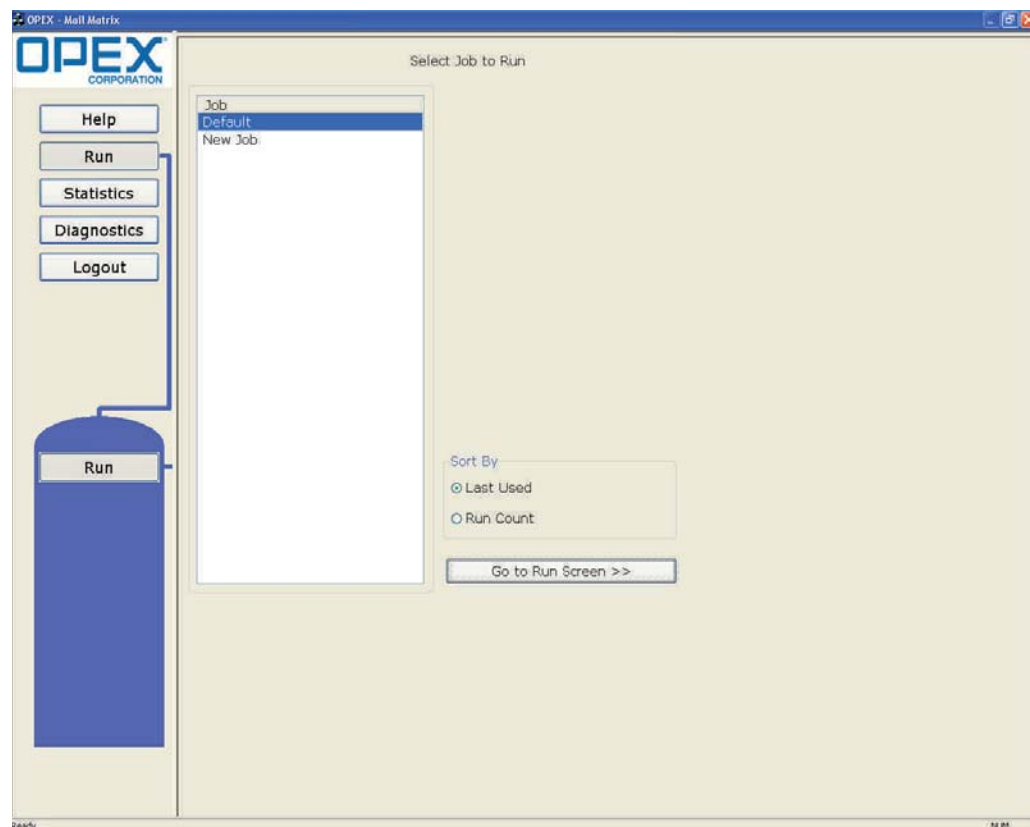


FIGURE 8: Job Select screen

Setting up your run

Once you have selected a job, the Run screen appears. Use the Run screen to to:

- Select the input mode (Key From Paper, Key From Image, MLOCR)
- Start and stop the job
- View vital system information about the current job as the machine is running
- View information about jams
- Access the Event Log
- Access the Keying Station application

There are 3 main components to the Run screen: the main controls, the main status area, and the information tabs.

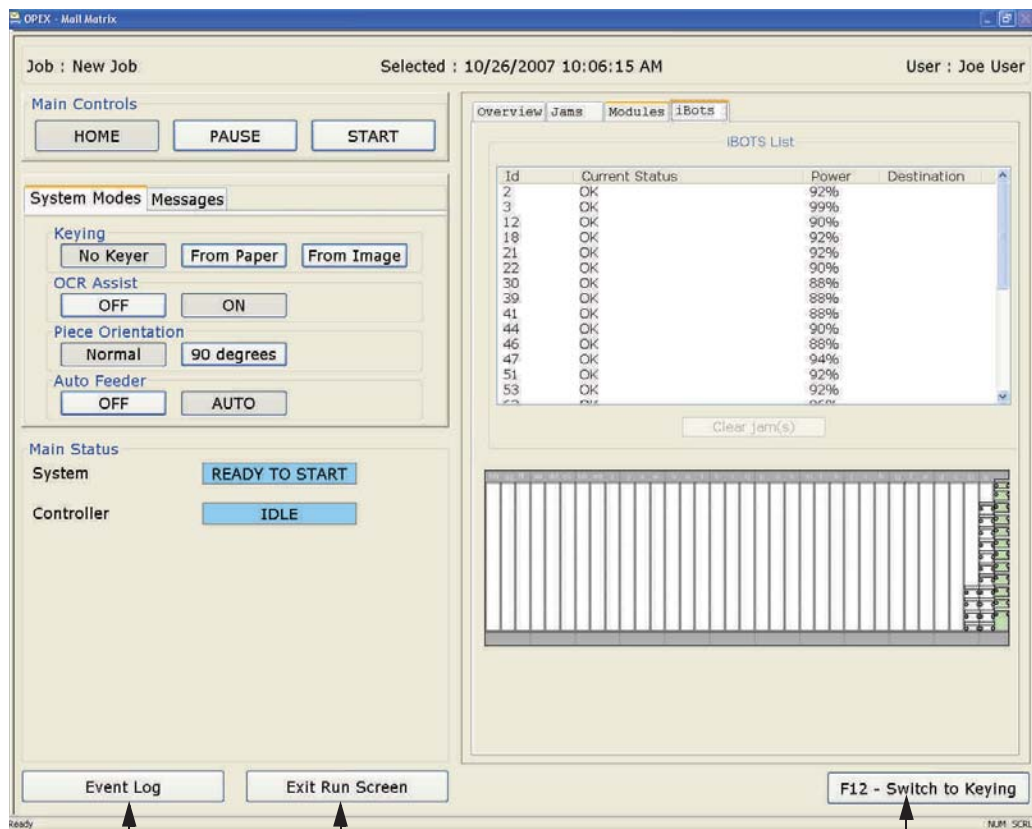
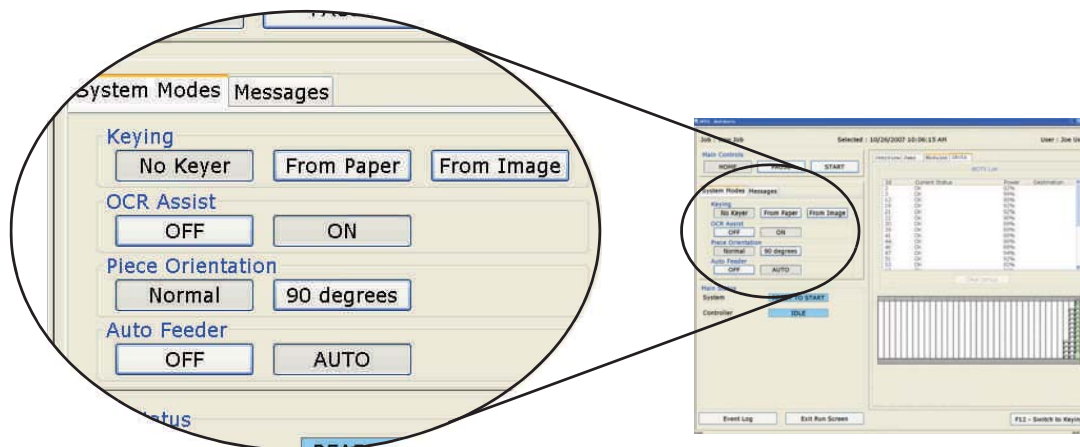


FIGURE 9: Run screen (iBOT status tab)

The next step in running your job is to select the options you want to use for the run. The Run screen's System Modes tab establish how you plan to run the job.



- 1 Select the desired Auto Feeder mode, if you have an auto feeder installed:
 - Select **AUTO** to have the feeder send pieces onto the conveyor automatically.
 - Select **OFF** to turn the auto feeder off and drop pieces manually.
- 2 Select a Keying mode. The keying mode establishes whether or not the operator will key in the recipients or if the installed image capture/MLOCR system will determine the recipient. The options available depend on whether or not you have the image capture/MLOCR option installed and whether or not you chose to use the auto feeder in step 1. Select:
 - **No Keyer** if you have image capture/MLOCR installed and do not wish to have an operator identify recipients.
 - **From Paper** to key in the recipients at the operator station before dropping the piece.
 - **From Image** to identify recipients based on the image provided by the installed camera setup.
- 3 Turn the OCR Assist **ON** or **OFF**. This activates the MLOCR function for analyzing the piece for the recipient information. OCR Assist must be turned **ON** if the Keying Mode is set to **No Keyer**.

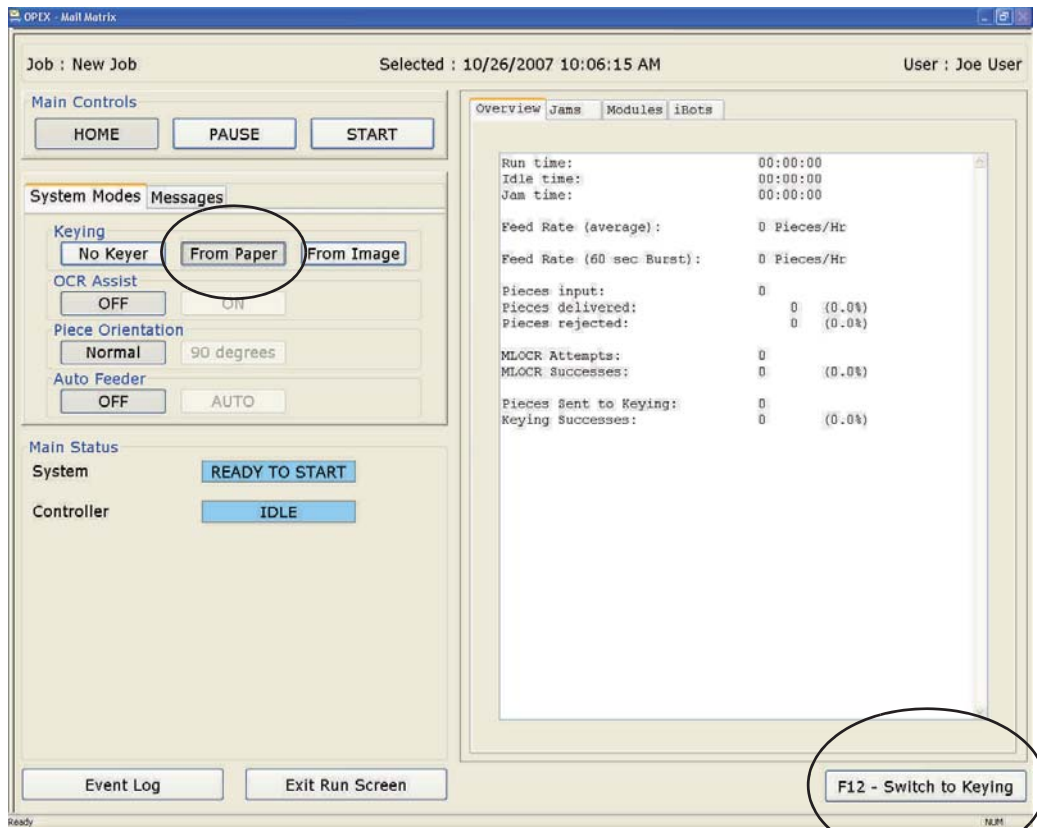
Processing mail

Once you have decided *how* you want to run your job, it's time to start processing mail. Below you will find two procedures: the first is for operators with the basic Mail Matrix configuration, who will key in the recipient and manually drop mail, the second is for machines with auto-feeder and image capture/MLOCR options installed.

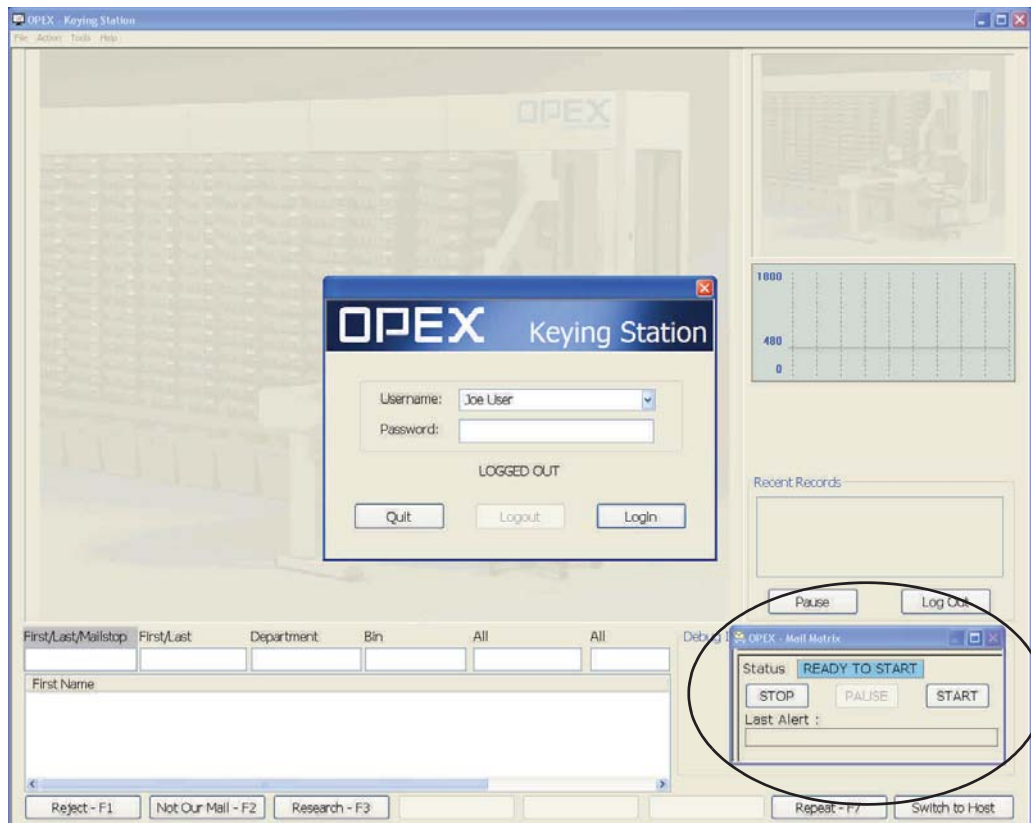
Basic, Key From Paper mode

The basic procedure involves the operator identifying the recipient of each piece and dropping the mail onto the conveyor. This procedure can be used on any Mail Matrix machine.

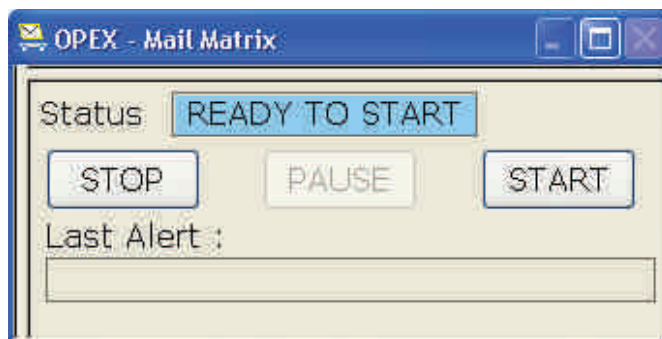
- 1 After selecting the job and choosing the **From Paper** keying option, press **F12** on the keyboard to switch to the Keying Station application on the Host PC (or click on the **F12 - Switch to Keying** button on the bottom of the Run screen).



- Press **F12** on the keyboard to switch to the Keying Station application on the Host PC. A miniature version of the Run screen will appear in the lower right corner of the screen.



- Enter your username and password into the appropriate fields and click the **Login** button to log in to the Keying Station application.
- Press **START** on the miniature Run screen to start the machine.

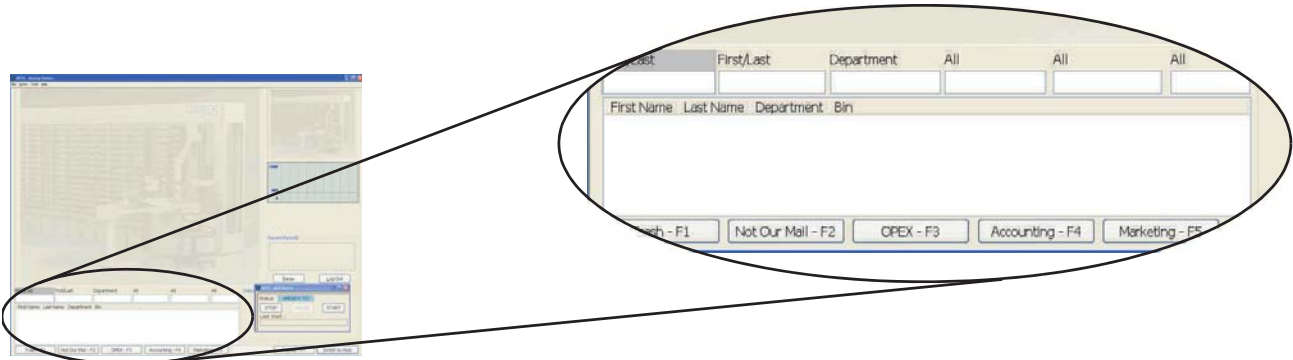


Pressing **START** will send the machine into its startup routine, which includes positioning the iBOTs in the loading column and starting the conveyor. The moving parts of the Mail Matrix can become jammed and/or damaged by foreign objects, so make sure the conveyor and iBOT loading areas are clear before you press **START**. Also make sure to keep hands, hair, loose clothing and/or jewelry away from the moving parts.



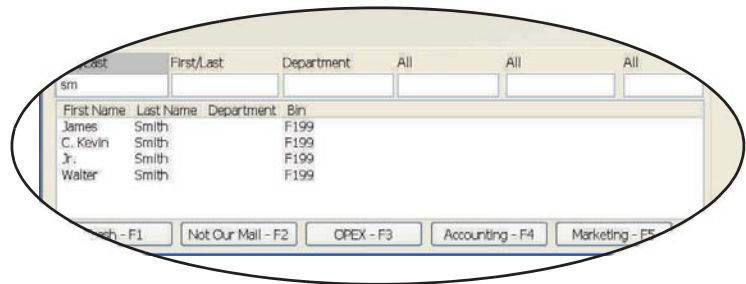
2 Operation

- 5 Enter the intended recipient of your first piece of mail into the Keying Station application.

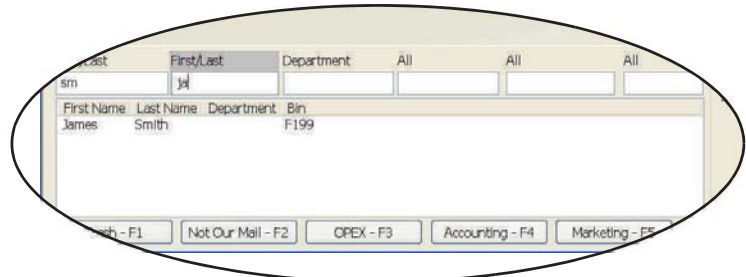


Enter the first or last name of the recipient in the first of the First/Last fields. As you type, the database entries that match your input will appear in the window. In this example we have a piece of mail for James Smith. As we begin to type "sm" for "Smith," all the database entries that have either a first or last name that have "sm" in them appear as a possible match.

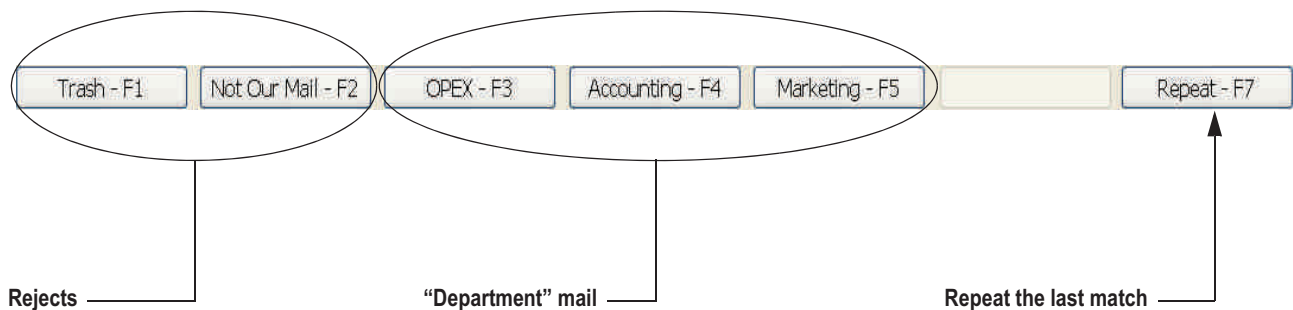
NOTE: If you see your intended recipient in the window at any point, you can use the down arrow and press enter to select the recipient at any time.



Press Tab on the keyboard to move to the next First/Last field (or move the cursor with the mouse). For this example, we type "ja" for the first name of our recipient, James, our intended recipient is the only one that matches and in this case, press Enter on the keyboard to make the match.



You can also use the Quick Buttons at the bottom of the Keying Station to identify the recipient instantly. These buttons are best used for mail that was addressed improperly or mail that is going to a specific department for which you have a Quick Button assigned.



- 6 Drop the piece onto the conveyor. The conveyor will carry the piece to the iBOT, which will then deliver the piece to the appropriate bin.



Be especially careful not to let loose clothing, hair, and jewelry away from the conveyor when dropping pieces. Loose articles of these sort can get caught in the conveyor and cause damage to the machine and/or could injure the operator.

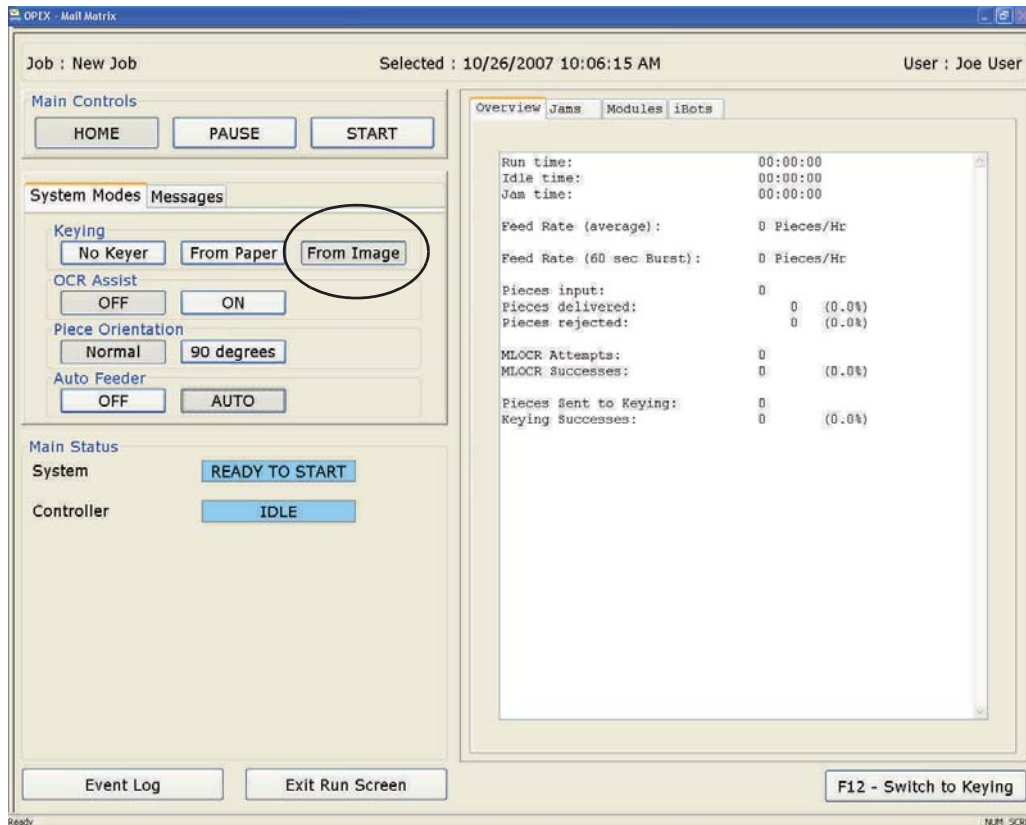
- 7 Repeat the process for all the mail you want to process.

Key From Image mode

Fully-configured machines can run in different modes which use installed options to minimize the role of the operator in the process. These modes are only available if the image capture/MLOCR and/or auto-feeder options are installed.

Key From Image mode sends images for mail pieces that could not be identified by the image capture/MLOCR setup to an available keying station. Key From Image mode can be used with or without the auto-feeder.

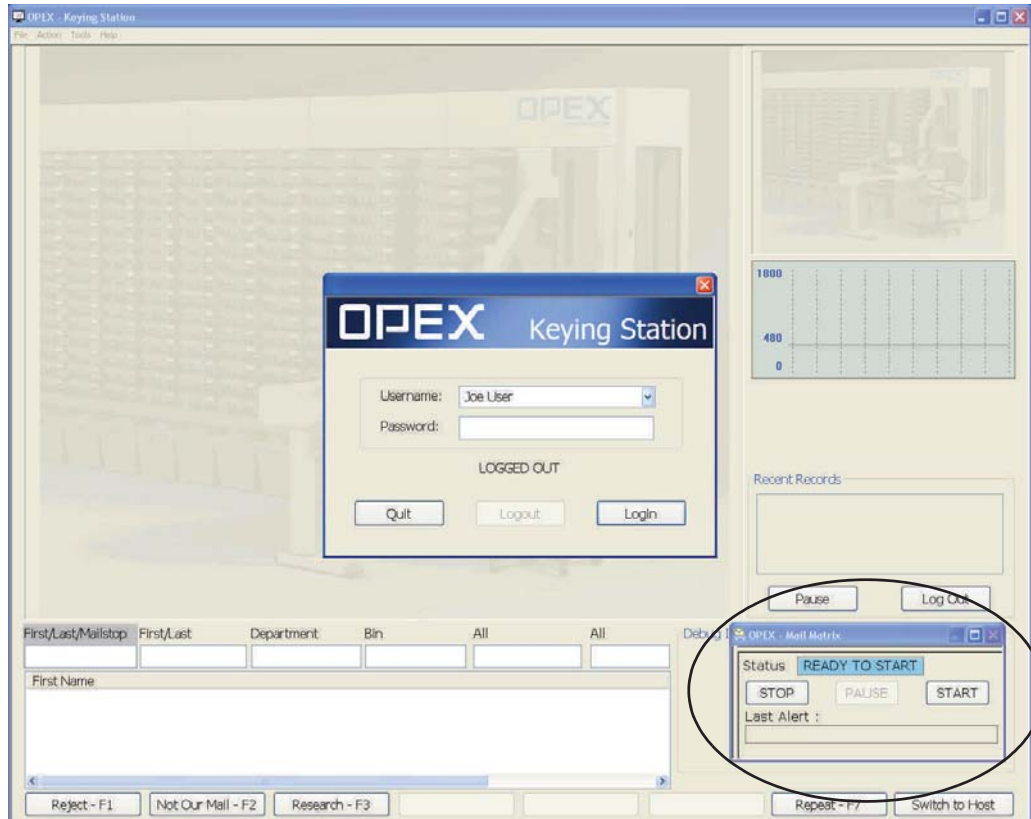
- 1 After selecting the job and choosing the **From Image** keying option, choose from the other options as desired:
 - Select the OCR Assist mode. Turn OCR Assist **ON** if you have the image capture/MLOCR option installed and you want the software to attempt to determine the recipient.
 - Select **AUTO** for the Auto Feeder mode if you want to use the installed auto feeder to feed your mail. Select **OFF** to feed the mail manually.
 - Select a Piece Orientation. Usually, you will want to set this to **Normal**.



- 2 Once you have your run set up the way you want, decide whether or not to use the Host PC as a Keying Station. If you have other KFI modules installed and active, you can have the images of unrecognized mail sent to those stations and

just control the run from the Host PC. If you do choose to use the Host PC as a Keying Station:

- a. Press **F12** on the keyboard to switch to the Keying Station application on the Host PC. A miniature version of the Run screen will appear in the lower right corner of the screen.



- b. Enter your username and password into the appropriate fields and click the **Login** button to log in to the Keying Station application.

2 Operation

- 3 If you are using the auto-feeder, load it with mail as described here. If not, proceed to step 4:
 - a. Stack mail in the auto-feeder face forward, right-side up.



- b. Hold the mail stack in place with the cleaver, which fits into the grooves on the feeder belt.



Be careful not to get fingers caught in the feed mechanism or under the cleaver.

- 4 Press **START** on the Run screen. If you activated the auto-feeder, it will begin feeding mail onto the conveyor. If you did not activate the auto-feeder (or do not have one installed), drop the mail onto the conveyor yourself.



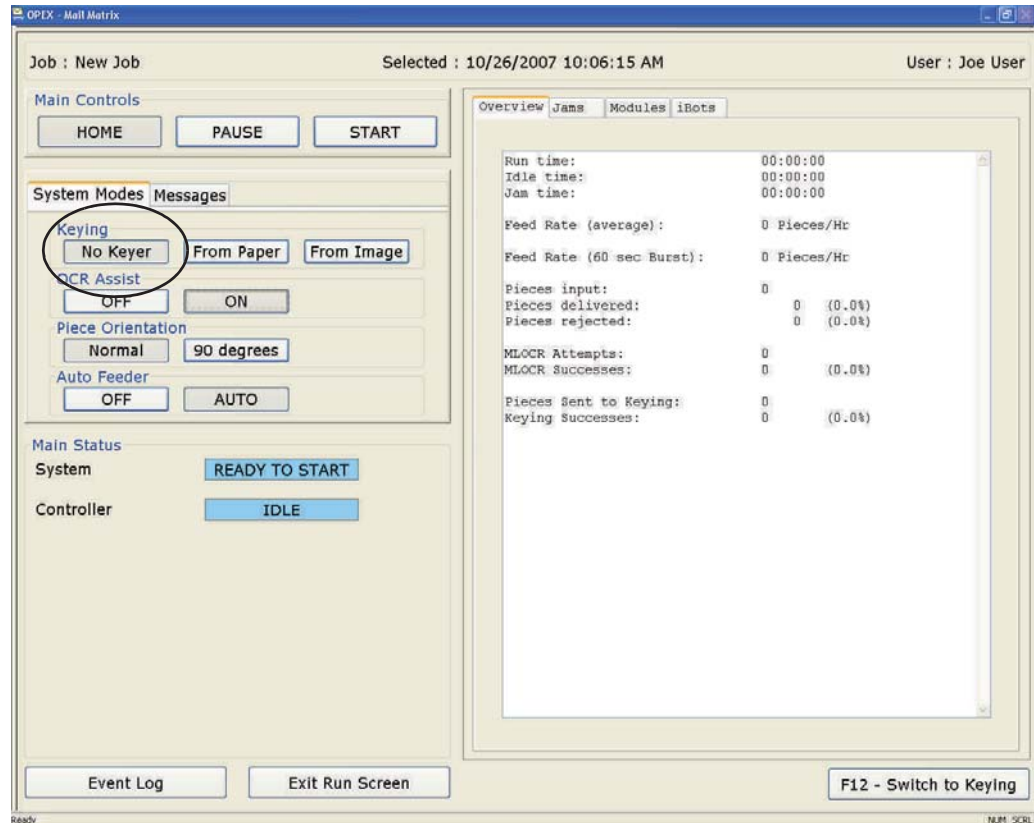
Pressing **START** will send the machine into its startup routine, which includes positioning the iBOTs in the loading column and starting the conveyor. The moving parts of the Mail Matrix can become jammed and/or damaged by foreign objects, so make sure the conveyor and iBOT loading areas are clear before you press **START**. Also make sure to keep hands, hair, loose clothing and/or jewelry away from the moving parts.

- 5 The conveyor will carry your mail past the camera and to an awaiting iBOT. The camera will capture the image, the MLOCR software will interpret the text, and the DRS will attempt to assign a bin.
 - If the software cannot determine the recipient, the image will be sent to an available Keying Station, either at the operator station or at an installed, active KFI module.
 - If the piece is not identified in a certain amount of time, the piece will be sent to the reject bin.
- 6 The iBOT delivers the mail piece to the appropriate bin.

No Keyer mode

The **No Keyer** mode uses the auto-feeder to place mail onto the conveyor. Any pieces that are not identified by the image capture/MLOCR system are rejected.

- 1 Select a job and choose the **No Keyer** keying option. press **F12** on the keyboard to switch to the Keying Station application on the Host PC (or click on the **F12 - Switch to Keying** button on the bottom of the Run screen).



2 Operation

- 2 Stack mail in the auto-feeder face forward, right-side up.



- 3 Hold the mail stack in place with the cleaver, which fits into the grooves on the feeder belt.



Be careful not to get fingers caught in the feed mechanism or under the cleaver.

- 4 Press **START** on the Run screen. The auto-feeder will begin feeding mail onto the conveyor. If you did not activate the auto-feeder (or do not have one installed), drop the mail onto the conveyor yourself.



Pressing START will send the machine into its startup routine, which includes positioning the iBOTs in the loading column and starting the conveyor. The moving parts of the Mail Matrix can become jammed and/or damaged by foreign objects, so make sure the conveyor and iBOT loading areas are clear before you press START. Also make sure to keep hands, hair, loose clothing and/or jewelry away from the moving parts.

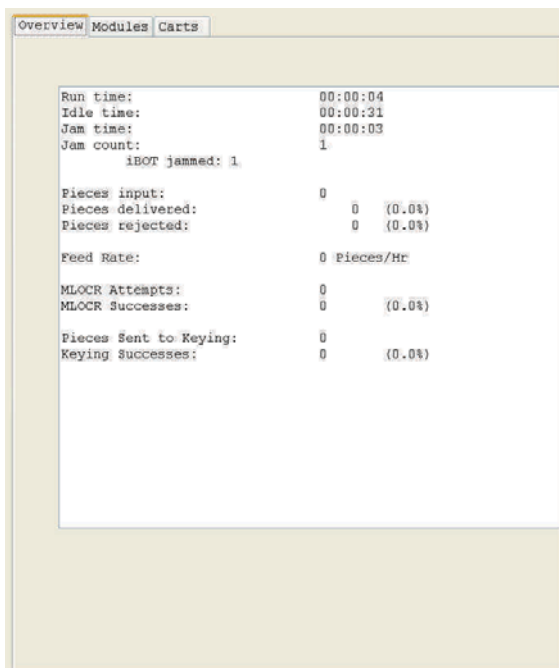
- 5 The conveyor will carry your mail past the camera and to an awaiting iBOT. The camera will capture the image, the MLOCR software will interpret the text, and the DRS will attempt to assign a bin. If the software cannot determine a match, the piece will be rejected.
- 6 The iBOT delivers the mail piece to the appropriate bin.

Information tabs

The information tabs on the right side of the Run screen provide information about the machine and its performance during the run.

Overview tab

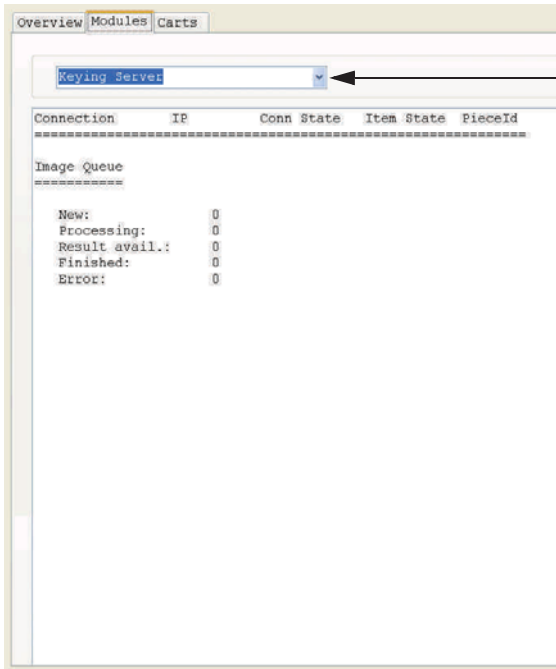
The Overview tab provides information about the current run.



Run time	Total time spent processing mail.
Idle time	Time the operator spent with the Run screen open without a job running.
Jam time	Total time the system was halted for a jam.
Jam count	Reports occasions when run was halted due to a paper jam or a processing problem that was machine related.
iBOT jammed	Jams due to failed delivery by an iBOT.
Pieces input	Total number of pieces fed into the system.
Pieces delivered	Number of pieces that were successfully delivered to a bin.
Pieces rejected	Number of pieces rejected.
Feed rate	Total number of pieces fed into the system, per hour.
MLOCR attempts	Number of pieces the MLOCR attempted to read.
MLOCR successes	Number of pieces the MLOCR positively identified.
Pieces sent to keying	Number of pieces sent to a keying station for identification.
Keying successes	Number of pieces positively identified by an active keying station.

Modules tab

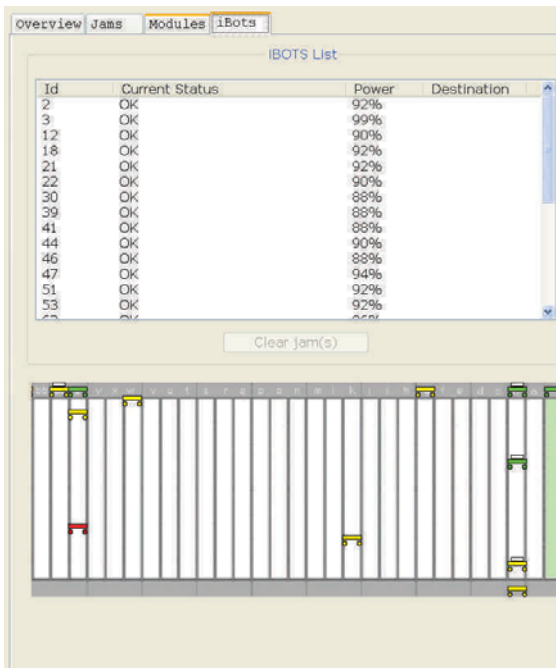
The Modules tab provides information about installed components, such as keying stations and auto feeders.



Use the dropdown list to view information for installed modules

iBOTS tab




The iBOTS tab provides information about each active iBOT. The tab includes a status report for each iBOT, including its power level and destination bin, as well as a graphical display.



About the display:

The graphical display at the bottom of the iBOTS tab shows exactly where in the system each active iBOT is at any time during the run. The green column on the far right represents the loading column.

The color of each iBOT indicates its current status:

-  (Green) The iBOT is sufficiently charged
-  (Yellow) The iBOT is low on power
-  (Red) The iBOT has jammed

The white rectangle on top of an iBOT indicates that the iBOT is carrying a piece of mail.

Operational Maintenance

Chapter

3

Cleaning the System	3-1
iBOT Maintenance	3-2
Removing/Replacing iBOTs	3-3
Shift Maintenance	3-6

Cleaning the System



Do not clean any parts of the machine while it is running. This can result in severe personal injury and costly equipment damage. If a belt, roller, gate, etc., needs to be cleaned, hand-crank the component or clean it while stationary.

Acetone

Acetone is a powerful solvent and degreaser. Only use it on metal objects or surfaces when your intention is to remove all of the grease or lubricant from the object or surface being cleaned.

Exercise care when using acetone near any type of bearing. Flooding the bearing with acetone removes the lubricant from the bearing. This can result in severe degradation of the materials in a short period of time.

Alcohol

Alcohol is a degreaser, but less powerful than acetone. Use it in place of acetone for shafts or bearings when your intention is to remove grease or lubricant from them.

Use only isopropyl or rubbing alcohol on the Mail Matrix. Denatured alcohol is much stronger and more hazardous. Do not use denatured alcohol for any reason.

Exercise care when using alcohol on bearings. Flooding the bearing with alcohol removes the lubricant from the bearing, and can result in degradation of the materials over time.

Detergent-based cleaners

A detergent-based cleaner, such as Formula 409, is less powerful than acetone or alcohol. Use it to clean the glass and plastic surfaces of the Mail Matrix. Detergent-based cleaners do not cause component degradation.

If you use a detergent-based cleaner on a feed or singulator mechanism, remove any residue left by the cleaner by wiping down the mechanism with a cloth moistened with water.

iBOT Maintenance

Each iBOT has a control panel, which houses the on/off switch, a brake button, and red and green status lights. The green light indicates that the iBOT is charged and ready to go, and the red light indicates that the iBOT is in need of attention.

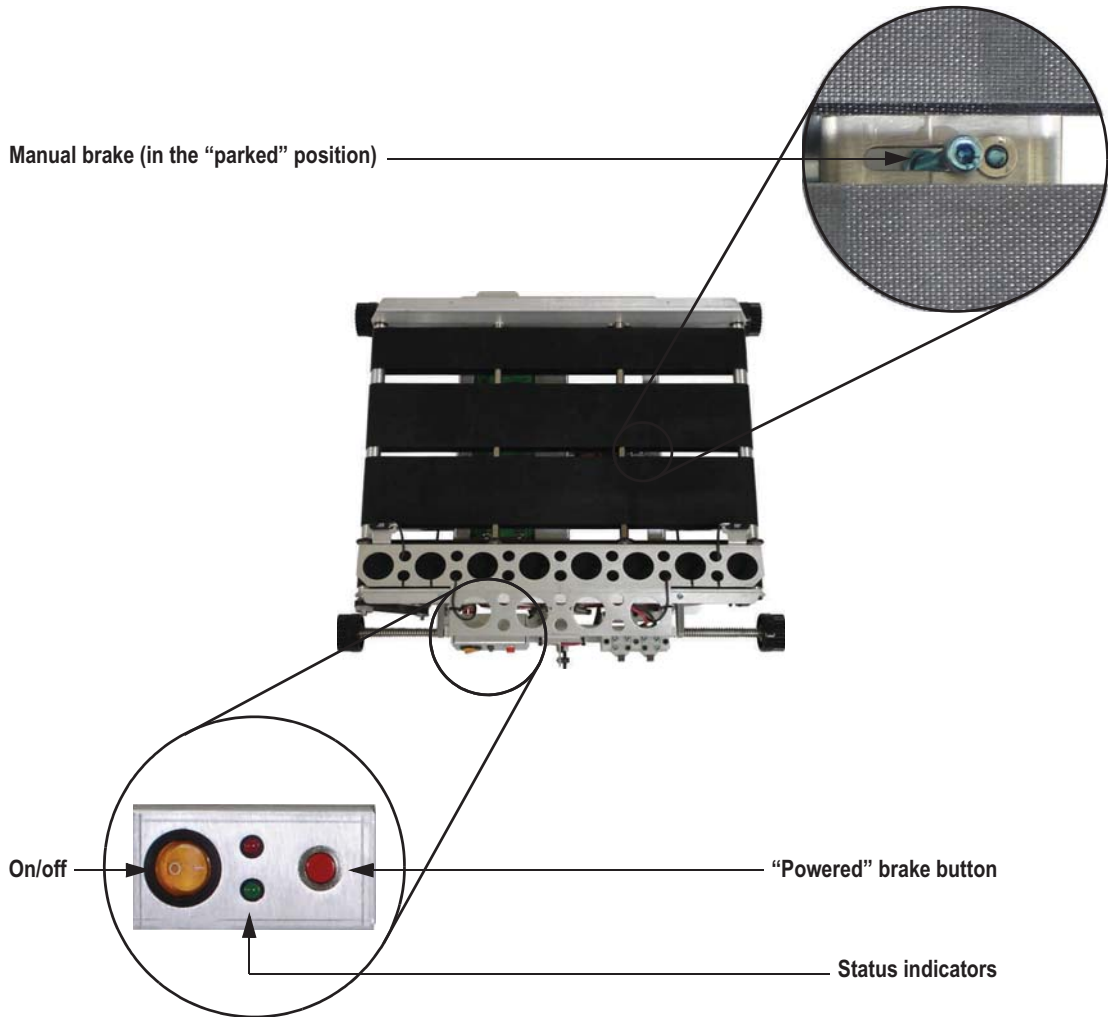


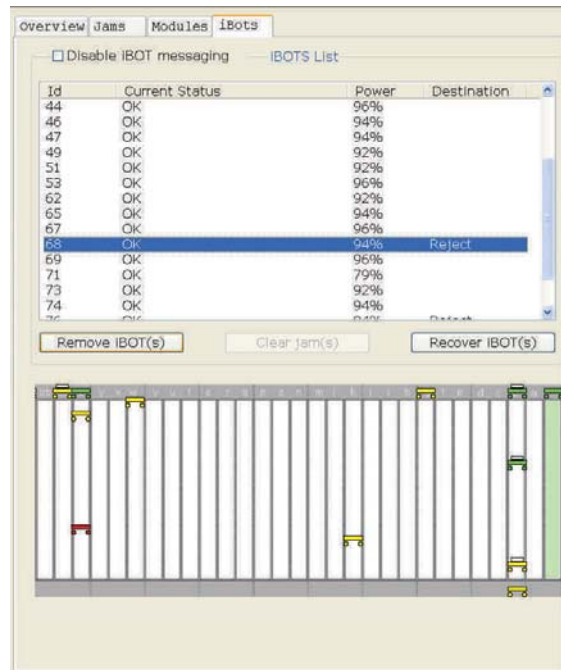
FIGURE 10: iBOT components

The “powered” brake button on the iBOT control panel releases the iBOT brake for as long as it is pushed and held in. This button will only work, however, when the iBOT has sufficient power. In the event that the iBOT requires assistance but does not have sufficient power for the brake button to work, you can release the iBOT brake by pushing the manual brake to the left.



Be careful then using the brakes. Releasing the “powered” brake button wil engage the brake again, so as to make sure it will not fall when stuck in high places in the delivery columns. If you need to release the manual brake, however, be prepared for it to fall immediately. The iBOTs are fairly lightweight, but still heavy enough to injure an operator if it falls from above.




The iBOTS tab on the Run screen will display the status of all the iBOTS in the system as well. Use the iBOTS tab to monitor and maintain your iBOTS. The tab includes a status report for each iBOT, including its power level and destination bin, as well as a graphical display.



About the display:

The graphical display at the bottom of the iBOTS tab shows exactly where in the system each active iBOT is at any time during the run. The green column on the far right represents the loading column.

The color of each iBOT indicates its current status:

-  (Green) The iBOT is sufficiently charged
-  (Yellow) The iBOT is low on power
-  (Red) The iBOT has jammed

The white rectangle on top of an iBOT indicates that the iBOT is carrying a piece of mail. Click on an iBOT in the display to see its status information in the top window.

FIGURE 11: Run screen iBOT status tab

Removing/Replacing iBOTS

In the event that an iBOT should require maintenance, it can be quickly and easily removed from the system. The iBOT in need of repair can be swapped for another and returned to OPEX for service.

The drawer in the bottom of the stacker column is used to help remove and insert iBOTS into the system so that the gears align properly for tracking purposes.

To remove an iBOT from the loading assembly

- 1 [Move the iBOT into the loading assembly.](#)
- 2 Open the access door.
- 3 Press and hold the brake button to release the brake on the iBOT.
- 4 Move the iBOT away from the track towards the front of the iBOT loading assembly.

3 Operational Maintenance

- 5 Lift the handle which causes the left and right clamps to grip the wheels of the iBOT, and slide the loading assembly out of the stacker assembly.

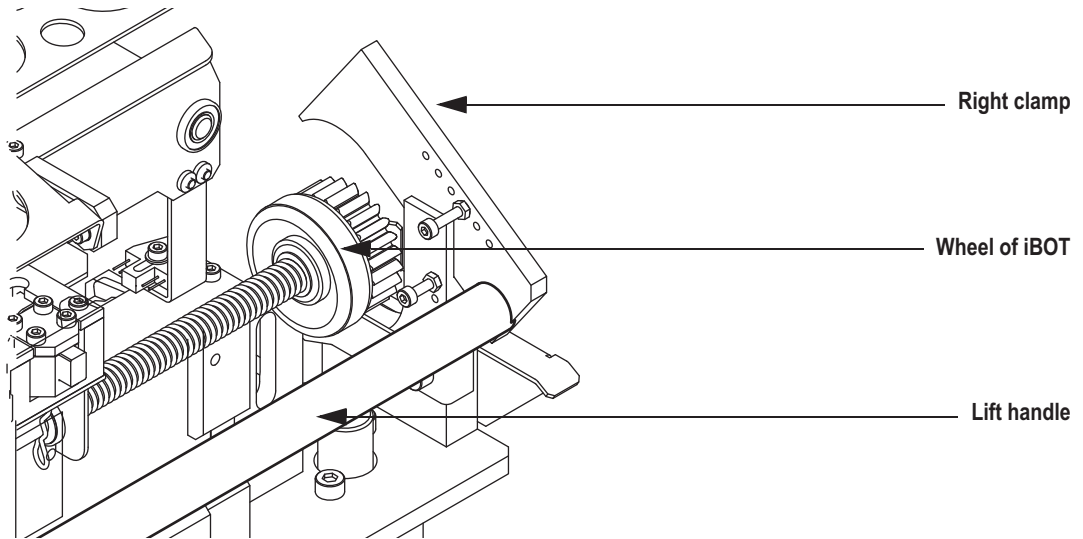
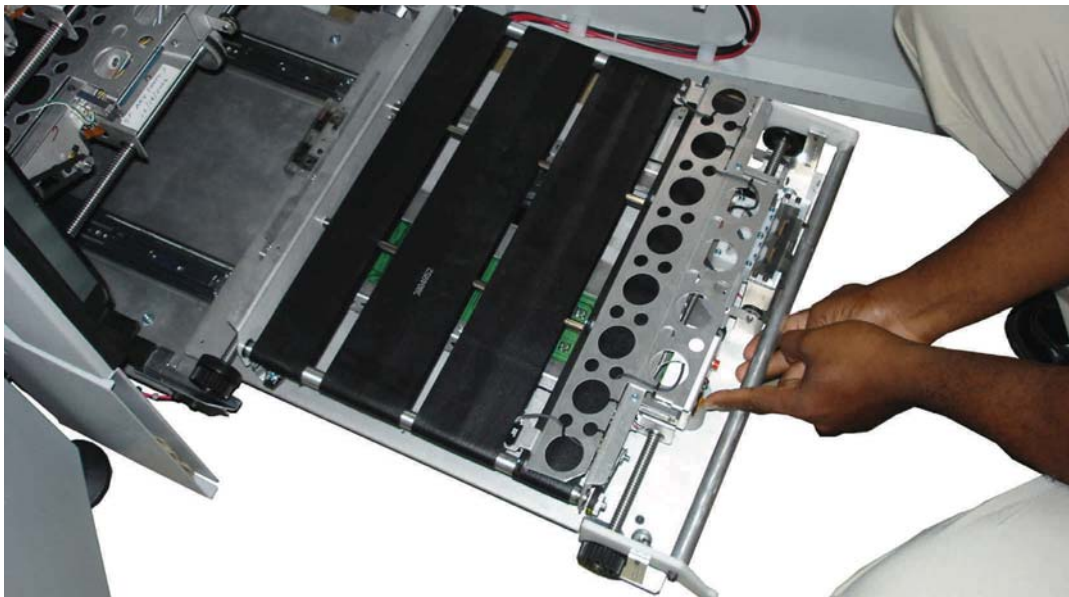


FIGURE 12: Car loader assembly with iBOT

- 6 Remove the iBOT from the loading assembly.
- 7 Slide the empty loading assembly back into the stacker and close the access door.

To insert an iBot at the loading assembly

- 1 Open the access door.
- 2 Slide the loading assembly out.
- 3 Put the iBOT into place and align it so that the back wheels are beneath the left and right wheel clamps.



- 4 Lift the handle, and slide the loading assembly back.
- 5 Close the access door.

To remove an iBOT from a delivery column:

Sometimes an iBOT will get stuck in a delivery column, too far away to remove it from the loading assembly. In this case, you must either remove all the bins in the area or the go inside the machine to remove the iBOT.



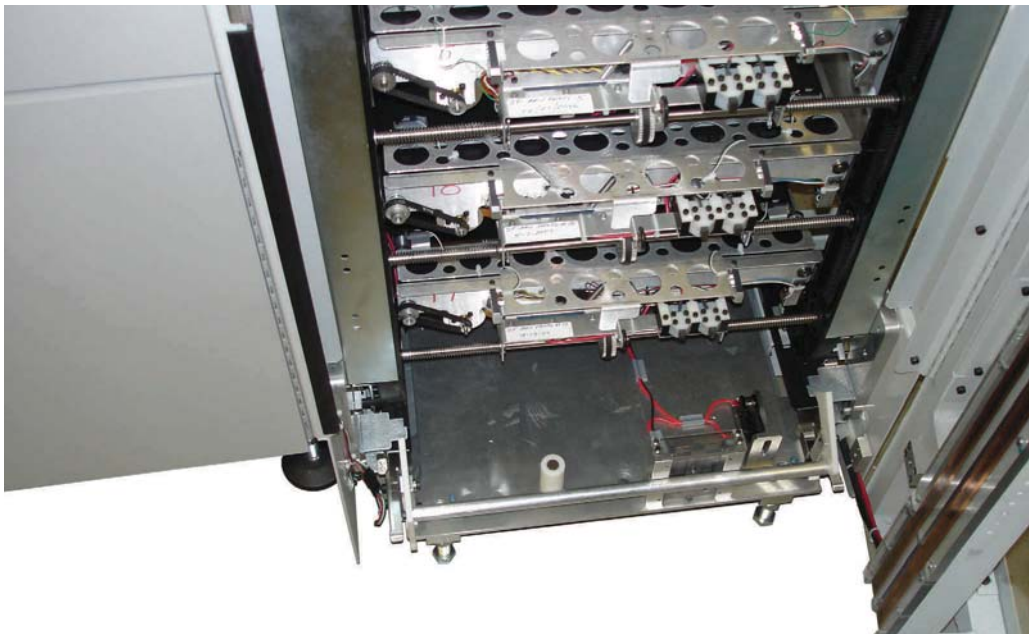
Shift Maintenance

Shift operators should perform the following duties:

- Vacuum all areas of the paper path. Pay special attention to:
 - Conveyor area

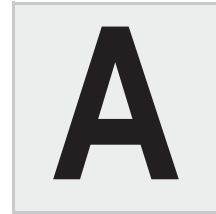


- iBOT loading area



Appendix

Statistics



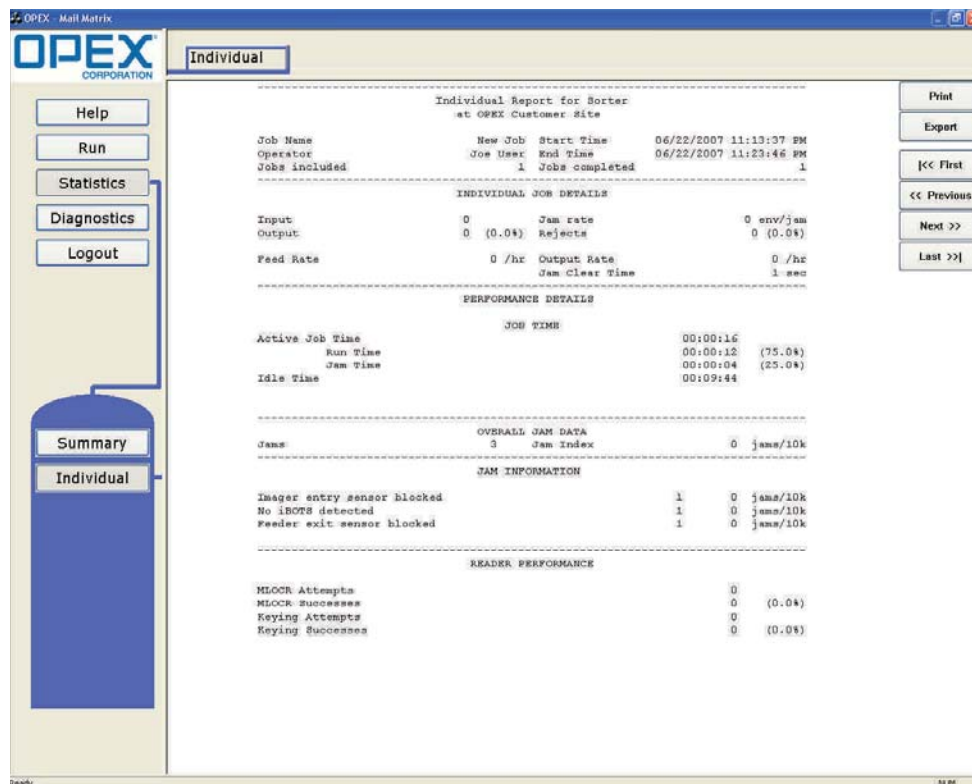
Individual reports A-1
Summary reports A-2

Statistics

The Mail Matrix statistics provide information on the jobs run on the system. Create statistics reports on a per-run basis (**Individual Report**), or as a summary of several runs over a designated period of time (**Summary Report**).

Individual reports

An individual report is created for each *run* made on the machine, regardless of job or operator. To view an individual report, select **Statistics > Individual**.



Individual report buttons

Print	Print the selected report.
Export	Export the current report to the hard drive. The .txt file will be saved to the default directory: C:/OPEX/MailMatrix/Data/Stats.
 << First	View the first saved run report.
<< Previous	Open the report for the run previous to the one you are viewing.
Next >>	View the report for the next run.
Last >> 	View the most recent run report.

Summary reports

A Summary report is based on the Report Criteria you set up. The Report Criteria establishes which jobs, operators and dates will make up the Summary report.

There are 3 different types of summary report:

- The **System Performance** report provides information relative to the machine's performance such as run time, throughput, MLOCR rates, etc.
- The **Per Recipient** report details how many pieces of mail were delivered to each recipient during the specified period of time.
- The **Simple Report** gives the criteria for the current search, as well as the total number of data records for the specified time period.

Creating a summary report:

- 1 Select **Statistics > Summary > Criteria**. These are the items that will be included in your reports.

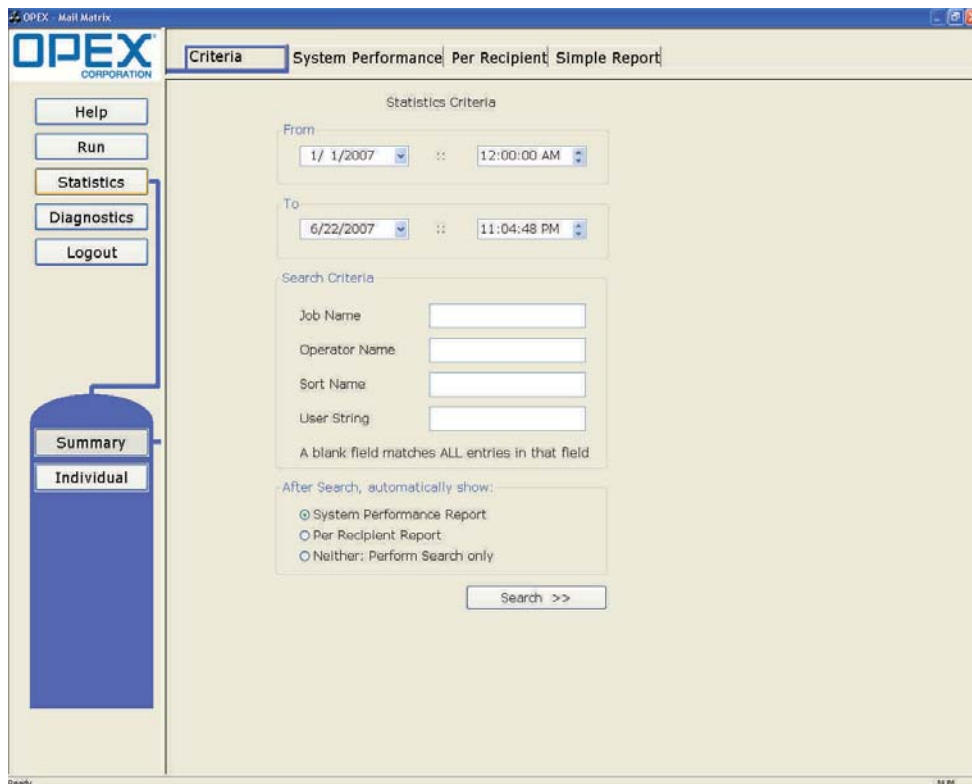
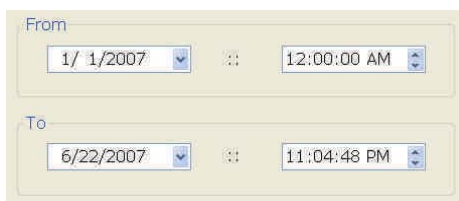


FIGURE 13: Summary report criteria

- 2 Enter the date and time range for the report in the Date section.



The screenshot shows a form titled "Date range settings" with two sections: "From" and "To". Each section contains two dropdown menus separated by a double colon (::). The "From" section has a date dropdown set to "1/1/2007" and a time dropdown set to "12:00:00 AM". The "To" section has a date dropdown set to "6/22/2007" and a time dropdown set to "11:04:48 PM".

FIGURE 14: Date range settings

- 3 Enter the names of the jobs, operators, sort names, and user string fields that you want to include in the report. Leave the fields blank to select all the jobs, operators, etc. run on the machine during the specified time period.



The screenshot shows a form titled "Search Criteria" with four text input fields: "Job Name", "Operator Name", "Sort Name", and "User String". Below the fields is a note: "A blank field matches ALL entries in that field".

FIGURE 15: Search criteria fields

- 4 Select which report, or none at all, to show when the search is complete.



The screenshot shows a form titled "After Search, automatically show:" with three radio button options: "System Performance Report" (selected), "Per Recipient Report", and "Neither: Perform Search only".

NOTE: Individual and summary reports are very similar. The following tables define the terms you find in both of these reports.

Overall System Performance Measures

Input	Number of envelopes to enter the paper path via the feeder module.
Outsorts	Number of envelopes deemed unsuitable for processing. The statistic report contains a list of counts for each outsort category. Each envelope that is directed to the Outsort Bin will only increase one category on the list. If a piece has the potential to increase multiple categories, only the first category in the list is increased. See Appendix A: "Outsorts, Reunites and Rejects" for more information.
Output	Transactions that have passed through the Extract module and have been sent to either the reunite bin or one of the stacker bins.
Jam Rate	Number of jams per run. The formula for the Jam Rate is: $\text{Jam Clear Time} = \frac{\text{Jam Time}}{\text{Jams}}$
Run Type	Shows how much of the job was run on the Mail Matrix and how much of the job was run from the IEM refeeders.
Feed Rate	Number of envelopes per hour the Mail Matrix is currently feeding. The formula for the Feed Rate is: $\text{Feed Rate} = \frac{\text{Input} * 3600 \text{ (seconds per hour)}}{\text{Active Job Time}}$
Output Rate	Number of envelopes per hour the Mail Matrix is processing. The formula for the Output Rate is: $\text{Output Rate} = \frac{\text{Output} * 3600}{\text{Active Job Time}}$
Jam Clear Time	Average time the Mail Matrix was halted while the operator was clearing a jam. The formula for the Jam Clear Time is: $\text{Jam Clear Time} = \frac{\text{Jam Time}}{\text{Jams}}$
Reference Feed Rate	This calculation approximates the feed rate if jams are cleared in the time designated by the Reference Jam Clear time: $\text{Reference Feed Rate} = \frac{\text{Input} * 3600}{\text{Run Time} + (\text{Jams} * \text{Reference Jam Clear Time})}$
Reference Output Rate	This calculation approximates the machine output rate if jams are cleared in the time designated by the Reference Jam Clear time: $\text{Reference Output Rate} = \frac{\text{Output} * 3600}{\text{Run Time} + (\text{Jams} * \text{Reference Jam Clear Time})}$
Reference Jam Clear Time	Estimated time it takes to clear a jam. This is set at 20 seconds by default, but most sites have set it to 30 seconds. The Reference Jam Clear Time is used to calculate Reference Feed and Reference Output Rates, which are intended to provide the rates the machine would achieve if the operator cleared jams within a certain period of time.

Performance Details

Active Job Time	<p>Amount of time the Mail Matrix was either actively running or halted due to a jam. Active Job Time is further broken down into:</p> <p>Run Time: the time spent processing mail</p> <p>Jam Time: the total time the system was halted for a jam</p>
Idle Time	Time the operator spent with the Run screen open without a job running.
Outsorts	The Outsorts section of the Performance Details lists the number of envelopes that the Mail Matrix could not process and the reasons why. These reasons are defined in Appendix A: "Outsorts, Reunites and Rejects."
Output	The Output section of the Performance Details lists the number of transactions that were processed by the machine. Keep in mind that in addition to clean mail and rejects, "Output" also includes reunites and jamsorts. The items in the Output section are defined in Appendix A: "Outsorts, Reunites and Rejects."

Overall Jam Data

Jams	Reports occasions when run was halted due to a paper jam or a processing problem that was machine related.
Jam Index	
Stops	Any time the Mail Matrix is halted due to a problem which could have been avoided by the operator (i.e., feed empty, no bin available, etc.).
Stop Index	

Jam/Stop Information

Reorder Gate 2 Sensor Missing Jam	Reports occasions when run was halted due to a paper jam or a processing problem that was machine related.
Stops	Any time the Mail Matrix is halted due to a problem which could have been avoided by the operator (i.e., feed empty, no bin available, etc.).

Glossary



Barcode A series of bars and spaces arranged in a predetermined pattern to represent elements of data.

E-Stop Emergency Stop. A button used to stop the machine in case of emergency.

Menu bar Vertical series of menus on the left side of the screen. Use the Menu Bar to navigate through the various system parameters and utilities.

Host Operator's main interface with the machine. The Host PC interfaces with the system's controller to manage the system's non machine-related functions.

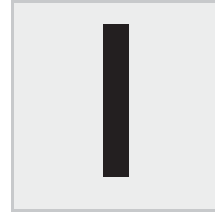
Job A profile of parameter settings you use for processing documents. When you run mail through the Mail Matrix, you must specify which job to run. Jobs allow you to process pieces in a similar manner from run to run.

MLOCR Multi-Line Optical Character Recognition. Used by the scanner to identify letters, numbers, and symbols on documents.

Operator The person running the machine.

UPS Uninterruptible Power Source.

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