Network Document Processor

Quantum Series
Capabilities Overview

December 2014 4326 8077-005

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NDP Quantum Series

Quan•tum *n*., an extensive change or advance
Webster's New World Dictionary

Technology.
A payment system technology, built for the 21st century. A technology designed to meet today's Check 21 requirements and position you for the future. A design that's so superior you'll experience significant efficiency improvement over previous technology. A technology completely scalable, providing the right solution for your needs.

Done Better.
The NDP Quantum Series delivers that technology. With its bold new look, open-track design, and new performance features in every module, the NDP Quantum Series offers unrivaled throughput performance, quality, and reliability.

This document describes the Network Document Processor (NDP) Quantum Series transports. Available at 200, 300 and 600 documents per minute (dpm), the NDP Quantum Series is the only product family in its class that is field upgradeable from 200 dpm all the way to 600 dpm.

Introduction

"We are particularly pleased with the new Quantum announcement from Burroughs. Burroughs has worked very closely with us on Check 21 initiatives as well as many other technology developments. We believe the improvements offered by this product will keep both Burroughs and Comerica firmly on the leading edge of innovation in the financial services industry."

Paul Obermeyer, Senior Vice President, Comerica Bank

Burroughs leveraged decades of experience from our industry leading, high-speed transports. Our engineering teams have incorporated the best-in-class features of our high-speed transports into the NDP Quantum Series platform, resulting in first-rate performance throughout our entire product line. To ensure that you get your work out on time, we focused our development on performance enhancements.

With the NDP Quantum Series, you can expect up to 60 percent higher throughput when upgrading from a DP500 or similar competitive model. And the NDP Quantum Series will outperform competitive transports in its class by as much as 20 percent.

Burroughs understands the importance of quality and reliability. We believe that reliability must be designed-in throughout the entire product development phase to achieve the most dependable product in the market. Every aspect of the NDP Quantum Series is designed to provide the dependability required for transaction-intensive environments, attaining an average 98.9% availability.

The worldwide implementation of check truncation and image interchange systems—such as Check 21—make the quality, security, and dependability of the image capture process more important than ever. The superior image capabilities of the NDP Quantum Series offer the highest recognition rates in the industry. Image quality controls and digital signatures provide a high degree of assurance that images are usable for their intended purpose and protected against fraudulent alteration.

Figure 1-1 illustrates an NDP Quantum Series transport.

Figure 1–1. Performance, Quality, and Reliability—the NDP Quantum Transport

New Features and Benefits

"We needed the best sorter in the market and nothing else measured up to the Burroughs. We weren't interested in a short-term solution; we wanted to develop a long-term relationship and partnership."

Fred Holzapfel, V.P. Computer Operations, Anchor Bancorp, Inc.

The NDP Quantum Series offers the payment industry a suite of 21st century document processors that provide unrivaled performance, quality, and reliability. The following features apply to each of the models in the NDP Quantum Series:

- Best-in-class wall-clock throughput
- State-of-the-art engineering
- Unmatched ergonomics and dramatic styling
- Unrivaled scalability

Best-in-Class Wall-Clock Throughput

An open track and visual indicators provide unprecedented visibility of document locations.

Higher wall-clock throughput is achieved through the NDP Quantum Series design innovations as shown in Table 1-1:

Table 1-1. Best-in-Class Wall-Clock Throughput

Throughput Design Feature	Benefit
Open-track design with wider track wall gaps	Instant document visibility No paper-damage-prone tight spots Rapid track clearing Easy document access Faster recovery
Retractable reader station	Unrivaled document visibility Reduced recovery time Less document damage Easy track accessibility
Document indicator lights on every module	Easy location of documents concealed under safety covers Less wasted motion when opening covers

continued

Improved document tracking sensors and firmware	Fewer items involved in exceptions

Table 1-1. Best-in-Class Wall-Clock Throughput

Throughput Design Feature	Benefit
Advanced exception handling by Item Sort Completion software	Rapid track clearing for checks not involved in exception sort Fewer documents to handle Fewer items go back in the feeder Faster exception recovery
Start Flow switch on every module	Faster recovery after an exception

State-of-the-Art Engineering

Burroughs understands the importance of design.

State-of-the-art engineering provides you with performance features designed to give you and your institution the Quantum advantage. The NDP Quantum Series shares technology, components, and engineering solutions with the robust Burroughs NDP 850 through 2000 Intelligent Speed Series platform. The following tables provide details about the new console, stacker, high-speed encoder, and image designs.

Table 1-2. Console Design

Console Design Feature	Benefit
Long-life, anti-skew rollers throughout the track repel dust and dirt	Reduces number of paper-handling stops Improves MICR/OCR read results Produces higher quality images Increases courtesy amount recognition (CAR) rates Reduces downtime Diminishes operational noise Requires less operator and Burroughs service representative attention
Large-capacity hopper for as many as 2,550 standard documents	Flip-up flag design enables continual loading/operation Vibrating hopper floor provides consistent document feeding

Continued

Multi Jet Endorser (MJE) with available high-capacity ink reservoir (non-toxic ink)	Five times more ink capacity, resulting in fewer cartridge changes

Table 1-2. Console Design

Console Design Feature	Benefit
Improved front and new rear upstream image camera	One-pass Power Encode and inline CAR Reduced footprint
Staple detector	Reduces track jams and service calls Provides immediate feedback on document preparation quality
Positive document location identifier	Precise identification of all documents in the track (both visually and through Common API) Reduced exception recovery time
Single PC for track and image processing	Available when either upstream or downstream image other than color JPEG is selected No PCs visible Functionality through the large flat-panel display, keyboard, and mouse

Table 1-3. Stacker Design

Stacker Design Feature	Benefit
New pocket shape with tall document guides	Better stacking of tall documents Fewer pocket jams
New roller material and design	Reduced document skew and fewer jams Less operational noise

Table 1-4. High-Speed Encoder Design

High-Speed Encoder Design Feature	Benefit
Single-track design	True 600 dpm performance (amount-only encoding) Half the parts of a dual-track design, resulting in fewer failures, jams, and service calls

continued

Redesigned print mechanism/hammer banks	Enhanced reliability Drop-in ribbon, providing faster ribbon changing and easier operator training

Table 1-4. High-Speed Encoder Design

High-Speed Encoder Design Feature	Benefit
Retractable, wide-gap high-speed encoder walls	Reduced document damage Reduced recovery time

Table 1-5. Image Design

Image Design Feature	Benefit
Image quality flags	ANSI standard X9.37 compliant
Image security	Each image digitally signed prior to media storage Immediate protection from internal fraud in the processing environment as well as external fraud prevention
Standard image compression: • 100-dpi, low-storage JPEG • 200-dpi CCITT • 240-dpi CCITT /120-dpi JPEG	Provides choices to meet processing requirements
200-dpi high-resolution JPEG 240-dpi high-resolution JPEG (with a 240-dpi camera), or 200-dpi camera digital image plus scaling	Superior recognition Full-front image or region of interest Full rear image
240-dpi high-resolution color JPEG 200-dpi high-resolution color JPEG with a 240-dpi camera plus scaling	Provides choices to meet processing requirements Facilitates automatic recognition of Chop symbols Specialized applications
Upstream/downstream image compression	Always performs at track speed and provides up to ten images in a single pass

Note: These performance features are available on each of the NDP Quantum Series models.

Unmatched Ergonomics and Dramatic Styling

Burroughs knows how to find the right balance between productivity, quality, and safety.

The unmatched ergonomics and dramatic styling of the NDP Quantum Series combines a bold, new look with innovative features that achieve up to 60 percent improvement in performance over previous models. These innovative ergonomic design features are shown in Table 1-6.

Table 1-6. Ergonomic Design

Ergonomic Design Feature	Benefit
Removable knee well panel (for raised-height models only)	Allows for either seated or standing operation
Curved console with enlarged work surface	Provides operator with easy reach and improved hopper access Reduces operator strain and fatigue Provides room for more supplies
Unique illuminated read station access	Enables unrestricted access and visibility to the track
Large flat-panel display with wide-angle view	Offers an easy-to-read view from any operator position along the transport Reduces eye strain
Optional touch-panel display	Supplies the operator with a convenient and intuitive display interface
PC cabinet	Eliminates visible PCs Offers convenient storage for consumables and miscellaneous items Provides operator with a neat work area
At-a-glance document location with open track design and document indicator lights	Offers convenient at-a-glance location of documents Eliminates needlessly opening covers Provides for faster exception processing

Unrivaled Platform Scalability

Not all transports are created equal.

The NDP Quantum Series provides the most scalable and configurable machine on the market today. With this product, Burroughs offers you a transport that is upgradeable onsite from 200 to 300 to 600 dpm. The single design across all models enables you to expand for increasing work volumes, without the need to purchase a new transport. None of our competitors offers you that much flexibility and investment protection.

Overview

"One of the things that we as a company make decisions on, when we are partnering up with someone, is how well are we able to work together… and our experience with Burroughs has been very good. That's why we were a pioneer in image check processing."

Ted R. Kute, Senior Vice President, Item Processing Administration
Huntington Bancshares, Inc.

The NDP Quantum Series provides a cost-effective and practical Windows XP, Windows 7, 32 or 64-bit based solution to the payment processing needs of your organization. Each document passes through an optional alphanumeric optical character recognition (OCR) reader and magnetic character recognition (MICR) reader. High-speed printers and encoders then imprint pertinent data on each document. The front and back of the document are imaged, and then the document is sorted into high-speed pockets.

With image capture, document images are captured at track speed during a prime sort pass. The images are then stored until they are needed for processing. In addition, captured images can be sent to the optional SoftCAR+ Diamond Edition subsystem. This subsystem can read the machine- or hand-printed courtesy amount from document images as well as the tran code, account numbers, and other fields.

The transport is fully controlled by a PC running Microsoft Windows XP, Windows 7, 32 or 64-bit. The PC can communicate with a variety of application servers, including UNIX, Windows XP, Windows 7, Novell-based PCs, and a variety of mainframes, over multiple local area networks (LANs).

For in-depth information about the NDP Quantum Series system software, hardware, and training, support, and maintenance, refer to the remaining sections of this book.

The NDP Quantum Series can perform the following payment processing tasks:

- Proof of deposit
- Signature verification
- Image statement
- Inline CAR/mark sense recognition
- ATM deposit balancing
- Image archive
- Remittance and lockbox

- Return items
- Reject re-entry
- International clearings

Additional Functionality

Based on your requirements, other functions, such as those listed below, are available for the NDP Quantum Series.

- Audit trail
  A real-time audit trail records information such as amounts, document identification numbers, item counts, and transaction codes. The audit trail can be written to disk and printed on any network printer. It can also be written to the display.
- Concurrent processing
  Track and background programs run at the same time to allow report generation and data communications while documents are being processed.

The remainder of this subsection covers the following topics:

- Outstanding performance
- Configuration flexibility
- Additional advantages

Outstanding Performance

Taking performance to new levels.

The performance of the NDP Quantum Series is outstanding among mid-range document processors in the financial industry. The following enhancements contribute to this superior performance:

- Up to 600 documents per minute track speed for 15.24-cm (6-in.) documents
- Improved document tracking, sensors, and firmware for fewer paper jams
- Large-capacity hopper option with a flip-up flag to lessen the number of stops and operator attentions and to provide easy “on-the-fly” document loading
- Fewer MICR rejects and misreads due to MICR/MICR and MICR/OCR combined read technology

- More efficient batch processing
- Less exception processing
- Reduced back-end corrections
  - Full-field encoding
  - Secondary feeder for merge feeding

    - High-quality images resulting from two decades of Burroughs image technology and expertise
- Improved image character recognition rates
- Knowledgeable Burroughs implementation and support team
- Specialized image capture configurations (dual image, dual filter cameras, color cameras or embossment highlighting)
- Courtesy amount recognition and legal amount recognition (CAR/LAR) and alphanumeric image character recognition (ICR) for check processing
- Upstream and/or downstream imaging capability
    - Highest CAR read rate in the industry for reduced amount-entry processing time
    - State-of-the-art industry-standard Windows XP operating system provides simpler system architecture

Configuration Flexibility

Designed with configuration and option flexibility for a worldwide market.

With the NDP Quantum Series, you choose the configuration you need to meet your site's requirements. The following models are available in the series:

- Community bank or image remittance
- Centralized or distributed proof of deposit (POD) bank truncation
- Reject reentry for institutions running high-speed transports

Note: In addition to the three standard NDP Quantum models, customized configurations are available, depending on the needs of your institution.

Community Bank or Image Remittance Model

The NDP Quantum Series community bank or image remittance model has the following components:

- Stand-up system with large hopper
- Available at speeds of 200, 300, or 600 dpm
- Secondary feeder
- Upstream front/rear image capture with CCITT/JPEG
- E13B MICR/OCR combined
- OCR reader
- Rear MJE
- 12 pockets
- High-visibility, touch-panel display
- 135 dpm low-speed encoder
- Common API 7.0
- Sit-down version available

Key Options

Key options for this model include the following:

- High-speed encoder
- 24 or 36 pockets
- Downstream CCITT image
- Downstream JPEG (grayscale or color) image
- Dual MJE

Centralized or Distributed POD Bank Truncation Model

The NDP Quantum Series POD bank truncation model has the following components:

- Stand-up system with large hopper
- Available at speeds of 200, 300, or 600 dpm
- Secondary feeder
- Downstream front/rear image capture with CCITT/JPEG
- E13B/CMC7 MICR
- Rear MJE
- 12 pockets
- High-visibility, touch-panel display
- 135 dpm low-speed encoder
- Common API 7.0
- Sit-down version available

Key Options

Key options for this model include the following:

- High-speed encoder
- 24 or 36 pockets
- Dual MJE

Reject Reentry Model for Institutions Running High-Speed Transports

The NDP Quantum Series reject reentry model has the following components:

- Sit-down system with large hopper
- Available at speeds of 200, 300, or 600 dpm
- Secondary feeder
- Upstream front/rear image capture with CCITT/JPEG
- E13B high and low MICR read with OCR combined
- OCR reader
- Rear MJE
- 12 pockets
- High-visibility, touch-panel display
- 135 dpm low-speed encoder
- Common API 7.0

Key Options

Key options for this model include the following:

- High-speed encoder
- 24 or 36 pockets
- Downstream CCITT image
- Downstream JPEG image (grayscale or color)
- Dual MJE

Burroughs Experience in Document Processing

Burroughs has been a leader in the payment business for over 40 years.

Along with the NDP Quantum Series, you have the advantage of our vast experience in the business of document processing. Benefits to your organization include the following:

- A worldwide, installed product base
- Part of a suite of document processors ranging from 30 documents per minute to 32 documents per second (2,000 documents per minute)
- Capability to process all lines of business
  - Proof of deposit
  - Image statement
  - Image archive
  - Return items
  - Reject re-entry
  - Signature verification
  - ATM deposit balancing
  - Remittance and lockbox
  - International clearings

Ease of Customization

We customize to meet your requirements.

The NDP Quantum Series can be quickly and easily adapted to meet the specific requirements of your site, as listed in the following table.

Table 1–7. Ease of Customization

Requirement	Advantage
Fast, efficient application development	The Microsoft Windows XP operating system provides an efficient, industry-standard, open interface that can be easily accessed by application developers using tools such as Visual Basic and Delphi. Less coding and interface development time reduces your cost of ownership and the time it takes to adapt the transport system to your needs.
Application files customized for multiple workstations	When the same application is running on several NDP Quantum document processors, each workstation can use a different customizer file. For example, lockbox processors can process information from a number of clients with different needs.
Customized fonts	The following customized fonts for OCR readers are available: – OCR-A full alphanumeric – OCR-B full alphanumeric – 407 numeric – 1428 numeric – E13B – OCR7B Also, you have the ability to switch to another font type at one of eight character positions, or through the use of up to a three-character sequence. This secondary font can be a subset of the first font or an entirely different font.

Maintainability

The NDP Quantum Series provides smooth-running payment processing.

Dependability and Reliability

The document processors undergo rigorous quality testing to predefined standards that ensures a consistent and reliable performance rate.

The single-track design ensures smooth operation, especially during encoding.

Ease of Maintenance

The operator can perform routine maintenance tasks quickly and easily. Maintenance diagnostic routines are available as part of the standard system. A service representative is available to help with more complicated maintenance procedures.

NDP Quantum Series System Software

Every aspect of the NDP Quantum Series is designed to provide the reliability, scalability, and dependability required for transaction-intensive environments.

The NDP Quantum Series system software includes the Burroughs Common API, Windows XP track interface, applications, and utilities. These combine to make the NDP Quantum Series a powerful, industry-standard, and cost-saving document processor.

Common API

Run the same application on all Burroughs document processors.

The Burroughs Common API is the Windows XP-based system software interface to the NDP Quantum Series that controls all processing and imaging functions. The Common API offers the following advantages:

- Common development tools
- Common interface to the application
- Common and intuitive operator interface
- Faster development and training cycles

Note: A minimum version level 7.0 is required for operation with the NDP Quantum Series.

Common Development Tools

Shorten your application development time and reduce the total cost of operating the NDP Quantum Series.

The Common API enables the use of industry-standard application development tools. This benefits your organization in the following ways:

- May reduce the need for specialist programmers

  The Common API potentially reduces the need for developers to specialize in one document processor, since Windows XP is the operating system on all platforms. Virtually the same application program and the same source code may interface with document processors running at different speeds. The Common API also simplifies the complexity of programming.

- Fast-cycle interface for application developers

  The Common API enables the reduction of interface development time by using Visual Basic, Visual C++, or Delphi. These tools provide an efficient, industry-standard process for controlling the NDP Quantum Series. The 32-bit OLE custom control (OCX) interface simplifies the NDP Quantum Series interface to the application. Developers can write a working application in 300 lines of code, compared to thousands. This can mean a 10 to 1 reduction in the lines of required code.

- Reduces your total cost of ownership

Finally, by shortening application development time and reducing the amount of specialist programmers, the Common API helps your organization to realize a reduction in the total cost of operating the NDP Quantum Series. The Common API enables you to concentrate on payment processing tasks, rather than development tasks.

Common Application Interface

Provides a consistent look and feel across all Burroughs document processor platforms.

The Common API strategy provides the same interface for all platforms. This common interface provides the following benefits:

- Fast, simple application development
- Simplified exception handling
- Developers do not need to code complicated recovery code for paper jam recovery. The Exception Handler program (part of the Common API) provides error screens that are uniform from application to application, as well as from platform to platform. Refer to “Exception Handler” next in this document for more information.
- Common track device commands are provided, while differences in machine architecture are “hidden” by the track interface.

Exception Handler

Shows where documents are jammed and guides the operator through error recovery.

A Burroughs-supplied Exception Handler program shows where documents are jammed and guides the operator through error recovery. It provides a pop-up display with a description of the error, its location, corrective action steps, and a list of documents involved in the exception. Figure 2-1 shows a typical Exception Handler screen.

Figure 2–1. Exception Handler Screen

The operator can obtain additional information describing the error and the recovery procedure by selecting the Help (F1) key. During recovery, the Exception Handler issues track commands. After recovery, the track is returned to the operation it was performing before the error occurred.

The display for an exception document can be customized by the application.

Common Operator Interface

Reduces operator-training costs when the interface is the same.

The Common API strategy provides a common operator interface among all the Burroughs document processors. The operator interface for all machine operation is a true Windows application: screens are designed with detailed graphics, ergonomic considerations, and uniformity.

Windows Track Interface

Provides an industry-standard interface between the mechanical aspects of the track and the application program.

The standard Windows XP training can complement application training. The Windows XP track interface software controls the physical action of the NDP Quantum Series and the configured options.

Application Programs

Fast, simple application development.

Application programs can be developed using the fast-cycle, industry-standard development tools such as Visual Basic, Delphi, and Visual C++.

Utilities

Available utilities support the operator and the service representative.

The utilities provided include Customized Fonts, System Exerciser, Maintenance Test Routines, and StatsPlus. Their features are summarized in the following table:

Table 2-1. Utilities and Their Features

Utility	Feature
Customized Fonts	Customized font recognition files for OCR readers are available. The application program uses the font recognition files to read document code lines.
StatsPlus	StatsPlus is a statistics tool that checks transport performance. It displays compact graphics that enable viewing of statistics for any transport that has Common API installed, allowing quick assessment or review of a period of transport performance (a job, day, week, or more). StatsPlus provides summary and detailed information on all areas affecting machine performance, including: – Application (batch downloads, stops, miscues) – Machine (jams, sensor errors, missorts) – Media (dog ear, double docs, skew, spacing, staples) – Operation (empty feeder, full pockets, open covers) Using StatsPlus information, both the client and the service representative can determine the overall output of the transport and which areas to focus on to increase throughput. The Performance Assessment Strategy in StatsPlus helps determine areas for potential improvement, including applications, work preparation, or machine components.
System Exerciser (available only to the service representative)	The System Exerciser is a tool that enables testing of the system functions and runs under the Windows XP operating system. Images captured using the System Exerciser can be displayed to visually confirm image capture and quality. The System Exerciser can be used with a mouse and/or keyboard, and powering on and off can be performed from within the System Exerciser.
Maintenance Test Routines (MTRs) (available only to the service representative)	MTRs are a set of tests used to diagnose errors down to the level of a field replaceable unit.

Common Image Export System

Export images in JPEG format, CCITT format, or a combination of the two.

Common Image Export (CIE) is a Windows XP system that provides a common platform for exporting images from document processor systems.

CIE extracts image data from an image capture server or an image file server. CIE enables you to export images in JPEG format, CCITT format, or a combination of these two formats. In addition, code line or other application data can be packaged with images that are exported.

Courtesy Amount Read and Legal Amount Recognition (SoftCAR+ Diamond Edition)

SoftCAR+ Diamond Edition produces industry-leading read and accuracy rates.

Burroughs offers the Courtesy Amount and Legal Amount Recognition software (SoftCAR+ Diamond Edition) to find and read check and other document values and amounts. This software automatically reads the hand- or machine-printed currency amounts on personal and business checks, as well as internal forms and documents. This enables significant labor reductions and increases in processing efficiencies. Work is completed faster and at a higher accuracy level.

Note: For more information on Courtesy Amount and Legal Amount Recognition software, refer to the SoftCAR+ Diamond Edition Courtesy Amount Recognition Capabilities Overview (4326 8598).

NDP Quantum Series Hardware

With its bold new look, open-track design, and new performance features in every module, the NDP Quantum Series offers unrivaled throughput performance, quality, and reliability.

The modular design of the NDP Quantum Series provides you with a system that will meet your specific requirements. This section describes basic and optional devices that you can select, and includes information on the following:

- Floor space requirements
- Basic devices
  - Transport track
  - Workstation and features
    - Readers
    - Encoder
    - Endorsers
  - Stacker modules
- Optional modules
  - High-speed encoders
  - Imaging cameras
    - Downstream
    - Upstream
    - Downstream and Upstream imaging in one transport
  - Microfilmer
- Networked and standalone configurations

Floor Space Requirements

The NDP Quantum Series design balances safety and maintenance requirements.

Figure 3-1 illustrates the floor space requirements of the NDP Quantum Series. Each module and its needed space are shown.

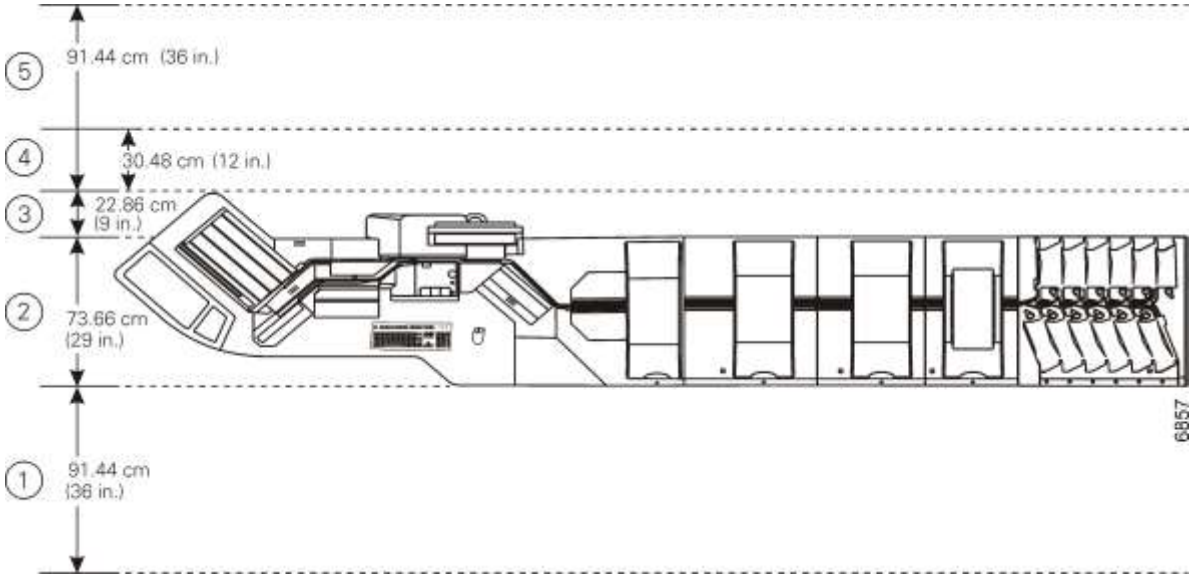


Figure 3–1. Floor Space Requirements

Legend

1	91.44 cm (36 in.) for the operation and servicing area
2	73.66 cm (29 in.) for the depth of all modules
3	22.86 cm (9 in.) for the display, hopper, and upstream imaging
4	30.48 cm (12 in.) for the machine from the wall or between machines working back to back
5	91.44 cm (36 in.) for maintenance and servicing - The transport can be rolled forward temporarily to permit rear access, if needed.

Basic Devices

The NDP Quantum Series sets a new standard in the industry. Take a look.

The modular design of the NDP Quantum Series ensures the flexibility you need to create a system tailored to suit your specific requirements. Figure 3-2 and the following paragraphs illustrate and describe the components of a fully configured system.

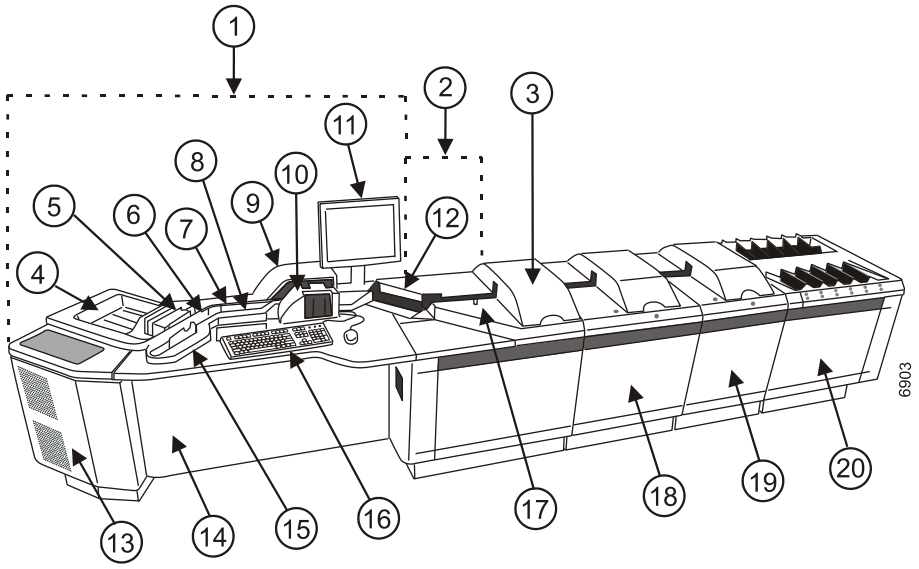


Figure 3–2. NDP Quantum

Legend

1 Operator console
2 Print station area
3 MJE inkjet endorser
4 Large-capacity hopper
5 Primary feeder
6 Staple detector
7 View station 1
8 Manual feeder
9 Front and rear upstream image
10 MICR/OCR reader station
11 Flat-panel display or touch-panel display (optional)
12 Post-read view station
13 PC cabinet
14 Removable knee well panel (raised-height models only)
15 Secondary feeder
16 Keyboard
17 Low-speed encoder
18 High-speed encoder module
19 Image capture module
20 Stacker module
Microfilmer module (not shown)

Transport Track

An open track and visual indicators provide unprecedented visibility of document locations.

For the NDP 600 Quantum, the track moves 600 dpm for 15.24-cm (6-in.) documents from the feeder through the operator console, print stations, and any optional modules to the stacker. The track moves 300 dpm for 15.24-cm (6-in.) documents from the feeder through the operator console, print stations, and any optional modules to the stacker for the NDP 300 Quantum, and 200 dpm for 15.24-cm (6-in.) documents for the NDP 200 Quantum.

Anti-skew controls provide a series of self-adjusting, document-controlling rollers that provide forward velocity and a stabilizing, downward force. This downward force maintains the document alignment throughout the machine. It also stabilizes the document to reduce the incidence of document jams. The anti-skew controls result in reducing document jams, improving MICR and OCR read results, producing higher quality images, and increasing CAR rates.

The track is controlled by the Windows XP track PC, the application program, and a number of sensors. Drive-wheels impel the documents from station to station under the direction of the transport controller. Document sensors report the location and status of each document position to the Windows XP track PC, which can modify the flow of documents to optimize throughput, and to prevent jams, missorts, staples, and piggyback documents.

Document indicator lights on every module enable the operator to locate, at a glance, any documents concealed under safety covers.

The operator introduces documents into the track in one of three ways:

- Batches of documents can be loaded into the automatic primary feeder.
- Single documents can be hand-dropped into the manual feeder.
- Batch of documents can be loaded into the automatic secondary feeder.

Workstation Features

A design that is so superior you will experience significant efficiency improvements over previous technology.

This subsection describes the standard and optional features located in the workstation area (operator console and print station) of the NDP Quantum Series.

Ergonomic Design and Spacious Work Area

The curved workstation is designed for operator comfort and efficiency. It has a padded work surface and provides space to hold a tray of documents for easy

loading. The removable knee well panel (for raised-height models only) enables either seated or standing operation.

PC Cabinet

Located in the operator console, the PC cabinet holds the PC and provides operators with storage space for work or personal items.

Automatic Primary Feeder

The primary feeder feeds documents automatically into the track of the NDP Quantum Series. A Feeder Empty sensor halts the primary feeder when it needs to be refilled.

Hopper and Optional Large-Capacity Hopper

The hopper capacity is approximately 1,400 90-gm^2 (24-lb) documents, depending on paper condition and weight. This is approximately the equivalent of a stack of documents 17.78 cm (7 in.) high.

The optional large-capacity hopper is nearly twice the capacity of the standard hopper and keeps work flowing for a longer period of time and lessens operator intervention. It expands the document capacity to 2,550 to 3,000 90-gm^2 (24-lb) documents, depending on paper condition and weight. The flip-up flag enables loading “on-the-fly” that nearly eliminates stops to reload documents.

Note: Refer to Appendix A for document specifications.

Manual Feeder and Document Storage Tray

The operator can enter individual documents using the manual feeder. This feeder is independent of the automatic feeder and view station 1 section of the track. The application program controls operation of the manual feeder. A document storage tray with a capacity of up to 200 documents is located in front of the manual feeder.

Secondary Feeder

The secondary feeder inserts documents automatically into the processing flow under program control. Capacity is approximately 125 90-gm^2 (24-lb) documents, depending on paper condition and weight. This is approximately the equivalent of a stack of documents 1.65 cm (0.65 in.) high. The secondary feeder increases throughput capability when control documents are required, resulting in dramatically improved power encode productivity.

Note: Refer to Appendix A for document specifications.

Dog-Ear Detectors

These detectors alert the operator to documents with bent or torn corners so that document repairs can take place prior to further processing. The operator can remove the document, repair it, and then reinsert it in the primary, secondary, or manual feeder. Under control of the application program, the dog-ear detectors halt processing if the lower corner of the leading edge of the document is torn, folded, or missing.

Dog-ear detectors are located at the exits of view station 1 and the manual feeder/secondary feeder.

Double-Document Detector

This detector senses piggyback documents as they leave the primary feeder, giving the operator an opportunity to separate them before the documents travel down the track. If a piggyback document is identified, the documents are halted at view station 1 for inspection and extraction, and further feeding is stopped. A double-document detector is located at the exit from the primary feeder.

Black-Band Detector

An optional black-band detector at the exit from the automatic feeder may be used to separate groups of items for subtotaling. The application can be programmed to halt automatic feeding when a black-band document is detected.

Staple Detector

The staple detector prevents staples, either loose or on documents, from traveling down track. The device stops the staple, notifies the operator, and allows the operator to remove the staple. It then provides normal recovery to continue flow after the staple is removed. Staples are removed from the track using the supplied magnetic wand.

This detector focuses on the bottom 1.90 cm (0.75 in.) of the document and track, the area most prone to damage and stops due to staples. The NDP Quantum Series StatsPlus Performance Tracker logs each occurrence of a detected staple.

This information can be used to increase awareness of removing staples in document preparation. Transport-based video help clips are also provided to assure quick operator training and staple awareness.

Keyboard

An alphanumeric keyboard is included with the NDP Quantum Series. The keyboard is a standard PC keyboard with alphabetic keys, numeric keys, punctuation keys, and 12 function keys.

A numeric keypad with additional cursor movement (arrow) keys is located on the right side of the alphabetic keys. The keyboard can be positioned for right- or left-hand use. Language versions for 12 countries are available as keyboard options.

17-Inch Flat-Panel Display

A large, 43.18-cm (17-in.) color video flat-panel display provides enhanced viewing of images and data. It swivels so that the operator can position it to a comfortable viewing position. Easy viewing from the stacker area enables pocket recovery at the stacker.

The operator can view the system status, the audit trail (if required), system messages, and application program messages on the display. The application determines the appearance of the information displayed.

17-Inch Touch-Panel Display

A large, 43.18-cm (17-in.) touch-panel operator interface can replace the standard flat-panel display. The touch-panel display is combined with Common API touch-sized graphical Exception Handler buttons. These features provide intuitive, point-and-go transport operation and exception recovery. Touch-based applications can seamlessly utilize this graphical display operation. Keyboard and mouse functions are also enabled, facilitating traditional user interface tasks. The display pivots to enable operator viewing from any work location.

View Station 1

View station 1 provides a view of the amount written in the courtesy amount box so that the operator can enter required data.

Post-Read View Station

The post-read view station provides a full view of a document after it has passed through the reader, and a magnified view of the document‘s MICR line. The operator can then make any required corrections. The document can be removed, inspected, and replaced in the post-read view station if necessary.

The operator can specify whether data entry is to occur while the document is stopped in view station 1 or the post-read view station. Code line corrections,

however, are always performed while the document is stopped at the post-read view station.

Nonvolatile Memory

Nonvolatile memory protects data in the event of a power failure.

Windows XP, Windows 7, 32 or 64-Bit Track PC

This PC provides control for all track processing. Devices for backup and data exchange can be any device supported by Windows XP, Windows 7, 32 or 64 bit. Data communications provide the ability to communicate with a wide variety of hosts. Refer to current Microsoft Windows documentation for available communications protocols.

Virtual Master Printer and Electronic Journal

A virtual master printer serves as an electronic journal for audit trail information. Print requests are written to disk, and tape information is shown on the operator's display, printed on a laser printer, or e-mailed to another department.

Readers

The new unique, illuminated read station enables unrestricted access and visibility to the track.

Reader configurations enable processing documents encoded with MICR or OCR characters.

An NDP Quantum may be configured with any of the following reader options listed below, with a maximum of three readers at any time.

- MICR auto-detect E13B/CMC7 (configured as one reader)
- MICR E13B dual-height—high and low (configured as two readers)
- Dual height-selectable OCR with MICR auto-detect E13B/CMC7 (configured as three readers)

Note: *Height-selectable OCR requires front upstream image capability on the transport.*

- Single height-selectable OCR with dual-height (high and low) MICR (configured as three readers)

A MICR reader with an unused OCR channel can be configured to provide MICR/OCR combined read and improve rejected and misread performance.

Documents pass through the read station at a maximum transport speed of 600 dpm. The scan area on a document is within a 10.2-mm (0.4-in.) vertical band. The vertical band extends the length of the document with the exception of the right and left margins. This scan band is within the required OCR 12.7-mm (0.5-in.) clear band. The required clear band may contain non-read ink characters and background and extends the full document length.

Note: Refer to Appendix C for OCR code line specifications.

Before the reader begins to operate, the application program running on the NDP Quantum Series defines which font files the system software loads into reader memory.

Software Height-Selectable OCR Reader

The application program or the operator can select the OCR scan height.

The software height-selectable OCR reader enables up to two complete OCR lines to be selected and read by the application program at track speed, without operator intervention. The center of the OCR scan bands can be located from 0.64 to 9.65 cm (0.250 to 3.8 in.) from the bottom of the document.

The benefit of the software height-selectable OCR reader is increased throughput of the NDP Quantum, especially in higher-volume applications such as lockbox, remittance, and GIRO processing, where it is not practical to standardize the code lines between different customers. Since the OCR height is selected by the application program, the NDP Quantum operator does not have to stop and adjust the OCR reader when a work source with a different height scan band is processed. Also, instead of manual intervention, the software height-selectable OCR reader can be adjusted on a document basis at track speed.

Note: For special documents, the operator can override the software-selected scanned height settings by using a convenient OCR height-setting utility.

Features of the OCR reader are described in the following paragraphs.

Blank and Space Detection

This feature enables the reader to detect separate data fields and determine the read length. The OCR reader converts the blank areas between data fields and characters into a discrete number of spaces. Conversion accuracy depends on variations in track speed, sensor tolerances, character print quality, and selected fonts.

The reader decodes and transmits as a space character any blank area in a print line that has a width equal to the character pitch and insufficient data to be a character.

Dropout Ink Acceptance

The use of approved dropout inks for the encode line does not affect reader effectiveness, due to the weak contrast signal of dropout inks. However, the contrast must not fall below an approved reading to ensure that the OCR reader reads the scan line accurately.

Font Switching

Full OCR alphanumeric recognition capabilities are provided as customizable so that fonts can be defined for each of your documents.

OCR readers can switch between fonts automatically at a specific character position in two ways: when recognizing special font switch characters, according to document type, or at locations determined at customization. The position immediately after the switch character must be a clear space to allow the reader time to complete the switch.

96 Characters Per Code Line

In a three-reader configuration, all three readers can have up to 96 characters per code line.

E13B and CMC7 MICR Readers

Superior MICR readers significantly reduce the time required for data correction caused by character rejects and substitutions.

MICR readers interpret the fluctuations in the strength of a magnetic field caused by the movement of a magnetized code line in front of the sensor and convert these signals into data suitable for further electronic processing.

Under control of the application, the E13B and CMC7 MICR readers recognize MICR characters and the special symbols used to separate fields. E13B MICR characters are used commonly in the United States and the United Kingdom. CMC7 MICR characters are used commonly in Europe.

The center of the area scanned for a code line by both the single-read E13B and the CMC7 MICR readers is set to the standard position of 7.92 mm (0.312 in.) above the bottom of the document.

Note: Refer to Appendix C for MICR code line specifications.

The **MICR dual-height E13B reader** sets two scan areas, one for each read head, at 7.92 mm (0.312 in.) and 23 mm (0.937 in.) above the bottom of the document. The application program controls the selection of the read head to be used for a specific group of documents. This is useful particularly in dual-line MICR applications such as reject re-entry.

The **MICR auto-detect E13B/CMC7 reader** enables batches of intermixed E13B and CMC7 font documents by selecting the correct font (E13B or CMC7) automatically when reading documents containing either font, and provides the correct output. The auto-detect reader recognizes spaces in the code line, as does the current CMC7 and E13B MICR reader.

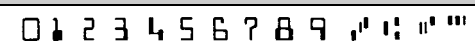
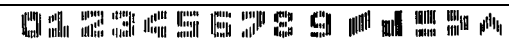
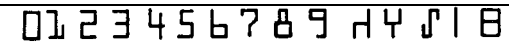
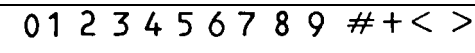
Low-Speed Encoder

This low-cost encoding option for smaller item volumes offers enhanced print quality and reliability.

The NDP Quantum Series can encode all fields or an entire code line, which can be subsequently read by a MICR or OCR reader. The low-speed encoder is located in the print station before the endorser.

MICR encoding is provided in E13B or CMC7 fonts; OCR encoding is provided in OCR-A or OCR-B fonts. The following table provides examples of these fonts. Only one font may be configured in each transport, and the application program controls the format of the code line.

Table 3-1. MICR and OCR Font Examples

Font	Example
E13B	
CMC7	
OCR A	
OCR B	

Encoding speeds range from 48 to 135 dpm, depending on the speed style of the sorter and also on the composition of the encode line. For example, with the Quantum 600, a single amount field of 12 characters can be encoded at 135 dpm . The Quantum 200 and Quantum 300 processing a single amount field of 12 characters would encode at less documents per minute (approximately 90 documents per minute), due to differences in item tracking and inter-document gaps. Any documents that are not to be encoded are passed through the encoder station at normal track speed.

If the high-speed encoder module is configured in the transport but its functions are temporarily unavailable, the application can redirect documents to the low-speed encoder.

Endorsers

Endorsing is done at track speed; no slow down required.

Ink-jet and stamp endorsers that print on the fronts and/or backs of documents are located in the print station after the low-speed encoder and before the next module

(first stacker, high-speed encoder, image capture, or microfilmer, depending on system configuration).

Two types of endorsers are available:

- Multi-Line Ink-Jet Endorser (MJE)
- Fixed information stamp

MJE

Fewer cartridge changes and lower supplies cost are realized through a 500 percent ink capacity increase.

The MJE provides a flexible, reliable, and high-quality endorsement. It enables endorsement of up to four lines of programmable text (40 characters per line) with a graphical logo. This applies to both the front and/or rear of documents passed through the transport at full track speed (600 dpm). Up to 180 characters in seven factory fonts and nine customized fonts can be printed on the front and/or rear of a document.

The advanced graphics capability of the MJE provides the advantages of both stamp and ink-jet endorsement techniques.

Note: Refer to Appendix C for the location of the MJE endorsement.

The following table provides the maximum number of characters printed on each endorsement line.

Table 3-2. Maximum Number of Characters Printed per Endorsement

Print Lines	Characters Per Inch (CPI)	Total Characters	Paper Used
4 line	10	180	4.5 in. (11.43 cm)
3 line	10	180	4.5 in. (11.43 cm)
2 line	10	180	6.0 in. (15.24 cm)
1 line	10	90	6.0 in. (15.24 cm)
1 line	5 cpi double height	45	6.0 in. (15.24 cm)

Additional features of the MJE include the following:

- Operator-adjustable endorsement height results in fewer overprinted endorsements, and an opportunity for reducing the number of suspense items and write-offs.
- Clean, low-maintenance print heads and reusable ink cartridges reduce total cost of ownership.
- A high-capacity ink reservoir system provides five times the volume of a standard ink-jet cartridge for systems requiring high-volume endorsing. A sealed, self-clamping cartridge and ink supply provide a simple and fast snap-in replacement for this consumable.
- Capable of emulating the single-line matrix endorser at track speed.
- Built-in cartridge cleaning station enables quick and easy cleaning for ink-jet cartridges to assure optimum print quality.

The MJE graphical logos also eliminate the need for a stamp endorser, in most cases.

Fixed Information Stamp Endorser

A cancellation stamp endorsed at track speed.

The fixed information stamp endorser (cancellation stamp) is available in front or rear endorsement styles. In either location, it operates at track speed using a replaceable endorsement legend.

Front and rear endorsement locations are set as defined by ANSI specification X9.3 (as revised) for standardized check endorsements. The stamp is 2.9-cm (1.14-in.) long, including a 0.51-cm (0.20-in.) landing pad, and 0.196-cm (0.077-in.) + 0.076-cm (0.03-in.)/- 0.0 thick.

The front stamp endorser prints at track speed. The height and size of the legend are chosen to prevent overprinting the matrix endorser print area. No part of the endorsement is printed within 6.35 cm (2.5 in.) of the leading edge of the document (ANSI X9.7), leaving the courtesy amount box clear of endorsements.

The rear stamp endorser prints at track speed unless it is printing concurrently with the matrix endorser, in which case it prints at the same speed as the matrix endorser.

The application controls the horizontal position of the rear endorsement. The vertical position and size of the legend have been defined to prevent overprinting of the matrix endorser print areas. The endorser can print either in specific zones or in positions described in 2.5-mm (0.1-in.) increments from the leading edge of the document.

Note: Refer to Appendix C for the location of the stamp endorsement.

Endorser Combinations

The endorser combinations available on the NDP Quantum Series are shown in the following list.

- Front MJE
- Rear MJE
- Front and rear MJE
- Front stamp
- Rear stamp
- Front stamp and rear MJE
- Rear stamp and front MJE

Stacker

Our new pocket design maximizes operational efficiency.

Stacker modules are situated at the end of the track and can be configured to provide 12, 24, or 36 collection pockets. The stacker modules collect items at 600 dpm for 15.24-cm (6-in.) documents.

The stacker pockets are arranged in a herringbone pattern to reduce the amount of space needed by the stacker. Document aligners improve handling of tall documents. An innovative roller material and design reduce document skew. A Stop/Start switch located on the top of each stacker module can be used to turn the feeder off and on. Optional covers provide sound insulation.

Pocket-full sensors inhibit the automatic feeder when a pocket is full (approximately 400 documents). An indicator for each pocket is located on the front of the stacker and lights when the relevant pocket is full.

The stacker can detect document jams and missorts between pockets. The pocket indicator blinks when a jam or missort occurs, helping the operator locate problems as they happen. When the documents are removed from the pocket and the operator presses the Stop/Start switch located on the stacker, the automatic feeder resumes operation. Through the application, the transport has the ability to allow automatic restart of document processing after the operator empties full pockets.

Optional Modules

The new NDP Quantum Series has performance features in every module.

The capabilities of the NDP Quantum Series can be enhanced by the addition of one or more optional modules such as the high-speed encoders, an image capture subsystem, and a microfilmer. The following subsections describe these options.

High-Speed Encoders

Ensure highly reliable encoding performance, meet your throughput needs, and achieve fault resilience.

There are two optional high-speed encoder modules: the amount-only encoder and the full-field encoder. The amount-only encoder can encode up to 16 characters in the amount field of a single document. The full-field encoder can encode up to 65 characters in any or all fields on a single document. High-speed encoder modules are located just downstream from the endorser station.

Operator and service features include the following:

- Opening track at encoder print location with automatic release function for fast clearing of jammed documents
- Automatically guided, ergonomic drop-in ribbon-loading mechanism with interlocked ribbon locking/unlocking function for fast, simple ribbon loading
- Positive, all-gear-drive constant-tension ribbon mechanism for highest reliability
- Removable, no-tool ribbon spool design.
- No-tool removal of entire print mechanism for service
- Quick-change hammer assembly and print drum
- Ribbon capacity of 80,000 standard code lines with on-screen low-ribbon warning and positive end-of-ribbon detection
- No physical contact with ink side of ribbon for cleaner operation and ribbon loading

Amount-Only Encoder

Choose our accurate high-volume amount encoder, with the new wider track, for applications such as POD or remittance.

The optional amount-only encoder is the fastest single-track encoding equipment in its class. This encoder encodes up to 16 CMC7 or E13B MICR characters on 15.24-cm (6-in.) documents at 600 dpm on an NDP 600 Quantum. Application programs determine whether documents are encoded without operator attention or whether the operator must handle each document individually.

The amount-only encoder accepts documents from the workstation at track speed. The documents are checked and aligned and then stopped at a precise location for the encoder to encode the predetermined amount and transaction code fields. After the document is encoded, the transport system accelerates the document and moves it to the next module at track speed. A dog-ear detector prevents encoding over dog-eared documents. These documents can be outsorted or pocketed.

When the amount-only encoder is part of a high-speed image system, Power Encode software instructs the encoder to encode the items with the appropriate MICR fields.

Full-Field Encoder

The high-speed encoder is designed with a new, wider track for fewer stops and higher productivity.

The optional full-field encoder module encodes up to 65 E13B MICR characters on a document in a single pass. The encoder can encode Auxiliary On Us, Routing, On Us, and Amount fields; up to five fields can be encoded at once. Reject repair applications can use this option for their full-field encoding.

The full-field encoder module prints only E13B characters. With 15.24-cm (6-in.) documents, this encoder operates at up to 383 dpm for an NDP 600 Quantum when encoding single-field amounts.

The following table provides the track performance for the number of fields being encoded.

Table 3-3. Encoding Speed for the Full-Field Encoder

Number of Fields	NDP 600 Quantum Encoding Speed (dpm)	NDP 300 Quantum Encoding Speed (dpm)	NDP 200 Quantum Encoding Speed (dpm)
0	600	300	200
1	383	300	200
2	225	225	200
3	165	165	165
4	125	125	125
5	100	100	100

The full-field encoder offers the following benefits:

- Produces a high throughput compared to the low-speed encoder.
- Reduces the processing time since a full document can be encoded in a single pass.
- Prevents errors. Errors are detected online in the transport operation, ribbon movement, hammer movement field encoding process, and general hardware operation. There is no need for a costly additional MICR verification step.

Imaging Cameras

Our high-resolution image quality enables industry-leading recognition rates providing cost-saving benefits.

The NDP Quantum Series provides the ability to capture and compress up to ten images for each document at full-track speed per imaging subsystem. These images can include CCITT front and rear for Image Statement Print and Data Entry, JPEG front and rear for Archive, and front and rear high-resolution JPEG for character recognition or special post-processing applications. Images can be stored in either an industry-standard XML format or the Common Image API file format.

Image quality suspects are flagged through Advanced Image Assurance Architecture to identify document images potentially exhibiting one or more image quality defects as described by the Financial Services Technology Consortium (FSTC) Image Quality and Usability Assurance Phase I Project. It is expected that these defects will be adopted by the soon-to-be-released American National Standards (ANS) X9.100-180 Specifications for Electronic Exchange of Check Image Data and/or the soon-to-be-released X9 Technical Report 33. Burroughs also supports image quality flags defined by the Draft Standard for Trial Use (DSTU) X9.37, which is expected to be superseded by X9.100-180. Image

capability is standard on the NDP 200 and NDP 300 Quantum. Additional modules that work with the image cameras are described in the following paragraphs.

Image Capture Subsystem

The image cameras use the image capture subsystem to capture images from the front or both sides of documents, scale and compress images, and then package them for use by an application.

Dual JPEG/CCITT Image

Dual JPEG/CCITT image is a capability of the image capture subsystem, and can be used in sites where both archive and character recognition/data entry processing are required. This capability provides two image compression formats—JPEG and CCITT—from one front and/or rear camera in a single pass at track speed.

JPEG images are created for archive applications that require preservation of low contrast and overlapping information. CCITT images are created for applications such as character recognition, data entry, or image statement printing. In addition, there is an optional, high-resolution JPEG compressed image of an application-selected region of the document (snippet).

JPEG snippets—a clipped portion of the front high-resolution JPEG image defined by X/Y coordinates—are typically used for character recognition. However, the front high-resolution JPEG image can be either a full document or a snippet, as requested by the application.

The rear high-resolution JPEG image is always a full document image.

The high-resolution JPEG image can also be used by recognition applications such as signature verification, payee line, or any other document field.

The following table shows the available image compression and scaling options. The site administrator can change resolution settings.

Note: CCITT images and high-resolution JPEG images must be set to the same resolution for each side.

Table 3-4. Image Scaling Options

Image Compression Format	Resolution – Dots Per Inch (DPI)
Front CCITT	200, 240
Front JPEG	100, 120
Front high-resolution JPEG	200, 240
Rear CCITT	200, 240

Table 3-4. Image Scaling Options

Rear JPEG	100, 120
Rear high-resolution JPEG	200, 240

SoftCAR+ Diamond Edition

SoftCAR+ Diamond locates and interprets a wide variety of unconstrained hand-printed and machine-printed characters from the courtesy amount area on documents automatically. This optional program locates and reads up to eight fields on a document. SoftCAR+ Diamond Edition is available for 200 and 240 dpi resolution, and is located on an external SoftCAR+ Diamond Edition PC.

Image Capture Server

The image capture server stores document images and provides image and data management functions to image-enabled applications. Image capture server software also detects any failures of the image hardware and reports them to the NDP Quantum Series processor. For potentially bad images, the image capture server notifies the application, which then selects the appropriate recovery. The server receives and stores document image data, code line data, and CAR results (if CAR is configured) and provides this information to image workstations for data entry, data corrections, and balancing. The image capture server makes images and code line data available to other applications or devices, such as exporting, character recognition, advice or statement printers.

Image Quality Monitor

Image Quality Monitor software scrutinizes images during application development and for system demonstrations. CAR values and corresponding successful read rates could also be displayed. During operation, the images are displayed at periodic intervals, so an operator may view images without impacting processing.

Image Quality Flags

Image Quality Flags software provides for automatic, real-time detection of image quality defects through image quality flags (IQFs), which identify suspect document images potentially exhibiting one or more image quality defects. The sorter can be configured to interrupt operation and alert the operator for a specific number or rate of occurrence of selected image quality defects. Conditions for testing image quality are selected and thresholds associated with IQF detection are set using the Image Capture Server (ICS) Configuration utility or the Upstream Image IQF Configuration utility.

Image Security

Image security software produces digital signatures for every image captured on a document processor to protect the image from being altered or replaced with another image. One- or two-factor authentication is supported.

Downstream Imaging

Fully processed items can be archived with downstream imaging.

For downstream imaging, the image capture subsystem is located down the track near the first stacker module so that the captured images include added encoding and endorsements in the same pass.

The elective downstream image camera module has image capture subsystem options that do not apply to upstream imaging. These options are described in the following paragraphs.

Red Filter

The downstream camera can be configured with a red filter for European Giro and image character recognition (ICR)/data entry applications. Additionally, a standard (clear) filter is available for archiving applications.

Dual Filter

Dual filter uses two cameras to produce two color-filtered outputs in a single pass. These independently filtered images optimize the images for ICR and archive applications. Filters may also be used, for example, to remove a form or a complicated background or to improve readability. In addition, a particular filter may meet legal archive requirements, assuring the legality of the image.

Embossed Front Camera

An embossed front camera, typically used for Japanese applications, provides single-sided lighting to image stamps and embossed watermarks when little or no ink is present on the document.

Color

The color image camera adds full-color image capture to the Quantum transport. It captures high-resolution color JPEG images and bi-tonal CCITT images in a single pass. The full-color images may be used for specialized recognition functions or archiving. Image quality flags are supported only for the CCITT images. The following table shows the available image compression and scaling options for color image. The site administrator can change resolution settings. In addition, the site administrator can independently adjust the degree of image compression applied to the front and rear color document images.

Note: CCITT images and color JPEG images must be set to the same resolution for each side of the document.

Table 3-5. Image Scaling Options

Image Compression Format	Resolution – Dots Per Inch (DPI)
Front CCITT	200, 240
Front color JPEG	200, 240
Rear CCITT	200, 240
Rear color JPEG	200, 240

Vertical Image View

Each downstream image camera for dual JPEG/CCITT image, red filter, dual filter, or embossed front camera has a base optical resolution of either 200 or 240 dpi. The 200 dpi camera has a vertical image view area of 11.48 cm (4.52 in.), while the 240 dpi camera has a vertical image view of 10.16 cm (4.00 in.).

The downstream color image camera has a base optical resolution of 240 dpi. This camera has a vertical image view of 11.48 cm (4.52 in.).

Upstream Imaging

Upstream imaging enables real-time recognition processing.

For more efficient image-supported exception handling and lower-cost remittance systems, the upstream front and rear cameras are available on the NDP Quantum Series. The upstream image cameras can be configured similarly to the downstream cameras, and are located at the operator's console, near the OCR/MICR reader.

The elective upstream image cameras have image capture subsystem options that do not apply to downstream imaging. These options are described in the following paragraphs.

Image-Enabled Exception Handling

With image-enabled exception handling, the operator views the document image display during exception error recovery and reprocessing procedures, which enables efficient clearing and re-entering of documents from the transport following jams or other exceptions. This, in turn, increases the document wall-clock throughput rate.

Vertical Image View

The upstream rear camera has a vertical image view area of 11.48 cm (4.52 in.) at 200/240 dpi. The upstream front camera has a vertical image view area of 10.16 cm (4.00 in.) at 200/240 dpi.

Downstream and Upstream Imaging in One NDP Quantum

With a single pass of the document, produce up to ten images.

Both upstream and downstream imaging can be configured on the same transport and produce up to ten images on a single pass of the document. The following specifies these images:

- Three upstream front images
  - 200/240 dpi CCITT
  - 100/120 dpi JPEG
  - 200/240 dpi high-resolution JPEG
- Two upstream rear images
  - 200/240 dpi CCITT
  - 100/120 JPEG
  - 200/240 high-resolution JPEG
- Downstream dual JPEG/CCITT image, red filter, dual filter or embossed front camera
- Three downstream front images
  - 200/240 dpi CCITT
  - 100/120 dpi JPEG
  - 200/240 dpi high-resolution JPEG
- Two downstream rear images
  - 200/240 dpi CCITT
  - 100/120 dpi JPEG
  - 200/240 dpi high-resolution JPEG
- Downstream color
  - Two downstream front images
    - 200/240 dpi CCITT
    - 200/240 dpi color JPEG
  - Two downstream rear images
    - 200/240 dpi CCITT
    - 200/240 dpi color JPEG

When performing image capture, upstream image can run in place of downstream image without application code changes. This is referred to as batch processing mode. Alternatively, upstream images can also be made available on a per-document basis to the application. When both downstream and upstream image are configured on the same transport, the upstream images are provided on a per-document basis, and the downstream images are provided in the batch image file format.

Microfilmer

Use the microfilmer for your long-term records.

The optional microfilmer module provides a photographic record of processed documents. It microfilms documents selectively on 16-mm film at a rate of 500 dpm for 15.24-cm (6-in.) documents. When not microfilming, documents pass through the module at 600 dpm. The microfilmer module is located between the print station (or high-speed encoder or downstream image camera, if present) and the stacker.

The microfilmer operates in cinemode (duplex), filming the back and front of the document across the width of the film to maximize film usage. Both sides of the document are photographed at the same time, and the image is reduced to one-fiftieth of its original size to produce a package density of 140 documents per 30.5 cm (1 ft) of film for documents up to 9.5 cm (3.75 in.) in height. For documents of greater height, the package density is 90 documents per 30.5 cm (1 ft) of film.

The microfilmer can also place identifying blip marks and characters on the film alongside the document images. This annotation is used later for image retrieval and is controlled by the application program being used. The blip marks comply with ANSI/NMA MS8-1979.

Note: Refer to Appendix C for the location of the film annotation.

The microfilm used is standard 16-mm film held in a two-part cassette that can be split. The operator can remove the exposed film for processing from one part of the cassette while the remaining film in the other part is protected from the light and ready for use. Film spool capacity is 65.6 m (215 ft) of film with a thickness of 0.0635 mm (0.0025 in.).

Networked and Standalone Configurations

As your processing needs grow, move up to a networked solution.

The NDP Quantum Series can perform as part of a network or as a stand-alone system, depending on your requirements. You can start with a single NDP Quantum, and, as your operation expands, you can move to a networked operation when needed. Additional components, such as application servers and PCs, are dependent upon the application requirements. A Windows XP database server is optional.

The following three figures illustrate different NDP Quantum Series configurations.

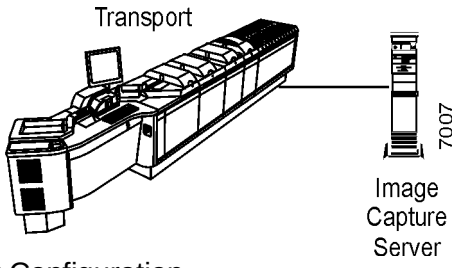


Figure 3–3. Single Transport Configuration

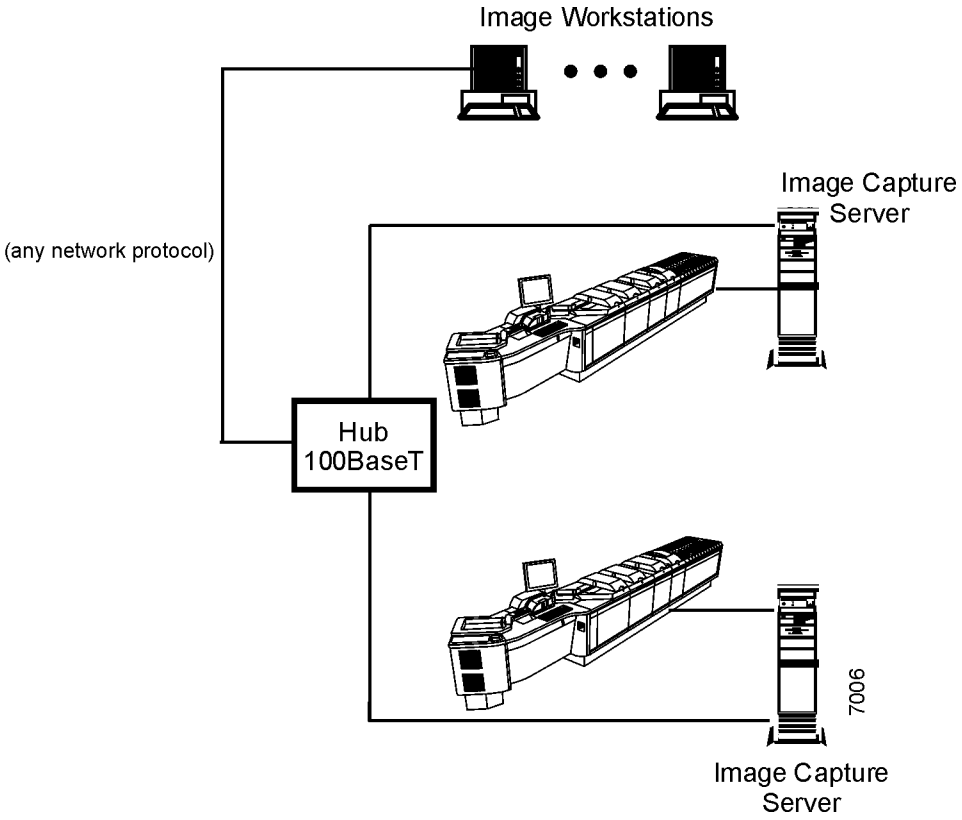


Figure 3–4. Multiple Transport Networked Configuration

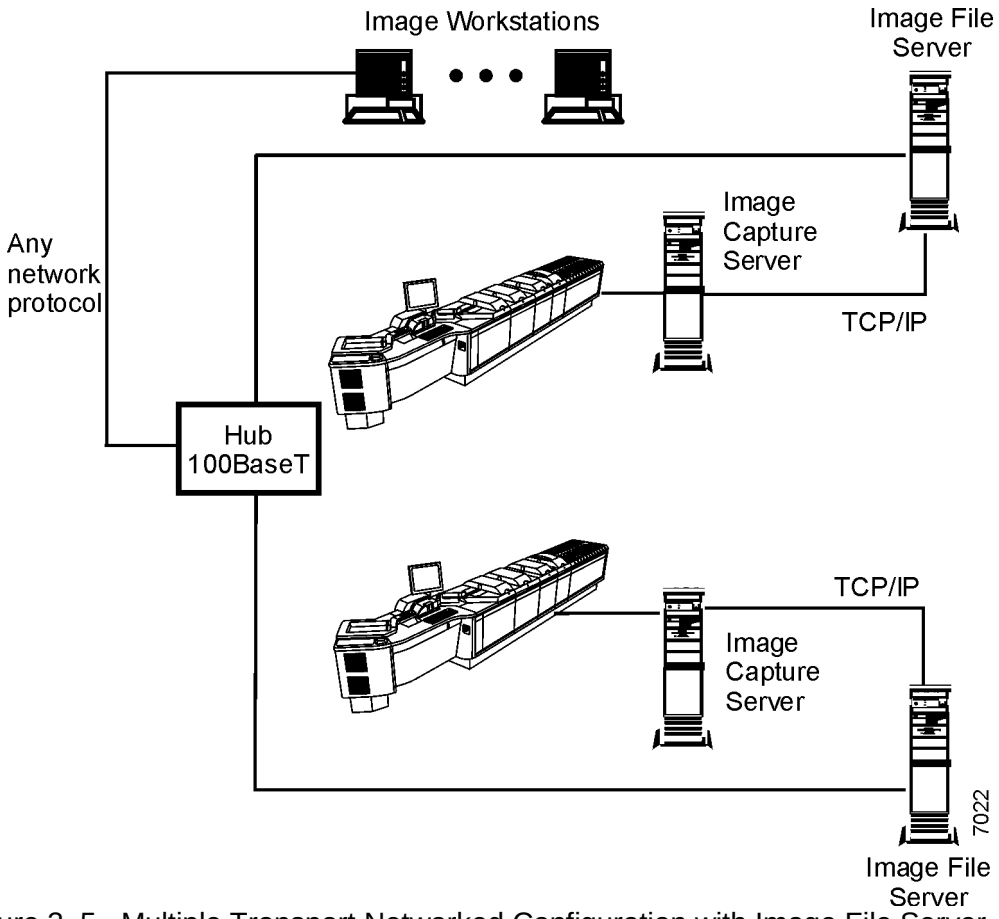


Figure 3–5. Multiple Transport Networked Configuration with Image File Server

You can upgrade a stand-alone NDP Quantum to a networked system at any time. The Windows XP database server is optional.

Network Protocols

In Figures 3-3, 3-4, and 3-5, the network protocols defined are required. These have been tested and qualified to ensure proper performance.

Support and Maintenance

An excellent document processor that could only come from Burroughs, a company that designs, engineers, implements, and supports payment systems.

Comprehensive support and training are available for users of the NDP Quantum Series hardware and software components. This section is organized into the following subsections:

- Support services
- Product information
- Website
- Maintenance

Support Services

Outstanding, worldwide support is available from Burroughs.

Customer and Software Support Center

Call the Burroughs Technical Support Center (Help Desk) at 1-800-287-7684 for assistance.

Burroughs Website and Product Information

Additional support services are available from our Burroughs Drivers & Downloads online resource center.

Product Information

Award-winning documentation is available at your fingertips.

Operator Video Help is designed to provide the right information (for the task at hand), in the right place (at the transport), and at the right time (when it's needed). Help topics are context sensitive so they can be called up from a transport screen by simply pressing a key on the keyboard. Video and sound clearly demonstrate operation, consumables replacement, and maintenance tasks.

Operator Video Training and Help systems are pre-installed on the NDP Quantum Series and are included with Common API system software.

Burroughs also provides an extensive library of documents that supply information on system features, installation, and operation. The following is a partial list:

- Network Document Processors Imaging, Image Quality, and Image Security Implementation and Administration Guide (4326 8291)
- Network Document Processor Quantum Series Operations Handbook (4326 8085)
- Payment Technology Network Document Processor Series Document Design and Performance Guidelines (4326 6808)

Additionally, the Common Application Program Interface (CAPI) Programming Reference Guide (4326 7160) is an HTML Help file that is provided with Common API software.

Burroughs Drivers & Downloads

Look to Drivers & Downloads section of www.burroughs.com when you have a question. The web site has technical documentation, downloads and support information that is exclusive to Burroughs Network Document Processors, Character Recognition Software, and Financial Printers. A quick review provides information on a wide variety of topics including transport maintenance and cleaning procedures, jam recovery, performance tuning and document preparation.

There is a full selection of information in this site that is available to customers with no login required. Authorized Service Providers and Software Developer Partners of Burroughs, per contractual agreement, have a login user name and password to obtain proprietary information.

Maintenance

Maintenance and support are made easy by diagnostic routines, preventive maintenance, and a first-class worldwide service organization.

Burroughs equipment is designed to perform reliably and to be easy to maintain and repair. Industry-standard components are arranged to provide ready access for field replacement of components and parts. Diagnostic indicators are readily visible, and status messages are easy to understand. The number of tests and adjustments required for maintenance and support are minimal and straightforward.

Support Plan

Burroughs maintains a ready supply of spare parts for components (usually mechanical) and printed circuit board assemblies (PCBAs) that occasionally require replacement. Replacements for expendable parts, such as diskettes, endorser cartridges and ribbons, feeder components, and microfilm, are also available.

Note: Refer to Appendix D for a list of the transport consumables.

Preventive Maintenance

The recommended maintenance schedule includes visual, manual, and detection procedures to detect any faults that may occur during operation.

Various devices in the NDP Quantum Series require preventive maintenance by operators or a service representative to ensure peak performance. Your local customer service manager will identify those specific tasks and responsibilities during the installation planning stage.

Power-On Confidence Tests

At power-on or when invoked by a service representative, each module in the NDP Quantum Series initiates a test of its own circuits, boards, parts, and basic functions. Failures are reported on the flat-panel displays and/or on the monitor screens of the NDP Quantum Series.

Note: If a failure is reported, the POC tests continue reporting all other failures not due to the prior failures.

Diagnostic Routines and Error Logs

The service representative uses available maintenance test routines (MTRs) when an abnormal system condition is observed or reported. These routines may be activated from the NDP Quantum Series display and keyboard so that the service representative can locate and replace failed components. MTRs are menu-driven and easy to follow, making maintenance and repair efficient. They report errors in both code and plain language. Each MTR keeps a log of errors observed and tests run during one session. An error log is also maintained for use by the service representative.

Appendix A
Document Specifications

This appendix provides a summary of specifications for documents that can be processed by the NDP Quantum Series. To ensure trouble-free operation and good encoding and endorsement quality, documents must conform to these specifications.

Note: For more in-depth information on document design and specifications, refer to Payment Technology Network Document Processor Series Document Design and Performance Guidelines (4326 6808).

Length and Height

To ensure efficient document handling and stacking, the document length-to-height ratio should be within the range of 1.5 : 1 to 3 : 1. Document dimensions should be within the limits stated in the following table:

Table Error! No text of specified style in document.**-1. Document Dimensions**

Measurement	Minimum	Maximum
Length		
Centimeters	12.40 (See note.)	23.50
Inches	4.88 (See note.)	9.25
Height		
Centimeters	7.00	10.80
Inches	2.75	4.25

Note: The minimum document length that can be placed in the secondary feeder is 13.97 centimeters or 5.5 inches.

Weight and Thickness

The NDP Quantum Series can handle paper of the weights and thicknesses stated in the following table:

Table Error! No text of specified style in document.**-2. Document Weights and Thicknesses**

Measurement	Minimum	Maximum
Weight		
gm^2	75	90
Pounds	20	24
Thickness		
Millimeters	0.1	0.15
Inches	0.0035	0.006

As the minimum values of weight and thickness are approached, the suitability of the paper is increasingly affected by other characteristics, such as its tensile strength, tear point, curl tendency, long/cross grain stiffness, and surface smoothness.

Documents up to a maximum extreme weight of 171 gm^2 (105 lb) can be placed in the primary feeder and processed, but a degradation of 10 percent in stop rate will occur. This document weight is not recommended for the secondary feeder.

Grain

For paper weights above 90 gm^2 (24 lb), the grain can lie on either axis of the document. For lighter papers, it is recommended that the grain lie along the length of the document, that is, long grain.

Surface Texture

The surface texture of a document must be such that MICR characters adhere to it during multiple passes through the MICR readers. Documents should be encoded on the felt side.

Standard Paper Stock

This subsection provides standard paper specifications.

Check Stock Safety or Bond Paper

Check stock suitable for the NDP Quantum Series meets the following specifications:

Table Error! No text of specified style in document.**-3. Check Stock Specifications**

	75 gm^2 (20 lb)	**90 gm^2 (24 lb)**
Caliper (in.)	0.005 max	0.005 max
Mullen, burst (psi)	28.0 min	35.0 min
Tensile strength with grain (kg)	5.9 min	8.0 min
Tensile strength cross grain (kg)	3.4 min	4.0 min
Tear with grain (gm/cm)	45.0 min	55.0 min
Tear cross grain (gm/cm)	53.0 min	62.0 min
Stiffness with grain (Taber 150B)	1.9 min	2.7 min
Stiffness cross grain (Taber 150B)	0.9 min	1.3 min
Grain direction	Long	Long or short

Punch Card Stock

Suitable punch card stock meets the following specifications:

Table Error! No text of specified style in document.**-4. Punch Card Stock Specifications**

	160 gm^2 (99 lb)
Caliper (in.)	0.007 ± 0.004
Mullen, burst (psi)	55 min
Tear with grain (gm/cm)	125 min
Tear cross grain (gm/cm)	125 min
Smoothness wire (Sheffield)	125 unit max
Smoothness felt (Sheffield)	125 unit max
Stiffness with grain (Taber 150B)	17 min
Stiffness cross grain (Taber 150B)	8 min
Length 80 column (in.)	7.375 ± 0.005
Width (in.)	3.250 ± 0.003
Static coefficient of friction	0.30 to 0.45
Dynamic coefficient of friction	At least 75 percent of static
Grain direction	Long

Appendix B
NDP Quantum Series Specifications

This appendix provides the weight, operating environment, and altitude specifications for the NDP Quantum Series.

Dimensions

The following details the specifications of each module of the NDP Quantum Series:

Table Error! No text of specified style in document.**-1. NDP Quantum Series Specifications**

Module	Length	Depth	Standard Height	Raised Height	Standard Installed Weight	Raised Installed Weight
Workstation operator console with upstream front/rear image	99 in. (251.5 cm)	37 in. (94.0 cm)	35 in. (88.9 cm)	41 in. (104.1 cm)	770 lb (350 kg) 865 lb (393 kg)	880 lb (400 kg) 975 lb (443 kg)
High-speed encoder	26 in. (66.0 cm)	29 in. (73.7 cm)	35 in. (88.9 cm)	41 in. (104.1 cm)	280 lb (127 kg)	310 lb (144 kg)
Image	21 in. (53.3 cm)	29 in. (73.7 cm)	35 in. (88.9 cm)	41 in. (104.1 cm)	252 lb (114 kg)	277 lb (125 kg)
Microfilmer	18 in. (45.7 cm)	29 in. (73.7 cm)	35 in. (88.9 cm)	41 in. (104.1 cm)	228 lb (103 kg)	278 lb (126 kg)
First stacker	33 in. (83.8 cm)	29 in. (73.7 cm)	32 in. (81.3 cm)	38 in. (96.5 cm)	260 lb (118 kg)	310 lb (141 kg)
Second stacker	27 in. (68.6 cm)	29 in. (73.7 cm)	32 in. (81.3 cm)	38 in. (96.5 cm)	180 lb (82 kg)	230 lb (105 kg)
Third stacker	27 in. (68.6 cm)	29 in. (73.7 cm)	32 in. (81.3 cm)	38 in. (96.5 cm)	180 lb (82 kg)	230 lb (105 kg)
Acoustic pocket cover			37 in. (94 cm)	43 in. (109.2 cm)		

Operating Environment

The following are the operating environment requirements for the NDP Quantum Series:

- Dry bulb temperature: +13° to 35° C (55° to 95° F)

Note: Maximum temperature is 32°C (90°F) if the PC is operating in the PC cabinet.

- Wet bulb temperature: 30° C (86° F) maximum
- Relative humidity: 20 to 70 percent
- Barometric pressure: sea level to 7,000 ft. (2 km): 30 hectogram (Hg) (760 to 584 mm)
- Thermal transition rate: 10 C an hour

Altitude

Sea level to 2,134 m (7,000 ft)

Appendix C
Reading, Encoding, Endorsing, and Microfilming Locations

This appendix provides figures that illustrate the location of the

- Software height-selectable OCR scan bands
- MICR and OCR code lines
- MJE endorsement
- Stamp endorsement
- Microfilmer blip marks

Software Height-Selectable OCR Scan Bands

The software height-selectable OCR reader enables two complete OCR lines to be selected and read by the application program at track speed, without operator intervention. The OCR scan bands can be located from 0.635 to 9.652 cm (0.250 to 3.8 in.) from the bottom of the document.

Figure **Error! No text of specified style in document.**–1 illustrates the location of the software height selectable OCR scan bands.

Figure **Error! No text of specified style in document.**–1. Location of Software Height Selectable OCR Scan Bands

MICR and OCR Code Lines

The location of the MICR encode line is shown in Figure **Error! No text of specified style in document.**–2. The optional locations of the OCR encode lines are shown in Figure **Error! No text of specified style in document.**–3.

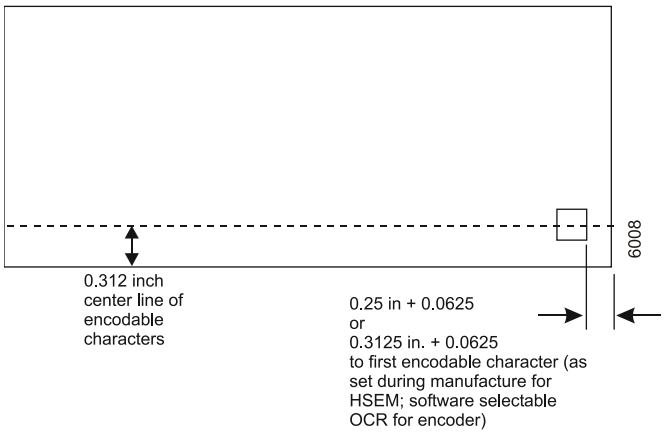


Figure **Error! No text of specified style in document.**–2. Location of MICR Code Line for E13B and CMC7

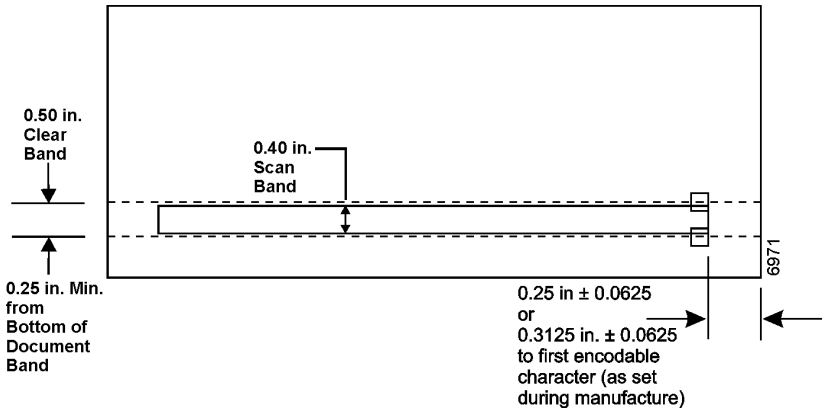
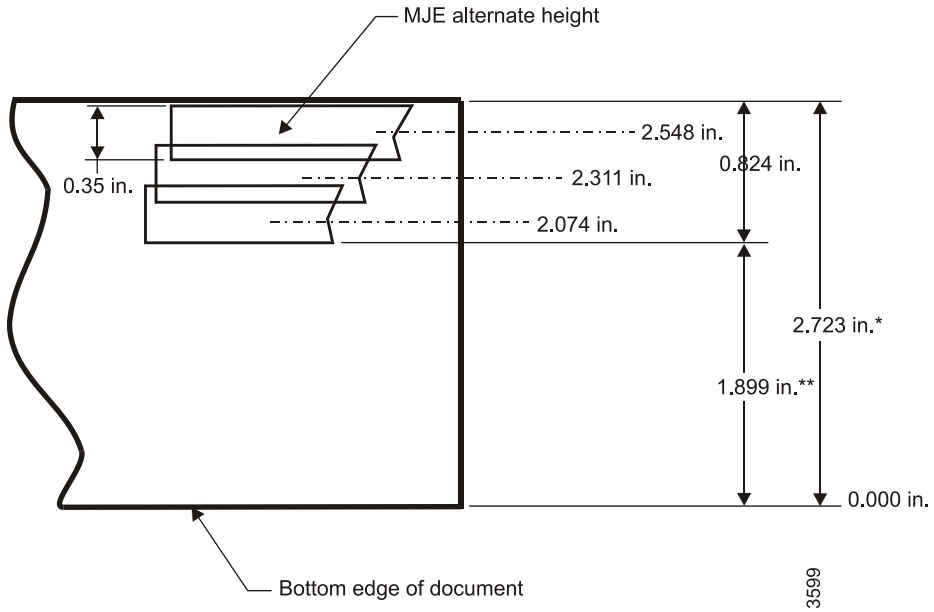


Figure **Error! No text of specified style in document.**–3. Location of Code Line for OCR–A and OCR–B

MJE Endorsement

The MJE enables endorsement of up to four lines of programmable text with a graphical logo, for the front and/or rear of documents. The operator can change the MJE endorsement location at any time.

The MJE endorsement location is shown in Figure **Error! No text of specified style in document.**–4.



*Maximum distance from bottom of document

**Minimum distance from bottom of document

Figure **Error! No text of specified style in document.**–4. MJE Endorsement Location

Stamp Endorsement

The stamp endorser is an option with the front MJE. The height and size of the legend are chosen to prevent overprinting in the matrix endorser print areas.

The dimensions and locations are shown in Figure **Error! No text of specified style in document.**–5.

Note: The position of the stamp endorsement is fixed.

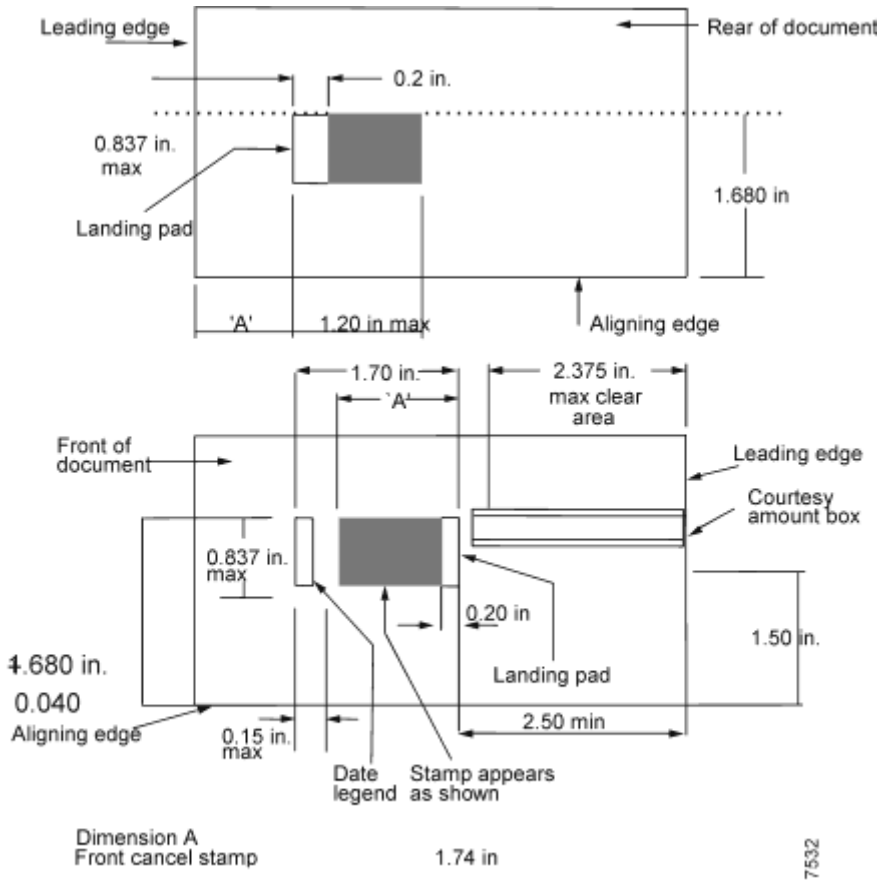


Figure **Error! No text of specified style in document.**–5. Stamp Endorsement Positions

Microfilmer Blip Marks

The microfilmer can place identifying blip marks and characters on the film alongside the document images. This annotation is used later for image retrieval and is controlled by the application program being used. The blip marks comply with ANSI/NMA MS8-1979.

Refer to Figure **Error! No text of specified style in document.**–6 for an illustration.

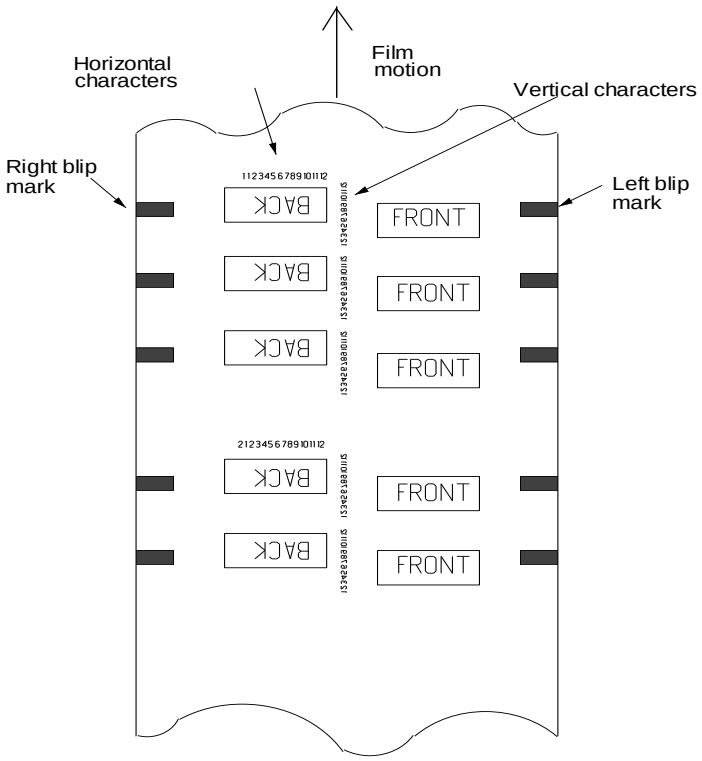


Figure **Error! No text of specified style in document.**–6. Film Annotation

Note: When "left blip" is selected during customization, the blip appears on the right side of the film, and vice versa.

Blip mark character generation can be disabled or set by the application as follows:

- Left-hand blip
- Right-hand blip
- Left-hand and right-hand blips
- No blips
- Horizontal identification characters (up to 16 in one line)
- Vertical characters (up to 9 in one line and one line per document)

Blip marks extend a minimum of 0.188 cm (0.074 inch) and a maximum of 0.267 cm (0.105 inch) from the edge of the film inwards. They have a minimum length of 0.114 cm (0.045 inch) and a minimum density of 1.0 on the density scale.

Appendix D
Consumables and Supplies

This appendix provides tables of consumable items and cleaning supplies. To order consumables and supplies in the United States, call 1-800-448-1424. To order consumables and supplies in Canada, call 1-800-387-6127. Or, go to www.Burroughsstore.com.

Consumables

The following table lists consumables for the various NDP Quantum Series components:

Table Error! No text of specified style in document.**-1. NDP Quantum Series Consumables**

Component	Item
Primary feeder	Feed kit Separator belt, feed tire, and nudger tire
Secondary feeder	Scrub tire
Upstream image (front and rear)	Lamps (4)
OCR reader	Lamps
MJE	Black ink-jet cartridge (box of 10) Ink-jet dabber (box of 25) Ink reservoir system Purple ink-jet cartridge (box of 10)
Standard low-speed encoder	Ribbon cassette MICR (E13B)/OCR MICR (CMC7)
Stamp endorser	Ink roll (black) Ink roll (purple) Legend front Legend rear
High-speed amount-only or full-field encoders	E13B ribbon CMC7 ribbon
Image capture module	Lamps (4)
Microfilmer	Film cartridge (source) Film cartridge (takeup) Index labels Mailing labels Film

Cleaning Supplies

The following table lists cleaning supplies for the various NDP Quantum Series components:

Table Error! No text of specified style in document.**-2. NDP Quantum Series Cleaning Supplies**

Component	Cleaning Item
General	Multipurpose hand cleaner
	Cotton swab (box of 500)
	Lint-free cloths
	Vacuum (customer supplied)
	Water bottle with tap water (customer supplied)
PC display	Display cleaning kit
Staple detector	Magnetic wand (5)
Track	Track cleaning spatula (10)
	Micro or air duster
	Track clearing spatula (5)
	Track cleaning wand (box of 100)
	Track and gate sensor cleaning kit Spatula (10) Scrubber sleeve (200)
	Track and gate sensor cleaner
MJE	Ink hand cleaner
	Ink cartridge cleaning swab (25)
High-speed encoder	Pre-saturated 50% isopropyl alcohol cleaning pad
Microfilmer	Microfilm mirror cleaning kit
	Pre-saturated 50% isopropyl alcohol cleaning pad
Stacker	Track and gate sensor cleaning kit Spatula (10) Scrubber sleeve (200)
	Track and gate sensor cleaner

Appendix E
Quantum Series Capabilities OverviewDocument Throughput

This appendix describes the NDP Quantum Series document throughput rates and provides information on the following factors that affect throughput rates:

- Media
- Operator
- Machine
- Application

Throughput Capability

The NDP Quantum Series is capable of a wall-clock throughput range of 20,000 to 26,000 over-the-counter or remittance payment documents per hour. This represents a document mix of prime pass, power encode, and repass items, typical of today's processing center image-based user.

To obtain this throughput rate, the following conditions must exist.

Media

The documents must be conditioned and jogged. They must also conform to the document specifications shown in Appendix A. Throughput rates are based on a mix of 50 percent 15.24-cm (6-in.) documents and 50 percent 21.59-cm (8.5-in.) documents.

Note: To be representative, any test sample must be large, at least 100,000 documents.

Operator

Throughput rate calculations include operator time for loading the hopper, emptying pockets, replacing consumables, and handling document exceptions such as jams. Idle time due to an empty hopper or full pocket is not included.

Machine

The operator must perform preventive maintenance on the machine at the recommended intervals. Operator-replaceable consumables must be within normal service life specifications for the duration of the throughput test run.

Application

Application stops and application pauses are not included in throughput rates. Application stops permit logical problems and situations to be dealt with in-line, rather than adjusted later. These application events provide a powerful tool that adds processing flexibility, but the number and duration of application stops can have a dramatic negative effect on wall-clock throughput.

OCR Performance

The NDP Quantum Series upstream image system provides archive-quality images that are visually pleasing, and suitable for CAR/ICR processing. The images are compatible with those produced by the downstream image module. Previous generations of upstream images were optimized for OCR reading only. Due to differences in background contrast, Quantum upstream images may be different when OCR characters are not on a white clear band background. A kit is available that optimizes the image for Quantum pure OCR applications. In any case, the document criteria defined in Appendix C of this overview should be followed.

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