DECLARATION OF PAUL D. LACEY

I, Paul D. Lacey, hereby declare:

1. I have personal knowledge of the facts set forth in this Declaration and am competent to testify thereto.

2. I reside at Oakville, Upper Crabbick Lane, Waterlooville, Hampshire, PO7 6HQ, England.

3. I received a Bachelors degree, with honors, in Electronics and Control at Portsmouth Polytechnic (now University), Portsmouth, Hampshire, England, in 1980.

4. I joined De La Rue Cash Systems, which was a part of De La Rue, PLC ("De La Rue") in 1980, and continued my employment there until 2001.

5. Between 1980 and 1988 I was an electronics design engineer in the De La Rue detector group. During that period, I was an electronics engineer from 1980 through 1984, a senior electronics engineer from 1984 through 1986, and a principal electronics engineer from 1986 through 1988.

6. From 1988 to 1994, I was the project manager of De La Rue's detector group.

7. From 1994 to 1998, I was the manager of the new technology group at De La Rue.

8. From 1999 to 2001, I was the program manager for the De La Rue desk top currency counters and currency discriminator products.

9. As a result of my experience, I am knowledgeable about De La Rue's products, guides, manuals, and brochures.

10. I am aware that Amro-Asian Trade, Inc. has filed requests for reexamination of U.S. Patent Numbers 6,459,806, 6,381,354, 5,966,456, and 5,909,903.

11. I have submitted declarations to be used in connection with Amro-Asian Trade, Inc.'s reexamination requests, including a Declaration dated January 10, 2008, to explain the pertinence and dates of various De La Rue references. I have reviewed my Declaration of January 10, 2008, and continue to believe that the statements made therein are true and accurate. Therefore, I incorporate by reference and reaffirm my Declaration of January 10, 2008.

12. One of the references that I discussed in my prior declarations is the De La Rue 3000 User Guide.

13. The De La Rue 3000 User Guide was prepared in or about 1981. The purpose of the De La Rue 3000 User Guide was to advertise De La Rue's capabilities and customer service to potential customers. It was also De La Rue's practice to send promotional materials, including the De La Rue 3000 User Guide, to existing customers.

14. The De La Rue 3000 User Guide was published and distributed to potential customers of De La Rue, most likely in or about 1981, but no later than 1984. In later years, as De La Rue developed more advanced pattern recognition and related techniques, the De La Rue 3000 User Guide became outdated and newer documents with updated information about the new technical developments were prepared and published.

15. The De La Rue 3000 User Guide targeted large organizations that would be interested in personalized set-up of De La Rue products. For example, in section 7.0, the User Guide explains the role of the De La Rue project manager. The

document explains that the project manager would meet with prospective bank customers and work with them to prepare a system requirement definition for customized options. The User Guide also explains that a De La Rue Systems Engineer spends up to two to three months on the site of a new customer in order to install the first such system that is adapted to the customer's specific requirements. This confirms my recollection that the De La Rue 3000 User Guide was directed to and distributed to potential customers of the De La Rue 3000 machines.

16. Section 1 of the De La Rue 3000 User Guide includes a brief history of the development of De La Rue technology, beginning in 1962 and ending in 1981, with the expansion of the 3000 UNS range to include the 3400, 3430, 3500, and 3530 machines. In section 1.3, the User Guide explains that pattern detection was introduced into the machines in 1981. The User Guide does not include later developments in technology at De La Rue, which I know occurred after 1981. Such information would have been included if the document had been published more than two or three years after 1981.

17. In section 5.4(c) of the De La Rue 3000 User Guide, the Guide states that "Low resolution input signals for pattern recognition may be derived either from the opacity detector or the reflective detectors primarily installed for determining note condition." This statement affirmatively dates the User Guide to the early 1980s, because low resolution input signals were not used in the later models of De La Rue machines.

18. As I explained in my earlier Declaration, the transmissive and reflective light detectors that I worked on for the 3000 series machines from 1983 to 1986 consisted of 32 cells side by side with a total width of approximately 300mm. The transmitted or reflected light was sensed by 32 receivers upon reflection from or

transmission through the bank note. This 32-cell pattern recognition system was a substantial improvement for De La Rue.

19. The reflective 32 cell-pattern recognition system was implemented in the 3000 Series machines sold in 1984 and is referenced in paragraph 46 of my January 10, 2008 Declaration. By way of contrast, Figure 19 of the De La Rue 3000 User Guide shows a low resolution reflectance system with three detectors. This further supports my statement that the De La Rue 3000 User Guide was published before 1984.

20. I continued my work on the reflective 32 cell-pattern recognition system through 1986, customizing the detectors for different customers in different countries. The results of these efforts would likely have been described in the De La Rue 3000 User Guide if the Guide had been published later in the decade.

21. Attached as Exhibit 1 to this Declaration is a document entitled "Reflective Pattern Recognition – MKIV Processor 'P' Engineering Specification." This internal De La Rue document, bearing a second revision date of September 17, 1984, was prepared by me. The "Reflective Pattern Recognition – MKIV Processor 'P' Engineering Specification" confirms my recollection that De La Rue had released its 3000 Series machines with 32-cell reflective light detectors by 1984.

22. Attached as Exhibit 2 to this Declaration is a document entitled "Confidential System Specification 3530 Used Note Sorting System," dated March 20, 1986. The disclosures in the "Confidential System Specification 3530 Used Note Sorting System" closely track those of the De La Rue 3000 User Guide, On page 3, the document indicates that it was prepared specifically for a De La Rue customer in Brazil. Page 19 references the Reflective Pattern detector that was fitted to this

Brazilian 3000 series machine. This also confirms that De La Rue had released and fitted its 3000 Series machines with 32-cell reflective light detectors by 1986.

23. Another reference that I discussed in my January 10, 2008 Declaration is the De La Rue 3000 Series Used Banknote Sorting Machines brochure.

24. The De La Rue 3000 Series Used Banknote Sorting Machines brochure was most likely published in or about 1981, but in any event no later than 1984.

25. The De La Rue 3000 Series Used Banknote Sorting Machines brochure is one of De La Rue's advertising materials. It was originally published in color, and distributed to potential customers. In practice, De La Rue did not commonly print internal documents in color, meaning that the De La Rue 3000 Series Used Banknote Sorting Machines brochure was created for external distribution and publication. De La Rue regularly distributed brochures like the De La Rue 3000 Series Used Banknote Sorting Machines brochure at trade shows, like CeBIT (Centrum der Büro- und Informationstechnik) in Hanover, Germany.

26. My statement that the De La Rue 3000 Series Used Banknote Sorting Machines brochure was published in the early 1980s is further supported by the document itself. On page 9 of the brochure, there is a copy of a Visual Display Unit printout from a sample run on the 3000 Series. The time and date on the printout is September 14, 1982, 1:58. In practice, De La Rue released brochures for advertising that were current or included visual screenshots with dates that were slightly into the future, in order to make the publications appear current a bit longer. This strongly suggests to me that the De La Rue 3000 Series Used Banknote Sorting Machines brochure was published within a year or two of September 14, 1982.

27. The De La Rue 3000 Series Used Banknote Sorting Machines brochure also lists a branch office address for De La Rue in Watford, Herts. The Watford office

closed in the early 1980s, not long after I joined De La Rue. De La Rue removed the Watford address from its later publications.

28. A third reference that I discussed in my January 10, 2008 Declaration is the document entitled "At 8P.M. Tonight."

29. The document entitled "At 8P.M. Tonight" was published and disseminated in the United States. The first branch address listed on the document is that of De La Rue's United States sales office in New Jersey. On the last page of the document, the United States voltage of 110V is listed, and on the bottom of fifth page, the document uses the American spelling of the word "color." Thus, the document entitled "At 8P.M. Tonight" was clearly prepared for the American market.

30. The United States office of De La Rue was a sales office. It was customary practice for the United States office to distribute brochures, and the fact that the document entitled "At 8P.M. Tonight" was printed in color confirms my recollection that the document was actually distributed.

31. As I stated in my prior declaration, the document entitled "At 8P.M. Tonight" was published around the 1983 introduction of the De La Rue 3100. The document entitled "De La Rue 3100 Operator Instructions," which is a second revision, bears a date of 1985. The machines themselves were introduced prior to 1985, as were De La Rue's advertising materials.

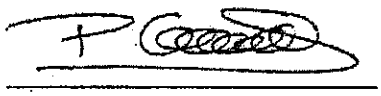
32. My declaration that the De La Rue 3100 machines did not denominate U.S. currency until about 1987 is consistent with my declaration that the document entitled "At 8P.M. Tonight" was published around 1983. The De La Rue 3100 machines were initially marketed in 1983 as desktop currency fitness sorters, and denomination capabilities were advertised later after they had been developed.

33. In addition to brochures, De La Rue routinely published a variety of technical manuals for its product lines, which were made available to any of its customers and potential customers upon request. It was De La Rue's business practice to make these documents available to customers and potential customers who requested them in order to provide more detailed information about the products and services that these actual and potential customers were purchasing from De La Rue.

34. Two such manuals for the De La Rue 3700 product line are the Service Manual For 3700 Used Banknote Sorting Machine, and the Detector Manual For 3700 Used Banknote Sorting Machine, both dated September, 1990. Salespersons would regularly carry manuals like these on sales calls to actual and potential customers, and used them to promote sales. Thus, in the course of business, De La Rue distributed manuals like the Service Manual For 3700 Used Banknote Sorting Machine and Detector Manual For 3700 Used Banknote Sorting Machine to a number of actual and potential customers, and made them available for viewing to many more.

35. I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and recollection.

Date: June 27th, 2008.



Paul D. Lacey

Exhibit 1

DE LA RUE SYSTEMS LIMITED

TITLE REFLECTIVE PATTERN RECOGNITION - MKIV PROCESSOR 'P' ENGINEERING SPECIFICATION

ORIGINATOR P LACEY

SPECIFICATION No. PS 3006-101-32

PAGE No.	ISSUE No.	PAGE No.	ISSUE No.
1	X 2		
2	1		
3	1		
4	1		
5	1		
6	1		
7	X 2		
8	X 2		
9	X 2		
10	X 2		
11	1		

ISSUE	DATE	APPROVED
2	19.9.84	AD155
1	14.11.83	M3023

CONTENTS

1. SCOPE

This document describes the operation of the Mk IV Pattern Recognition Detector, (herein referred to as 'Rack P') and its intended capabilities and limitations.

2. RELEVANT DOCUMENTS

PS 3002-101-30/2	Opacity Pattern Recognition Theory of Operation
PS 3006-101-31	Rack 'P' System Generation and Operation
PS 3006-102-12	Rack 'P' to Mk IV Head Interface Specification
PS 3006-101-12	Special Detector Interface Specification

3. GENERAL DESCRIPTION

3.1 The interrogation head consists of a white light source channelled through fibre optic guides, which illuminates a strip of the note as it passes the head.

Light reflected from the note surface is collected in fibre optic guides, and channelled to 32 photo-detectors. Each detector receives light reflected from an area of note approximately 7 mm x 4 mm.

3.2 Signals from the detectors are amplified and multiplexed onto a line to the Data Acquisition Board in Rack 'P' mounted externally to the 3400. The multiplex address is transmitted to the head from that board.

It is arranged that only the outputs from detectors covering the expected note area are sampled. These are selected by Rack 'P' CPU according to the note dimensions and expected lateral position. The required detector outputs are sampled sequentially by the Data Acquisition hardware on command from the CPU.

Samples are made at 4 mm intervals as the note passes the head, but the first and last 2 mm are not scanned.

3.3 Data received and converted by the Data Acquisition Board is normally passed directly to the comparison hardware which consists of one or more Correlation Boards.

The boards are initialised by the CPU prior to each note reaching the detector, and operate independently from the processor while receiving data.

Each Correlation Board contains permanently stored reference data obtained from a sample of each type of note to be recognised, and receives the same data from the Data Acquisition board. The data received is combined with the data stored according to an arithmetic expression as defined in PS 3002-101-30/2. At the note end, the processor reads the results contained in each board, and calculates correlation coefficients for each pattern.

If the highest coefficient exceeds a pre-defined value and the difference between itself and the next highest coefficient exceeds a second pre-defined value, the note is classified as the pattern corresponding to the highest coefficient. If the coefficient fails the tests, the note is deemed 'unclassified'.

3.4 Under test conditions, the output of the Data Acquisition Board can be read directly by the CPU. In this way, data from samples of notes to be recognised can be obtained. (See Specification No PS 3006-101-39 for procedure).

4. SYSTEM FACILITIES

4.1 Note Recognition

4.1.1 Up to 64 patterns may be used at any time. Normally each note type requires 4 patterns since notes may be presented in any orientation. The code returned to Rack 'D' is the complete pattern number, ie including the orientation information. It is possible to configure the system such that orientation data is inappropriate, in which case these bits may have an alternative meaning.

It is intended that the number of patterns available in the future be extended to 96.

4.1.2 All patterns used at any one time must relate to notes of nominally the same dimensions, notes of different sizes being sorted in separate passes. Patterns for these notes can be stored in the system and selected by process code. This allows 64 'live' patterns for each process. The maximum number of processes possible depends on the note sizes - typically, data for 6 different processes can be stored.

4.1.3 Limitations

(i) The correlation coefficient is reduced if notes are dirty, damaged, or presented out of position, but it is expected that the best match will remain correct. The pass threshold is therefore selected to give an acceptable unclassified rate.

(ii) If a note is presented which does not in fact have a corresponding pattern in the system, the best match coefficient cannot be guaranteed to fall below the pass threshold.

4.2 Test Facilities

4.2.1 The following information is available via a printer connected to the CPU board (P3): (Messages will only be printed when the printer is connected, when the rack is powered up or on reset).

(i) On power-up or reset, the first Test is to check the RAM. If this is faulty the LED on the 101M processor card will flash with an equal mark/space ratio.

The PROM contents are then validated against a checksum. If this proves faulty, the LED will remain on, indicating an EPROM fault.

S1 (on the 101M card), is next interrogated. If this is OFF, the 'P' rack will continue through further tests (below), and if a fully functioning system is found the machine will be ready to use.

If S1 is ON, the 'P' rack will be set up to permanently scan. This will enable the engineer to test out head, to Buffer Multiplexer, to Data Acquisition signals. The LED will flash with a mark/space ratio of 5:1 to show that it is in the 'scan' mode.

(ii) On power-up or reset, and on receipt of the process code, the CPU checks the status of the hardware. Any fault found causes an error code message to be printed. (See Specification No PS 3006-101-39).

4.2.2 The following information is available via a printer connected to the CPU board (P3):

If, on receipt of a process code, which is identical to a previous process code sent, the following information will be printed out:- (the printer having been connected on the last power up or CPU reset).

Note: In order to send a process code the same as the previous code, this is done every time the screen is 'refreshed' ie OPERATORS FUNCTION 18.

```
CURRENT PROCESS CODE XXXXXXXX
CURRENT DELAY (NOM = 6) Y
CURRENT PASS VALUE  %A
CURRENT DIFF VALUE  %B
```

CODE	QTY	LOW	HIGH	AVERAGE
0	F	G	H	I
2	F	G	H	I
3	F	G	H	I
etc				
NOTREC	J			

Where:-

X = Current process code P rack is running in.
Y = The delay being used at present (see para. 5.7).
A = The current pass % that the maximum correlation figure must be greater than to be classified.
B = The current difference % that the best and next best correlation differences must be greater than to be classified.
F = The quantity of notes (for the particular code) that has been fed since the last process code was sent).
G = The lowest correlation coefficient of the F notes fed.

H = The highest correlation coefficient of the F notes fed.

I = The average correlation coefficients of the F notes fed.

J = The number of notes that were not classified due to them not meeting the pass and difference figures for this process.

4.2.3 Calibration

The Data Acquisition Board requires matching to the detector head in use. This is achieved by means of a non-volatile memory which stores correction values for each channel. The values are obtained and programmed semi-automatically using the procedure described in Specification No. PS 3006-101-39. A printer connected to the CPU board records any errors detected during the calibration process.

5. HARDWARE CONFIGURATION

5.1 A single pattern recognition system comprises the following circuit boards, housed in a TM990/520 8 slot chassis, with power supplies as detailed below.

(i) TM990/101M (or equivalent) CPU board.

(ii) 3409-5006 Clock/Memory Card.

(iii) TM990/305 Parallel Interface Card.

(iv) 3409-5075 Data Acquisition Card.

(v) Up to four 3409-5076 Correlation Cards.

Ultimately, the number of Correlation Cards may be increased to six. This will entail use of a large chassis, and/or production of a combination Clock/Memory/Interface Card.

5.2 The system will normally be situated externally to the note transport (3400), and will connect to the MkIV head via a multi-twisted pair cable of 10 metres maximum length as defined in PS 3006-102-12.

5.3 Connection is also required to the External Detector Processor 'P', via a multi-twisted pair cable of 3 metres maximum length, as defined in PS 3006-101-12. This provides process information, syncronisation with the note transport and information concerning the relative position of each note prior to reaching the detector head.

5.4 The system requires a 180 to 250, (or 90 to 125) volt single phase, 47 to 63 Hz supply. Power consumption 200 watts maximum.

5.5 The system software is generated from 2/3 separate links:-

(i) Procedure

This is currently called PRCK0302 ie version 3, issue 2. This is situated in memory from 0 to >1FFF and is contained on the 101M CPU board:-

U44 >0000 to >FFE
U42 >0001 to >FFF
U45 >1000 to >1FFE
U43 >1001 to >1FFF

A suitable link file is shown below:-

```
NOPAGE
TASK PRCKO3NN                ;NN = current issue
PROGRAM 0
DATA >F000                   ;start address of ram
COMMON >2000,PRCTBL          ;start address of
COMMON >1F80,CONTID,DIFCID,CLCKID,PDECID
COMMON PDECID,DACQID,CORRID,XOPSID,CKSMID
INCLUDE directory.OBJ.CONTO3NN
INCLUDE directory.OBJ.DIFCO3NN
INCLUDE directory.OBJ.CLCKO3NN
INCLUDE directory.OBJ.PDECO3NN
INCLUDE directory.OBJ.DACQO3NN
INCLUDE directory.OBJ.CORRO3NN
INCLUDE directory.OBJ.XOPSO3NN
INCLUDE directory.OBJ.CKSMO3NN
END
```

5.6 Interrupt links on the CLOCK MEMORY card in 'P' Rack:-

SK10 Link pins 9 to 18
Link pins 8 to 17

5.7 Delay Facility

With all software up to PRCKO31C there has been a fixed delay present of 6 mm allowing the note to be in exactly the right position with reference to the head.

The facility has now been added so that this delay can be varied to optimise the suspect rate, this being done by S1 to S8 on the clock memory card within the 'P' Rack.

The switch settings are an offset from the nominal 6 mm. They are an inverted signed displacement S1 LSB and S8 MSB.

ie

S8	S7	S6	S5	S4	S3	S2	S1	Signed Disp.	Actual Delay
0	0	0	0	0	0	0	1	-2	4
0	0	0	0	0	0	0	0	-1	5
1	1	1	1	1	1	1	1	0	6 Nominal
1	1	1	1	1	1	1	0	+1	7
1	1	1	1	1	1	0	1	+2	8

etc

The actual delay can be checked by connecting a printer to 'P' Rack, see para. 4.2.2.

NOTE: WHEN RECORDING ENSURE DELAY IS SET TO NOMINAL.

CONFIDENTIAL

SYSTEM SPECIFICATION

3530 USED NOTE SORTING SYSTEM

De La Rue Systems Limited

EXH U0019

De La Rue Systems Limited

Walton Road, Portsmouth,
PO6 1TJ, England.
Telephone. Cosham (0705) 383161
Telex: 86337 DLRSP G
Cables: Delarsys Portsmouth

CONFIDENTIAL

SYSTEM SPECIFICATION

3530 USED NOTE SORTING SYSTEM

PM NO. 8004/86

COPY NUMBER ONE

DUTY OF CONFIDENCE

Registered Office: De La Rue House,
3/5 Burlington Gardens,
London W1A 1DL, England.
Registered Number: 555929
A member of the De La Rue Group

ISSUE NUMBER	DETAILS	PREPARED BY DATE
1	3530 System - Brazil	JW/RAH 20.3.86

CONTENTS

1. INTRODUCTION

This document is the Specification for the Model 3530 Used Banknote Sorting System produced by De La Rue Systems Limited.

Modifications, once incorporated into the Specification, will be recorded on the Amendment Record provided (page 2), in order that both parties can be assured that the Specification is to the correct issue.

Exhibit 2

SYSTEM SPECIFICATION

MODEL 3530

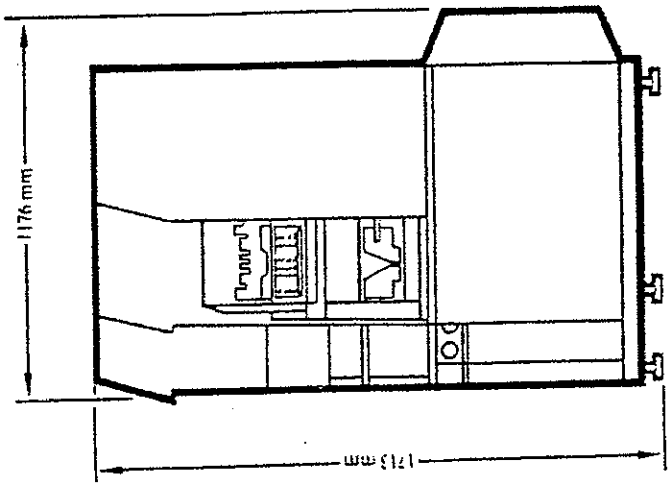
2. TECHNICAL SPECIFICATION - 3530 TRANSPORT

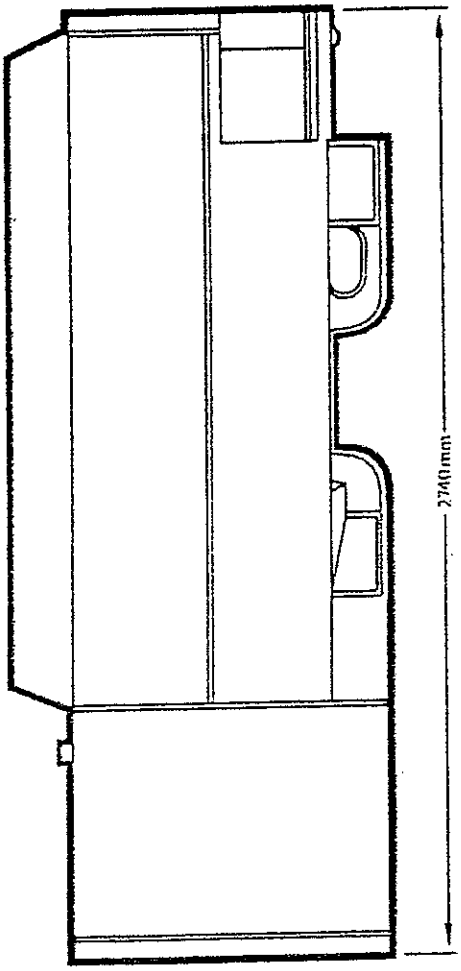
2.1 SPECIFICATION OF THE 3530

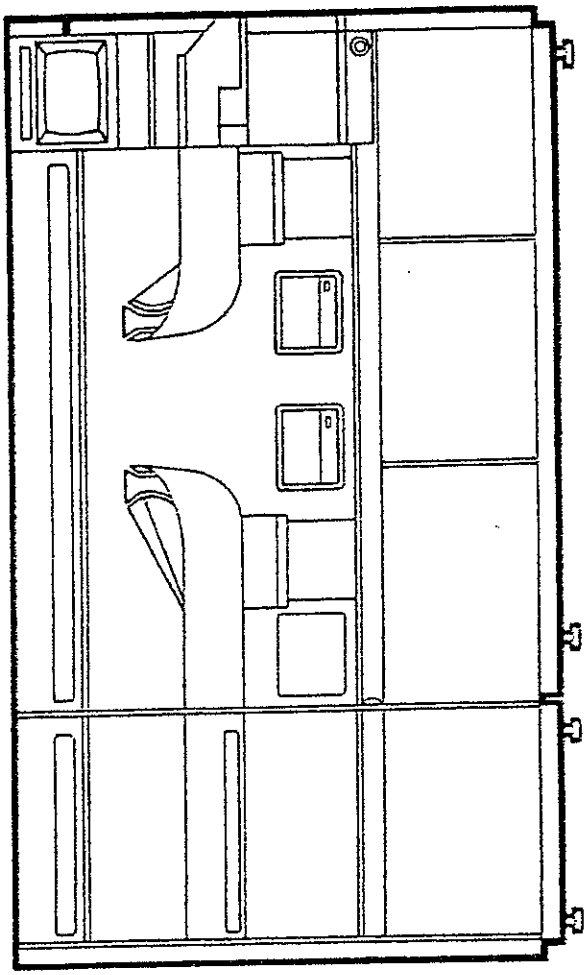
Transport	Feed rate	20 notes/second
	Note size range: Length Height	 100mm to 200mm 50mm to 100mm
	Weight range of notes	60-100 gsm
	Feed hopper capacity	250mm (between 1500 and 2000 notes)
	Output stackers	4, two at 100 notes each and two up to 500 notes max. each
	Mutilated/out of time note stacker	1, capacity of 100 notes max.
	Keyboard	0-9 plus control keys
Peripherals	Visual display unit (VDU)	24 lines x 80 characters
	Printer line width	132 characters
	Print rate	180 characters/ second
Granulator Unit	Type	3 blade granulator
	Drive	by independent motor
	Destruction rate	72,000 notes/hr, dollar size
	Granule size	3/8" grill (9.4mm)
On Line Bander	Band thickness	0.15mm
	Band width	25mm
	Breaking strength	270 - 300 Newtons (27-30Kg of force)
	Peel at tab	10 Newtons (1kg of force)
	Joint	14 x 8mm fusions
	Length of material per reel Band position	352 metres 8mm offset from centre of pack

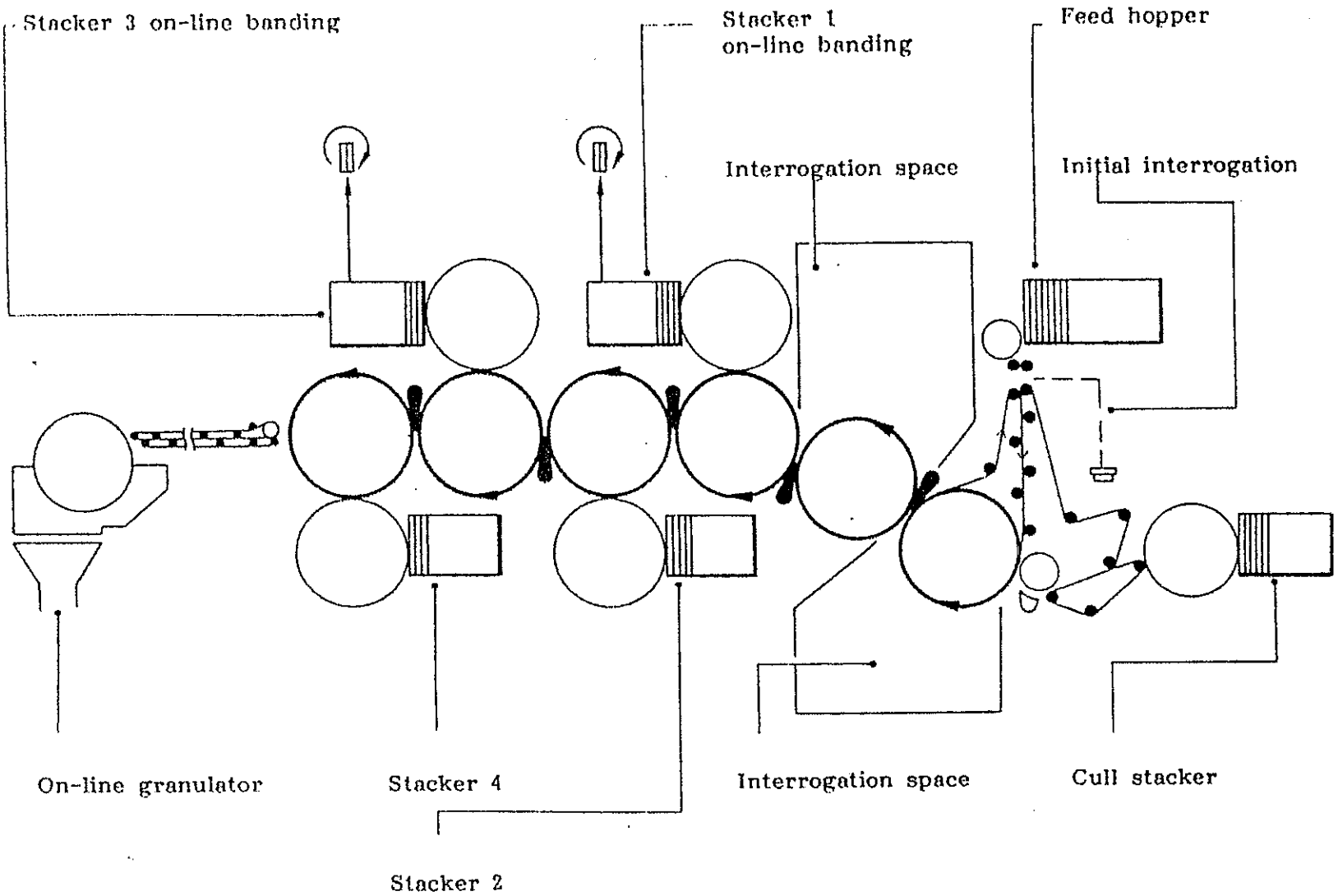
Joint location	25mm from edge of pack
Wrapping tension	10 Newtons (1Kg of force)
Removal technique	Peel by tab

Physical Characteristics	Transport	Detector Desk
Length	2740mm	1100mm
Height	1713mm	920mm
Depth (max)	1176mm	600mm
Weight	1100 Kg	circa 80 Kg
Maximum foot loading	200 Kg	
Power Requirements	60Hz, 3 phase, neutral and earth, 220 volts	
Power Consumption	13 KVA	
Heat Dissipation	9 KW	
Temperature	10-35 C	
Relative Humidity	40-80%	


1176 mm


2740mm




Stacker 3 on-line banding
Stacker 1
on-line banding
Feed hopper
Interrogation space
Initial interrogation
On-line granulator
Stacker 4
Interrogation space
Cull stacker
Stacker 2

Batches of notes for processing are placed in the continuously loadable hopper and fed synchronously into the transport with long edge leading. (er being separated by the vacuum peeler, the front end belt section guides each document past an electronic detector which checks the length and height, confirms that the note is single and inspects for physical defects. Any notes which do not meet preset standards are directed into the cull stacker for special attention. The majority of banknotes continue onto the main section of the transport for inspection by fitness and authenticity detectors. The requirements for fitness and authentication parameters are detailed in Section No.3

The System makes use of a microprocessor controlled document transport to move banknotes through a number of electronic counting and inspection stages to assemble into batches. After departure from the input hopper notes are transported by a belt assembly, prior to being transferred through the equipment by a high flow, low differential vacuum system applied to a series of synchronised drums rotating on horizontal axis.

The transfer of banknotes from drum to drum is controlled by the system microprocessor. The take-off to designated stackers is achieved by spiral pick-off assemblies which decelerate and collect the notes into batches. Progress of notes through the transport is checked continuously by a series of sensors.

2.3.1 On-Line Banding

This facility is fitted on the 3530 to enable automatic wrapping of bands around packs of notes delivered to the upper two stackers. A banding unit is provided for each of these stackers, serviced from a common control unit.

When the required quantity of notes to be banded (normally 100 but may be any quantity between 50 and 100) has been accumulated, the pack so formed is transported upwards by the stacker table, to the banding unit. The free end of the banding tape is secured against the side of the note pack and the pack is clamped. At this time the stacker table returns in readiness to collect the next pack of notes.

At the bander, the clamped pack is rotated such that the tape forms a band around the pack, with the requisite amount of tape dispensed automatically. A heat weld forms a firm joint to secure the band; a logo and two lines of 6 digits of information are applied to the band by a printer. The banded notes are then released onto the chute to a note collection box.

2.3.2 On-Line Granulation

The on-line granulator is designed to destroy notes that are not fit for re-issue; and is on the left-hand side of the 3530. The mechanism is mounted on a solid frame and stands on its own supports.

An advantage of granulation over shredding is that the output volume for disposal has only 4:1 increase as compared with 10:1 for shredding.

The mechanism used to granulate is quiet and safe in operation. Safety and security interlocks are fitted to ensure all covers are in position before the machine can be operated, the granulator is only activated when a mode requiring its operation is selected.

During operation, notes are delivered from the last drum of the main transport onto a belt track from where they are delivered into the mouth of the granulator which cuts them into small, irregularly shaped particles by means of three 'flying knives' rotating past stationary 'dead knives'.

The granulation is controlled by the system microprocessor thus ensuring accountability. The notes are only designated as 'destroyed' when they have entered the secure granulator area. At the entry of the secure note area an independent counter is fitted. This verifies the actual input compared to the microprocessor count.

a grill, and across a centrifugal head into a collection bin by a vacuum pump.

2.3.3 Battery Back Up

The 3530 is fitted with a Battery Back-up system which in the event of a main power failure gives an emergency supply, so that all current data held by the control microprocessor is automatically transferred to the printer for reconcilation.

The system thus ensures granulation accounting security on power supply failure.

2.4 GENERAL REQUIREMENTS

The 3530 System described in this proposal may be used to process "Cruzado" and or "Cruzeiro" notes subject to full note evaluation by De La Rue Systems Ltd.

The following are the basic requirement:-

a) Count and sort into qualities, of ATM fit, fit and unfit and outsort banknotes which are of incorrect denomination or issue to those being processed or classified suspect by examination of authenticity features.

Only one denomination may be processed at a time.

b) Provide a means of tracing variances to the original source by means of Batch Separators.

c) Provide a comprehensive auditing and reconciliation procedure in hard copy.

d) Automatically band notes fed to stackers 1 and 3.

e) Automatically granulate banknotes classified authentic unfit.

2.5 BANKNOTES TO BE TRANSPORTED

2.5.1 Process Requirements

The banknotes to be processed are "Cruzados" and "Cruzeiros". When design of the Cruzado is finalized, trials will be effected by De La Rue Systems Ltd and the details incorporated into this section.

DENOMINATION	DESCRIPTION	DIMENSIONS (mm)

2.5.2 Outsort Requirements

Ultimately with the transition from Cruzeiros to Cruzados the former will be outsorted. Subject to De La Rue Systems Ltd evaluation, it may be necessary to amend this requirement.

DENOMINATION	DESCRIPTION	DIMENSIONS (mm)

2.6 AVERAGE THROUGHPUT PERFORMANCE

The transport speed is 72,000 notes per hour. Throughput performance can only be detailed after banknote trials by De La Rue Systems Ltd.

Initially performance will depend upon the mix between Cruzados and Cruzeiros and the outsorting requirements.

However throughput performance will always depend upon the following:-

i) The system is operated in accordance with the procedure specified in the Operators Manual.

ii) The spread of banknotes is typical of the original evaluated sample.

iii) The batch of notes to be processed does not contain an excessive quantity of non 'machine handleable' notes.

iv) Modes and Process used.

NOTE:-

Notes outsorted by hand for destruction are generally unsuitable for machine processing.

SYSTEM SPECIFICATION

MODEL 3530

3. AUTHENTICITY AND CONDITION DETECTORS

3.1 DETECTOR PACKAGE

The 3530 is fitted with a package of detectors to identify note soil condition and authentication characteristics.

Subject to the Cruzado possessing suitable features and authentication characteristics, the 3530 System can be programmed to separate by denomination and sort for condition.

The System can separate Cruzeiro from Cruzado.

The detector configuration detailed below does not give separation of Cruzeiro by denomination.

a. Mk III, Shiny tape/soil
b. Mk IV, Shiny tape/soil and reflective pattern
c. Local Soil Soil inconjunction with Mk III and IV
d. Magnetic Ink Authentication
e. Metal Thread Authentication
f. Fluoresence Authentication of single feature on one side of the note.

This detector configuration is based upon information in the possession of DLRS Ltd on 24th March 1986 and may be subject to change after full evaluation of notes by De La Rue Systems Ltd.

3.2 BANKNOTE ORIENTATION

With the detector configuration, as described in 3.1, notes may be fed non-faced and non-orientated. Multiple detector heads are provided to enable this feeding flexibility.

3.3 BANKNOTE CONDITION MEASUREMENT

3.3.1 Fitness decisions are made in respect of:-

i) Soil Condition

ii) Excessive Tears and Holes

iii) Cornerfolds/missing corners

iv) Shiny Tape

3.3.2 Soil Conditions

The system will perform ATM/Fit/Unfit decisions, simultaneously in respect of the note soil levels. These will be based on a decision point which is adjustable in 20 increments ranging about a nominal sort level. (Median). The nominal level will correspond to the reflective level of light from an 'average' soiled banknote. The upper and lower limits are set to encompass the best and worst quality notes likely to be processed.

3.3.3 Fitness Detection (excluding soil)

The fitness detectors make decisions in respect to the following:-

a) Note Position - Linear (Short Edge Direction)

Any note which is outside of a machine synchronous position tolerance is routed to the Cull Stacker.

b) Note Position - Lateral (Long Edge Direction)

Any note which is outside a lateral transport position is routed to the Cull Stacker.

c) Note Dimension

Any note varying from the nominal size by more than a specified tolerance will be routed to the Cull Stacker.

d) Skew

Any note that is skewed with respect to the direction of note feed, by a fixed angle, which is dependent on note size, and pattern,

e) Holes

Any note which has a hole(s), singularly or cumulatively, in excess of 2 sq mm in any one segment may be classified as unfit. Maximum area not detected is 12 sq mm.

in excess of that specified below, will be classified Unfit.

Parallel to Short Edge

Minimum size detected 4 mm long x 1 mm wide

Maximum size not detected 12 mm long x 2 mm wide

NOTE: Detection of holes tears closer than 9 mm to the short edge of the banknote cannot be guaranteed.

Parallel to Long Edge

Minimum size detected 4.5 mm long x 1.5 mm wide.

Maximum size not detected 13.5 mm long x 2.0 mm wide.

NOTE: Detection of tears closer than 6 mm to the long edge of the banknote cannot be guaranteed.

g) Corner Folds

Corner Folds in excess of those specified below may be deemed 'FIT' or 'UNFIT' depending upon the Mode selected.

ASPECT RATIO	NOMINAL	MINIMUM SIZE DETECTED	MAXIMUM SIZE NOT DETECTED
1:1	12mm x 12mm	7mm x 7mm	14mm x 14mm
1:2	9mm x 18mm	4mm x 8mm	10mm x 20mm
2:1	18mm x 9mm	12mm x 6mm	22mm x 11mm

NOTE: Short Edge Dimension quoted first in each case. All the parameters for the primary detector noted above are ideal values. Actual performance attained will depend on the position of the note as it is fed through

h) Shiny Tape

The minimum size of shiny tape possible to detect is 12.5 mm parallel to the long edge of the note by 10 mm parallel to the short edge. The maximum size of shiny tape that may not be detected is 25 mm parallel to the long edge of the note by 10 mm parallel to the short edge.

NOTE: Production tolerances in respect of the original manufacture of the banknotes will be additional and cumulative to the tolerances above.

3.4 BANKNOTE AUTHENTICATION FEATURES

The design of the Cruzado may include Metal Thread, Magnetic Ink and Fluorescence features.

However, location and suitability as machine readable features are unknown, at the time of issue. of this specification.

SYSTEM SPECIFICATION

MODEL 3530

4. SOFTWARE PROFILE

4.1 MODES OF OPERATION

Some generally available Mode configurations are listed below. These will be developed by the De La Rue Systems Project Manager in order to fulfil the application requirement.

GROUP	MODE NO.	MODE DESCRIPTION	MODE TYPE
1	1 - 10	ATM SORT - 3 WAY	OPERATIONAL MODES
2	11 - 20	TWO WAY SORT	
3	21 - 30	ATM BANDING	
4	31 - 40	U/F BANDING	
5	41 - 50	BAND ALL LESS SUSPECTS	
6	51 - 60	FACING/ORIENTATING	
7	61 - 70	GRANULATE ALL LESS SUSPECTS	
10	100		ENGINEERING MODES

Each Group contains two types of modes: i) 'counting' ii) 'verifying'

4.2 PROCESSES

Some generally available Processes are listed below for reference only. When the design of the Cruzado is finalised, De La Rue Systems Project Manager will generate and agree processes to meet operation requirements.

PROCESS GROUP	PROCESSES	CHARACTERISTICS	PROCESS TYPE
1	1 - 10	AUTHENTICATE WITH FITNESS	OPERATIONAL
2	11 - 20	PARTIAL AUTHENTICATION WITH FITNESS	
3	21 - 30	FITNESS ONLY	
4	31 - 40	FACE AND ORIENTATE	
5	41 - 50	AUTHENTICATE ONLY	
6	51 - 60	EACH DETECTOR ENABLED INDIVIDUALLY	TEST

5. APPENDIX A

GLOSSARY OF TERMS

SUPERFIT	Notes which are classified as being fit and authentic for re-issue via Automatic Teller Mechanism's (ATM).
FIT	Notes which are classified as being fit and authentic for re-issue
UNFIT	Notes which are classified as authentic but not fit for re-issue due to soil condition or mechanical damage.
SORTING	Classification and separation of banknotes into the required categories.
MODE	A method of pre-selecting a range of stacker allocations.
PROCESS	A method by which detectors can be selected depending upon specific banknote parameters, and/or mode of operation.
CULLS	Notes are routed to the Cull Stacker because they cannot be satisfactorily transported or accounted for at the time of departing from the feed hopper into the system.

	suspect stacker because they cannot be accurately classified under the selected Mode and Process.
BATCH	A group of banknotes from a known source for which the system must account and report.
MODULATED FEED	When the pre-determined output stacker batch size is approached, and there is no designated alternative available, the feed rate is progressively reduced, such that the number of notes in transit does not exceed the balance of notes required for a full output batch. NB: Modulated Feed is used when there is only one stacker designated to a particular category of note, as defined by the selected mode.
SEPARATOR	A separator is a document fed with the banknotes to enable the 3530 systems to identify and account for specific batches.
INPUT	A quantity of banknotes forming the input to the system. This quantity is determined by the Mode or by Operator selection.
NON MACHINE HANDLEABLE	Any banknote that cannot be transported by the system.
FITNESS REPEATABILITY	The ability of the system to repeat a fitness decision within a defined tolerance.