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, P)7 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. Between 1981 and 2001 De La Rue designed, developed, marketed and sold machines that were capable of denominating, authenticating and condition

sorting currencies from approximately 80 different countries, including United States currency.

10. After joining De La Rue in 1980, I spent 3 or 4 months in various departments getting a grounding and understanding of what each department in the business did.

11. Beginning in 1981, I joined the detector group to work on the design of the detection systems for the De La Rue 3000 series machines.

12. Beginning in 1983, in addition to the 3000 series detection systems, I also worked on the design of the detection system for the De La Rue 3100 series discriminator machines.

13. The 3000 series machines were large currency sorting machines and included the De La Rue 3400, the 3430, the 3500 and the 3530 currency discriminating machines.

14. The 3100 series machines were desktop currency discriminating machines and included the 3100, the 3110 and the 3120 desktop discriminator machines

15. Early versions of the 3000 series machines existed when I joined De La Rue in 1980. these early machines were fitted with fitness and authenticity detectors and could sort bills according to fitness and authenticity, but were not equipped with pattern recognition detectors and thus could not denominate currency.

16. My work at the detector group at De La Rue included extending the application of the opacity (transmissive) detector in the 3000 series machines, that were originally used for fitness detection, to include pattern recognition based on opacity characteristics of the bills.

17. As a result my work and that of others on the detection system of the

3000 series machines, 3000 series machines capable of denominating currency of many countries, including U.S. currency, based on transmissive light, were built in 1981.

18. Based on the 3,000 series machine with currency denomination capability, De La Rue applied for a patent in the U.K. in 1981, followed by a U.S. application in 1982. The U.S. application issued in 1985 as U.S. Patent No. 4,542,829.

19. Subsequent to the filing of the 1981 patent application in the U.K., De La Rue proceeded to beta test the 3000 series machines that were capable of denominating currency, at customer locations in late 1981.

20. By early 1982, De La Rue was selling 3000 series machines capable of denominating currency.

21. A problem with the opacity recognition detector used in the 3000 series machines, which used infra red light, was that, being a transmissive device, information from the front and rear of a note would be seen as one.

22. Another problem with the 3000 series opacity recognition detector was that printed indicia on the bills would often disappear in the infra red light. This, however, was not a problem in the case of U.S. currency.

23. The problems with the opacity detector lead the detector group at De La Rue to develop a reflective light detector for the 3000 series machines, which used white light.

24. The white light source detector sensor was different from the opacity detector, but the processing of the data was very similar. The main difference between the two processing systems was the capability of the reflective system to

have multiple pattern set storage boards, enabling more pattern sets to be stored for a particular customer.

25. From 1983 through 1986, I worked as the lead engineer on designing the white light detector for 3000 series machines. I also helped in the development of the pattern recognition detector that was used on the 3100 series machines.

26. The transmissive and reflected light detectors of the 3000 series machines I worked on consisted of 32 cells side by side with a total width of approximately 300mm. Each cell was approximately 4mm long (in the dimension of the note transport). The transmitted or reflected light was sensed by the 32 receivers upon reflection from or transmission through the bank note.

27. As the note was transported through the detector, a two dimensional image of the note was created, each pixel being approximately 9 x 4mm. Cells outside the bounds of the note were ignored by the pattern recognition detector.

28. The analogue signals sensed by the cells were converted to a digital signal and normalized. The normalization process enhanced the contrast of dark areas of the note, and reduced the contrast of bright areas of the note.

29. Using a correlation technique. The normalized data was then correlated against a set of master patterns that had been previously captured and stored in memory within the pattern recognition hardware. The aster set of patterns represented all denominations that were to be processed in all four possible facings and orientations.

30. The detector would report to the main system the denomination, facing and orientation of the banknote fed, which, depending on the configuration, would then direct the note to the configured pocket/bander/shredder.

31. My work on the opacity and reflective light detectors included improvements to the correlation technique that was the core classification technique used by the detectors.

32. As a result of my work on the reflected light detector, the 3000 series machines could identify the facing, orientation and denomination of currencies from any different countries, including U.S. currency.

33. The 3000 had a number of detectors directed to the task of authenticating banknotes, including magnetic ink recognition, magnetic bar code reading, magnetic thread detection, fluorescent and phosphorescent detection, metal thread detection, UV bright and UV reflection detection.

34. Amongst the many currencies I worked on, U.S. currency was a major part of the work completed.

35. Between 1983 and 1986, in addition to the infra-red and white light reflectance detectors, I also worked on developing a high resolution soil (fitness) detector, and an authentication detector for the 3000 series machines.

36. From 1986 through 1988 I worked on the detection system of a short edge feed system called the 3200. This system utilized pattern recognition detection principles as used on our 3100 series machines.

37. My work during this period was based on the auto correlation principle and captured a one dimensional reflective pattern image with white light. We also had a variant which used a magnetic sensor, using the same processing hardware.

38. From 1988 to 1994, I was the detector group project manager, responsible for a team of electronic, mechanical and software engineers, delivering detector, and detector systems for the 3200, 3700 (another short edge feed machine utilizing a variation of the 3200 pattern detector) and 3100 range of products.

39. My responsibilities as project manager during the 1988 to 1994 period included customization of the 3000 series systems to the particular customer needs and requests.

40. In 1994, I became New Technology Group Manager. In that position, I had full responsibility for finding and delivering, leading edge new technologies to the business, including the De La Rue funded development of a camera based high resolution pattern recognition and Grafitti detection system with Datacube, and a novel short edge feed pattern recognition detection system developed by a Russian company, and used on 3200 and 3700 systems.

41. 41. From 1999 through 2001, I was programme manager for the Desktop products part of De La Rue. In that position I had responsibility for the development of a Euro authenticating bank note counter.

42. In order to process currency, since 1981, the 3000 series machines received a stack of bills in an input receptacle.

43. since 1981, the 3000 series machines transported bills from the input receptacle, one at a time, along a transport path in a direction that was parallel to the narrow dimension of the bills.

44. Since 1981, the 3000 series machines automatically denominated bills of a plurality of U.S. denominations by using a correlation technique.

45. From 1981 to 1984, the 3000 series machines used transmitted light to denominate currency, including the United States currency. Since 1984, the 3000 series machines used reflected light, from either side of the bills, to denominate currency, including the United States currency.

46. Since 1984, the 3000 series machines denominated bills by detecting light reflected off of passing bills, generating a reflected light characteristic output signal in response to detected characteristic information, and generating a

denomination signal in response to the reflected light characteristic information output signal

47. Since 1981, the 3000 series machines scanned bills across a single segment, or multiple segments of the bills.

48. Since 1981, the 3000 series machines were universal systems that would be customized to each customer's requirements.

49. Since 1981, the term "mode" was used in connection with the 3000 series machines to refer to a combination of features and functions of the machines.

50. Since 1981, a "process," as used in connection with the 3000 series machines, referred to the specifying of the parameters corresponding to each individual denomination. Process zero "0" was a catchall process that would cover all denominations. By way of an example, in the case of the U.S. currency, process "1" could be assigned to $1 bills, process 5 could be assigned to old $10 notes, process 7 could be assigned to new $50 notes, and so on. In this example process zero would cover all U.S. currency denominations and all denominations would be processed when this process was selected.

51. Since 1981, there were hundreds of operating modes and processes that could be used to program the 3000 series machines. The actual modes and processes that were programmed into any one machine would be selected based on the customer's requirements.

52. Since 1981, a 3000 series machine could store up to one hundred operating modes of operation.

53. Since 1981, the series 3000 machines were programmed with a "count mode," in which processed bills would be denominated, authenticated, checked for fitness, and counted.

54. Since 1981, the 3000 series machines were programmed with an "engineering mode" of operation. This "mode" would be activated by selecting the process zero (0) option on the machines, described above.

55. Since 1981, the engineering mode was typically used by the service and maintenance engineer, that was assigned to maintaining and providing technical support for each 3000 series machine, to test and verify the operating accuracy and functional integrity of the machine.

56. Since 1981, in the engineering mode, the operator would run a stack of bills of mixed denominations through the machine and get a print out of the processed bills, which included the number of bills of each denomination. Depending on the selected mode, the mixed denomination bills could be sent to a single output stacker.

57. After 1981, as part of my job requirements, I often visited the 3000 machines; customers at their locations. During those visits. I helped train the customers on their use of the machines, including the use of the "engineering mode" option on the machines.

58. Since 1981, the engineering mode was typically engaged one or more times a week, depending on the usage of the machine.

59. Since 1981, the 3000 series machines had stacker allocation capability, which allowed any stacker to be designated to receive all or a subset of the bills processed by the machine.

60. since 1981, the 3000 series machines had an "orientation" mode, in which bills of either a single or mixed denomination would be processed (i.e., be subjected to the functions of the detectors present on the particular machine such as the denomination detector, the fitness detector or the authenticity detector, etc.) and be allocated according to their facing (faced or unfaced) and orientation (orientated or not orientated).

61. Since 1981, when operating in the "orientation" mode, all bills of each facing and orientation, independent of denomination, fitness or authenticity, would be sent to a single output stacker. As such, each output stacker received bills of a plurality of denominations of a particular facing and orientation.

62. since 1981, the 3000 series machines model numbers 3430 and 3530 were equipped with a granulator that provided online destruction capability for bills that were, for example, deemed unfit or were otherwise designated to be taken out of circulation. When configured with a granulator, the granulator replaced output receptacle No. 5, that was the last pocket by physical location on the machines.

63. At all times after 1983, in the "granulate all" mode, all bills placed in the input receptacle were set for destruction and would be denominated, authenticated, checked for fitness and totaled, and would be sent to the granulator for destruction.

64. Since 1981, the 3000 series machines could denominate a batch of U.S. currency bills including bills of different denominations, regardless of facing or orientation of the bills.

65. since 1981, the 3000 series machines denominated bills at a rate of one thousand, two hundred (1200) bills per minute.

66. since 1981, the output receptacles of the 3000 series machines included stacker wheels with flexible blades for depositing the processed bills in output receptacles.

67. The stacker wheel blades of the 3000 machines had limited flexibility in the radial direction but were more flexible in the lateral direction.

68. Since 1981, the 3000 series machines included a display device (printer) for showing the quantity of each processed denomination, together with the facing and orientation of the processed bills.

69. Since 1981 the 3000 series machines were capable of restacking bills

that had been denominated in a single stack, using a stacking mechanism comprising stacker wheels with a plurality of flexible blades.

70. Since 1981, the 3000 series machines included an output receptacle that, after processing an entire stack of bills, would contain a set of bills, all of whose denominations were known, including bills of plurality of denominations.

71. Since 1983, the De La rue 3100 series machines included an input receptacle for receiving currency bills of a plurality of denominations to be processed by the machines.

72. since 1983, the 3100 series machines transported bills from the input receptacle, one at a time, along a transport path.

73. Since 1987, the 3100 series machines automatically denominated bills of a plurality of U.S. denominations by using a correlation technique.

74. In order to perform the correlation technique for purposes of denomination since 1987, the 3100 series machines used information from either side of the United States currency.

75. Since 1987, the 3100 series machines denominated U.S. currency bills by detecting light reflected off of passing bills, generating a reflected light characteristic output signal in response to detected characteristic information, and generating a denomination signal in response to the reflected light characteristic information output signal.

76. Since 1987, the 3100 series machines that denominated U.S. currency, were sold and offered for sale in the U.S.

77. Some of the 3100 machines used the traditional magnetic head for pattern recognition. It was called the magnetic pattern detector. The data processing for the magnetic signal was identical to the optical signals, using correlation.

78. The 3100 could authenticate bills based on magnetic, metallic and ultraviolet light detection.

79. At De la rue we started using magnetoresistive heads as a substitute or an alternative to the traditional magnetic head, beginning in the mid to late 1980's.

80. The first De La Rue products using the magnetoresistive head were bank note counters.

81. The use of magnetoresistive heads over wound magnetic heads was a design choice and the artisan would have the necessary skill to embody either type of a detector for authenticating currency.

82. I have reviewed and studied U.S. patent No. 4,296,326 (the "'326 Patent"), issued to De la Rue in 1981.

83. John Haslop, the first named inventor on the '326 patent and I worked together at De la Rue on numerous projects relating to banknote security features and detectors throughout my career at De La Rue.

84. The '326 Patent describes one of the authenticity detectors used on the De la rue 3000 Series machines.

85. Figures 1, 7 and 8 of the '326 patent depict a drum arrangement that was used in the De la Rue 3000 series machines.

86. The disclosure of the '326 patent, col. 3, ll. 40-65, describes the drums that were used in the De La Rue 3000 machines.

87. The De la Rue 3000 series machines, as well as the De la Rue 3100, 3700 and 3200 machines all stored master characteristic information associated with two or more currency systems. Customers would often want to process currency from more than one country, as many banks handle foreign currencies. As an example, a bank close to the US-Canadian border would want a machine to process US currency and Canadian currency.

88. All machines referenced in paragraph 88 were always configured to

handle at least two currency systems, as they would process the national currency, but they would also be configured to process test currency, so that machines could be set-up, checked, serviced, etc. without the requirement for "live" currency.

89. The De La Rue 3000, 3100, 3200 and 3700 series machines included a currency system selection device for designating one of the at least two currency systems for which master characteristic patterns were stored. Selecting a process on any of these De la Rue machines selected a pattern set corresponding to a currency system.

90. Since 1990 the De La Rue 3200 and 3700 series machines included means to allow an operator to select a denomination. Having selected the denomination, the machine automatically sends sensitivity levels to the condition detectors (sort levels) and authentication detectors.

91. Since 1990 the De la Rue 3200 and 3700 series machines included means to allow an operator to select a process that allowed a currency system to be selected, i.e. a set of denominations. The process would define which of the set of denominations are to be accepted or rejected. The sensitivity levels associated with all the denominations selected are sent to the detector system. The pattern detector response determines which of the replies associated with the relevant sensitivity level is used to classify the bill, i.e. to determine whether the bill is an authentic example of the determined denomination, and whether the bill is deemed fit or unfit.

92. The "De La Rue 3000 User Guide" and "De La Rue 3000 Series Used Bank note sorting Machines Brochure," which describe the De La Rue 3000 Series of machines, were both published in 1981.

93. The De La Rue 3110 MK II machine, which was sold in the mid-late 1980's, combined the teachings of the "De La Rue 3100 Operator Instructions," The "3110 MK II & 3120 Software Configuration Procedure," the "De la Rue

3110 MK II Brochure," the "De La Rue 3100 Technical Manual, Appendix 2," and the "De La Rue 3110 MK2 Technical Manual." Based on my 20 years of experience at De La Rue dealing with these systems (see above), the various components depicted in these references were indeed designed to work together in the actual De La Rue 3110 Mk II machine, and one of ordinary skill in the art would understand the components described in these references to be compatible.

94. The De La Rue 3100 desktop machine was conceived and designed based on the success of De La Rue with the 3400 and 3500 large sorters and the two systems shared many similarities, including a similar currency denomination technique based on correlation. This is confirmed in the sentence contained within the document titled "At 8 P.M. Tonight", which is a promotional brochure for the 3100 and was created around the 1983 introduction date of the 3100 to the market. The sentence on the third page of the document reads, "Using the technology and understanding gained in developing the 3400 high speed sorting systems, De La Rue has built the 3100... a compact, currency fitness sorting machine..." confirming my knowledge and experience at De La Rue that the 3100 machine was based on the 3400 sorters and the two systems shared common technology.

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

Date: January 10th 2008

Paul D. Lacey