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To: Members of the Executive Board  
From: *The Secretary*  
Subject: Installation of the New Telephone System

The attached paper on the installation of the new Rolm telephone system is circulated to the Executive Directors in connection with the discussion of the mid-year budget review scheduled for Wednesday, December 14, 1983.

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Department Heads

INTERNATIONAL MONETARY FUND

Installation of the New Telephone System

(Prepared by the Administration Department)

December 9, 1983

Introduction

In January of this year the difficult task of introducing the new Rolm telephone system began. Although it was anticipated that the process of conversion to the new system would create some difficulties, the extent of the problems and the attendant frustrations and anxieties was not foreseen. This paper attempts to answer some of the questions which have been raised regarding the reasons why a change in telephone systems was required and the considerations that applied to the selection of the Rolm system.

Background

The Centrex II system was installed in the Fund and Bank in 1977. By 1981, a number of developments forced both organizations to consider changing the telephone system. First and foremost, the C&P Telephone Company informed the Fund and Bank that the Centrex II system was being phased out, which meant that additional or replacement equipment for the system would eventually become impossible to obtain. At the same time, both organizations were faced with the imminent prospect of having to install phones in buildings under construction. Coincidentally, wiring the building for the increasing demand for data transmission became more and more difficult. Since the Centrex II system could not be adapted to accommodate the Fund's data transmission needs, links between terminals and the computer required direct wiring, separately from the regular telephone wiring. Hence, telephone and data transmission wires were over time filling up to full capacity the underfloor ductwork of the Fund's Phase I building. This also made office moves very complicated, as moving terminals or moving a telephone extension number required a physical wiring change by technicians in overcrowded ducts. Finally, most of the advantages of emerging office automation technology (such as an electronic link between the Cable Room and message originators, and the electronic transmission of drafts and documents among departments) were inaccessible due to the lack of adequate data communications facilities.

In summary, circumstances required a new phone system to provide basic voice communication in Phase IIa, while the increasing demands for data transmission and the difficulty of meeting them with the existing telephone system made it necessary to consider both issues simultaneously.

In announcing the phasing out of Centrex II, the C&P Telephone Company had proposed to the Fund and Bank to replace it with two separate C&P Dimension systems. Because the deregulation of the telephone industry was generating rapid technological and pricing changes in a newly opened market, and because Fund staff had insufficient technical knowledge to evaluate the merits of the Dimension system vis-a-vis other telecommunications systems on the market, it was decided to hire the services of a consulting firm to evaluate our telecommunication needs. Eight firms were requested to submit proposals and, Arthur D. Little, a consulting firm with special expertise in the telecommunications field, was retained in February 1982. Its task was to analyze the Fund's telecommunications needs, recommend candidate systems for consideration, assist in preparing requests for bids, help to analyze the bids received from the vendors and, following selection of the vendor, to assist in contracting for, and installation of, the new system.

### Selection

The bids which were received covered a wide spectrum of equipment that differed significantly in terms of technological sophistication, price, and ability to meet the Fund's needs. The bids included "second" generation (Dimension, Rolm, and Northern Telecom), and "third" generation (Intecom IBX) equipment. <sup>1/</sup> The Consultants' preferred solution was to purchase a third generation system designed for fully integrated voice/data traffic. The next best solution recommended by the Consultants was a second generation system, either Rolm or Northern Telecom.

The two alternatives, Intecom IBX or a second generation system (Rolm or Northern Telecom) were carefully reviewed, particularly by the heavy data users in the Fund (BCS, STAT, TRE, and RES). Two recently installed Intecom IBX systems were examined in operation by some Fund staff members. Since this technology is just emerging, few systems, if any, are mature enough to be evaluated. While the Intecom IBX appeared impressive, it was nearly US\$2 million more costly than the "next best" alternative, and the real added value was not considered commensurate. Another consideration was that, with the ongoing competition, technical developments in this field will continue to progress rapidly and bring purchase prices down in future years. Therefore, the third generation system was rejected on the grounds that it was too expensive, and that it was too new to have been adequately tested.

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<sup>1/</sup> Telecommunications systems are classified in three broad categories: "first," "second," and "third" generations, referring to distinct levels of technological advancement. First generation (Centrex II) are electromechanical systems designed for analog voice transmission at about 9,600 bits per second (bps). They cannot handle voice and data transmission simultaneously. Second generation are electronic systems, still designed for analog voice transmission, but subject to significant enhancements to carry voice and data simultaneously at speeds up to 64,000 bps. Third generation are integrated voice/data digital systems designed for unlimited volumes of simultaneous voice/data traffic at speeds up to 64,000 bps.

Unanimous agreement was reached that a good second generation system should be installed, recognizing that it would probably meet Fund requirements for voice/data communications for the next five years. In this connection, considerable weight was given to the fact that the wiring network of second generation systems will serve any foreseeable third generation telecommunications system, including office automation.

The C&P Telephone Company's Dimension system, which is a very early second generation system, was rejected on both technical and cost grounds as it was the highest priced second generation proposal received, and less technologically advanced than either Rolm or Northern Telecom, especially in data communications capabilities. <sup>1/</sup> The possibility of expanding Centrex II in Phase IIa was also explored as a temporary measure to allow postponement of a decision on a more permanent solution. The C&P Telephone Company responded, however, that, since Centrex II was being phased out, they were not in a position to provide the equipment for Phase IIa in a timely fashion. Furthermore, the leasing cost of Centrex II was uncompetitive with the costs of purchasing either Rolm or Northern Telecom equipment.

Once the choice was narrowed down to two vendors (Rolm and Northern Telecom), a series of detailed discussions was conducted with each vendor in which staff from both Administrative Services and the Bureau of Computing Services participated, along with the consulting firm, Arthur D. Little. In the end, it was decided to award the contract to Rolm, based on the following considerations:

1. The system proposed by Rolm has more flexibility than that proposed by Northern Telecom. It features distributed processing (the main computer consists of multiple processors which can be physically separated) which is particularly advantageous in dealing with situations such as the off-premises International Square location.
2. Although the decision was primarily based on voice needs, it was felt that the Rolm system, being more advanced than that offered by Northern Telecom, is somewhat more adaptable to data use, and these adaptations can be achieved at less cost than with the Northern Telecom alternative.
3. Both companies offered various advanced features but Rolm had an edge with its voice messaging, which Northern Telecom did not offer.
4. Both systems required the installation of a battery room. However, the Rolm switchboard could function for a period of time, up to a 600 line capacity, on AC power. This was an important factor in achieving timely installation of telephones in Phase IIa, because a satisfactory battery room could not be built in time for the opening of Phase IIa.

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<sup>1/</sup> Since then, the Bank has installed the Dimension system in its new H Building, and has encountered numerous teething difficulties.

5. Rolm's regional headquarters was being moved to Tyson's Corner in January 1983, and a manufacturing facility is planned at Reston within the next few years. In addition, significant Rolm installations have been successfully made at MCI in Washington, at COMSAT in Gaithersburg, and in the White House. These factors suggest a serious commitment to this area and should go a long way to ensuring the best of maintenance and support.

6. The bids were very close in terms of cost. Based on the bid specifications, the total cost of the new system installed in both Phase I and Phase IIa will come to \$2.2 million, compared with \$2.3 million for Northern Telecom. In addition, Rolm management has agreed to operate the system under contract for a year or two, until the Fund is experienced enough and ready to take over the full operation.

#### Looking ahead

The conversion to the Rolm system, which was tied in with the office renovation and moving program, has taken longer than originally anticipated. This has had the effect of prolonging the technical problems arising from the parallel operation of two telephone systems and the tie lines linking them. Some of the early malfunctions were due to installation failures by the C&P Telephone Company and C&P has made the necessary corrections. Currently, almost two thirds of the Fund's offices have been converted to Rolm and it is expected that the changeover will be completed by mid-1984.

Meanwhile, a number of measures, including re-engineering and more stringent quality control, have already been undertaken to prevent failures. Other engineering measures are in the process of being implemented. For example, in many cases the coding of up to ten frequently called numbers (station speed calling) has been erased because of insufficient computer capacity. The system's capacity will be expanded in the coming weeks.

Improvements and changes to user features to meet Fund requirements are being introduced as rapidly as possible. For example, the Fund has recently received, for evaluation purposes, a few of the more advanced Rolm 400 telephone instruments which contain a number of enhancements, e.g., improved intercom and line status monitoring. Other instruments, introduced by Rolm only during the month of November, are also being studied with a view to better meeting Fund needs. It is expected that the development process will continue and the Fund will be in a position to avail itself of useful enhancements as they arise.