Directory of Telecommunication Services in Africa 1991
The Directory of Telecommunications Services is a joint publication of the American Association for the Advancement of Science, the International Development Research Centre and the United Nations Economic Commission for Africa Pan African Development Information System.

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Fax: +251 (1) 51 45 34 or +251 (1) 51 44 16 or +1(212) 963-4957

Other publications available from PADIS:

Devindex-Africa
Directory of Development Institutions in Africa
Directory of African Experts
PADIS Newsletter
Directory of Telecommunication Services in Africa

1991
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</table>
Three different organizations, an international organization based in Africa, a Canadian research funding institution, and an American scientific society concerned with science, technology and development in sub-Saharan Africa have worked together to publish this Directory of Telecommunications Services in Africa. Each of the partners took responsibility for different stages of its production.

International Development Research Centre

Through support for research, Canada's International Development Research Centre (IDRC) assists developing countries in creating their own long-term solutions to pressing development problems. Support is given directly to Third World institutions whose research focuses primarily on meeting the basic needs of the population and overcoming the problems of poverty. Research is undertaken by Third World recipients independently or, occasionally, in collaboration with Canadian partners.

Within the IDRC's Information Sciences Division, the Telematics Program has been promoting and supporting the development, testing, evaluation and use of data communication techniques in support of development and research objectives in developing countries. This has been done to promote informed decisions concerning the utilization of these techniques by developing-country institutions. While this Program was being managed out of IDRC's Regional Office for East and Southern Africa in Nairobi, Mr. Luvenme Mack Kigada was provided an internship to produce this Directory and to facilitate networking experiments being implemented in the region.

Since restructuring of IDRC in April 1992, the Policy Issues in Information Technology sub-program of the Information and Communication Technologies Program (Information Sciences and Systems Division) continues to be involved in activities which positively influence the appropriate use of information and communication technologies in support of sustainable and equitable development. If this Directory of Telecommunications Services in Africa proves useful, it will be important to define mechanisms for its continual updating and dissemination.

American Association for the Advancement of Science

Since its inception some five years ago the Sub-Saharan Africa Program of the American Association for the Advancement of Science (AAAS) has been active in facilitating access to scientific and technical information for scientists and scholars in the region. In addition to administering a Journal Distribution Program, AAAS has undertaken activities focused on electronic communications—encouraging pilot projects in networking and addressing key policy issues that significantly affect networking outcomes for African universities and research institutes. In preparation for the August 1992 AAAS-African Academy of Sciences Workshop on Science and Technological Communication Networks in Africa, data collected by IDRC for the Directory of Telecommunications Services were translated into a draft document as an agenda item for discussion during the workshop. Mr. Kigada carried out this task as an intern at AAAS during the summer of 1992 while undertaking graduate studies in the United States. In providing more "information on information" for use by African scientists and development specialists, and by their counterparts abroad, AAAS has benefited from its participation in a partnership that involves IDRC and PADIS.
Pan African Development Information System

The interest of the United Nations Economic Commission for Africa's Pan African Development Information System in this Directory emerges from the IDRC-funded project it has been implementing on "Computer Networking in Africa." One of the difficulties encountered in implementation of the project was the lack of easy access to information on telecommunications facilities, services and costs in each country. Thus, once the Directory had been compiled at IDRC and edited and printed at AAAS, PADIS was eager to facilitate its publication and distribution in order to make future networking in the Africa region easier.

The data in the Directory were collected in 1990 and 1991. There is no question that this information constantly changes. Thus, the Directory is being sent to all the telecommunications authorities listed (as well as to those not listed) with the request that they update the information on their respective countries for the Directory's next edition. PADIS would also very much want to receive comments from users of the Directory, to know whether its contents meet their needs for information on telecommunications in Africa. Comments on the specific fields chosen for data collection would be particularly welcome. PADIS is putting the directory into a machine readable database that will be used, on the basis of the revised inputs received, to produce future editions of the Directory.

A limited number of additional copies of the Directory are available free of charge upon request from PADIS at the address listed on the inside cover.

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United Nations Economic Commission for Africa
Addis Ababa, Ethiopia
Introduction

Until the late 1950s and early 1960s, most African nations were colonies, protectorates or dependencies of one of the European powers. The telecommunications infrastructure was limited to the capital cities and major towns, and telecommunication services were limited to telephones and telegraphs and tailored for the administration of those countries. The equipment used was of analog technology and almost all exchanges were manually operated and had limited hours of operation. One had to book a call through the operator since direct dialing was very limited. International telecommunications from each country were limited almost exclusively to links with the colonial power. Inter-African calls had to be routed through one or more switching centres in Europe, e.g., a call from Nairobi, Kenya to Dakar, Senegal had to be routed through London and Paris.

After attaining independence it became evident that there was a need to have direct international telecommunications, especially within Africa, without having to follow the long, complex and expensive transit route through one or more switching centres on another continent.

Most African countries then embarked on the task of creating a more efficient telecommunications network that would then extend to the remote areas. Regional and sub-regional organisations were formed for mutual cooperation in telecommunications. These include the Pan-African Telecommunications Union (PATU), the African Postal and Telecommunications Union (UAPT) and the Panafri can Telecommunications Network (PANAFTEL), which was conceived by the ITU.

Today telecommunication facilities are still concentrated in the major urban centres of Africa. Remote areas are still very isolated with some tracts of land having no telecommunications at all. The gap between supply and demand is still very large. It is not unusual to find more customers on the waiting list for a telephone line than there are existing telephone lines. Waiting time ranges from a few days to years. Inter-African communication is greatly hampered by:

- lack of financial resources, particularly foreign exchange;
- high cost of equipment;
- lack of standardized equipment making it difficult and complex to interface and operate the regional networks;
- limited choice of equipment because most equipment is limited by the country that is financing the purchase of the equipment (i.e., their national manufacturers);
- inadequate local trained personnel; and
- lack of spare parts which makes it almost impossible to maintain equipment.

Despite these obstacles inter-African telecommunications has developed considerably, especially in the past decade. This is mainly due to the introduction of earth stations for use with INTELSAT satellites. High frequency circuits now interconnect countries. Sea cables have been laid. Most countries are now installing digital equipment as the analog systems have been phased out by the suppliers.

There is a great demand for communication and information exchange among research organisations, educational institutions, non-governmental organisations, the business community, individuals and governments within the African continent. Organisations want to network electronically so they can communicate data to each other as opposed to telephony (i.e. by voice), where a lot of time is
wasted trying to locate the person for whom the message is intended). The reasons why organisations want to network using data communications include:

- ease of use;
- error-free communication;
- lower cost than other means of communication;
- a print-out of the data received or transmitted can be obtained;
- the received data can be edited or used by other programmes and;
- communication can be done at the time, rate and location of one's choice.

One of the obstacles facing these organisations wanting to network is a lack of information on existing and planned telecommunications infrastructure to assist them in planning and building a network for their communication needs.

This guide has been compiled to provide information to those networks and organizations interested in implementing data communications techniques (electronic messaging, conferencing, bulletin boards and specialized databases) on the existing and planned telecommunications infrastructure, costs and policies in each African country.

A questionnaire was sent from the International Development Research Centre (IDRC) to each African PTT in June 1990. This was followed up by telex between September and October 1990 where an answer was not received. A second copy of the questionnaire was subsequently sent to the PTT's that responded to the telex indicating they had not received the first questionnaire.

About thirty African PTT representatives were contacted personally during the Africa Telecom '90 exposition and forum held between 3rd and 9th December 1990 in Harare, Zimbabwe. Between January and June 1991 telexes and faxes were sent and telephone conversations held (where possible) to try to get the questionnaire filled and returned. It is hoped that in the future more PTT's will respond to subsequent questionnaires.

For more detailed information on any one country, contact should be made with the individual PTT's of that country.

Luvenme M. Kigada
Nairobi, June 1991.

N.B:
The answers have been reproduced as they were received. Information marked not available means there was no answer to the question. Omissions in answers mean that the question was not completely answered. No information has been added or omitted. Counter checking for typographical errors in the answers proved to be very difficult. It should be noted that some regulations are interpreted differently in separate countries. An example of this is the type approval of modems: some PTT's allow the use of any modem by any individual once it has been type approved, while some PTT's only type approve modems on an individual basis, whether it was type approved previously or not. This must be borne in mind when reading and interpreting the guide.
Main Directory
A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Office des Postes et Télécommunications (OPT) Direction Générale
COTONOU - Benin

Tel: +229 31 20 45
Telex: 5206 OFIPOSTEL
Fax: +229 31 38 43

Charges:
All charges are in CFA Francs (CFA) as of August 1990.

1 USD = CFA 248.700 (November 1990).

Installation:
• Residential
  deposit .................................. CFA 24,000
  connection fee .......................... CFA 36,000
• Business
  deposit .................................. CFA 60,000
  connection fee .......................... CFA 36,000
  Rent (fortnightly):
  Exchange with more than 2,000 subscribers .... CFA 4,100
  Exchange with less than 2,000 subscribers .... CFA 3,100
  A local call costs ....................... CFA 60

The waiting time after application for an installation averages one month.

A.1. International calls
International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day to a limited number of subscribers.

Examples of the cost of a one minute telephone call to:

- Addis Ababa, Ethiopia ............... CFA 2,420
- Dakar, Senegal ....................... CFA 960
- Nairobi, Kenya ....................... CFA 2,420
- London, England ..................... CFA 1,740
- New York, USA ....................... CFA 1,860
- Paris, France ......................... CFA 1,201

A.2. Leased lines
It takes one month after application to obtain a leased satellite line.

Charges:
Leasing a satellite line costs CFA 3,799,800 per month to U.S.A., and CFA 1,944,000 per month to Europe.

A.3. Mobile telephones
There are no mobile telephone services available.

B. Text services
Applications for data/text services should be addressed to:

Office des Postes et Télécommunications (OPT) Direction Générale
COTONOU - Benin

Tel: +229 31 20 45
Telex: 5206 OFIPOSTEL
Fax: +229 31 38 43

B.1. Telex services
It takes approximately two months after application to receive a telex line. There are restrictions on a customer in terms of purchasing the brand of teleprinter.

Charges:
Installation ......................... CFA 60,000
Deposit .............................. CFA 20,000
Voltage stabilizer ................. CFA 40,000
Rent fortnightly ..................... CFA 110,000
The rent includes maintenance.

Examples of the cost of a one minute telex to:

- Addis Ababa, Ethiopia ............... CFA 1,606
- Dakar, Senegal ....................... CFA 437
- Nairobi, Kenya ....................... CFA 1,606
- London, England ..................... CFA 1,606
- New York, USA ....................... CFA 2,100
- Paris, France ......................... CFA 875

B.2. Telefax
There are no restrictions on the purchase of fax machines

Charges:
An approval fee is charged for each fax machine.

C. Modems
Presently all modems must be supplied by the OPT. Modems can work reliably at speeds up to 9600 bps at the national level. The charges for installing a modem vary according to the nature of the work and equipment involved.

D. Bulletin Boards/Electronic Mail
Information not available.
Benin (continued)

E. Public Data Networks

Information not available.

F. ISDN

Information not available.

A. Telephone Facilities:

Applications for a telephone installation should be addressed to any Botswana Telecommunications Corporation (BTC) office.

Botswana Telecommunications Corporation (BTC)
P.O. Box 700
GABORONE - Botswana

Tel: +267 35 80 00
Telex: (0962) 2252 BD

Charges:
All charges are in Botswana Pula (P) as of January 1991.

1 USD = P 1.8341 (November 1990).

Installation .................. P 183
Rent per quarter ............ P 50

A local six minute call costs P 0.20

Dialing is initiated by either pulse or tone. The waiting time after application for an installation is three weeks where a line plant is available.

A.1. International Calls

International calls are operator assisted. The service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

Addis Ababa, Ethiopia .......... P 8.57
Dakar, Senegal ................ P 8.57
Nairobi, Kenya ............... P 8.25
London, England ............ P 5.45
New York, USA .............. P 7.06
Paris, France ............... P 7.06

A.2. Leased lines

Leased local lines are available and take 21 days after application to obtain. Leased satellite lines are not available.

Charges:

Local leased lines cost between P 66 and P 900 per quarter depending on the distance.

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text services

Applications for data/text services should be addressed to any BTC office.

Botswana Telecommunications Corporation (BTC)
P.O. Box 700
GABORONE - Botswana

Tel: +267 35 80 00
Telex: (0962) 2252 BD

B.1. Telex services

It takes about 21 days after application to receive a telex line. Telex machines must be leased from the BTC.

Charges:

installation ................. P 450
Rent per quarter ............ P 480

Examples of the cost of a one minute telex to:

Addis Ababa, Ethiopia .......... P 8.25
Dakar, Senegal ................ P 8.25
Nairobi, Kenya ............... P 5.30
London, England ............ P 7.00
New York, USA .............. P 8.25
Paris, France ............... P 7.00

B.2. Teletax

There are no restrictions on the purchase of fax machines.

BTC leases fax machines.

Charges:

Leasing a fax from the BTC
Per quarter .................. P 540

C. Modems

There are no restrictions on the purchase of modems. Modems can reliably work at speeds up to 9600 bps at the national level.
Botswana (continued)

D. Bulletin Boards/ Electronic Mail

There are no bulletin boards or electronic mail services available. An approval is necessary before one can install and operate a BBS/E-Mail service.

E. Public Data Networks

There are no data switching facilities available. It is intended to implement packet switching services in late 1991.

F. ISDN

Plans are underway to introduce ISDN in 1994/95.

Cape Verde

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

C.T.T.-E.P.
Commercial Director
P.O. Box 220
PRAIA - Cape Verde

Tel: +238 61 33 15
Telex: +993 6086
Fax: +238 61 37 25

Charges:
All charges are in Cape Verde Escudos (CVE) as of December 1990.

1 USD = CVE 65.880 (November 1990).

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge, CVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>15,000</td>
</tr>
<tr>
<td>Rental</td>
<td>3,000</td>
</tr>
<tr>
<td>A local call costs</td>
<td>4.5</td>
</tr>
</tbody>
</table>

A.2. Leased lines

Leased local lines are available one week after application. Leased satellite lines are available two to four weeks after application.

Charges:
The cost of local leased lines varies considerably from island to island. A leased satellite line to the U.S.A. or Europe costs CVE 512,000

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text services

Applications for data/text services should be addressed to:

C.T.T.-E.P.
Commercial Director
P.O. Box 220
PRAIA - Cape Verde

Tel: +238 61 33 15
Telex: +993 6086
Fax: +238 61 37 25

B.1. Telex services

The time it takes to receive a telex line varies. There are no restrictions on purchasing telex equipment.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge, CVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>15,000</td>
</tr>
<tr>
<td>Rental</td>
<td>3,000</td>
</tr>
</tbody>
</table>

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Charge, CVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>350</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>350</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>350</td>
</tr>
<tr>
<td>London, England</td>
<td>350</td>
</tr>
<tr>
<td>New York, USA</td>
<td>470</td>
</tr>
<tr>
<td>Paris, France</td>
<td>350</td>
</tr>
</tbody>
</table>
Cape Verde (continued)

B.2. Telefax

There is no restriction on the purchase of fax machines and there are no special fees associated with the use of fax machines.

C. Modems

Modems can reliably work to a speed of 9600 bps at the national level.

D. Bulletin Boards/ Electronic Mail

Information not available.

E. Public data networks

There are no data switching facilities available in the country.

F. ISDN

Information not available.

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Direction Générale ONPT
Service Gestion Abonnés QNP
N'DJAMENA - Chad

Tel: +235 51 20 80
Telex: 5256 KD
Fax: +235 51 27 10

Charges:

All charges are in CFA Francs (CFA) as of August 1990.

1 USD = CFA 248.700 (November 1990)

Installation:
Private .................. CFA 108,700
Business ................. CFA 83,700
Rent fortnightly ......... CFA 5,100
A local call costs ......... CFA 100

The waiting time after application for an installation is one month.

A.1. International Calls

Direct dialing is available to France only. The rest of international calls are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

Addis Ababa, Ethiopia ...... CFA 2,175
Dakar, Senegal .............. CFA 975
Nairobi, Kenya ............. CFA 2,175
London, England ........... CFA 1,500
New York, USA ............. CFA 1,925
Paris, France .............. CFA 1,000

A.2. Leased lines

Local and satellite leased lines are available.

Charges:
A local leased line costs ...... CFA 108,700

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text services

Applications for data/text services should be addressed to:

Société des Télécommunications Internationales du Chad (TTI)
B.P. 1132
N'DJAMENA - Chad

Tel: +235 51 57 82
Telex: 52 000 KD
Fax: +235 51 50 66

B.1. Telex services

It takes approximately a month after application to receive a telex line. All telex machines must be leased from the telecommunications authority.

Charges:
Installation (deposit included) .......... CFA 320,000
Rent .......................... CFA 40,000

Examples of the cost of a one minute telex call to:

Addis Ababa, Ethiopia .......... CFA 1,650
Dakar, Senegal ................. CFA 700
Nairobi, Kenya ................ CFA 1,650
London, England .............. CFA 1,125
New York, USA ............... CFA 1,450
Paris, France ................. CFA 750
Chad (continued)

B.2. Telefax

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>CFA 120,000</td>
</tr>
<tr>
<td>Deposit</td>
<td>CFA 200,000</td>
</tr>
<tr>
<td>Rent including service</td>
<td>CFA 40,000</td>
</tr>
</tbody>
</table>

C. Modems

Modems can reliably work at speeds from 300 up to 9600 bps.

D. Bulletin boards/ Electronic mail

There are no BBS's or E-Mail services available.

E. Public Data Networks

The data switching facilities available in Chad are both circuit and packet switching. Chad does not have its own data switch but acts as a remote node of France. There are five towns N'djamena, Sarh, Abeche, Moundou and Fay connected to the packet switching facility.

Charges:

Installation: There are no installation charges.

Usage:

- **UAPT countries**: Per hour CFA 4,500, Plus per kilo segment CFA 2,400
- **France**: Per hour CFA 5,700, Plus per kilo segment CFA 2,700
- **Europe**: Per hour CFA 6,600, Plus per kilo segment CFA 3,600
- **Other countries**: Per hour CFA 10,200, Plus per kilo segment CFA 5,700

F. ISDN

Information not available.

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A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Service des abonnements (Comptabilité Téléphonique)
OPT BP 5000
MORONI - Comoros

Tel: +269 73 06 10
Telex: 241 PUBLIC KO

Charges:

All charges are in Comoro Franc (KMF) as of July 1990.

1 USD = 248.700 KMF (November 1990)

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>KMF 35,250</td>
</tr>
<tr>
<td>Rental fee</td>
<td>KMF 1,875</td>
</tr>
<tr>
<td>A local call cost</td>
<td>KMF 75</td>
</tr>
</tbody>
</table>

The waiting time after application for an installation is one week.

A.1. International Calls

International calls are operator assisted. This service is available 18 hours per day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>KMF 2,250</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>KMF 1,000</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>KMF 2,500</td>
</tr>
<tr>
<td>London, England</td>
<td>KMF 1,400</td>
</tr>
<tr>
<td>New York, USA</td>
<td>KMF 2,250</td>
</tr>
<tr>
<td>Paris, France</td>
<td>KMF 1,000</td>
</tr>
</tbody>
</table>

A.2. Leased lines

Local and satellite leased lines are not available.

A.3. Mobile telephones

Mobile telephone services are not available.

B. Text services

Applications for data/text services should be addressed to:

Service des abonnements (Comptabilité Téléphonique)
OPT BP 5000
MORONI - Comoros

Tel: +269 73 06 10
Telex: 241 PUBLIC KO
Comoros (continued)

B. 1. Telex services
It takes ten days after application to receive a telex line.

Charges:
- Installation: KMF 225,000
- Rent: KMF 22,500 (including maintenance).

Examples of the cost of a one minute telex to:
- Addis Ababa, Ethiopia: KMF 1850
- Dakar, Senegal: KMF 1800
- Nairobi, Kenya: KMF 1900
- London, England: KMF 1500
- New York, USA: KMF 1900
- Paris, France: KMF 1500

B. 2. Telefax
Information not available.

A. Telephone Facilities
Applications for a telephone installation should be addressed to:

Affaires Commerciales des Télécommunications
Direction des Télécommunications ONPT
BP 703
BRAZZAVILLE - Congo
Tel: +242 83 16 86
Telex: OFIPOSTEL 5208 KG
Fax: +242 83 59 38

Charges:
All charges are in CFA Francs (CFA) as of August 1990.

1 USD = CFA 248.700 (November 1990).

<table>
<thead>
<tr>
<th>Installation</th>
<th>CFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>71,750</td>
</tr>
<tr>
<td>ONPT Agent</td>
<td>36,750</td>
</tr>
</tbody>
</table>

Rental:
- Main exchange: CFA 5,960
- Other exchanges: CFA 8,190
- A local call costs: CFA 70

The waiting time after application for an installation is 15 days.

A. 1. International Calls
International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

C. Modems
Information not available.

D. Bulletin boards/ Electronic mail
There are no BBS or E-Mail systems available.

E. Public data networks
There are no data networks available.

F. ISDN
Information not available.

Examples of the cost of a one minute telephone call to:
- Addis Ababa, Ethiopia: CFA 1,750
- Dakar, Senegal: CFA 910
- Nairobi, Kenya: CFA 2,800
- London, England: CFA 1,750
- New York, USA: CFA 2,800
- Paris, France: CFA 1,400

A. 2. Leased lines
Local leased lines are available and take 45 days after application to receive. Leased satellite lines are available, and delivery depends on supply.

Charges:
The cost of a leased local line depends on distance.

A. 3. Mobile telephones
There are no mobile telephone services available.

B. Text services
Applications for data/text services should be addressed to:

Affaires Commerciales des Télécommunications
Direction des Télécommunications ONPT
BP 703
BRAZZAVILLE - Congo
Tel: +242 83 16 86
Telex: OFIPOSTEL 5208 KG
Fax: +242 83 59 38
Congo (continued)

B.1. Telex services

It takes 15 days after application to receive a telex line. There are restrictions on a customer in purchasing the brand of teleprinter.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost (CFA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>336,000</td>
</tr>
<tr>
<td>ONPT/SPE5</td>
<td>175,000</td>
</tr>
<tr>
<td>ONPT/TX20</td>
<td>210,000</td>
</tr>
<tr>
<td>Private/SPE5</td>
<td>105,000</td>
</tr>
<tr>
<td>Private/TX20</td>
<td>140,000</td>
</tr>
</tbody>
</table>

Note:

SPE5 and TX20 are teleprinter models. ONPT means the teleprinter belongs to ONPT. Private means the teleprinter belongs to the client.

Examples of the cost of a one minute telex to:

- Addis Ababa, Ethiopia: CFA 2,000
- Dakar, Senegal: CFA 500
- Nairobi, Kenya: CFA 2,000
- London, England: CFA 1,500
- New York, USA: CFA 2,000
- Paris, France: CFA 1,000

B.2. Telefax

There are no restrictions on the purchase of a fax machine. Fax machines can be leased from ONPT.

C. Modems

Clients must supply their own modems. Modems work reliably at speeds up to 4800 bps at the national level.

D. Bulletin Boards/ Electronic Mail

There are no BBS's or E-Mail services available.

E. Public Data Networks

There are no data switching facilities available in Congo, but plans are underway to introduce them in the near future.

F. ISDN

Information not available.

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Ethiopia Telecommunications Authority (ETA)
P.O. Box 1047
ADDIS ABABA - Ethiopia

Tel: +251 1 51 05 00
Telex: 21000 GENTEL ET
Fax: +251 1 51 57 77

Charges:

1 USD = EB 2.057 (May 1991).

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost (EB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>126.50</td>
</tr>
<tr>
<td>Rent</td>
<td>5.00</td>
</tr>
<tr>
<td>A local call costs</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Dialing is initiated by either pulse or tone. The waiting time after application for an installation is 15 days in principle but can take as long as two years.

A.1. International Calls

International calls are operator assisted. This service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Location</th>
<th>Cost (EB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakar, Senegal</td>
<td>6.55</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>3.70</td>
</tr>
<tr>
<td>London, England</td>
<td>7.85</td>
</tr>
<tr>
<td>New York, USA</td>
<td>10.00</td>
</tr>
<tr>
<td>Paris, France</td>
<td>7.35</td>
</tr>
</tbody>
</table>

A.2. Leased lines

Leased local lines are available while leased satellite lines are not available.

Charges:

Information not available.

A.3. Mobile telephones

There are no mobile telephone services available.
Ethiopia (continued)

B. Text services

Applications for data/text services should be addressed to:

Ethiopia Telecommunications Authority (ETA)
P.O. Box 1047
ADDIS ABABA - Ethiopia
Tel: +251 1 51 05 00
Telex: 21000 GENTEL ET
Fax: +251 1 51 57 77

B.1. Telex services

Telex machines must be leased from the Ethiopia Telecommunications Authority.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>EB 1,490.00</td>
</tr>
<tr>
<td>Rent</td>
<td>EB 145.00</td>
</tr>
</tbody>
</table>

Examples of the cost of a one minute telex to:

- Nairobi, Kenya: EB 3.70
- New York, USA: EB 10.00
- Paris, France: EB 7.50

B.2. Telefax

The purchase of fax machines is restricted to certain brands. All fax machines must be type approved. This takes a week to obtain and is free of charge.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lease from ETA</td>
<td>EB 4770.00</td>
</tr>
<tr>
<td>Service per month</td>
<td>EB 25.00</td>
</tr>
</tbody>
</table>

C. Modems

Modems must be leased from the ETA. Modems can reliably work at speeds up to 4800 bps at the national level. Speeds of 9600 bps are possible on leased lines.

Charges:

- Installation: Between EB 3,200 and EB 9,264 depending on the speed.
- Rental: Between EB 59 and EB 154 per month depending on the speed.

Service charges are included.

D. Bulletin Boards/ Electronic Mail

There are no bulletin boards or electronic mail services available.

E. Public Data Networks

There are no public data networks operating in the country.

F. ISDN

There are plans to introduce ISDN after 1996.

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Agence Commerciale des Télécommunications
B.P. 20.000
LIBREVILLE - Gabon

Tel: +241 74 19 00

Charges:

All charges are in CFA Francs (CFA) as of February 1991.

1 USD = CFA 248.700 (November 1990).

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>CFA 54,600</td>
</tr>
<tr>
<td>Rental fee</td>
<td>CFA 4,950</td>
</tr>
</tbody>
</table>

A local call costs CFA 65 for three minutes. Dialing is initiated by pulse and tone. The waiting time after application for an installation varies.

A.1. International Calls

International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

- Addis Ababa, Ethiopia: CFA 1,950
- Dakar, Senegal: CFA 650
- Nairobi, Kenya: CFA 3,900
- London, England: CFA 1,650
- New York, USA: CFA 3,900
- Paris, France: CFA 1,300
A.2. Leased lines
Leased local lines are available after application as soon as possible, and leased satellite lines are also available.

Charges
Information not available.

A.3. Mobile telephones
Cellular mobile telephone services are available.

Charges
- Installation: CFA 97,500
- Rental fee: CFA 126,750

B. Text services
Applications for data/text services should be addressed to:
Agence Commerciale des Télécommunications
B.P. 20.000
LIBREVILLE - Gabon
Tel: +241 74 19 00

B.1. Telex services
The time it takes to receive a telex line after application varies. All telex machines must be leased from the PTT.

Charges:
- Installation: CFA 54,600
- Rental: Depending on the type of machine, CFA 65,600 to CFA 111,150

Examples of the cost of a one minute telex to:
- Addis Ababa, Ethiopia: CFA 4,290
- Dakar, Senegal: CFA 1,365
- Nairobi, Kenya: CFA 6,630
- London, England: CFA 5,290
- New York, USA: CFA 5,460
- Paris, France: CFA 5,260

B.2. Telefax
Fax machines must be leased from the PTT.

C. Modems
There is no restriction on the purchase of modems although all modems must be type approved by the PTT. Modems can be leased from the telecommunications authority and can reliably work from speeds of 300 up to 4800 bps at the national level.

Charges
Information not available.

D. Bulletin Boards/ Electronic Mail
Information not available.

E. Public Data Networks
Gabon has its own data switch called GABON-PAC. This is a packet switched network using the X.25 and X.75 protocols. Currently there are national nodes in Libreville and Port Gentil. It is intended to expand the network throughout Gabon to include an electronic message directory and offer telematic services for professional users.

There are services to almost all countries with public data networks.

Charges:
Information on charges can be obtained by writing directly to the address on the previous page.

F. ISDN
There are plans to introduce ISDN in the year 1999.
**Ghana (continued)**

**Installation** .......................... Ce 70,000  
**International direct dialing line** .......................... Ce 200,000  

**Rent:**  
Business (per annum) ........ Ce 600  
Residential (per annum) .......... Ce 6,700  
A local call costs .......... Ce 20  

Dialing is initiated by pulse or tone. The waiting time after application for an installation is four weeks.  

**A.1. International calls**  
International calls are operator assisted or can be dialled directly. The operator-assisted service is available 24 hours a day.  

Examples of the cost of a one minute telephone call to:  
- Addis Ababa, Ethiopia ........ Ce 1,200  
- Dakar, Senegal ........ Ce 600  
- London, England ........ Ce 720  
- New York, USA .......... Ce 720  
- Paris, France .......... Ce 1,000  

**A.2. Leased lines**  
Leased local lines are available. Leased satellite lines are available four weeks after application.  

Examples of the cost of a one minute telephone call to:  
- Addis Ababa, Ethiopia ........ Ce 1,200  
- Dakar, Senegal ........ Ce 600  
- London, England ........ Ce 720  
- New York, USA .......... Ce 720  
- Paris, France .......... Ce 1,000  

**A.3. Mobile telephones**  
There are no mobile telephone services available.  

**B. Text services**  
Applications for data/text services should be addressed to:  
The Director General  
External Telecoms Services  
P&T Headquarters  
ACCRA North - Ghana  
Tel: +233 22 66 60  
Telex: 30 10 ENGHQ GH  

**B.1. Telex services**  
A telex line is available four weeks after application. There is no restriction on the purchase of telex machines. These can also be purchased from the telecommunications authority.  

**Charges:**  
Information on installation and rental charges is not available.  

Examples of the cost of a one minute telex to:  
- Addis Ababa, Ethiopia ........ Ce 497  
- Dakar, Senegal ........ Ce 587  
- Nairobi, Kenya ........ Ce 663  
- London, England ........ Ce 302  
- New York, USA .......... Ce 517  
- Paris, France .......... Ce 517  

**B.2. Telefax**  
There are no restrictions on the purchase of fax machines though they must be type approved. The type approval takes 24 hours to obtain and costs Ce 9,000. There is the possibility of purchasing fax machines from the telecommunications authority.  

**C. Modems**  
The telecommunications authority is planning on standardising matters related to modems. Modems can reliably work to a speed of 2400 bps at the national level.  

**Charges:**  
Not yet determined.  

**D. Bulletin Boards/ Electronic Mail**  
There are no BBS’s or E-mail services operating in the country.  

**E. Public Data Networks**  
There are no data switching facilities available in the country. The administration is planning on introducing packet switching services in the next project phase, i.e., 1994-1998.  

**F. ISDN**  
ISDN will be introduced in the near future.
A. Telephone Facilities

Applications for a telephone installation should be addressed to the nearest sales office or to:

The Manager
Marketing Sales Public Relations Office
P.O. Box 30301
NAIROBI - Kenya

Tel: +254 2 22 74 01
Telex: 22 40 6 EXTEL KE

Charges:
All charges are in Kenya Shillings (Ksh) as of February 1991.

1 USD = Ksh 27.90 (June 1991).

Automatic Exchange:
Installation: Ksh 1056.60
Deposit: Ksh 654.50
Rental: Ksh 90.80

Manual Exchange:
Installation: Ksh 683.10
Deposit: Ksh 410.50
Rental: Ksh 78.70

A local three minute call costs Ksh 1.50.

Dialing is initiated by pulse or tone (on digital exchanges). The waiting time after application for an installation varies and depends on the availability of spare lines.

A.1 International Calls

International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

Addis Ababa, Ethiopia Ksh 63.25
Dakar, Senegal Ksh 94.30
London, England Ksh 94.30
New York, USA Ksh 94.30
Paris, France Ksh 94.30

A.2 Leased lines

Leased local lines are available and take three weeks after application to obtain, leased satellite lines are available as soon as required.

Charges
The cost of leasing a local line varies with distance and routing.

Installation: Ksh 3,190

Leased telephone lines:
U.S.A. or Europe
Per month: Ksh 66,000

An Alternate Voice/Data (AVD) line:
U.S.A. or Europe
Per month: Ksh 75,625

A.3. Mobile telephones

Mobile cellular telephone services will be introduced in 1993 to the following towns: Eldoret, Kabarnet, Kericho, Kisumu, Malindi, Mombasa, Nairobi, and Thika.

Charges
Installation: Ksh 500
Deposit: Ksh 20,000
Registration: Ksh 1,660

Purchase Price:
Hand held set: Ksh 40,000
Car mounted set: Ksh 25,000

A local call will cost Ksh 5 per three minute call.

B. Text services

Applications for data/text services should be addressed to the nearest sales office or to:

The Manager
Marketing Sales Public Relations Office
P.O. Box 30301
NAIROBI - Kenya
Tel: +254 2 22 74 01
Telex: 22 40 6 EXTEL KE

B.1. Telex services

It takes about a month to receive a telex line after application. All telex machines must be leased from the telecommunications authority.

Charges:
Installation: Ksh 4,598.00
Deposit: Ksh 3,921.50
Rental: Ksh 2,612.50

Examples of the cost of a one minute telex to:

Addis Ababa, Ethiopia Ksh 47.15
Dakar, Senegal Ksh 63.25
London, England Ksh 79.35
New York, USA Ksh 79.35
Paris, France Ksh 79.35

B.2. Telefax

There is no restriction on the purchase of a fax machine although all fax machines must be type approved by the Kenya Posts and Telecommunications Corporation. This takes about a week to obtain.
Kenya (continued)

Charges

Type approval: .................. Ksh 2,500.00

C. Modems

There is no restriction on the purchase of modems although all modems must be type approved by the Kenya Posts and Telecommunications Corporation. A list of type approved modems can be obtained from the postal authorities of Kenya. These type approved modems can be used without restriction by paying a fee of Ksh 9,867.50. Modems can reliably work from speeds of 300 up to 2400 bps. The packet switching lines are reliable up to 9600 bps.

Charges for modems supplied by KPTC.
Installation .................. Ksh 4,598.00
Rental .................. Ksh 1,078.00
(Service included)

Type approval:
New type approval: .................. Ksh 19,635.00
Already approved: .................. Ksh 9,817.50

D. Bulletin Boards/ Electronic Mail

There are no BBS's or E-Mail services available.

E. Public Data Networks

Kenya has its own data switch called KENPAC. This is a packet switched network using the X.25 and X.75 protocols. Currently there are national nodes in Kisumu, Mombasa, Nairobi, Nakuru and Nyeri. There are services to Canada, United Kingdom and the U.S.A.

Charges:
All Charges are on a per line basis.

Dedicated Access:

A. 300-1200 bps
Installation .................. Ksh 2,985
Deposit .................. Ksh 10,000
Rental fee .................. Ksh 800

B. 2400-4800 bps
Installation .................. Ksh 2,985
Deposit .................. Ksh 15,000
Rental fee .................. Ksh 2,000

C. 9600 bps
Installation .................. Ksh 2,985
Deposit .................. Ksh 25,000
Rental fee .................. Ksh 9,000

Private dial-up access:
A. 300-1200 bps
Installation .................. Ksh 1,400
Deposit .................. Ksh 10,000
Rental fee .................. Ksh 120

B. 2400-4800 bps
Installation .................. Ksh 1,400
Deposit .................. Ksh 15,000
Rental fee .................. Ksh 300

Public dial-up access:
A. 300-2400 bps
Installation .................. Ksh 900
Deposit .................. Ksh 15,000
Rental fee .................. Ksh 80

B. 4800-9600 bps
Installation .................. Ksh 900
Deposit .................. Ksh 25,000
Rental fee .................. Ksh 80

NOTE:
I. Deposits: In the case of more than one connection, each additional connection will attract only 50% of the deposit.

II. Access charges via PSTN are, as per the prevailing unit local telephone charge, currently Ksh 1.50 for both private and public dial-up.

III. International Charges: Initially all calls will be charged at the same rate of Ksh 340 per kilosegment and Ksh 340 per hour.

IV. Modems: Installation and rental charges are only applicable to KPTC owned modems.

For further information contact:

Kenpac Customer Advisory Centre
Kenya Posts & Telecommunications Corporation
P.O. Box 30301
NAIROBI - Kenya

Tel: +254 2 22 74 01 Ext. 2514/5
Telex: 22 24 5
Fax: +254 2 33 67 81

F. ISDN

There are no plans to introduce ISDN in the near future.
A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Lesotho Telecoms
Sales office
P.O. Box 7387
MASERU - Lesotho

Tel: +266 1 32 42 11
Telex: 4236 LO
Fax: +266 1 31 00 74

Charges:

All charges are in Maloti (M) as of December 1990.

1 USD = M 2.530 (November 1990).

| Installation | M 260.00 |
| Deposit      | M 72.00  |
| Rent         | M 15.00  |
| A local call costs | M 0.15 |

Dialing is initiated by tone and pulse. The waiting time after application for an installation is about 30 days but depends on the availability of plant.

A.1. International calls

International calls are operator assisted or can be dialed directly. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Location</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>7.20</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>7.20</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>5.40</td>
</tr>
<tr>
<td>London, England</td>
<td>9.00</td>
</tr>
<tr>
<td>New York, USA</td>
<td>10.80</td>
</tr>
<tr>
<td>Paris, France</td>
<td>9.00</td>
</tr>
</tbody>
</table>

A.2. Leased lines

Leased local lines are available five days after application. Leased satellite lines are also available.

Charges:

The cost of a local leased line is:

| Installation | M 2,000.00 |
| Rent         | M 780.00  |

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text services

Applications for data/text services should be addressed to:

Lesotho Telecoms
Sales office
P.O. Box 7387
MASERU - Lesotho

Tel: +266 1 32 42 11
Telex: 4236 LO
Fax: +266 1 31 00 74

B.1 Telex services

A telex line is available approximately five days after application. All telex services are rented from the PTC.

Charges:

| Installation | M 1,200.00 |
| Line provision | M 332.00 |
| Rental of electronic type | M 120.00 |

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>Location</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>7.20</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>7.20</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>5.40</td>
</tr>
<tr>
<td>London, England</td>
<td>9.00</td>
</tr>
<tr>
<td>New York, USA</td>
<td>10.80</td>
</tr>
<tr>
<td>Paris, France</td>
<td>9.00</td>
</tr>
</tbody>
</table>

B.2. Telefax

Fax machines purchased by a customer must be type approved. The type approval takes on average one day and costs about M 10 depending on the quotation prepared when diagnosing the different parameters and changing certain accessories.

Charges:

Fax machines rented from LTC:

| Installation | M 3,015.00 |
| Rent         | M 150.00  |

Service is included in rental fee.

C. Modems

Modems purchased by a customer must be type approved. The type approval takes one day and costs about M 10.00. Modems can reliably work to a speed of 4800 bps at the national level.

Charges:

Modems supplied by PTC.

| Installation | M 400.00 |
| Rent         | M 150.00 |

Modems supplied by customer.

| Installation | M 275.00 |
| Deposit     | M 72.00  |
| Rent        | M 100.00 |


Lesotho (continued)

D. Bulletin Boards/ Electronic Mail

An E-mail service is currently being implemented.

E. Public Data Networks

There are no data switching facilities available.

F. ISDN

There are no plans to introduce ISDN in the near future.

Madagascar

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Monsieur Le Directeur des Télécommunications
Ministère des P.T.T.
ANTANANARIVO - Madagascar

Tel: +261 2 21 65 6
Telex: 22 250
Fax: +261 2 29 51 7

Charges:

All charges are in Madagascar Francs (FMG) as of May 1990.

1 USD = FMG 1316.54 (November 1990).

Installation (min.) . . . . . . . FMG 69,000
Fixed charge (min.) . . . . . FMG 4,025
Rent (min.) . . . . . . . . . . FMG 4,600
(includes maintenance)

A local call costs FMG 115 per unit.

Dialing is initiated by pulse or tone. It takes two weeks after application to obtain a telephone.

A.1. International calls

International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

Addis Ababa, Ethiopia . . . . FMG 7,850
Dakar, Senegal . . . . . . . FMG 7,680
Nairobi, Kenya . . . . . . . FMG 5,125
London, England . . . . . FMG 9,965
New York, USA . . . . . . . FMG 12,440
Paris, France . . . . . . . FMG 5,350

A.2. Leased lines

Leased satellite lines are available and take approximately a month after application to obtain. The time it takes to obtain one is largely determined by the terrain of the project. Requests for local leased lines are very rare.

Charges

Leased line to U.S.A. . . . . . . . FMG 40,070
Leased line to France . . . . . . FMG 20,000

A.3. Mobile telephones

Mobile telephone services are not available.

B. Text services

Applications for data/text services should be addressed to:

Monsieur Le Directeur des Télécommunications
Ministère des P.T.T.
ANTANANARIVO - Madagascar

Tel: +261 2 21 65 6
Telex: 22 250
Fax: +261 2 29 51 7

B.1. Telex services

It takes about two weeks after application to receive a telex line. The purchase of telex machines is restricted to certain brands.

Charges:

Machines supplied by the PTT:

A. SPE Type of telex machine.

Installation . . . . . . . . . . FMG 2,128,960
Rent . . . . . . . . . . . . . . . . FMG 1,527,360
Maintenance . . . . . . . . . . FMG 75,680

B. TX-20 Type of telex machine.

Installation . . . . . . . . . . FMG 4,575,560
Rent . . . . . . . . . . . . . . . . FMG 3,566,560
Maintenance . . . . . . . . . . FMG 177,600
Madagascar (continued)

C. TX-35 Type of telex machine.
Installation ................. FMG 5,430,560
Rent ......................... FMG 4,279,200
Maintenance ................. FMG 213,920

Machines supplied by the subscriber:
A. SPE Type of telex machine.
Installation ................. FMG 371,680
Rent ......................... FMG 305,600
Maintenance .................. FMG 213,920

B. TX-20 Type of telex machine.
Installation ................. FMG 473,600
Maintenance .................. FMG 712,800

C. TX-35 Type of telex machine.
Installation ................. FMG 504,920
Maintenance .................. FMG 855,360

Examples of the cost of a one minute telex to:
Addis Ababa, Ethiopia .... FMG 6,595
Dakar, Senegal .......... FMG 1,875
Nairobi, Kenya .......... FMG 6,595
London, England .. FMG 7,910
New York, USA .......... FMG 8,345
Paris, France .......... FMG 4,020

B.2. Telefax
There is no restriction on the purchase of a fax machine although all fax machines must be type approved by the PTT. The PTT does not lease fax machines but offers a maintenance service.

Examples of the cost of a one minute telephone call to:
Addis Ababa, Ethiopia .... K 3.00
Dakar, Senegal .......... K 4.00
Nairobi, Kenya .......... K 3.00
London, England .... F 5.00
New York, USA .......... K 5.00
Paris, France .......... K 5.00

A. Telephone Facilities
Applications for a telephone installation should be addressed to:
Blantyre Telephone Sales Office
P.O. Box 537
BLANTYRE - Malawi
Tel: +265 62 00 00
Telex: 44649
Fax: +265 67 14 60

There are also six area sales offices throughout the country.

Charges:
All charges are in Malawi Kwacna (K) as of July 1990.

1 USD = K 2.531 (November 1990).

Installation:
Residential ................. K 36.00
Business ..................... K 45.00

Rental:
Residential .................. K 7.00
Business ...................... K 10.00

A local three minute call costs K 0.10

Dialing is initiated by pulse or touch tone. The waiting time after application for an installation is between three months and two years.

A.1. International calls
International calls are made either by direct dialing or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:
Addis Ababa, Ethiopia .... K 3.00
Dakar, Senegal .......... K 4.00
Nairobi, Kenya .......... K 3.00
London, England .... F 5.00
New York, USA .......... K 5.00
Paris, France .......... K 5.00
**Malawi (continued)**

**A.2. Leased lines**
Leased local lines and leased satellite lines are available within months after application.

*Charges:*
- A local leased line costs K 60.00 per month.
- Leasing a 75 Baud line to U.S.A or Europe costs K 35,400.00 per annum.

**A.3. Mobile telephones**
Mobile telephone services are not available.

**B. Text services**
Applications for data/text services should be addressed to:

Blantyre Telephone Sales Office
P.O. Box 537
BLANTYRE - Malawi

Tel: +265 62 00 00
Telex: 44649
Fax: +265 67 14 60

There are also six area sales offices throughout the country.

**B.1. Telex services**
A telex line is received within months after application. All telex machines must be leased from the telecommunications authority.

*Charges:*
- Installation .................. K 195.00
- Security deposit .............. K 600.00
- Rental of teleprinter line per month .......... K 240.00

Examples of the cost of a one minute telex to:

- Addis Ababa, Ethiopia ....... K 3.00
- Dakar, Senegal ............... K 6.00
- Nairobi, Kenya ............... K 3.00
- London, England ............ K 6.00
- New York, USA ............... K 6.00
- Paris, France ................. K 6.00

**B.2. Telefax**
There is no restriction on the purchase of a fax machine although all fax machines must be type approved by the Malawi Posts and Telecommunications Corporation which takes about a week to do. Only group 2 or 3 fax machines can be type approved.

*Charges:*
- Inspection fee ............... K 100.00
- Authorization fee ............ K 20.00
- Type approval ............... K 50.00

**C. Modems**
There is no restriction on the purchase of modems although all modems must be type approved by the Malawi Posts and Telecommunications Corporation. A type approval can take up to six months to obtain. The Malawi Posts and Telecommunications Corporation can lease modems to customers. Modems can reliably work from speeds of 300bps up to 9600 bps.

*Charges:*
- Inspection fee ............... K 50.00
- Type approval ............... K 50.00

If the modem is supplied by the telecommunications authority, the rental fee is K 1000.00 per annum, and the installation fee is such amount as fixed by the PTT.

**D. Bulletin Boards/ Electronic Mail**
There are no BBS's or E-Mail services available.

**E. Public Data Networks**
There are no Public Data Networks (PDN) operating in Malawi. There are no plans to introduce a packet switching service in the near future.

**F. ISDN**
There are no plans to introduce ISDN in the near future.

---

**Mauritania**

**A. Telephone Facilities**
Applications for a telephone installation should be addressed to:

Service Technico-Commercial Division Exploitation

**B.2. Teletex**
Direction Telecom OPT
NOUAKCHOTT - Mauritania

Tel: + 222 51 64 9 ext. 1110
Telex: 600
Fax: +222 5170 0
Mauritania (continued)

Charges:
All charges are in Ouguiya (UM) as of July 1990.

1 USD = UM 78.94 (November 1990).

<table>
<thead>
<tr>
<th>Installation</th>
<th>UM 36,400</th>
</tr>
</thead>
</table>
| Rental fee for
  thirty
     days | UM 1,075 |
| A local call costs | UM 13 |

Dialing is initiated by touch tone. The waiting time after application for an installation is one month.

A.1. International calls
International calls are made either by dialing directly or they are operator assisted.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Location</th>
<th>UM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>150</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>150</td>
</tr>
<tr>
<td>London, England</td>
<td>150</td>
</tr>
<tr>
<td>New York, USA</td>
<td>360</td>
</tr>
<tr>
<td>Paris, France</td>
<td>150</td>
</tr>
</tbody>
</table>

A.2 Leased lines
Local and satellite leased lines are available. It takes four days and seven days to obtain a local and leased satellite line, respectively.

Charges:
Information not available.

A.3. Mobile telephones
Mobile telephone services are not available.

B. Text services
Applications for data/text services should be addressed to:

Service Technico-Commercial Division Exploitation Direction Telecom OPT NOUAKCHOTT - Mauritania

Tel: +222 51 64 9 ext. 1110
Telex: 600
Fax: +222 51 70 0

B.1. Telex services
It takes a week after application to receive a telex line. The purchase of telex machines by the customer is restricted to certain brands. Telex machines can be leased from the telecommunications authority.

Charges:

<table>
<thead>
<tr>
<th>Installation</th>
<th>UM 36,400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposit:</td>
<td>UM 13,000</td>
</tr>
<tr>
<td>With telephone set</td>
<td>UM 200,000</td>
</tr>
<tr>
<td>Without telephone set</td>
<td>UM 100,000</td>
</tr>
</tbody>
</table>

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>Location</th>
<th>UM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>230</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>230</td>
</tr>
<tr>
<td>London, England</td>
<td>230</td>
</tr>
<tr>
<td>New York, USA</td>
<td>306</td>
</tr>
<tr>
<td>Paris, France</td>
<td>125</td>
</tr>
</tbody>
</table>

B.2 Telefax
Fax machines must be leased from OPT.

Charges:

<table>
<thead>
<tr>
<th>Installation</th>
<th>UM 36,400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent fortnightly</td>
<td>UM 1,075</td>
</tr>
<tr>
<td>Service</td>
<td>UM 1,073</td>
</tr>
</tbody>
</table>

C. Modems
Modems must be leased from OPT. Modems can reliably work at 300 bps at the national level.

D. Bulletin Boards/ Electronic Mail
Information not available.

E. Public Data Networks
There are no public data networks available.

F. ISDN
Information not available.

Mauritius

A. Telephone Facilities
Applications for a telephone installation should be addressed to:

Mauritius Telecommunication Services Ltd. (MTS)

Fon Sing Building
Edith Cavell Street
PORT LOUIS - Mauritius

Tel: +230 8 20 01
Telex: 4000 DIRTEL
Fax: +230 8 87 77
**Mauritius (continued)**

**Charges:**

All charges are in Mauritius Rupees (Rs) as of July 1990.

1 USD = Rs 13.876 (November 1990).

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>1000</td>
</tr>
<tr>
<td>Rental fee</td>
<td>60</td>
</tr>
<tr>
<td>Domestic</td>
<td>100</td>
</tr>
</tbody>
</table>

A local eight minute call costs Rs 1. A national three minute call costs Rs 1.

Dialing is initiated by pulse or tone. The waiting time after application for an installation is two months where line plant is available.

**A.1. International calls**

International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

**Examples of the cost of a one minute telephone call to:**

- Addis Ababa, Ethiopia     Rs 16
- Dakar, Senegal            Rs 28
- Nairobi, Kenya             Rs 16
- London, England            Rs 24
- New York, USA              Rs 28
- Paris, France              Rs 24

**A.2. Leased lines**

Leased local lines are available and take two months after application to obtain; and leased satellite lines are available six months after application.

**Charges:**

Leasing a local line costs Rs 250 per year per 400 metres.

**A.3. Mobile telephones**

Mobile telephone services are available.

**Charges:**

- Installation: Rs 600  
- Rental per day: Rs 200  
- Access fee per month: Rs 335  
- Calls per minute: Rs 5

**B. Text services**

Applications for data/text services should be addressed to:

Mauritius Telecommunication Services Ltd. (MTS)
Fon Sing Building
Edith Cavell Street
PORT LOUIS - Mauritius

Tel: +230 8 20 01  
Telex: 4000 DIRTEL  
Fax: +230 8 67 77

**B.1. Telex services**

It takes between one and three months after application to receive a telex line. All telex machines must be leased from MTS.

**Charges:**

- Installation: Rs 1000  
- Rental: Rs 1130  
- Oki machine: Rs 750

Additionally land/line charges of Rs 2000 per year per 375 km are required.

**Examples of the cost of a one minute telex to:**

- Addis Ababa, Ethiopia: Rs 15  
- Dakar, Senegal: Rs 25  
- Nairobi, Kenya: Rs 15  
- London, England: Rs 22  
- New York, USA: Rs 30  
- Paris, France: Rs 25

**B.2. Telefax**

All fax machines purchased by a customer must be type approved by Mauritius Telecommunications Services Ltd. A fax type approval takes about two months to obtain.

**Charges:**

- Authorization fee: Rs 300  
- Type approval: Rs 1,000  
- Leasing a fax machine per month including service: Rs 1,500

**C. Modems**

All modems must be type approved by MTS. A type approval takes about a month or two to obtain. Modems can reliably work from speeds of 300 up to 4800 bps at the national level.

**Charges:**

There are no charges for modems supplied by Mauritius Telecommunications Services Ltd.

Type approval: Rs 3,000

**D. Bulletin Boards/ Electronic Mail**

There are no BBS’s or E-mail services available.

**E. Public Data Networks**

Mauritius has its own packet switching network called MAURIDATA, operated by the Over-seas Telecommunication Services. Port Louis is the only town connected to it nationally. There are packet switching services to the following countries:

- All European countries, New Zealand, Australia, Hong Kong, Singapore, Taiwan, Indonesia, Canada and South Africa.
**Mauritius (continued)**

Charges:

I. **ACCESS CHARGES**

I.1. Direct access:

Monthly subscription including the subscriber's modem, but excluding the rental of the leased line.

- **PAD 1200 bps** .......... Rs 1,000.00
- **X.25 2400 bps** .......... Rs 1,150.00
- **X.25 4800 bps** .......... Rs 1,350.00
- **X.25 9600 bps** .......... Rs 1,550.00

I.2. Dial-up access:

Telephone subscription and calls billed by MTS.

- Monthly access charge, modem inclusive .......... Rs 500.00
  (Flat speed 1200 bps)
- Monthly access charge, modem exclusive .......... Rs 300.00
  (Flat speed 1200 bps)

II. **DURATION CHARGES FOR NATIONAL TRAFFIC**

II.1. Between two OTS direct access subscribers

<table>
<thead>
<tr>
<th>Speed Charges</th>
<th>Rs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200 bps/minute</td>
<td>0.03</td>
</tr>
<tr>
<td>2400 bps/minute</td>
<td>0.05</td>
</tr>
<tr>
<td>4800 bps/minute</td>
<td>0.08</td>
</tr>
<tr>
<td>9600 bps/minute</td>
<td>0.10</td>
</tr>
</tbody>
</table>

II.2. Between a dial-up subscriber and a direct access subscriber

- **1200 bps/minute** .......... Rs 0.60

III. **DURATION CHARGES FOR INTERNATIONAL TRAFFIC**

III.1. Dial-up access

- **Per minute** .......... Rs 2.5

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**Morocco**

**A. Telephone Facilities**

Applications for a telephone installation should be addressed to any ONPT agency.

Office National des Postes et Télécommunications (ONPT)
6, Rue Oqba
Place Bourgogne
AGDAL-RABAT - Maroc

Tel: +212 77 76 03
Telex: 362-01 or 369-48
Fax: +212 77 74 16

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**F. ISDN**

Information not available.

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A.1. **International calls**

International calls are made either by dialing directly or they are operator assisted.

Charges:

- All charges are in Dirham (DH) as of January 1991.

1 USD = DH 8.00 (November 1990).

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Country</th>
<th>DH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>2,400.00</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>19.80</td>
</tr>
</tbody>
</table>
Morocco (continued)

Nairobi, Kenya ......... DH 2,400.00
New York, USA ........... DH 28.80
Paris, France ............ DH 14.40

A.2. Leased lines

Local leased lines take about two months to obtain. Leased satellite lines take three months to obtain.

Charges:

Local leased lines cost between DH 1,250 and DH 10,500 depending on the length of the line. Leasing a satellite line to U.S.A. costs DH 28,651 per month, and to Europe DH 12,948 per month.

A.3. Mobile telephones

Mobile telephone services are available. The system is not cellular.

Charges:

Installation in a car ....... DH 49,840
Sale of portable set ......... DH 52,416

B. Text services

Applications for data/text services should be addressed to any ONPT agent.

Office National des Postes et Télécommunications (ONPT)
6, Rue Oqba
Place Bourgogne
AGDAL-RABAT - Maroc

Tel: +212 77 76 03
Telex: 362-01 or 369-48
Fax: +212 77 74 16

B.1. Telex services

It takes three to ten months after application to receive a telex line. Teleprinters must be leased from ONPT.

Charges:

Installation .............. DH 1,200.00
Deposit .................. DH 1,344.00
Rental ................... DH 1,050.00

Examples of the cost of a one minute telex to:

Addis Ababa, Ethiopia .... DH 26.40
Dakar, Senegal ............ DH 16.80
Nairobi, Kenya ............ DH 26.40
London, England .......... DH 7.25
New York, USA ........... DH 36.00
Paris, France ............. DH 7.25

B.2. Telefax

Fax machines can be leased from ONPT. Fax machines purchased by a customer must be type approved.

Charges:

Type approval fee:

Each fax machine ........ DH 560

C. Modems

Modems are not supplied by ONPT. Customers have to submit their modems for type approval. This process takes three months. Modems can work reliably at speeds up to 9600 bps at the national level.

Charges:

A type approval ........... DH 560

D. Bulletin Boards/ Electronic Mail

There are no BBS’s or E-mail systems in operation.

E. Public Data Networks

A national packet switching service encompassing 20 cities in the country will be introduced in July 1991. There are negotiations to provide services to France.

F. ISDN

Information not available.

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

The Postmaster General
Telephone Contracts (TK-1)
P.O. Box 287
WINDHOEK 9000 - Namibia

Tel: +264 61 20 13 04

Charges:

All charges are in Rand (R) as of December 1990.

1 USD = R 2.530 (November 1990).

Installation ............... R 140.00
Rental fee ................ R 21.00

Telex: 50 90 8-43 4
Fax: +264 61 22 65 00

Namibia
Namibia (continued)
A local call with unlimited timing costs

Dialing is initiated by pulse. The waiting time after application for an installation about one month if one is in an area where there is exchange capacity and cable to provide service.

A.1. International calls
International calls are made either by direct dialing or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>City</th>
<th>Rental (per month)</th>
<th>Installation (per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>R 6.82</td>
<td>R 175.00</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>R 7.03</td>
<td></td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>R 3.52</td>
<td></td>
</tr>
<tr>
<td>London, England</td>
<td>R 4.86</td>
<td></td>
</tr>
<tr>
<td>New York, USA</td>
<td>R 5.71</td>
<td></td>
</tr>
<tr>
<td>Paris, France</td>
<td>R 5.68</td>
<td></td>
</tr>
</tbody>
</table>

A.2. Leased lines
Leased local lines are available and take about one month after application to obtain. Leased satellite lines are not available.

Charges:
Leasing a local line costs R 12.00 per month + R 2.60 per kilometre beyond M.R.A.

A.3. Mobile telephones
Mobile telephone services are not available.

B. Text services
Applications for data/text services should be addressed to:

The Postmaster General
Telephone Contracts (TK-1)
P.O. Box 287
WINDHOEK 9000 - Namibia

Tel: +264 61 20 12 18
Telex: 50 90 8-62 8
Fax: +264 61 22 65 00

B.1. Telex services
It takes about one month after application to receive a telex line. All telex machines must be leased from the postal authority.

Charges:
Installation.................................................. R 175.00
Rental:
T1000 .................................................. R 90.00
T1200CCT .................................................. R 140.00

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>City</th>
<th>Rental (per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>R 6.95</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>R 5.65</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>R 5.65</td>
</tr>
<tr>
<td>London, England</td>
<td>R 5.65</td>
</tr>
<tr>
<td>New York, USA</td>
<td>R 5.65</td>
</tr>
<tr>
<td>Paris, France</td>
<td>R 5.65</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>R 5.65</td>
</tr>
</tbody>
</table>
Namibia (continued)

Otjiwarongo, Tsumeb, Keetmanshoop and Luederitz. Packet switching services are available to the following countries: Australia, Austria, Belgium, Germany, Italy, Portugal, South Africa, Switzerland and the United Kingdom.

Charges:

- Installation charges:
  - Baseband modem and line .................. R 120.00
- Monthly subscription:
  - Subscriber's baseband modem ................ R 45.00
  - Line ........................................ R 18.00
- Connect time charges:
  - Inland per hour ............................ R 0.02
  - Neighbouring countries per minute .......... R 0.01
  - International per minute ................... R 0.03

Volume (traffic) charges:

- Inland and neighbouring countries per Ksegment .................. R 0.08
- International per 10 segments .................. R 0.18

Call duration charges:

- Inland calls per hour ........................ R 0.02
- Neighbouring countries calls per minute .......... R 0.01
- International calls per minute ................ R 0.30

Connect time charges:

- X.28 users with dial-up access per hour .......... R 1.00

Note: This charge is intended to discourage the malpractice whereby an X.28 user with dial-up access makes a call to a common PAD and then leaves the call connected for a period longer than is required for the transfer of data.

Call attempt charge per call R 0.003

The Namibia Posts and Telecos will expand packet switching services as the need arises.

F. ISDN

There are no immediate plans to introduce ISDN.

Sao Tome & Principe

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Direction Commerciale
Service de Gestion de la Clientèle
Avenue du 12 Juillet
Edifice des Télécommunications

Tel: +239 12 22 06 7
Telex: 223 ST
Fax: +239 12 21 32 4

Charges:

- All charges are in Dobra (D) (unless otherwise stated) as of February 1991.

  1 USD = D 135.00 (February 1991)
  1 DTS = USD 1.42260 (February 1991).

- Installation .................. D 5000
- Monthly rental depending on the type of telephone D 300, D 600 or D 900.
- A local call costs .................. D 5

Dialing is initiated by pulse. The waiting time after application for an installation is one month.

A.1. International calls

International calls are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

- Addis Ababa, Ethiopia ............ DTS 2.61
- Dakar, Senegal .................. DTS 3.92
- Nairobi, Kenya ................. DTS 3.92
- London, England ............... DTS 1.96
- New York, USA ................. DTS 3.32
- Paris, France ................. DTS 2.94

A.2. Leased lines

Leased local lines are not available. Leased satellite lines are available.

Charges

Information not available.

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text Services

Applications for data/text services should be addressed to:
Sao Tome & Principe (continued)

Directory Commerciale
Service de Gestion de la Clientele
Avenue du 12 Juillet
Edifice des Télécommunications
SAO TOME

Tel: +239 12 22 06 7
Telex: 233 ST
Fax: +239 12 21 32 4

Telex services
It takes between one and two weeks after application to receive a telex line.

Charges

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>D 15,000</td>
</tr>
<tr>
<td>Rental</td>
<td>D 4,500</td>
</tr>
</tbody>
</table>

Example of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>DTS 3.50</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>DTS 3.50</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>DTS 4.10</td>
</tr>
<tr>
<td>London, England</td>
<td>DTS 4.10</td>
</tr>
<tr>
<td>New York, USA</td>
<td>DTS 4.60</td>
</tr>
<tr>
<td>Paris, France</td>
<td>DTS 4.10</td>
</tr>
</tbody>
</table>

B.2. Telefax
There is an authorization fee of Dobras 15,000.00 for the use of a fax machine.

C. Modems
Information not available.

D. Bulletin Boards/ Electronic Mail
Information not available.

E. Public Data Networks
Information not available.

F. ISDN
Plans are underway to introduce ISDN in 1995.

A. Telephone Facilities
Applications for a telephone installation should be addressed to:

Agence Commerciale des Télécommunications (ACTEL)
Avenue Malick Sy
DAKAR - Senegal

Tel: +221 22 46 00
Telex: 12 78
Fax: +221 22 14 92

Charges:
All charges are in CFA Francs (CFA) as of August 1990.

1 USD = CFA 248.700 (November 1990).

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>CFA 44,000</td>
</tr>
<tr>
<td>Basic rental fee</td>
<td>CFA 4,070</td>
</tr>
<tr>
<td>Ordinary phone</td>
<td>CFA 990</td>
</tr>
<tr>
<td>Luxury phone</td>
<td>CFA 2,695</td>
</tr>
</tbody>
</table>

A local call costs CFA 55 for three minutes.

Dialing is initiated by tone. The waiting time after application for an installation is ten days.

A.1. International calls
International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>CFA 5,280</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>CFA 1,760</td>
</tr>
<tr>
<td>London, England</td>
<td>CFA 1,100</td>
</tr>
<tr>
<td>New York, USA</td>
<td>CFA 1,467</td>
</tr>
<tr>
<td>Paris, France</td>
<td>CFA 880</td>
</tr>
</tbody>
</table>

A.2. Leased lines
Leased local lines are available and take ten days after application to obtain and leased satellite lines are available two months after application.

Charges
Leasing a local line
Fortnightly CFA 137,500

A leased line to U.S.A. costs CFA 4,401,000 and CFA 2,640,000 to Europe per month.

A.3. Mobile telephones
Mobile telephone services are available. The system is not cellular.
Senegal (continued)

Charges

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>CFA 88,000</td>
</tr>
<tr>
<td>Rental fee</td>
<td>CFA 174,000</td>
</tr>
</tbody>
</table>

B. Text Services

Applications for data/text services should be addressed to:

Agence Commerciale des Télécommunications (ACTEL)
Avenue Malick Sy
DAKAR - Senegal

Tel: +221 22 46 00
Telex: 1278
Fax: +221 22 14 92

B.1. Telex Services

It takes about ten days after application to receive a telex line. The purchase of telex machines is restricted to certain brands.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>CFA 55,000</td>
</tr>
<tr>
<td>Subscription</td>
<td>CFA 11,000</td>
</tr>
<tr>
<td>Rental of machine</td>
<td>CFA 66,000</td>
</tr>
<tr>
<td>Maintenance</td>
<td>CFA 22,000</td>
</tr>
</tbody>
</table>

Examples of the cost of a minute telex to:

Addis Ababa, Ethiopia       CFA 1,057.10
Nairobi, Kenya              CFA 1,057.10
London, England             CFA 1,057.10
New York, USA              CFA 1,409.81
Paris, France              CFA 600.60

B.2. Telefax

There is no restriction on the purchase of a fax machine although all fax machines must be type approved by Société National des Télécommunications du Sénégal (SONATEL). SONATEL does not lease fax machines as yet.

Charges

Type approval: CFA 10,000

C. Modems

There is no restriction on the purchase of modems although all modems must be type approved by SONATEL. Modems can reliably work from speeds of 300 up to 9600 bps at the national level.

Charges

<table>
<thead>
<tr>
<th>Speed</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 bps</td>
<td>CFA 10,850</td>
</tr>
<tr>
<td>1200 bps</td>
<td>CFA 19,000</td>
</tr>
<tr>
<td>2400-4800 bps</td>
<td>CFA 25,000</td>
</tr>
<tr>
<td>9600-19200 bps</td>
<td>CFA 37,900</td>
</tr>
</tbody>
</table>

(D Maintenance is included)

D. Bulletin Boards/ Electronic Mail

There are no BBS's or E-Mail services available.

E. Public Data Networks

Senegal has its own data switch called SENPAC. This is a packet switched network using the X.25 and X.75 protocols. Currently there are national nodes in Dakar and Thiès. It is intended to expand the network throughout Senegal.

There are services to Chad, Côte d'Ivoire, Brazil, Austria, Belgium, Denmark, France, Germany, Luxembourg, Sweden, Switzerland, United Kingdom, Canada, Telenet U.S.A., Hong Kong and Singapore.

Charges:

These charges are as of June 1990.

DEDICATED ACCESS:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation two wire</td>
<td>CFA 150,000</td>
</tr>
<tr>
<td>Installation four wire</td>
<td>CFA 200,000</td>
</tr>
</tbody>
</table>

Rent:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 bps</td>
<td>CFA 36,300</td>
</tr>
<tr>
<td>1200 bps</td>
<td>CFA 39,000</td>
</tr>
<tr>
<td>2400 bps</td>
<td>CFA 44,800</td>
</tr>
<tr>
<td>9600 bps</td>
<td>CFA 60,700</td>
</tr>
<tr>
<td>19200 bps</td>
<td>CFA 72,600</td>
</tr>
</tbody>
</table>

DIAL-UP ACCESS:

A. Private dial-up access:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation charge</td>
<td>CFA 50,000</td>
</tr>
</tbody>
</table>

Normal telephone charges

B. Two way access:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refundable Deposit</td>
<td>CFA 52,800</td>
</tr>
<tr>
<td>Subscription fee</td>
<td>CFA 11,000</td>
</tr>
</tbody>
</table>

B.1. Two way asynchronous access (300-1200 bps).

1 unit charge of CFA 55 every three minutes.

(6 minutes in off peak hours) for a call originating inside Senegal.

B.11. Two way asynchronous access (1200-2400 bps).

1 unit charge of CFA 55 every 60 seconds for a call originating inside Senegal.

Monthly rental of modems:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 bps</td>
<td>CFA 10,850</td>
</tr>
<tr>
<td>1200 bps</td>
<td>CFA 19,000</td>
</tr>
<tr>
<td>2400 bps</td>
<td>CFA 25,000</td>
</tr>
</tbody>
</table>

CONNECTION CHARGES:

A. Between two SENPAC subscribers:

A.1. Temporary virtual circuit:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300-1200 bps</td>
<td>CFA 4.0</td>
</tr>
<tr>
<td>2400 bps</td>
<td>CFA 6.5</td>
</tr>
<tr>
<td>4800 bps</td>
<td>CFA 10.0</td>
</tr>
</tbody>
</table>

There are no BBS's or E-Mail services available.

E. Public Data Networks

Senegal has its own data switch called SENPAC. This is a packet switched network using the X.25 and X.75 protocols. Currently there are national nodes in Dakar and Thiès. It is intended to expand the network throughout Senegal.

There are services to Chad, Côte d'Ivoire, Brazil, Austria, Belgium, Denmark, France, Germany, Luxembourg, Sweden, Switzerland, United Kingdom, Canada, Telenet U.S.A., Hong Kong and Singapore.

Charges:

These charges are as of June 1990.

DEDICATED ACCESS:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation two wire</td>
<td>CFA 150,000</td>
</tr>
<tr>
<td>Installation four wire</td>
<td>CFA 200,000</td>
</tr>
</tbody>
</table>

Rent:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 bps</td>
<td>CFA 36,300</td>
</tr>
<tr>
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<td>CFA 39,000</td>
</tr>
<tr>
<td>2400 bps</td>
<td>CFA 44,800</td>
</tr>
<tr>
<td>9600 bps</td>
<td>CFA 60,700</td>
</tr>
<tr>
<td>19200 bps</td>
<td>CFA 72,600</td>
</tr>
</tbody>
</table>

DIAL-UP ACCESS:

A. Private dial-up access:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation charge</td>
<td>CFA 50,000</td>
</tr>
</tbody>
</table>

Normal telephone charges

B. Two way access:

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<tr>
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<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
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<td>CFA 52,800</td>
</tr>
<tr>
<td>Subscription fee</td>
<td>CFA 11,000</td>
</tr>
</tbody>
</table>

B.1. Two way asynchronous access (300-1200 bps).

1 unit charge of CFA 55 every three minutes.

(6 minutes in off peak hours) for a call originating inside Senegal.

B.11. Two way asynchronous access (1200-2400 bps).

1 unit charge of CFA 55 every 60 seconds for a call originating inside Senegal.

Monthly rental of modems:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
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<td>CFA 10,850</td>
</tr>
<tr>
<td>1200 bps</td>
<td>CFA 19,000</td>
</tr>
<tr>
<td>2400 bps</td>
<td>CFA 25,000</td>
</tr>
</tbody>
</table>

CONNECTION CHARGES:

A. Between two SENPAC subscribers:

A.1. Temporary virtual circuit:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>300-1200 bps</td>
<td>CFA 4.0</td>
</tr>
<tr>
<td>2400 bps</td>
<td>CFA 6.5</td>
</tr>
<tr>
<td>4800 bps</td>
<td>CFA 10.0</td>
</tr>
</tbody>
</table>

There are no BBS's or E-Mail services available.
Senegal (continued)

<table>
<thead>
<tr>
<th>Bit Rate</th>
<th>CFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600 bps</td>
<td>12.5</td>
</tr>
<tr>
<td>19200 bps</td>
<td>17.5</td>
</tr>
</tbody>
</table>

A.II. Permanent virtual circuit:

Rent per month:
- 300-1200 bps  CFA 29,500
- 2400 bps  CFA 49,900
- 4800 bps  CFA 74,850
- 9600 bps  CFA 96,000
- 19200 bps  CFA 133,100

B. Between a telephone subscriber and a SENPAC subscriber:

B.I. Telephone access at 300 bps:
- two-way / minute  CFA 5.5
- lease / month  CFA 13,200.0

B.II. Telephone access at 1200 bps:
- two-way / minute  CFA 8.5
- Async. lease / month  CFA 15,900.0
- Sync. lease / month  CFA 16,400.0

B.III. Telephone access at 2400 bps:
- two-way / minute  CFA 11.0
- Sync. lease / month  CFA 20,100.0

* plus virtual circuit charges during the call.

VOLUME CHARGES:

Charges are graded and the volume is calculated twice a month (valid only for national calls).

- Upto 12,500 Koctets per Koctet  CFA 11.00
- 12,500 to 50,000 Koctets per Koctet  CFA 8.25
- Over 50,000 Koctets per Koctet  CFA 5.50

CALL CHARGES:

- Per call  CFA 30.00
  (Only for each successful call)

F. ISDN

There are plans to introduce ISDN after the year 2005.

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

The Manager Marketing & Sales
Cable and Wireless
(SEY) LTD.
P.O. Box 4
VICTORIA - Seychelles

Tel: +248 22 22 1
Telex: 2210 CWEXEC SZ
Fax: +248 22 77 7

Charges:

- All charges are in Seychelles Rupees (SR) as of April 1991.

  \[ 1 \text{ USD} = SR 5.6 \text{ (April 1991)} \]

  - Installation  SR 421
  - Rental fee  SR 73
  - A local six minute call costs SR 0.80

Dialing is initiated by either pulse or tone. The waiting time after application for an installation is three weeks.

Seychelles

A.1. International calls

International calls are operator assisted. This service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

- Addis Ababa, Ethiopia  SR 16.74
- Dakar, Senegal  SR 42.00
- Nairobi, Kenya  SR 12.63
- London, England  SR 25.16
- New York, USA  SR 25.16
- Paris, France  SR 27.26

A.2. Leased lines

Leased local lines are available and take 21 days after application to obtain. Leased satellite lines take approximately three weeks to obtain depending on the routing.

Charges:

- A local leased line costs  SR 73.60
- A leased satellite line to either Europe or the U.S.A. costs  SR 55,000

A.3. Mobile telephones

There are no mobile telephone services available.
Seychelles (continued)

B. Text services

Applications for data/text services should be addressed to:

The Manager Marketing & Sales
Cable and Wireless(SEY) LTD.
P.O. Box 4
VICTORIA - Seychelles

Tel: +248 22 22 1
Telex: 2210 CWEXEC SZ
Fax: +248 22 77 7

B.1. Telex services

It takes about three weeks after application to receive a telex line. Telex machines must be leased from the service provider.

Charges:

- Installation ................ SR 1,000.00
- Rent ......................... SR 521.00

Examples of the cost of a one minute telex to:

- Addis Ababa, Ethiopia ...... SR 15.37
- Dakar, Senegal ............... SR 26.53
- Nairobi, Kenya .............. SR 11.58
- New York, USA ............... SR 33.37
- Paris, France ................. SR 26.53

B.2. Telefax

Fax machines must be leased from the telecommunications authority.

Charges:

- Lease from the telecommunications authority costs SR 473.60.

C. Modems

There are no restrictions on the purchase of modems but they must be type approved. This takes a day to do. Modems can reliably work at speeds up to 9600 BPS at the national level.

Charges:

- Modems supplied by the telecommunications authority cost between SR 6,000 and SR 12,000.
  - Installation .................. SR 2,000
- Rent:
  - up to 4,800 bps .............. SR 100
  - above 4,800 bps ............ SR 200

Service charges are included.

D. Bulletin Boards/ Electronic Mail

There are no bulletin boards or electronic mail services available. An approval is necessary before one can install and operate a BBS/E-Mail service.

E. Public Data Networks

The Seychelles operates data switching facilities as a remote node of IDAS in Hong Kong. The facilities are both circuit and packet switched.

Services are available to the following countries:

- Hong Kong, Singapore, Belgium, Australia, Philippines, London (Mercury, BTI) and USA.

Charges:

- Installation .................. SR 5,500.00
- Connect charges per minute .................. SR 1.25
- Volume charges per data segment ............ SR 0.14

If demand increases, the Seychelles PTT will install its own packet switching network.

F. ISDN

There are no plans to introduce ISDN in the near future.

---

A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Telecom. Public Corp.
Dar Elhatif
KHARTOUM - Sudan

Tel: +249 11 70 19 9
Telex: 22 29 9
Fax: +249 11 75 59 9

Charges:

All charges are in Sudanese Pounds (SP) as of September 1990.

1 USD = SP 4.500 (November 1990).

- Installation .................. SP 1,000.0
- Rent ......................... SP 15.0
- A local call costs ............ SP 0.4

The waiting time after application for an installation depends on the location.
Sudan (continued)

A.1. International calls
International calls are made either by direct dialing or they are operator assisted.

Examples of Charges:

Cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Location</th>
<th>Charge (SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>17</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>27</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>17</td>
</tr>
<tr>
<td>London, England</td>
<td>21</td>
</tr>
<tr>
<td>New York, USA</td>
<td>27</td>
</tr>
<tr>
<td>Paris, France</td>
<td>21</td>
</tr>
</tbody>
</table>

A.2. Leased lines
Leased local and leased satellite lines are available depending on the location. The time after application it takes to obtain a leased line depends on the location.

Charges:

<table>
<thead>
<tr>
<th>Type</th>
<th>Charge (SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local leased line per month</td>
<td>1,350</td>
</tr>
<tr>
<td>Leasing a satellite line to U.S.A or Europe costs per annum</td>
<td>USD 271,000</td>
</tr>
</tbody>
</table>

A.3. Mobile telephones
Information not available.

B. Text services
Applications for data/text services should be addressed to:

Telecom. Public Corp.
Dar Elhatif
KHARTOUM - Sudan

Tel: +249 11 70 19 9
Telex: 22 29 9
Fax: +249 11 75 59 9

B.1. Telex services
The time it takes to obtain a telex depends on the location. Telex machines must be leased from the telecommunications authority.

Charges:

<table>
<thead>
<tr>
<th>Type</th>
<th>Charge (SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>3,000</td>
</tr>
<tr>
<td>Rent</td>
<td>2,340</td>
</tr>
</tbody>
</table>

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>Location</th>
<th>Charge (SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>26</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>26</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>26</td>
</tr>
<tr>
<td>London, England</td>
<td>26</td>
</tr>
<tr>
<td>New York, USA</td>
<td>26</td>
</tr>
</tbody>
</table>

B.2. Telefax
Fax machines must be leased from the telecommunications authority.

Charges:

<table>
<thead>
<tr>
<th>Type</th>
<th>Charge (SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leasing a fax machine</td>
<td>3500</td>
</tr>
<tr>
<td>Service</td>
<td>1500</td>
</tr>
</tbody>
</table>

C. Modems
Information not available.

D. Bulletin Boards/ Electronic Mail
Information not available.

E. Public Data Networks
Information not available.

F. ISDN
There are no plans to introduce ISDN in the near future.

---

Swaziland

A. Telephone Facilities
Applications for a telephone installation should be addressed to:

Telephone Sales office
Posts and Telecommunications Corporation.
P.O. Box 125
MBABANE - Swaziland

Tel: +268 43 13 1

Charges:

All charges are in Emalangeni (E) as of December 1990.

1 USD = E 2.530 (November 1990).

<table>
<thead>
<tr>
<th>Type</th>
<th>Charge (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>66.00</td>
</tr>
<tr>
<td>Rent</td>
<td>6.50</td>
</tr>
<tr>
<td>A local call costs</td>
<td>0.14</td>
</tr>
</tbody>
</table>
Swaziland (continued)

Dialing is initiated by pulse. The waiting time after application for an installation is two weeks.

A.1. International calls

International calls are operator assisted or direct dialing. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>City</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>E 8.20</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>E 9.75</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>E 4.35</td>
</tr>
<tr>
<td>London, England</td>
<td>E 6.45</td>
</tr>
<tr>
<td>New York, USA</td>
<td>E 9.70</td>
</tr>
<tr>
<td>Paris, France</td>
<td>E 6.45</td>
</tr>
</tbody>
</table>

A.2. Leased lines

Local leased lines are available two weeks after application. Leased satellite lines are presently not available.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local leased line</td>
<td>E 132.00</td>
</tr>
</tbody>
</table>

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text services

Applications for data/text services should be addressed to:

Telephone Sales office
Posts and Telecommunications Corporation.
P.O. Box 125
MBABANE - Swaziland

Tel: +268 43 13 1
Telex: 2019 WD
Fax: +268 45 522

B.1. Telex services

A telex line is available two weeks after application. All telex services are rented from the PTC.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>E depending on the distance from the telex exchange.</td>
</tr>
</tbody>
</table>

Rental:

<table>
<thead>
<tr>
<th>Type</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siemens</td>
<td>E 127.00</td>
</tr>
<tr>
<td>Oki</td>
<td>E 182.60</td>
</tr>
</tbody>
</table>

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>City</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>E 6.25</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>E 6.25</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>E 7.60</td>
</tr>
<tr>
<td>London, England</td>
<td>E 5.75</td>
</tr>
<tr>
<td>New York, USA</td>
<td>E 7.60</td>
</tr>
<tr>
<td>Paris, France</td>
<td>E 7.60</td>
</tr>
</tbody>
</table>

B.2. Telefax

Fax machines purchased by a customer must be type approved. The type approval takes one day to obtain and is free of charge. E 22.00 is charged if a socket is required to connect the fax machine.

C. Modems

Modems purchased by a customer must be type approved. The type approval takes one day to obtain and is free of charge. Modems can reliably work to a speed of 4800 bps at the national level but can be upgraded to 9600 bps.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modems supplied by PTC</td>
<td>E 143.00</td>
</tr>
<tr>
<td>Basic fee</td>
<td>E 44.00</td>
</tr>
<tr>
<td>Installation</td>
<td>E 99.00</td>
</tr>
</tbody>
</table>

D. Bulletin Boards/ Electronic Mail

There are no BBS's or E-mail services operating in the country. An approval from the telecommunications authority is required before a customer can set up a BBS or E-mail service. The fee for an approval is still being planned.

E. Public Data Networks

There are no data switching facilities available in the country.

F. ISDN

Information not available.

A. Telephone Facilities

Applications for a telephone installation should be addressed to the nearest Post Office.

Tanzania Posts and Telecommunications Corporation

P.O. Box 9070
DAR-ES-SALAAM - Tanzania

Tel: +255 51 31 15 5

Charges:

All charges are in Tanzania Shillings (Tsh) as of July 1990.
**Tanzania (continued)**

1 USD = Tsh 194.901 (November 1990).

**Installation:**
- Residential .................. Tsh 6,000
- Business ..................... Tsh 15,000
- Rental ....................... Tsh 495

A local three minute call costs Tsh 2.65.

Dialing is initiated by pulse. The waiting time after application for an installation is several years and depends on availability.

**A.1. International calls**

International calls are operator assisted. This service is available 24 hours a day. Direct dialing will be introduced in the 1991/92 time frame after the commissioning of a Standard A earth station in the Mwenge area.

Examples of the cost of a one minute telephone call to:
- Addis Ababa, Ethiopia ........ USD 6.25
- Dakar, Senegal ............... USD 7.15
- Nairobi, Kenya ............... Local
- London, England ............. USD 8.35
- New York City, USA .......... USD 8.35
- Paris, France ............... USD 8.35

**A.2. Leased lines**

Leased local lines are available within a week after application. Leased satellite lines are available within two to three months.

**Charges:**
Leasing a satellite line to the U.S.A costs USD 15,211.57 per month and one to Europe costs USD 5,950.00 per month.

**A.3. Mobile telephones**

Mobile telephone services are not available.

**B. Text services**

Applications for a telex installation should be addressed to the nearest Post Office.

Tanzania Posts and Telecommunications Corporation
P.O. Box 9070
DAR-ES-SALAAM - Tanzania

Tel: +255 51 31 15 5

**B.1 Telex services**

A telex line is received a long time after application. All telex machines must either be leased from the telecommunications authority or they can be purchased privately, with restrictions on the brands.

**Charges:**
- Installation:
  - I. Siemens .................. Tsh 26,620
  - II. Okitek ................. Tsh 36,450
- Rental:
  - I. Siemens .................. Tsh 9,330
  - II. Okitek ................. Tsh 12,630

Examples of the cost of a one minute telex to:
- Addis Ababa, Ethiopia ........ USD 5.85
- Dakar, Senegal ............... USD 6.25
- Nairobi, Kenya ............... Local
- London, England ............. USD 8.00
- New York, USA ............... USD 8.00
- Paris, France ............... USD 8.00

**B.2. Telefax**

There is no restriction on the purchase of fax machines although all fax machines must be type approved by the Tanzania Posts and Telecommunications Corporation which takes less than a month to obtain.

**Charges:**
- Connection fee ............... Tsh 15,000
- Type approval ............... Tsh 20,000

**C. Modems**

There is no restriction on the purchase of modems although all modems must be type approved by the Tanzania Posts and Telecommunications Corporation. A type approval takes less than a month to obtain. The TPTC does not supply modems to be leased by customers.

**Charges:**
- Type approval ............... Tsh 20,000

**D. Bulletin Boards/ Electronic Mail**

There are no BBS's or E-Mail services available.

**E. Public Data Networks**

There are no Public Data Networks (PDN) operating in Tanzania, and there are no plans to introduce a packet switching service in the near future.

**F. ISDN**

There are no plans to introduce ISDN in the near future.
A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Agence Commerciale des Télécommunications
Chaque Division des Communications
Bd. du 9 Avril - La Kasbah
TUNIS - Tunisia

Tel: +216 1 26 19 33
Telex: 14 360 GENTEL TN
Fax: +216 1 56 43 57

Charges:
All charges are in Dinar (D) as of January 1991.

1 USD = D 0.8224 (November 1990).

- Installation ............... D 100
- Rental fee ............... D 7

A local call costs D 0.06.

Dialing is initiated by tone. The waiting time after application for an installation varies between 20 days and two years maximum.

A.1. International calls

International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

- Addis Ababa, Ethiopia ........ D 3.00
- Dakar, Senegal ............... D 2.40
- Nairobi, Kenya ............... D 3.00
- London, England ............. D 0.96
- New York, USA ............... D 2.00
- Paris, France ............... D 0.84

A.2. Leased lines

Leased local lines are available one to three months after application, and leased satellite lines are also available.

Charges
Local leased lines:
Upto 50Km D 180 + D 45/Km
Above 50Km D 1,260 + D 26.4/Km

Leased satellite lines:
USA ...................... D 7,000
Europe four rates D 2,000 to D 9,935

A.3. Mobile telephones

Cellular mobile telephone services are available.

Charges
Information not available.

B. Text services

Applications for data/text services should be addressed to:

Agence Commerciale des Télécommunications
Chaque Division des Communications
Bd. du 9 Avril - La Kasbah
TUNIS - Tunisia

Tel: +216 1 26 19 33
Telex: 14 360 GENTEL TN
Fax: +216 1 56 43 57

B.1. Telex services

It takes between two months and two years after application to receive a telex line.

Charges:
- Installation ............... D 100

Examples of the cost of a one minute telex to:

- Addis Ababa, Ethiopia ........ D 2.40
- Dakar, Senegal ............... D 1.60
- Nairobi, Kenya ............... D 1.60
- London, England ............. D 0.40
- New York, USA ............... D 2.40
- Paris, France ............... D 0.40

B.2. Telefax

There are no restrictions on the purchase of fax machines though they must be type approved.

C. Modems

There is no restriction on the purchase of modems although all modems must be type approved by the PTT. Modems can reliably work from speeds of 300 up to 4800 bps at the national level.

Charges
Information not available.

D. Bulletin Boards/ Electronic Mail

Information not available.

E. Public Data Networks

Tunisia has its own data switch under the auspices of the PTT. Currently there are national nodes in Tunis, Sousse and Sfax acting as concentrators for the rest of the country. In the course of the current development plan 1987-1991, a network of packet switching services will be installed.

Charges:
Information on charges can be obtained by writing to the address mentioned above.
Tunisia (continued)

F. ISDN

There are plans to introduce ISDN in the future.

A. Telephone Facilities

Applications for a telephone installation should be addressed to the nearest telephone sales office or:

Telephone Sales Manager (Kampala)
P.O. Box 7171
KAMPALA - Uganda

Tel: +256 41 23 46 09
Telex: 61 02 7 POSTEL
Fax: +256 41 24 59 07

Charges:
All charges are in Uganda Shillings (Ush) as of April 1991.

1 USD = 640 Ush (April 1991)

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>Ush 21,250</td>
</tr>
<tr>
<td>Rental fee</td>
<td>Ush 800</td>
</tr>
<tr>
<td>A local call costs</td>
<td>Ush 20</td>
</tr>
</tbody>
</table>

Dialing is initiated by pulse or touch tone. The waiting time after application for an installation is three weeks.

A.1. International calls

International calls are operator assisted. This service is available 24 hours per day.

Examples of the cost of a one minute telephone call to:

<table>
<thead>
<tr>
<th>Country</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>Ush 1,275</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>Ush 2,025</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>Ush 1,275</td>
</tr>
<tr>
<td>London, England</td>
<td>Ush 3,060</td>
</tr>
<tr>
<td>New York, USA</td>
<td>Ush 2,550</td>
</tr>
<tr>
<td>Paris, France</td>
<td>Ush 3,060</td>
</tr>
</tbody>
</table>

A.2. Leased lines

Local leased lines are available on average 15 working days after application. A local leased line costs Ush 2,345,800 annually. Satellite leased lines are available about two months after application. A leased satellite line to the U.S.A. costs USD 53,600 and USD 52,600 to Europe annually.

A.3. Mobile telephones

Mobile telephone services are not available.

B. Text services

Applications for data/text services should be addressed to:

Telephone Sales Manager (Kampala)
P.O. Box 7171
KAMPALA - Uganda

Tel: +256 41 23 46 09
Telex: 61 02 7 POSTEL
Fax: +256 41 24 59 07

B.1. Telex services

It takes about a month after application to receive a telex line. The purchase of telex machines is restricted to certain brands.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>Ush 74,820</td>
</tr>
<tr>
<td>Deposit</td>
<td>Ush 500,000</td>
</tr>
<tr>
<td>Rent</td>
<td>Ush 15,000</td>
</tr>
</tbody>
</table>

Including maintenance.

Examples of the cost of a one minute telex to:

<table>
<thead>
<tr>
<th>Country</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addis Ababa, Ethiopia</td>
<td>Ush 1,610</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>Ush 1,820</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>Ush 1,610</td>
</tr>
<tr>
<td>London, England</td>
<td>Ush 2,300</td>
</tr>
<tr>
<td>New York, USA</td>
<td>Ush 2,300</td>
</tr>
<tr>
<td>Paris, France</td>
<td>Ush 2,300</td>
</tr>
</tbody>
</table>

B.2. Telefax

The purchase of fax machines is restricted to certain brands. All fax machines must be type approved and this takes about a week to obtain.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposit if leasing from the PTT</td>
<td>Ush 200,000</td>
</tr>
<tr>
<td>Type approval</td>
<td>Ush 63,900</td>
</tr>
</tbody>
</table>

C. Modems

The purchase of modems is restricted to certain brands. All modems must be type approved. A type approval takes about a week to obtain and costs Ush 63,900. Modems can reliably work at speeds of up to 9600 bps at the national level.
A. Telephone Facilities

Applications for a telephone installation should be addressed to:

Monsieur Le Director Régional des Télécommunications
O.N.P.T.Z.
B.P. 2.898
KINSHASA - Zaire

Tel: +243 12 22 93 3

Charges:
All charges are in Zaire (Z) as of May 1991.

1 USD = Z 4,126.24 (May 1991).

Installation ....................... Z 65,400
Subscription ...................... Z 6,000
Acquisition of forms ............. Z 660,000

A local call costs Z 600 per unit of five minutes.

Dialing is initiated by tone. The waiting time after application for an installation is approximately three months.

A.1. International calls

International calls are made either by dialing directly or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:

Addis Ababa, Ethiopia .......... Z 11,925
Dakar, Senegal ................. Z 15,975
Nairobi, Kenya ................. Z 26,376
London, England ............... Z 15,975
New York, USA ................. Z 17,986
Paris, France ................... Z 15,593

A.2. Leased lines

Leased local lines are available two days after all administrative requirements have been fulfilled. Leased satellite lines will not be available until after the acquisition of a new earth station planned for the fourth quarter of 1991. It takes a minimum of 48 hours to obtain a leased satellite line after contact has been established with INTELSAT.

Charges
Charges for local leased lines and leased satellite lines to the USA are not determined until an application is made.
Europe initial charge ........ Z 50,000
Annual lease .................. Z 23,912,400

A.3. Mobile telephones

Mobile telephone services are available from authorized private firms.

Charges
All questions on mobile telephone charges should be directed to the authorized private firms.

B. Text services

Application for data/text services should be addressed to:

Monsieur Le Directeur Régional des Télécommunications
O.N.P.T.Z.
B.P. 2.898
KINSHASA - Zaire

Tel: +243 12 22 93 3

B.1. Telex services

It takes approximately three months in meeting administrative requirements to receive a telex line after application. There are no restrictions on the purchase of telex equipment.

Charges:
Installation ..................... Z 1,272,600
(Includes subscription charges)

Examples of the cost of a one minute telex to:

Addis Ababa, Ethiopia .......... Z 14,813
Dakar, Senegal ................. Z 24,513
Nairobi, Kenya ................. Z 24,513
London, England ............... Z 24,513
New York, USA ................. Z 24,513
Paris, France ................... Z 19,379

E. Public Data Networks

There are no data networks available.

F. ISDN

There are no plans to introduce ISDN before the year 2000.
Zaire (continued)

B.2. Telefax

There are no restrictions on the purchase of fax machines though they must be type approved models. The ONPTZ does not lease out fax machines.

Charges

| Annual subscription | Z | 1,500,000 |
| Monthly usage       | Z | 600,000  |

C. Modems

There is no restriction on the purchase of modems although all modems must be type approved by the ONPTZ. A type approval takes approximately two months to obtain. Modems can reliably work from speeds of 300 up to 9600 bps at the national level.

Charges

The PTT does not charge for use of modems.

D. Bulletin Boards/ Electronic Mail

There are no BBS's or E-Mail services available.

E. Public Data Networks

Zaire has public data networks that are run by authorized private individuals. No towns are linked at the national level. International links exist between Zaire and Belgium, France, the U.K. and the U.S.A.

Charges:

- Installation charge: Z 150,000
- Monthly subscription to the PTT per line: Z 23,912,400

F. ISDN

ISDN will inevitably be introduced when it has been introduced as a world standard. But its introduction has not been planned as yet.

Examples of the cost of a one minute telephone call to:

- Addis Ababa, Ethiopia: USD 4.00
- Dakar, Senegal: USD 7.00
- Nairobi, Kenya: USD 3.00
- London, England: USD 5.00
- New York City, USA: USD 5.50
- Paris, France: USD 5.50

A.2. Leased lines

Leased local lines and leased satellite lines are available and take one month after application to obtain.

Charges:

- Leasing a CCITT M1020/25 standard line to U.S.A or Europe costs USD 18,000 per month. A CCITT M1040 line to U.S.A. or Europe costs USD 16,000 per month.

A.4. Mobile telephones

A mobile cellular telephone system has been contracted for Lusaka.

B. Text Services

Applications for data/text services should be addressed to:

- Posts and Telecommunications Corporation Limited.
- P.O. Box 30099
- LUSAKA - Zambia
- Tel: +260 1 22 77 77
Zambia (continued)

Posts and Telecommunications Corporation Limited.
P.O. Box 21410
KITWE - Zambia
Tel: +260 2 21 06 55

B.1. Telex services

It takes about six weeks after application to receive a telex line. All telex machines must be leased from the telecommunications authority.

Charges:
Installation .................. K 1,000
Security deposit .............. K 10,000
Rental per annum ............. K 14,796

Examples of the cost of a one minute telex to:
Addis Ababa, Ethiopia .... USD 4.00
Dakar, Senegal ............... USD 7.10
Nairobi, Kenya ............... USD 2.80
London, England ............. USD 5.00
New York, USA ............... USD 5.50
Paris, France ................. USD 5.50

B.2. Telefax

There is no restriction on the purchase of a fax machine although all fax machines must be type approved by the Zambian Posts and Telecommunications Corporation, which takes about a week to obtain.

Charges:
Inspection fee ............... K 56
Type approval ............... K 500

C. Modems

There is no restriction on the purchase of modems although all modems must be type approved by the ZPTC. A type approval takes about two weeks to obtain. ZPTC does not supply modems to be used by customers. Modems can reliably work at speeds of 300bps up to 4800bps.

Charges:
Inspection fee ............... K 56
Type approval ............... K 500

D. Bulletin Boards/ Electronic Mail

There are no BBS's or E-Mail services available.

E. Public Data Networks

There are no Public Data Networks (PDN) operating in Zambia. There are plans to introduce a packet switching service in the near future.

F. ISDN

There are plans to introduce ISDN in the near future.

Zimbabwe

A. Telephone Facilities

Applications for a telephone installation should be addressed to:
The Manager
Sales and Services
P.O. Box 4800
HARARE - Zimbabwe
Tel: +263 4 791701
Telex: 22308

Charges:
All charges are in Zimbabwe Dollars ($) as of July 1990.
1 USD = $ 2.549 (November 1990).

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>$ 52.50</td>
</tr>
<tr>
<td>Rent</td>
<td>$ 5.15</td>
</tr>
<tr>
<td>A local three minute call cost</td>
<td>$ 0.15</td>
</tr>
</tbody>
</table>

Dialing is initiated by pulse. The waiting time after application for an installation is eight weeks if one is in an area where there is exchange capacity and cable to provide service; otherwise it takes longer.

A.1. International calls

International calls are made either by direct dialing or they are operator assisted. The operator-assisted service is available 24 hours a day.

Examples of the cost of a one minute telephone call to:
Addis Ababa, Ethiopia .... $ 6.50
Dakar, Senegal ............ $ 6.50
Nairobi, Kenya ............. $ 4.90
London, England ........... $ 4.90
New York, USA ............. $ 4.90
Paris, France ............. $ 4.90

A.2. Leased lines

Leased local lines are available and take three weeks after application to obtain, but leased satellite lines are available as soon as required.
Zimbabwe (continued)

Charges:

Leasing a local line costs $2.25 per 500 metres or part thereof per month.

A leased line costs USD 6,000 to U.S.A. and USD 9,458 to Europe per month.

A.3. Mobile telephones

There are no mobile telephone services available.

B. Text services

Applications for data/text services should be addressed to:

The Manager
Telecommunications Services
P.O. Box 8061
Causeway,
HARARE - Zimbabwe

Tel: +263 4 791711
Telex: 24753

B.1. Telex services

It takes about a month after application to receive a telex line. All telex machines must be leased from the telecommunications authority.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>$122.00</td>
</tr>
<tr>
<td>Rental</td>
<td>$257.00</td>
</tr>
</tbody>
</table>

Examples of the cost of a one minute telex to:

Addis Ababa, Ethiopia $4.90
Dakar, Senegal $4.90
Nairobi, Kenya $4.90
London, England $4.90
New York, USA $4.90
Paris, France $4.90

B.2. Telefax

There is no restriction on the purchase of a fax machine although all fax machines must be type approved by the Zimbabwe Posts and Telecommunications Corporation. A type approval takes about a month to obtain.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>$52.50</td>
</tr>
<tr>
<td>Type approval</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

C. Modems

There is no restriction on the purchase of modems although all modems must be type approved by the Zimbabwe Posts and Telecommunications Corporation. A type approval takes about a month to obtain. A list of type approved modems can be obtained from the postal authorities of Zimbabwe. These type approved modems can be used without restriction or any extra fee. Modems can reliably work from speeds of 300 up to 9600 bps at the national level.

Charges:

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase from PTT</td>
<td>$78.00</td>
</tr>
<tr>
<td>Installation</td>
<td>$78.00</td>
</tr>
<tr>
<td>Rental</td>
<td>$180.00</td>
</tr>
<tr>
<td>Type approval</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

Monthly rental for modems:

1) Both point to point and dial-up

<table>
<thead>
<tr>
<th>Speed</th>
<th>Rental</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>$62.00</td>
</tr>
<tr>
<td>600</td>
<td>$62.00</td>
</tr>
<tr>
<td>1200</td>
<td>$62.00</td>
</tr>
<tr>
<td>2400</td>
<td>$132.00</td>
</tr>
</tbody>
</table>

2) Point to point only

<table>
<thead>
<tr>
<th>Speed</th>
<th>Rental</th>
</tr>
</thead>
<tbody>
<tr>
<td>4800</td>
<td>$160.00</td>
</tr>
<tr>
<td>9600</td>
<td>$180.00</td>
</tr>
</tbody>
</table>

Monthly rental for communication lines:

- 4 wire per 500 metres $9.00
- two wire per 500 metres $4.50
- Internal inter city circuits $6.00
  (per km per month between exchanges)

D. Bulletin Boards/ Electronic Mail

There are no BBS’s or E-Mail services available.

E. Public Data Networks

Zimbabwe does not have its own data switch. For data communications one uses the Public Service Telephone Network or subscribes to the Interim Zimnet Packet Switching Service which provides a multiplexer that connects X.28 or X.25 users to the switch owned by British Telecom Intl. in U.K. This data switch can be connected to any automatic exchange in the country. Zimbabwe intends to have its own data switch in the near future.

Charges:

X.28 SERVICE.

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>$78.00</td>
</tr>
<tr>
<td>Rental</td>
<td>$62.00</td>
</tr>
<tr>
<td>Service rental</td>
<td>$110.00</td>
</tr>
<tr>
<td>Per hour</td>
<td>$18.00</td>
</tr>
<tr>
<td>Per kilo segment</td>
<td>$15.00</td>
</tr>
</tbody>
</table>

X.25 SERVICE.

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two 2400bps modems</td>
<td>$156.00</td>
</tr>
<tr>
<td>Communication line</td>
<td>$202.50</td>
</tr>
</tbody>
</table>
**Zimbabwe (continued)**

**F. ISDN**

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two modems</td>
<td>$260.00</td>
</tr>
<tr>
<td>Communication line</td>
<td>$9.00</td>
</tr>
<tr>
<td>Service rental (Harare-London)</td>
<td>$440.00</td>
</tr>
<tr>
<td>Usage:</td>
<td></td>
</tr>
<tr>
<td>Per hour</td>
<td>$18.00</td>
</tr>
<tr>
<td>Per kilo segment</td>
<td>$15.00</td>
</tr>
</tbody>
</table>

There are no plans to introduce ISDN in the near future.
Annex
Most of the definitions have been obtained from "Telecommunications Systems and Services Directory" 2nd Edition 1985, Gale Research Company, Detroit.

A

alternate voice/data (AVD) channel

Alternate voice/data (AVD) channels are circuits that have been specially conditioned to accommodate both audio and data signals.

B

baud

Baud is a measure of transmission speed in telecommunications, equal to the number of signal changes per second. When a signal change represents one bit, the baud rate is equivalent to bps (bits per second). However, since a signal change can in some modems represent groups of more than one bit, baud and bps are not always identical.

bit

Binary digit can either have the value on (one) or off (zero).

bps

(bits per second) is a measurement of data transmission speed. It is equivalent to baud when one bit is depicted by one signal change. When bps is measured by the thousand, the abbreviation kbps is often used.

BBS

see BULLETIN BOARD SYSTEM

bulletin board system (BBS)

An electronic bulletin board enables messages to be posted on a computer system so that any number of people can access the messages using a modem and communicating terminal or personal computer. The bulletin board differs from electronic mail in that electronic mail directs messages to particular individuals or groups of individuals. A bulletin board system (BBS) is a publicly accessible bulletin board run by a system operator (sysop), sometimes devoted to particular topics.

byte

Eight bit character is represented by a byte.

carrier

A company which offers telecommunications facilities to the public.

C

CCITT

Consultative Committee on International Telephony and Telegraphy. This is part of the International Standards Organization and sets standards for telecommunications.

CCITT facsimile standards

The CCITT has defined the following four classifications of facsimile devices: 1) Group I devices are analog facsimile devices which operate at six minutes per page using frequency modulation (FM) techniques. CCITT has also provided in Group I for a four-minute speed as a manufacturers option. 2) Group II devices are analog facsimile devices which operate at three minutes per page using amplitude modulation (AM). CCITT has also provided in Group II for a two-minute speed as a manufacturer's option. 3) Group III devices are digital facsimile devices which operate at one minute per page utilizing techniques of redundancy reduction, such as rapid skipping of white space. 4) Group IV devices are high-speed (56 kbps or more) digital facsimile devices designed to use public packet switching networks.

channel

A channel is a route for electrical transmission between two or more points. A channel is not necessarily a wire; it may be a radio carrier or a light wave.

circuit

A circuit is a communications path between two points established by means of their physical connection to a conductive medium (e.g., copper wire, fiber optic cable, etc.).

circuit-switching network

A circuit-switching network is a communications network in which stations are provided with a direct link (through a system of switches) for the duration of their interchange of information. An example of this is the public voice telephone network usually called Public Switched Telephone Network (PSTN). Other types of switching networks (not circuit switched) include the message-switching network and the packet-switching network.

closed user group (CUG)

Closed user group refers to a group of users on a public data or message system that has access to data, information, or communications facilities not available to other system users outside the group.
data communication equipment (DCE)

Data communication equipment performs the function of linking the data terminal equipment (DTE) to the data circuit, e.g., modem.

data switching exchange

Data switching exchange generally refers to the point at which incoming data traffic is transferred to an outgoing circuit.

data terminal equipment (DTE)

These are devices that users interact with, e.g., terminals or computers. They are connected to the DCE and generate or receive the data carried by the network.

dedicated

Dedicated refers to a program procedure, machine, network channel, or system set apart for special use or assigned to specific functions.

dial-up

Dial-up refers to the use of telephone (either dial or push button) to initiate a station-to-station telephone call. In data communications, a public dial-up connection is contrasted with a leased-line connection.

earth station

An earth station is the physical equipment used to send data communications to a satellite (called the uplink) and/or receive data communications from a satellite (called the downlink).

electronic bulletin board

see BULLETIN BOARD

electronic mail (e-mail)

Electronic mail is a generic term describing the use of digital computer and other technologies (e.g., facsimile) in the generation and transmission or distribution of messages. It includes store-and-forward capabilities which can effect economies through off-peak time transmission. There is a growing number of electronic mail network capabilities for limited user groups and through the public networks.

facsimile transmission

(also referred to as TELEX or FAX). Facsimile transmission is a technique of transmitting and receiving document pages (text, diagrams, and pictures) over telecommunications links. Historically, facsimile has been an analog technique through which the facsimile device electromechanically scans the page to convert the variations in black and white, or tone, to electronic signals. Newer facsimile devices use digital technologies with improved scanning and transmission speeds and higher resolution. The CCITT has established standards for analog and digital facsimile transmission.

fax

see FACSIMILE TRANSMISSION

Integrated services digital network (ISDN)

Integrated services digital network (ISDN) is a concept in which an end-to-end digital network carries both data and voice in the same channel. Based on the telephony integrated digital network (IDN), ISDN progressively incorporates additional functions and network features, including those of any other dedicated networks, so as to provide for existing and new services. ISDN services are expected to include digitized voice, facsimile and graphics, video, telemetry, videotex, software and data transfer, electronic mail, and database access.

ISDN

see INTEGRATED SERVICES DIGITAL NETWORK

KB - Kilobyte

1024 bytes.

leased line

A leased line (also known as a private line or dedicated line) is a telecommunications line available exclusively to a subscriber organization through a monthly lease payment to the communications carrier. While these lines are now typically actual links reserved by the leasing organization, the common carriers are offering an alternative approach referred to as a virtual leased line.

MB - Megabyte

1,048,576 Bytes.

message-switching network

A message-switching network is a communica-
The packet-switching network in which a message from one station to another is forwarded and stored at intermediate switching points, en route from the sending station to the station (e.g., the telegram and teletype networks). Contrasts with a circuit-switching network and packet-switching network.

**modem**

A modem is a device that accepts a digital bit stream as input and produces a modulated analog carrier as output (and vice versa). The term modem is a contraction of modulator-demodulator. The modem is placed between the digital computer and the analog telephone system.

**network**

A telecommunications network is an interconnected set of locations or devices linked by communications facilities, including telephone lines and microwave and satellite connections.

**node**

A node of a data communications network is a device at a physical location which performs a control function and influences the flow of data in the network. Node can also refer to the points of connection in the links of a network.

**P**

**packet**

A packet is a sequence of binary digits including data and call control signals that is switched as a composite whole. The data, call control signals, and possibly error control information are arranged in a specific format.

**packet assembler/disassembler (PAD)**

The device performing character-to-packet and packet-to-character transformation is called packet assembler/disassembler (PAD). The CCITT X.25 standard defines a specific format for packets in a packet-switching network. So that ordinary asynchronous terminals can communicate on the network, a device is needed to collect individual characters from a group of terminals and to output properly formatted packets. Similarly at the receiving end, the inverse operation is required to split up the packet into individual characters.

**packet switching network**

A packet switching network is a communications network which, in order to transmit a message from one station to another station, breaks the message into smaller units called packets. Each packet contains destination (header) information and a part of the message. The packets are routed from the sending station to the receiving station through switching points, where each of the switches itself is a computer capable of recognizing the address information and of routing the packet to its destination. The packet-switching nodes can dynamically select the best route for each packet, so that later packets may arrive prior to earlier packets. The switch at the receiving end reassembles the packets in the proper order. Packet-switching networks do not establish a real connection between transmitter and receiver, but instead create a virtual circuit that emulates the connection created by a physical link. Packet-installed networks are highly efficient and can improve real-time transmission.

**PAD**

see PACKET ASSEMBLER/DISASSEMBLER

**PDN Public Data Network**

A public data network is a digital leased circuit, digital switched circuit, or packet switching network that is designed to provide low-cost-rate data transmission by using digital rather than analog techniques.

**protocol**

A protocol is a set of agreed-upon rules and conventions governing the formats and processes used in data communications. Protocol functions include establishing procedures for beginning and terminating connections, identifying stations, and ensuring compatibility between devices. Examples of protocols include the CCITT X.25, and the IBM SDLC, and BISYCH.

**PTT**

PTT (Postal, Telephone, and Telegraph Authority) is the term used to describe the agency of government which, in most countries outside North America, is responsible for the administration and management of telecommunications and mail.

**PSTN**

Public Switched Telephone Network. See SWITCHED NETWORK.
switched network

The switched network generally refers to the publicly available network of lines and switching equipment used for dialed telephone calls or dial-up data transmission. The term can also apply to private or otherwise limited networks of lines and switching equipment.

tariff

A tariff is a schedule published by a communications common carrier. It describes the particular services provided, their rates, and the conditions under which the services are available.

telecommunications

Telecommunications refers to the transmission and/or reception of information by telephone, telegraph, radio or other methods of communication over a distance. The information may be in the form of voice, text, pictures, and/or encoded data.

teleconferencing

Teleconferencing describes the use of telecommunications links to support interaction by a number of conference participants at two or more physical locations. The telecommunications links may include one or more of the following: multiple connection voice telephone (audio teleconferencing); audio teleconferencing with audioraphic capabilities; or one-way or multi-locational video communication in addition to the audio, through which text and images may be read and augmented by authorized participants at their convenience. (Computer conferencing, in which participants converse with each other from remote locations via intelligent terminals or microcomputers, is also frequently referred to as teleconferencing). Video teleconferencing includes full-motion video, equivalent to the quality of a standard television broadcast; slow-scan, which involves transmitting a video image, via telephone lines, that slowly but constantly changes when displayed; freeze-frame or still video, in which a picture is held on the screen for approximately a half minute and then dissolved.

Telefax

see FAXSIMILE TRANSMISSION

telegraph

Telex is a teletypewriter (TTY) service introduced by Western Union in the 1950's. Telex teletypewriters have a printout speed of 66 words per minute and use Baudot five-level code. Telex messages can be sent worldwide through the facilities of international record carriers (IRCs). New telex-oriented message transmission and reception capabilities are being introduced as part of teletext services, which allow such devices as personal computers, electronic memory typewriters, and communicating word processors to communicate with each other.

text

Text refers to that portion of a transmitted data message containing the substantive information to be conveyed. In addition to the text or body of the message, the full data transmission generally includes a header portion with routing information and a trailer portion providing additional summary system information.

type approval

Type approval is a procedure that equipment manufacturers submit to in order to ensure that their equipment meets certain minimum specifications set by a telecommunications authority before the equipment can be connected to the telecommunications network.

X

X.3

X.3 is an international standard for the packet assembly/disassembly facility (PAD) in a Public Data Network (PDN)

X.25

X.25 is an international, three level protocol for interfacing computers and terminals to public packet-switching networks worldwide. Developed by the CCITT with the participation of the United States, Canada, Great Britain, France and Japan, X.25 includes electrical, link control, and network interface protocol layers. The physical/electrical interface follows the X.21 recommendation. The link control level is compatible with HDLC and can accommodate the BISYNC (binary synchronous) protocol developed by IBM. The network interface protocol defines the origination, termination, and use of virtual circuits which connect host computers and terminals across the network.

X.28

X.28 is a CCITT standard for the data terminal equipment (DTE) and data communication equipment (DCE) interface for accessing the PAD in a public data network situated in the same country.

X.75

X.75 is a CCITT standard for the interconnection of two public packet-switching networks that support the X.25 network interface protocol.