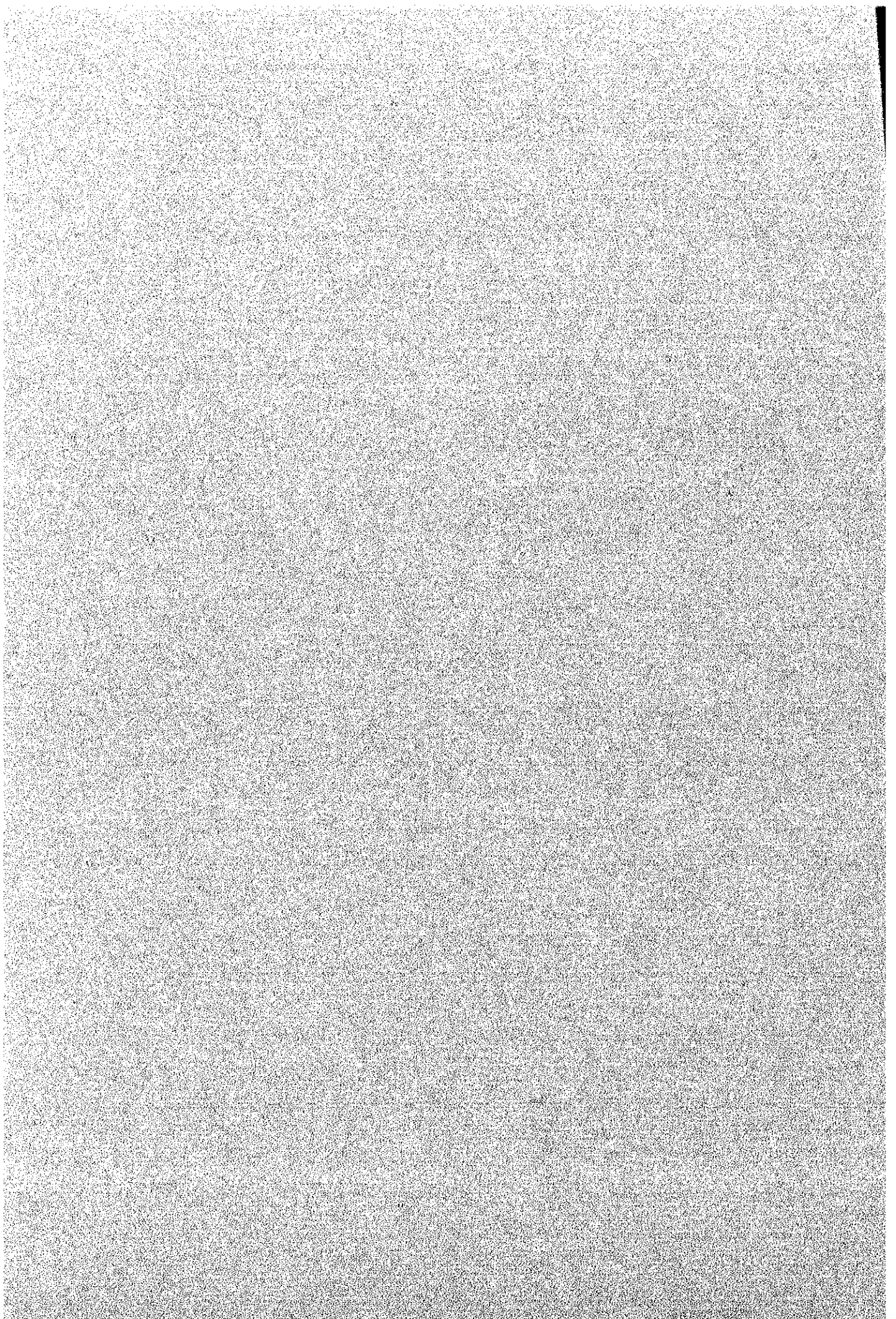


CHAPTER 4 PROJECT EVALUATION AND CONCLUSION

CHAPTER 4 PROJECT EVALUATION AND CONCLUSION



CHAPTER 4 PROJECT EVALUATION AND CONCLUSION

4.1 Effects of the Project

With the implementation of this Project, 4,190 subscribers in the Western region including new district capitals, Gasa and Tashiyangtse, can be connected to a high quality telecommunications system, and an integrated domestic digital telecommunications network can be established covering the whole country. This means that "anytime available" telephone services will be realized in main cities throughout the country.

The number of beneficiaries of this Project is estimated to be approx. 100,000 in the objective areas. The telephone density will be remarkably improved from 0.9% as of 1994 to 2.0% when telephone installations have reached the capacity of the switching facilities including those installed by the previous project.

In addition to the above, the following effects can be expected:

- (1) In times of emergencies, such as natural disaster, necessary information and instruction can be transmitted promptly, so that quick action can be taken for emergency measure. Thus social security can be enhanced.
- (2) In the case of sudden illness or injury, urgent communication can be made with hospitals or Basic Health Unit (BHU), leading to the saving of the lives of inhabitants in the objective areas.
- (3) Productivity of administration services can be enhanced through the rapid transmission of information between the central and local offices by the use of, among others, facsimile service, compared with the conventional information transmission by mail which used to require several days.
- (4) Information on road blocking due to rainfall, snowfall, etc., can be transmitted promptly to relevant agencies, so that they can take any necessary action quickly, and transportation can be managed efficiently and effectively.
- (5) In the commercial and industrial sectors, rapid transmission of information on commodity distribution will permit manufacturers to make "planned" production, through "planned" material purchase and product transportation.

This means enhanced productivity and more efficient stocking, leading to the saving of storage space and efficient sales.

- (6) In the tourism business, improved communication services will permit smooth hotel reservation and transportation arrangement, that is, efficient tourism services. Tourists including those from abroad also can enjoy benefits from improved communications as they will be able to make telephone calls to any place at any time.

4.2 Justification

As described above, far reaching benefits can be derived from the construction of a digital telecommunication network in the Western region and two new, no telephone district capitals, Gasa and Tashiyangtse, with which a highly reliable integrated telecommunication network can be established covering the whole country. That is, this Project will contribute to the upgrading of the basic human needs of the people of the Kingdom of Bhutan and the expected benefits from this Project will conform with the objective of Japan's grant aid system. In addition, operation and maintenance costs to be required after the completion of the system can sufficiently be covered by the income from this Project, and materialization of this Project will contribute to the promotion of the National Development Five-Year Plan. In view of the above, this Project is judged appropriate as a grant aid project.

4.3 Recommendations

In order to ensure satisfactory operation and maintenance of the facilities provided by this Project, it is recommended that the Royal Government take action on the following:

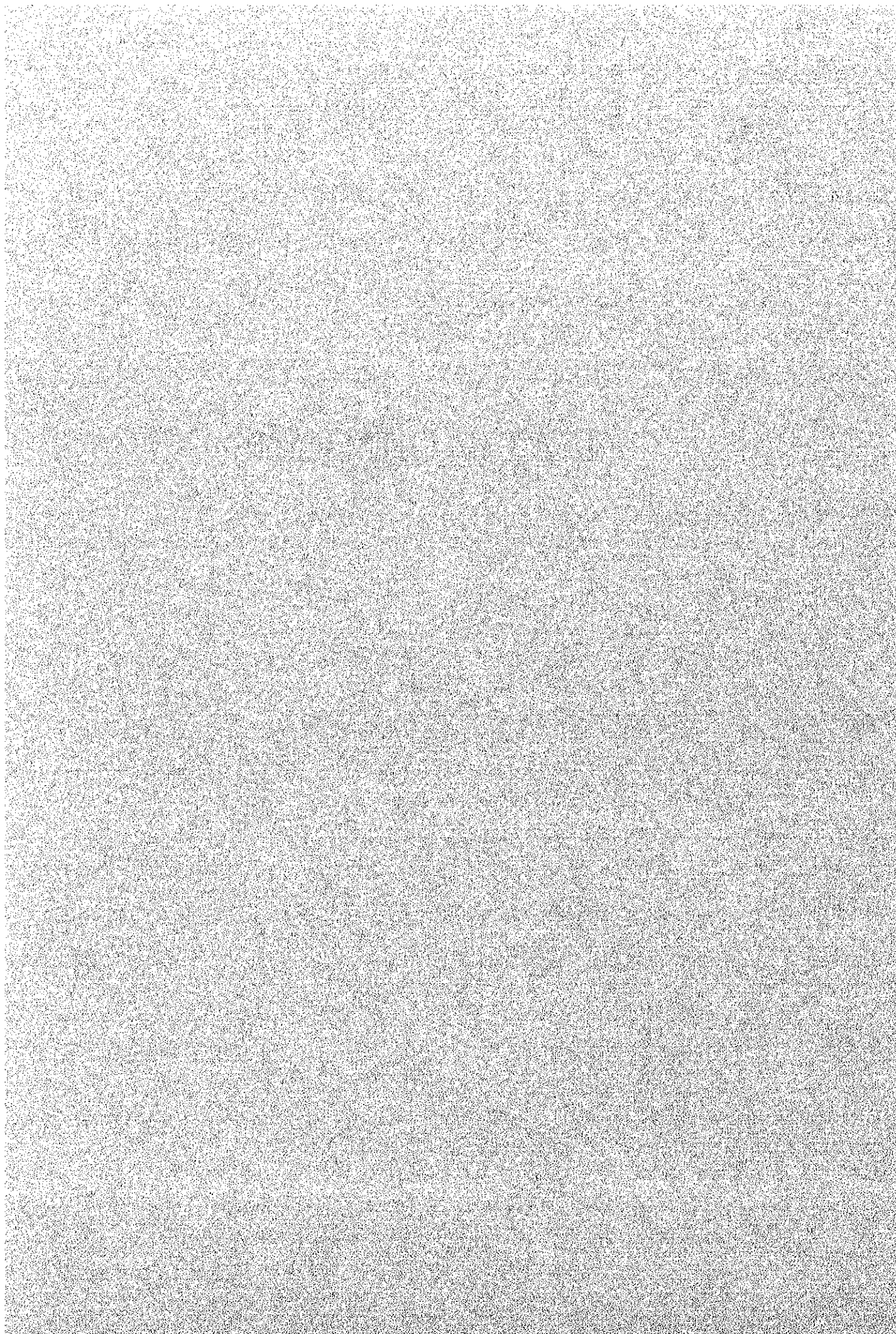
- (1) At present, Division of Telecommunications (DOT) is conducting training of technical staff for the operation and maintenance of the facilities to be provided by this Project. It is recommended, however, that the training system be reinforced both qualitatively and quantitatively so that the required number of operation/maintenance staff can be procured in advance of the commencement of the operation of these facilities.
- (2) In planning the system for this Project, there were no actual traffic data; even

data concerning the previous project were not available, and traffic forecast had to be estimated based on certain assumptions. In order to achieve satisfactory management of the telecommunication network in the Kingdom, it is recommended that the traffic management system be reinforced.

- (3) According to the financial regulation of the Royal Government, DOT's income goes directly to the national treasury, and DOT's expenditures are disbursed from the treasury. With the materialization of this Project, DOT's income is expected to increase and, therefore, it is recommended that some of the operational income be utilized as funds for small scale telecommunications development.

ATTACHMENT

1. ATTACHMENT



Attachment-1

Member List of Study Team for Field Survey

Leader, Communication System Planner : Mr. Shigemaro AOKI
Development Specialist of JICA

Grant Aid Planner : Mr. Mineo NEGITA
Grant Aid Div., Economic Cooperation Bureau, Ministry of Foreign Affairs

Project Coordinator : Mr. Toshinobu KATO
Second Basic Design Study Div., Grant Aid Study & Design Dept., JICA

Chief Consultant.
Telecommunication Network Planner : Mr. Takeshi KOMIYA
Nippon Telecommunications Consulting Co., Ltd.

Radio Transmission Planner(I)
Cost Estimator : Yasuro YOSHIDA
Nippon Telecommunications Consulting Co., Ltd.

Radio Transmission Planner(II) : Mr. Yoshiaki KAWAI
Nippon Telecommunications Consulting Co., Ltd.

Switching System Planner : Mr. Toyokuni YAMAGUCHI
Nippon Telecommunications Consulting Co., Ltd.

Outside Plant Planner : Mr. Kozo SATAKE
Nippon Telecommunications Consulting Co., Ltd.

Architecture Planner : Mr. Ryoichi FUKAMACHI
Nippon Telecommunications Consulting Co., Ltd.

Power Supply Planner : Mr. Yasushi KATO
Nippon Telecommunications Consulting Co., Ltd.

Consultant Coordinator : Mr. Shuji SATO
Nippon Telecommunications Consulting Co., Ltd.

Attachment-2 Schedule for Field Survey

1994

- Oct. 4 (Tue) Departure from Tokyo
5 (Wed) Arrival at Thimphu,
 Courtesy Call on JOCV Bhutan Office, MOC, and DOT
6 (Thu) Interview with Telecom Engineers of JOCV
7 (Fri) Explanation and Discussion on Inception Report with MOC and DOT,
 Courtesy Call on Ministry of Planning and National Budget & Account
8 (Sat) Investigation for Status quo of the Previous Project site (Tongsa)
9 (Sun) Investigation for Status quo of the Previous Project Site (Tongsa)
10 (Mon) Team Member Meeting,
 Discussion with DOT,
 Preparatory Work for Field Survey
11 (Tue) Investigation for Training Unit in Thimphu Exchange,
 Discussion with DOT,
 Preparatory Work for Field Survey
12 (Wed) Discussion with DOT,
 Courtesy Call on UNDP,
 Preparatory Work for Field Survey
13 (Thu) Signing on the Minutes of Discussions,
 Reporting to JOCV Bhutan Office
14 (Fri)
| Field Survey and Data Collection
- Nov. 1 (Tue)
2 (Wed) Arrangement of Data Collected
3 (Thu) Arrangement of Data Collected,
 Discussion with DOT
4 (Fri) Arrangement of Data Collected,
 Discussion with DOT,
 Courtesy Call on MOC and JOCV Bhutan Office
5 (Sat)
| Arrangement of Data Collected
6 (Sun)
7 (Mon) Departure from Thimphu,
 Arrival at Delhi,
 Reporting to Embassy of Japan in India
8 (Tue) Reporting to JICA India Office,
 Investigation for Procurement of Telecommunication Cables from India

9 (Wed) Investigation for Procurement of Telecommunication Cables from India
10 (Thu) Arraival at Tokyo

Attachment-3 Member List of Concerning Party for Field Survey

1. Ministry of Planning
Lyonpo Chenkyab Dorji : Minister
2. National Budget & Account
Mr. Wangdi Norbu : Director
3. MOC
Dasho Leki Dorji : Dy. Minister
4. DOT
Mr. Tshering Dorji : Director
Mr. Sangey Tenzing : Superintended Engineer
Mr. Thinley Dorji : Project Manager
Mr. Pushupa Mani Pradhan : Coordinator
5. UNDP
Mrs. Akiko Naito-Yuge : Resident Representative
6. JOCV Bhutan Office
Mr. Akio Yamamoto : Resident Representative
Ms. Sakiko Takeuti : Medical Coordinator
Mr. Hirokazu Fujita : Telecom Engineer
Mr. Mamoru Arima : Telecom Engineer
7. ITU
Dr. Robert G. Winch : Digital Transmission/
Training Expert
8. Tongsa Dzong
Mr. Dorji Namgyel : Dzongdha
9. Embassy of Japan in India
Mr. Seiji Kojima : Minister
Mr. Masato Fukushima : First Secretary
10. JICA India Office
Mr. Minoru Sasago : Resident Representative
Mr. Masahiro Nomura : Deputy Resident Representative

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT FOR
THE DOMESTIC TELECOMMUNICATION NETWORK
IN
THE WESTERN REGION
IN
THE KINGDOM OF BHUTAN

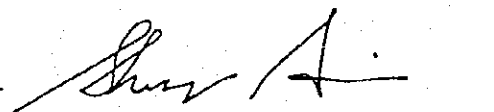
In response to a request from the Royal Government of Bhutan, the Government of Japan decided to conduct a Basic Design Study on the Project for the Domestic Telecommunication Network in the Western Region (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Kingdom of Bhutan a study team, which is headed by Mr. Shigemaro AOKI, Development Specialist of JICA, and is scheduled to stay in the country from October 5 to October 15, 1994.

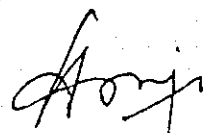
The team held discussions with the officials concerned of the Royal Government of Bhutan and conducted a field survey at the study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further work and prepare the Basic Design Study Report.

Thimphu, October 13, 1994



Shigemaro AOKI
Leader
Basic Design Study Team
JICA



Dasho Leki Dorji
Deputy Minister
Ministry of Communications
The Royal Government of Bhutan

ATTACHMENT

1. Objective

The objective of the Project is to contribute towards improving quality of life of the people and social-economic development in the Kingdom of Bhutan.

The objective can be achieved with the completion of main network in the Western Region following the previous Project in the Central and Eastern Regions to establish an integrated digital telecommunication network.

2. Study sites

The Study sites concerned with the Project are as follows:

Phuentsholing, Samtse, Paro, Haa, Wangduephodrang, Punakha, Chimakothi, Gasa, Tashiyangtse, Thimphu

and repeater stations where concerned with the above sites.

3. Executing agency

Ministry of Communications of the Royal Government of Bhutan is responsible for the administration and execution of the Project.

If the Royal Government of Bhutan has any plan to restructure the Division of telecommunications, Ministry of Communications, the Royal Government of Bhutan promises to inform the Government of Japan of such plan and schedule.

4. Items requested by the Royal Government of Bhutan

After discussions with the Basic Design Study Team, the following items were finally requested by the Bhutan side.

- 1) Switching facilities/DRCS at:
Phuentsholing, Samtse, Paro, Haa, Wangduephodrang, Punakha, Chimakothi, Thimphu(Tandem), Gasa, Tashiyangtse
- 2) Transmission facilities on the digital microwave routes (Thimphu to each switching facility)
- 3) Supply of local Network for each exchange (Cable and accessories)
- 4) Power supply equipment concerning switching facilities, DRCS and active repeaters
- 5) Billing System
- 6) Maintenance spares and vehicle

7) Priority order of the sites is as follows:

Phuentsholing
Samtse
Paro
Thimphu (Tandem)
Tashiyangtse
Gasa
Chimakothi
Wangduephodrang
Punakha
Haa

However, the final components of the Project will be decided after further studies.

5. Japan's grant aid systems

- 1) The Royal Government of Bhutan has understood the system of Japan's grant aid explained by the team.
- 2) The Royal Government of Bhutan will take the necessary measures, described in Annex, for smooth implementation of the Project on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the study

- 1) The consultants will proceed to further studies in the Kingdom of Bhutan until November 7.
- 2) JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around February, 1995.
- 3) If the contents of the report is accepted in principle by the Royal Government of Bhutan, JICA will complete the final report and send it to the Royal Government of Bhutan by March, 1995.

ANNEX : Necessary measures to be taken by the Royal Government of Bhutan in case Japan's Grant Aid is executed

- (1) To secure the sites for the Project
- (2) To clear, level and reclaim the sites prior to commencement of the construction
- (3) To cut obstruction trees on the transmission route
- (4) To undertake incidental outdoor works such as gardening, fencing, gates and lighting in and around the sites where required
- (5) To provide storage and yards in the sites where required
- (6) To construct the access road to the sites prior to commencement of the construction
- (7) To provide facilities for distribution of electricity, drainage, sewage and other incidental facilities to the Project sites
 - 1) Electricity distributing line to the sites
 - 2) Drainage construction in and around the sites
 - 3) General furniture such as carpets, curtains, tables, chairs and others
- (8) To secure the equipment space for the terminal stations
 - 1) Removal of existing equipment
 - 2) Alteration and/or expansion of existing buildings
 - 3) Construction of new buildings
- (9) To install Outside Plant where required
- (10) To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement
- (11) To exempt the taxes and to take necessary measures for customs clearance of the materials and equipment for the Project at the port of disembarkation
- (12) To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Kingdom of Bhutan and stay therein for the performance of their work
- (13) To exempt Japanese nationals from the custom duties, internal taxes and their fiscal levies which may be imposed in the Kingdom of Bhutan with respect to the supply of the products and services under the verified contract
- (14) To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant
- (15) To bear all the expenses other than those to be borne by the Grant necessary for construction of the facilities as well as for the transportation and installation of the equipment

Attachment-5

Member List of Study Team for Explanation of Draft Report

Leader : Mr. Shigemaro AOKI
Development Specialist of JICA

Grant Aid Planner : Mr. Hiroyasu MURAKASHI
Grant Aid Div., Economic Cooperation Bureau, Ministry of Foreign Affairs

Chief Consultant
Telecommunication Network Planner : Mr. Takeshi KOMIYA
Nippon Telecommunications Consulting Co., Ltd.

Power Supply Planner : Mr. Yasushi KATO
Nippon Telecommunications Consulting Co., Ltd.

Attachment 6 Schedule for Explanation of Draft Report

1995

- Mar. 11 (Sat) Departure from Tokyo (Consultant Members)
- 12 (Sun) Arrival at Thimphu,
Courtesy Call on JOCV Bhutan Office, MOC, and DOT (Consultant Members)
- 13 (Mon) Explanation on Draft Report to MOC and DOT (Consultant Members)
- 14 (Tue) Departure from Tokyo (Official Members),
Explanation on Draft Report with DOT (Consultant Members)
- 15 (Wed) Courtesy Call on Embassy of Japan in India and JICA India Office (Official Members)
Explanation on Draft Report to MOC and DOT (Consultant Members)
- 16 (Thu) Explanation on Draft Report to DOT (Consultant Members)
Arrival at Thimphu (Official Members),
Team Member Meeting
- 17 (Fri) Courtesy Call on Ministry of Finance, MOC, UNDP, DOT and JOCV Bhutan Office
- 18 (Sat) Discussion on Draft Report with DOT
- 19 (Sun) Investigation for Status quo of the Objective Sites (Wangdue Phodrang, Punakha)
- 20 (Mon) Team Member Meeting,
Courtesy Call on Ministry of Planning
- 21 (Tue) Discussion on the Minutes of Discussions with DOT
- 22 (Wed) Signing on the Minutes of Discussions,
Reporting to JOCV Bhutan Office,
Arrival at Paro
- 23 (Thu) Arrival at Delhi,
Reporting to Embassy of Japan in India and JICA India Office
- 24 (Fri) Arrival at Hong Kong
- 25 (Sat) Arrival at Tokyo

Attachment-7

Member List of Concerning Party for Explanation of Draft Report

1. Ministry of Planning
Lyonpo Chenkyab Dorji : Minister
2. Ministry of Finance
Dasho Yeshey Zimba : Secretary
3. MOC
Dasho Leki Dorji : Dy. Minister
4. DOT
Mr. Sangey Tenzing : Offg. Director
Mr. Thinley Dorji : Project Manager
Mr. Gopi Pradhan : Chief of Training Unit
5. UNDP
Mrs. Akiko Naito-Yuge : Resident Representative
6. JOCV Bhutan Office
Mr. Akio Yamamoto : Resident Representative
Mr. Shigehiro Hamaoka : Telecom Engineer
7. Embassy of Japan in India
His Excellency
Mr. Chusei Yamada : Ambassador
Mr. Seiji Kojima : Minister
Mr. Masato Fukushima : First Secretary
8. JICA India Office
Mr. Minoru Sasago : Resident Representative
Ms. Nana Hosoi : Assistant Resident Representative

Attachment-8

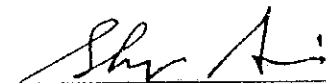
MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT FOR
THE DOMESTIC TELECOMMUNICATION NETWORK
IN
THE WESTERN REGION
IN
THE KINGDOM OF BHUTAN
(CONSULTATION ON DRAFT REPORT)

In October 1994, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on the Project for the Domestic Telecommunication Network in the Western Region (hereinafter referred to as "the Project") to the Kingdom of Bhutan, and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

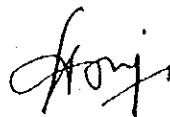
In order to explain and to consult the Bhutan side on the components of the draft report, JICA sent to Bhutan a study team, which is headed by Mr. Shigemaro AOKI, Development Specialist of JICA, and is scheduled to stay in the country from March 16 to 23, 1995.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Thimphu, March 22, 1995



Shigemaro AOKI
Leader
Draft Report Explanation
Team JICA



Dasho Leki Dorji
Deputy Minister
Ministry of Communications
The Royal Government of Bhutan

ATTACHMENT

1. Components of Draft Report

The Government of Bhutan has agreed and accepted in principle the components of the Draft Report proposed by the team. However, on the basis of discussions, both parties confirmed further review and revisions are necessary about some items as described in Annex I.

2. Japan's Grant Aid system

- 1) The Government of Bhutan has understood the system of Japanese Grant Aid explained by the team. (Annex II)
- 2) The Government of Bhutan will take the necessary measures, described in Annex III, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further schedule

The team will make the Final report in accordance with the confirmed items, and send it to Government of Bhutan by the end of March, 1995.

ANNEX I : Further Review and Revisions on Draft Report

1. Japanese side explained the existing small capacity DRCS shall be used for Chimakoti and Haa.

Bhutan side insisted the traffic volume of existing subscribers in Chimakoti and Haa exceeds the traffic processing capacity of the existing DRCS.

As the results of discussions, Japanese side understood the Bhutan side's request.

Then, Japanese side recognized the necessity of the introduction of large capacity DRCS both in Chimakoti and Haa.

2. Japanese side forecasted the originating call rate per subscriber is 0.2 Erl in average at all exchanges in Project sites.

As the results of discussions, both sides agreed that Japanese side will review the traffic forecast of originating call rate, and that this result will be described in the Final Report.

3. Japanese side pointed out the importance of traffic administration for the appropriate network management, and recommended the improvement in traffic administration.

Bhutan side understood the recommendation.

Both sides agreed this matter shall be presented in the Final Report.

ANNEX II : Japan's Grant Aid Scheme

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application Study	(Request made by a recipient country) (Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

- d)Preparation of a basic design of the Project
- e)Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organization of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan Grant Aid Scheme

1) What is Grant Aid ?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments Concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement

between the two Governments.

- 4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

- 6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

- 7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payment will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

ANNEX III : Necessary measures to be taken by the Royal Government of Bhutan in case Japan's Grant Aid is executed

- (1) To secure the sites for the Project
- (2) To clear, level and reclaim the sites prior to commencement of the construction
- (3) To cut obstruction trees on the transmission routes
- (4) To undertake incidental outdoor works such as gardening, fencing, gates and lighting in and around the sites where required
- (5) To provide storage and yards in the sites where required
- (6) To construct the access road to the sites prior to commencement of the construction
- (7) To provide facilities for distribution of electricity, drainage, sewage and other incidental facilities to the Project sites where required
 - 1) Electricity distributing line to the sites
 - 2) Drainage construction in and around the sites
 - 3) General furniture such as carpets, curtains, tables, chairs and others
- (8) To secure the equipment space except for the repeater stations
 - 1) Removal of existing equipment
 - 2) Alteration and/or expansion of existing buildings
 - 3) Construction of new buildings
- (9) To install Outside Plant where required
- (10) To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement
- (11) To exempt the taxes and to take necessary measures for customs clearance of the materials and equipment for the Project at the port of disembarkation
- (12) To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Kingdom of Bhutan and stay therein for the performance of their work
- (13) To exempt Japanese nationals from the custom duties, internal taxes and their fiscal levies which may be imposed in the Kingdom of Bhutan with respect to the supply of the products and services under the verified contract
- (14) To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant
- (15) To bear all the expenses other than those to be borne by the Grant necessary for construction of the facilities as well as for the transportation and installation of the equipment

Attachment-9

Effects of Project Implementation

Effects of the Project are expected to be as follows:

	Problems	Countermeasures to be Taken by this Project	Effects and Improvements to be Achieved by this Project
1	<p>Problems of Objective Sites</p> <p>(1) Phuentsholing</p> <p>The largest commercial city in the Kingdom. But business activities are constrained by poor communication services being provided by a small capacity and antiquated analogue system. Even in the business center, communication is very difficult. Most of the peripheral industrial areas are non-telephone areas. Communications to remote areas can hardly be done.</p>	<p>A digital switching system having 2,200 L.U. is installed, and a digital radio transmission link is established for connection with Thimphu.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Thimphu, contributing to the following:</p> <ul style="list-style-type: none"> - Efficient administrative services. - Efficient distribution of commodities through realization of time-saving business transaction. - Increase in the productivity at the factories around Phuentsholing, through efficient and systematic procurement of raw materials and products shipping.

			<ul style="list-style-type: none"> - Enhancement of social welfare of the people in the objective areas, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 23,000.
	<p>(2) Samtse An industrial city embracing cement factories, food processors, etc., but having no roadway connection to other areas in the country. For long distance calls, only an open wire installed via India is available. For local calls, there exists only the aged and small capacity analogue switching equipment, and practically no communication is feasible.</p>	<p>A digital switching system with 400 L.U. is installed, and a digital radio transmission line is established for connection with Phuentsholing.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Phuentsholing, contributing to the following:</p> <ul style="list-style-type: none"> - Realization of communication services independent of India, serving for reinforcement of the national security as an independent country. - Efficient administrative services. - Increase in the productivity of the industrial sector in this area. - Promotion of systematic production and efficient export of oranges, cardamon, etc. which can earn foreign exchange.

		<ul style="list-style-type: none"> - Enhancement of social welfare of the people in this area, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 7,000.
<p>(3) Paro Only one international airport city, but no telephone services are available for tourists from abroad. Also a distribution center of agricultural products from farms extensively spread in the vicinity. The existing telecom. facilities are insufficient both in capacity and quality. Even communications for administrative services are difficult.</p>	<p>A digital switching system having 500 L.U. is installed, and a digital radio transmission link is established for connection with Thimphu.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Thimphu, contributing to the following:</p> <ul style="list-style-type: none"> - Tourists arriving in Paro from abroad can communicate with any country in the world, as well as any place in the nation. - Efficient administrative services. - Efficient transportation of agricultural products, such as apples which can earn foreign exchange, rice which is the staple food in the Kingdom, etc. - Enhancement of social welfare of the people in the objective area, particularly in

		<p>respect of medical services and security.</p> <ul style="list-style-type: none"> - The estimated number of beneficiaries: approx. 16,000.
<p>(4) Tashiyangtse Capital of a new district separated from Tashigang, but still remains to be a non-telephone area. Even communications for administrative services are difficult.</p>	<p>DRCS for 50 subscriptions is introduced, and a transmission-link is established for connection with Tashigang.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Tashigang, contributing to the following:</p> <ul style="list-style-type: none"> - Promotion of administrative functions of the new capital, through easy and prompt communication with other areas in the country. - Enhancement of social welfare of the people in this area, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 2,000.
<p>(5) Gasa Capital of a new district separated from Punakha but still remains to be a non-telephone area, like Tashiyangtse. Being 2-day distant on foot from Punakha, communication by any means is very difficult.</p>	<p>DRCS for 50 subscriptions is installed and a transmission link is established for connection with Thimphu.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Thimphu, contributing to the following:</p>

			<ul style="list-style-type: none"> - Promotion of administrative functions of the new capital, through easy and prompt communication with other areas in the country. - Enhancement of social welfare of the people in this area, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 1,500.
	<p>(6) Chimakoti There exists a large hydroelectric power station, which supplies power to India. Power is a top ranking foreign exchange earner. Expansion of the power station is under planning. Existing telecom. facilities are in sufficient in both quality and quantity, resulting in poor telecom. service.</p>	<p>DRCS for 200 subscriptions is installed and a transmission link is established for connection with Paro.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Paro, contributing to the following:</p> <ul style="list-style-type: none"> - Efficient operation and maintenance of hydraulic power station, leading to stable power supply in the country and increase in export of power to India. - Promotion of administrative functions. - Enhancement of social welfare of the people in this area, particularly in respect of medical services and security.

		<ul style="list-style-type: none"> - The estimated number of beneficiaries: approx. 4,000.
<p>(7) Wangdue Phodrang A key point in transportation from Thimphu to the Central and Eastern regions, and an agricultural district, with farmland extending over relatively gentle slopes. Existing telecom. facilities are inadequate, resulting in poor communication services.</p>	<p>A digital switching system having 300 L.U. is installed, and a digital transmission link is established for connection with Thimphu.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Thimphu, contributing to the following:</p> <ul style="list-style-type: none"> - Efficient transportation of agricultural products. - Promotion of administrative functions. - Enhancement of social welfare of the people in the objective area, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 20,000.
<p>(8) Punakha Former capital of the Kingdom, having relatively large population. Being located on the rather gentle slope, the agricultural industry is being developed, with the increasing population. Telecom. services are poor, with inadequate facilities.</p>	<p>A digital switching system having 300 L.U. is installed, and a digital radio transmission is established for connection with Thimphu.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Thimphu, contributing to the following:</p> <ul style="list-style-type: none"> - Efficient transportation of agricultural and other products.

			<ul style="list-style-type: none"> - Promotion of administrative functions. - Enhancement of social welfare of the people in the objective area, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 20,000.
	<p>(9) Haa A center of the agricultural area extending in rather wide valleys. The existing facilities consist of only an open wire and an aged, small capacity analogue switching equipment, and practically no communication is feasible.</p>	<p>DRCS for 200 subscriptions is installed and a transmission link is established for connection with Paro.</p>	<p>High quality national and international communication becomes feasible with various places throughout the country and over the world, via Paro, contributing to the following:</p> <ul style="list-style-type: none"> - Efficient transportation of agricultural-and other products. - Promotion of administrative functions. - Enhancement of social welfare of the people in the objective area, particularly in respect of medical services and security. - The estimated number of beneficiaries: approx. 5,000.

2	The existing charging system consists of only one set each of magnetic tape reader and bill printer installed in Thimphu Exchange, and is low in both efficiency and reliability.	One set each of magnetic tape reader and bill printer is added to the existing system in Thimphu Exchange.	Efficiency and reliability of the charging system is enhanced, and the efficiency in bill collection business can be enhanced.
3	The existing Training Unit is not provided with necessary training equipment and materials. Currently only basic and theoretical training is being conducted. Lack of practical training is a problem to be solved for obtaining qualified operation/maintenance staff.	The equipment necessary for practical training is supplied to the Training Unit.	Through the practical training by means of the supplied equipment, capable operation/ maintenance staff can be obtained, leading to satisfactory operation/ maintenance and increased system reliability.
4	The current diffusion rate is assumed to be 1.5%, which should be improved.	With the implementation of this Project, 4,190 subscriptions will be added.	The diffusion rate is improved to 2%.

2. DESIGN DATA

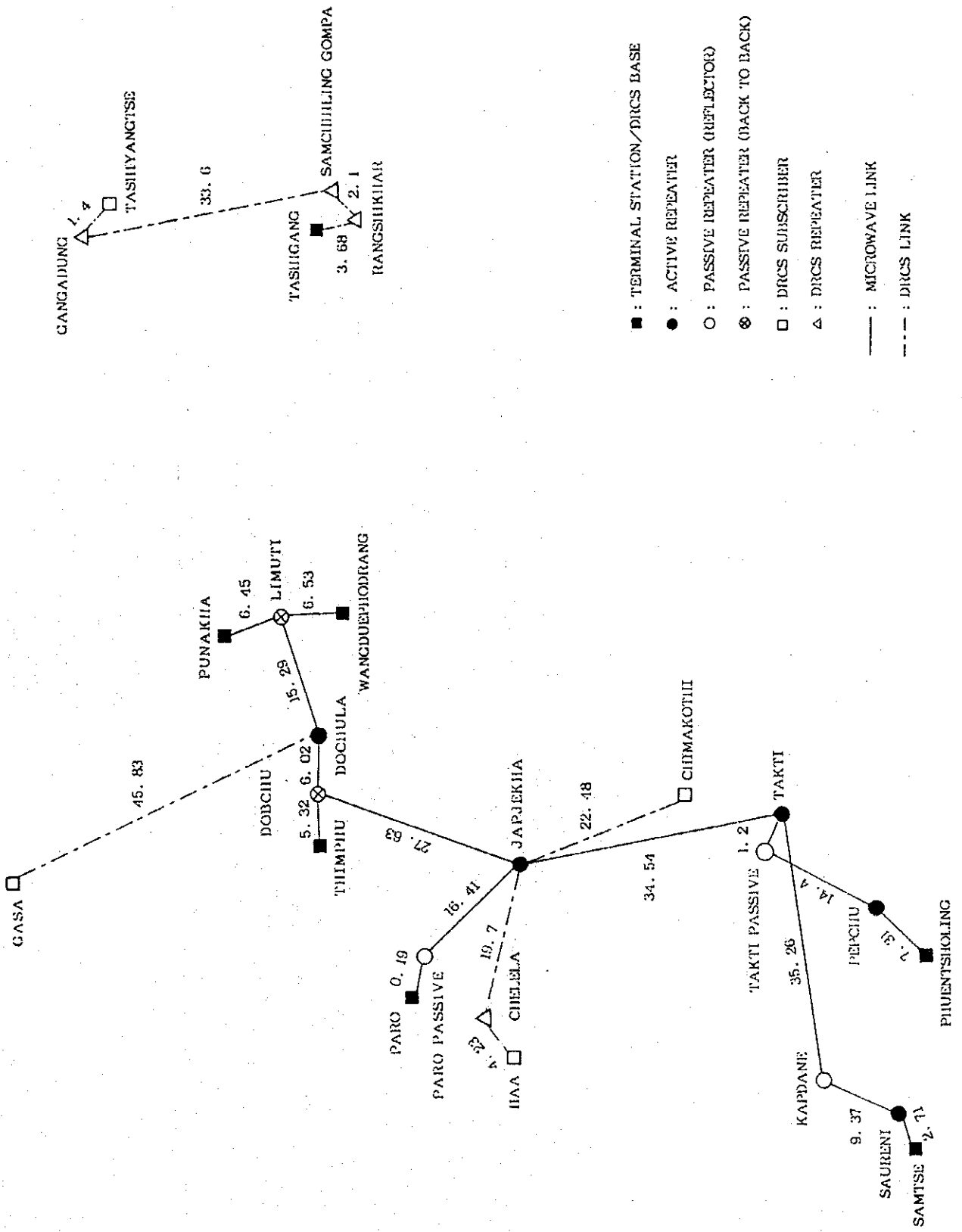
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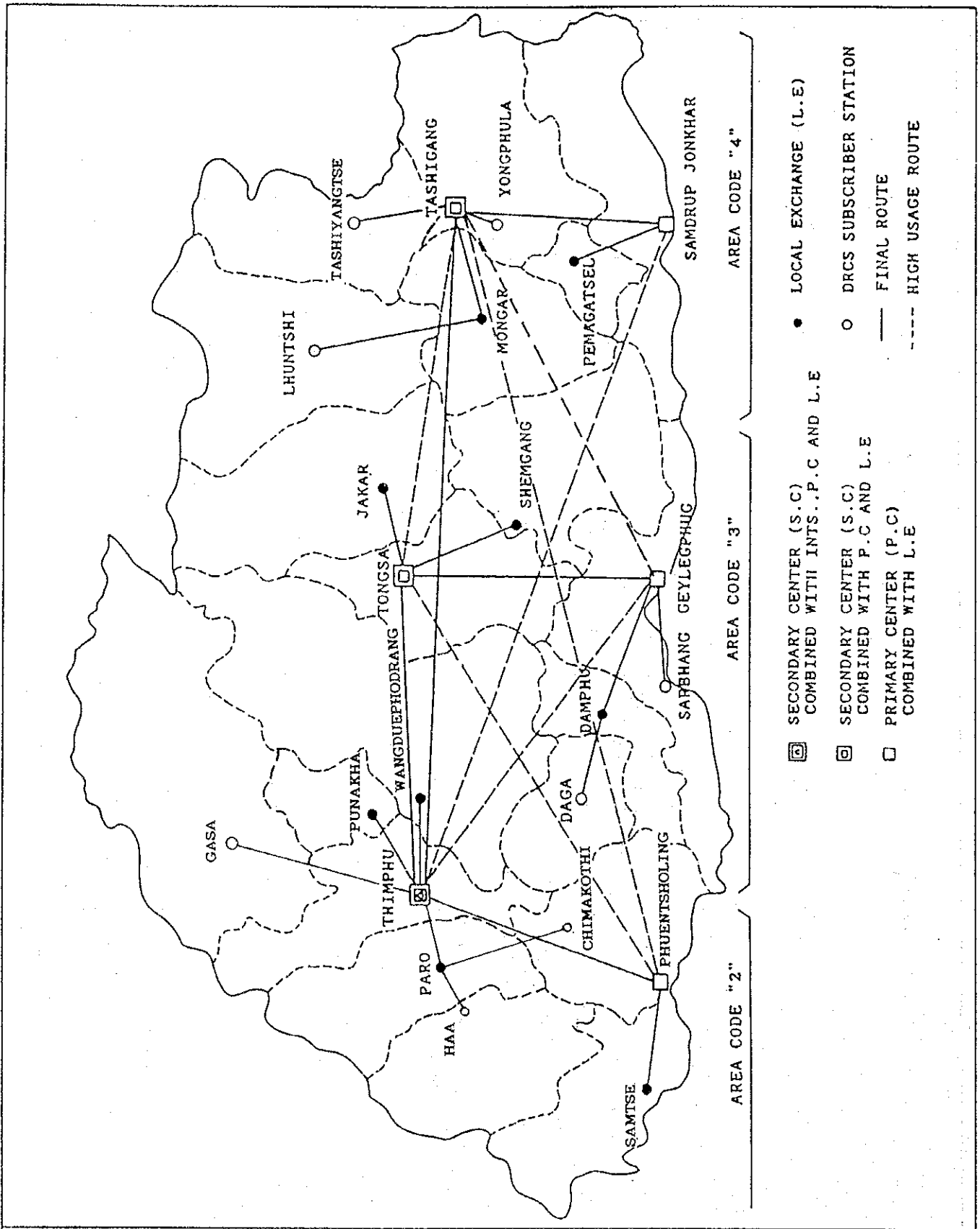
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MICROWAVE TRANSMISSION
NETWORK PLAN

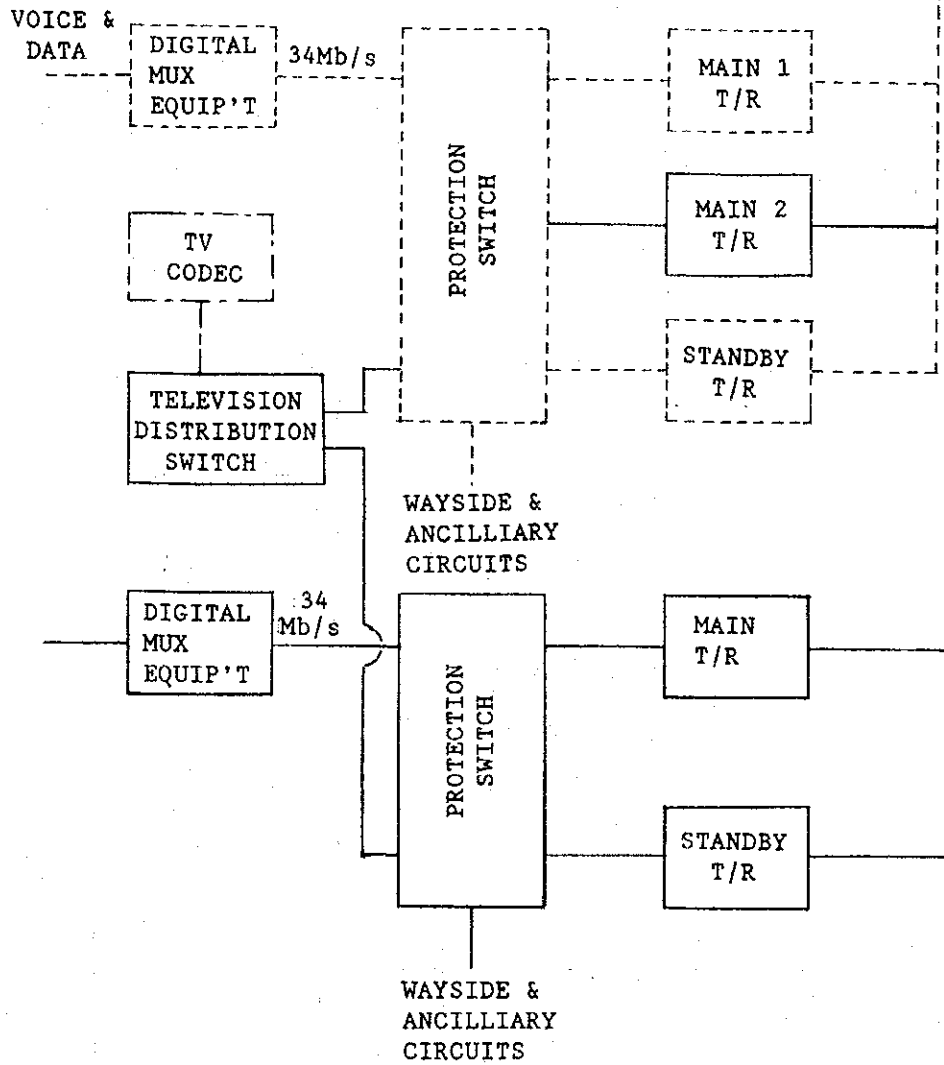
FIG. NO. :
NT-1



TELEPHONE SWITCHING NETWORK PLAN

FIG. NO. :
NT-2

TERMINAL
(THIMPHU)

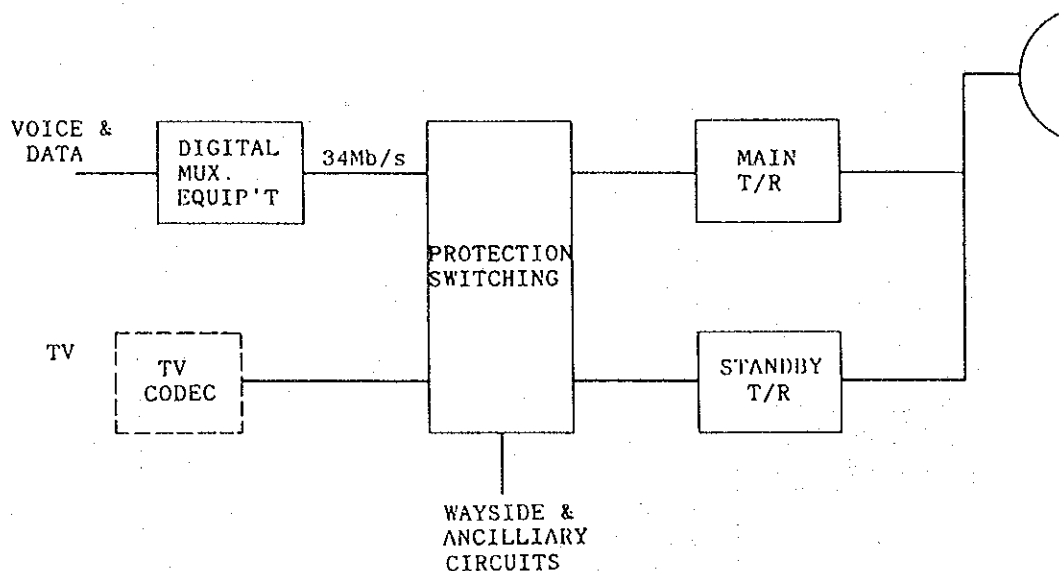


- - - - - EXISTING
 _____ NEW EQUIPMENT
 - · - · - FUTURE USE

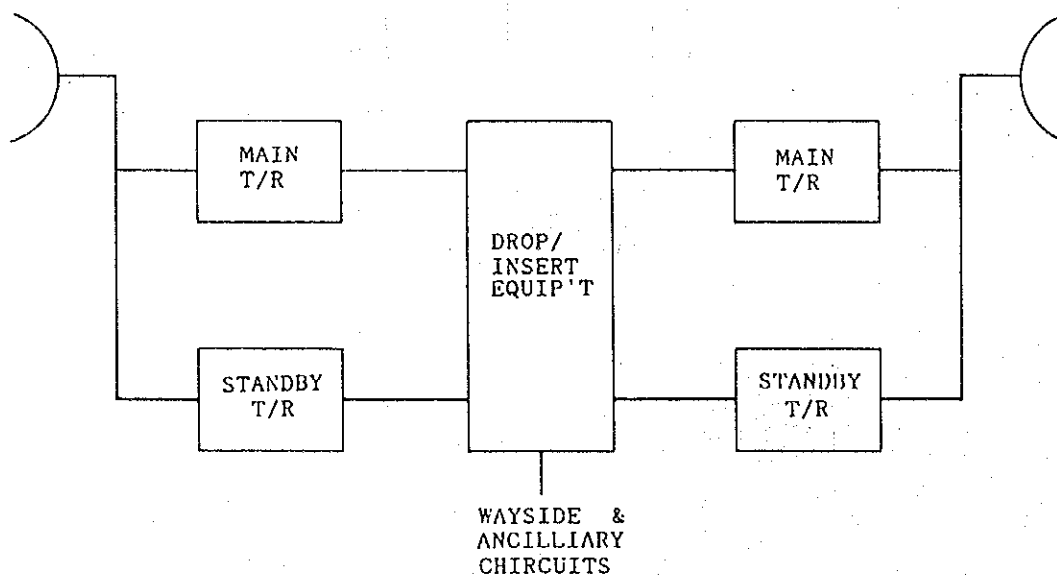
TRANSMISSION EQUIPMENT
BLOCK SCHEMATIC

FIG. NO. :
TR-1

TERMINAL
 (PHUENTSHOLING AND PARO)
 (WANDUEPHODRANG, PUNAKA AND SAMTSE)



THROUGH REPEATER
 (PEPCHU AND SAURENI)

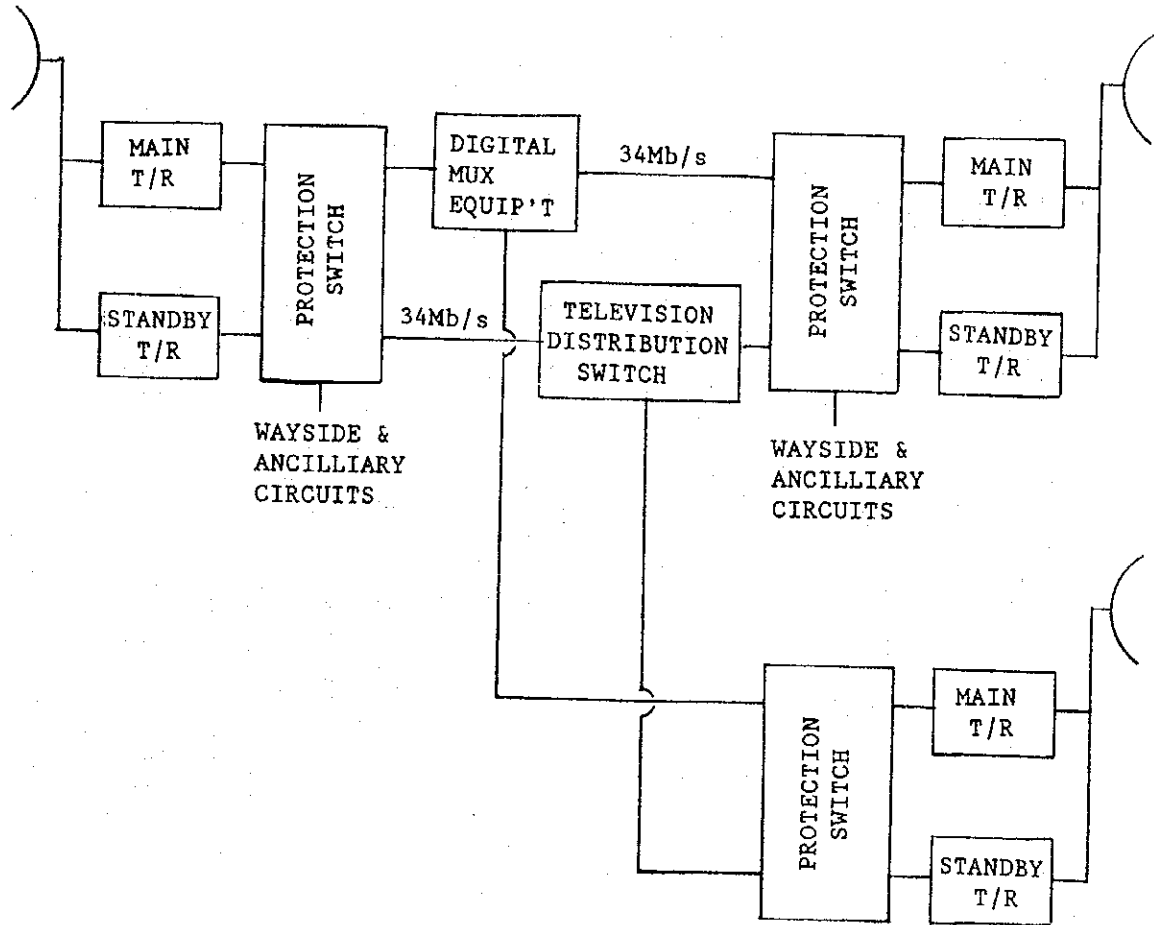


TRANSMISSION EQUIPMENT
 BLOCK SCHEMATIC

FIG. NO. :
 TR-2

BRANCHING REPEATER

(JAPJEKHA AND TAKTI)

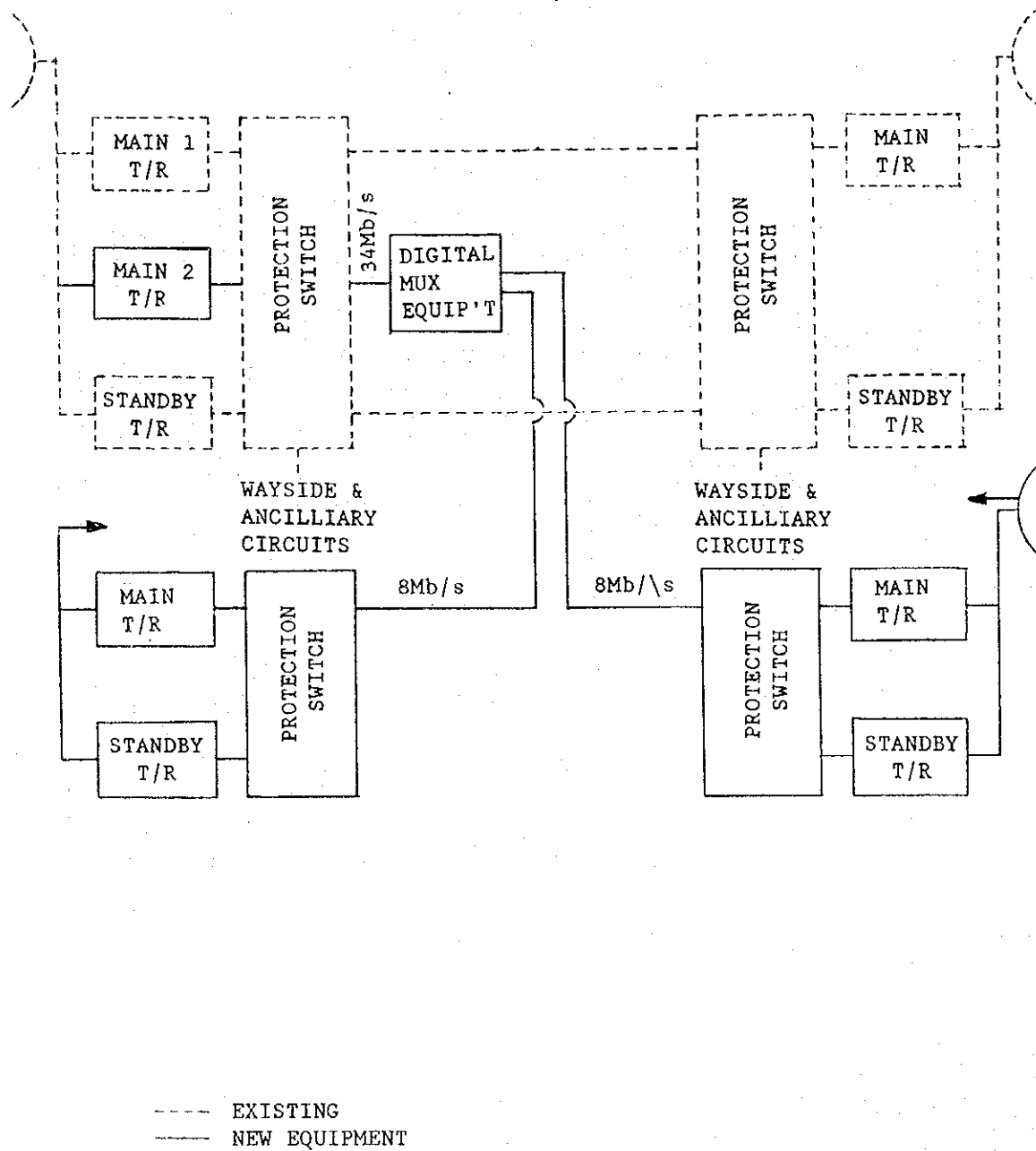


TRANSMISSION EQUIPMENT
BLOCK SCHEMATIC

FIG. NO. :
TR-3

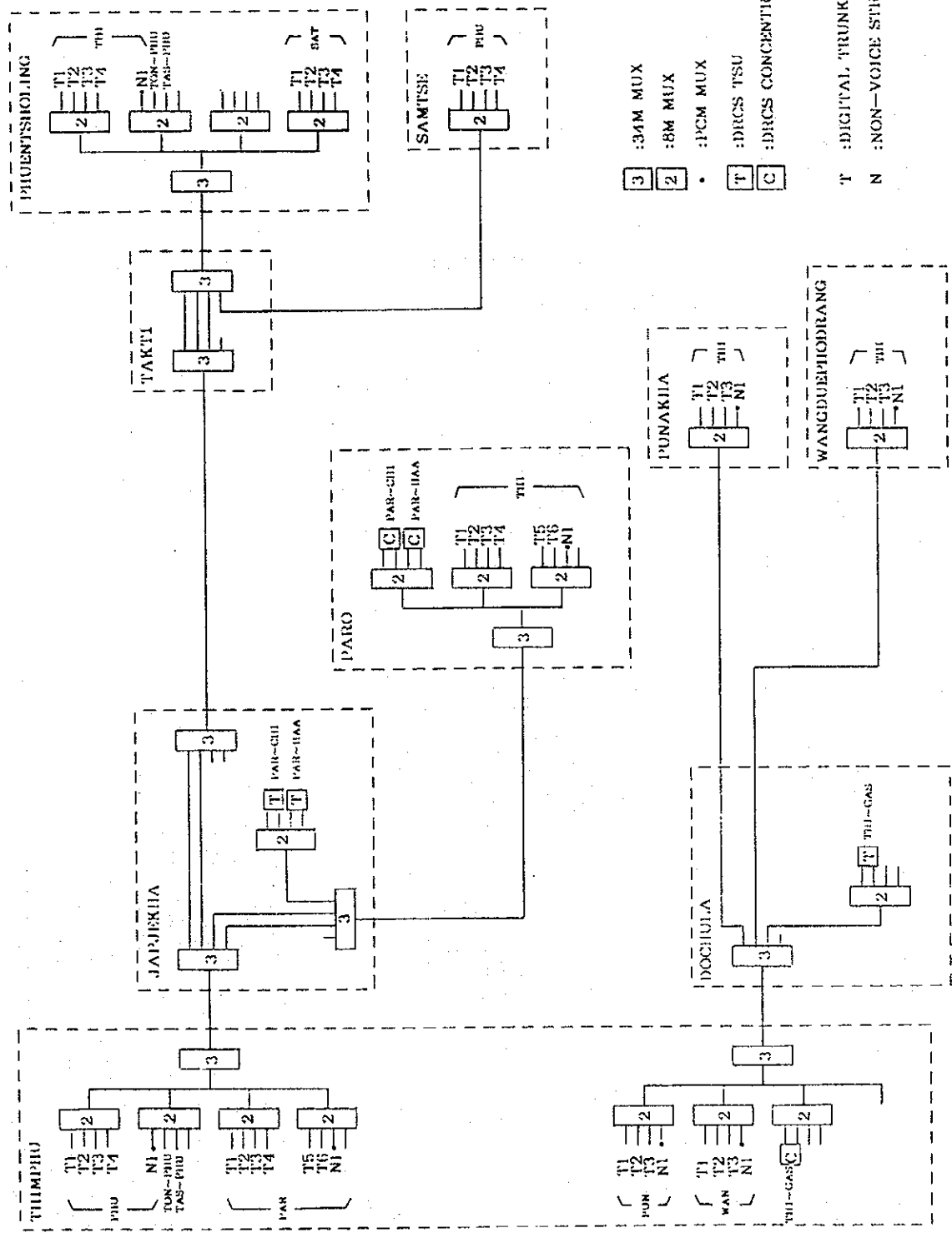
BRANCHING REPEATER

(DOCHULA)



TRANSMISSION EQUIPMENT
BLOCK SCHEMATIC

FIG. NO. :
TR-4



3 : 34M MUX
 2 : 8M MUX
 • : PCM MUX
 T : DRCS TSU
 C : DRCS CONCENTRATOR
 T : DIGITAL TRUNK STREAM
 N : NON-VOICE STREAM

MULTIPLEX ARRANGEMENT PLAN

FIG. NO. :
TR-5

THIMPHU

TELG 1
TELX 1
DATA 1
2W 1

PUNAKHA

TELG 1
TELX 1
DATA 1
2W 1

WANGDUEPHODRANG

TELG 1
TELX 1
DATA 1
2W 1

TELG 1
TELX 1
DATA 1
2W 1

PARO

TELG 1
TELX 1
DATA 1
2W 1

TELG 1
TELX 1
DATA 1
2W 1

PHUENTSHOLING

TELG 1
TELX 1
DATA 1
2W 1
4W 1

TELG 1
TELX 1
DATA 1
2W 1
4W 1

SAMTSE

TELG 1
TELX 1
DATA 1
2W 1

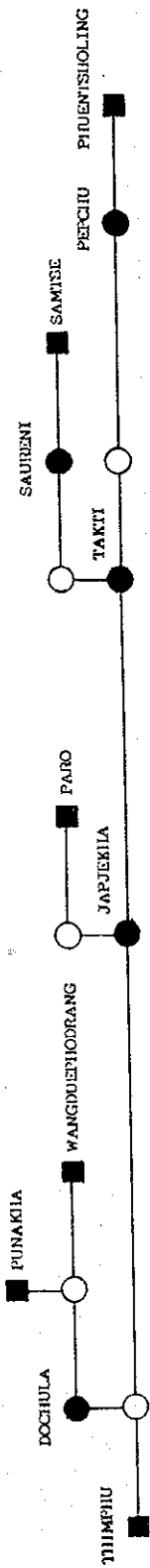
TELG 1
TELX 1
DATA 1
2W 1

NON-VOICE CIRCUIT
ARRANGEMENT PLAN

FIG. NO. :
TR-6

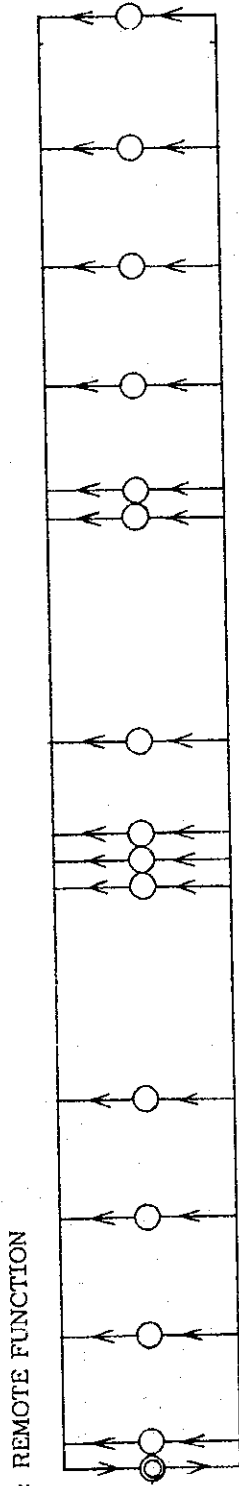
MICROWAVE RADIO ROUTE

- : TERMINAL STATION
- : ACTIVE REPEATER
- : PASSIVE REPEATER



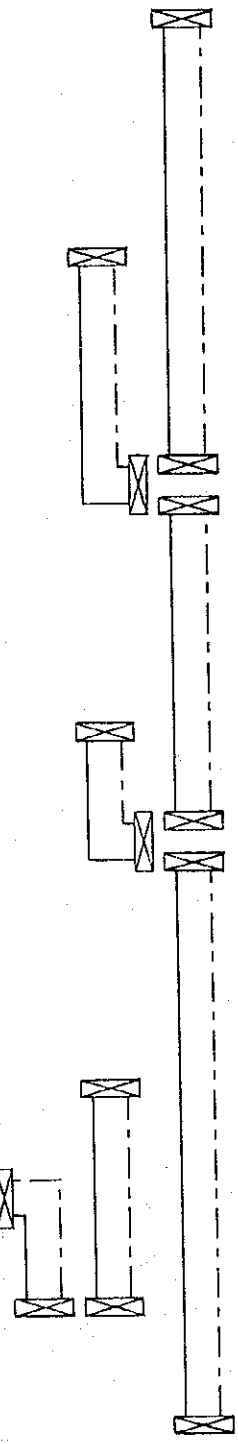
SUPERVISORY AND CONTROL SYSTEM

- ⊙ : MASTER FUNCTION
- : REMOTE FUNCTION



SWITCHOVER CONTROL SYSTEM

- : PROTECTION CHANNEL
- - - : REGULAR CHANNEL

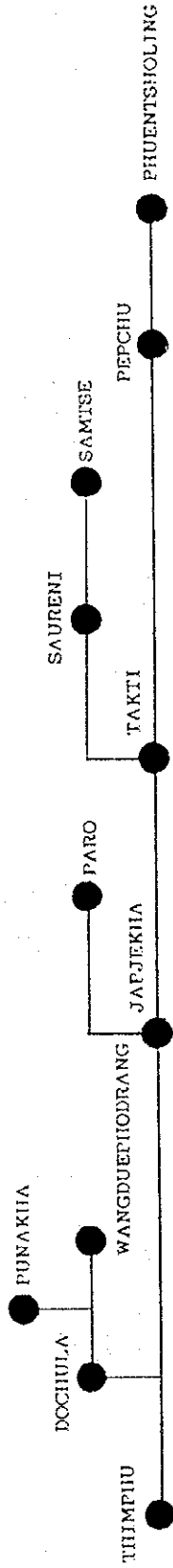


SYSTEM CONFIGURATION OF SUPERVISORY AND CONTROL SYSTEM

FIG. NO. : TR-7

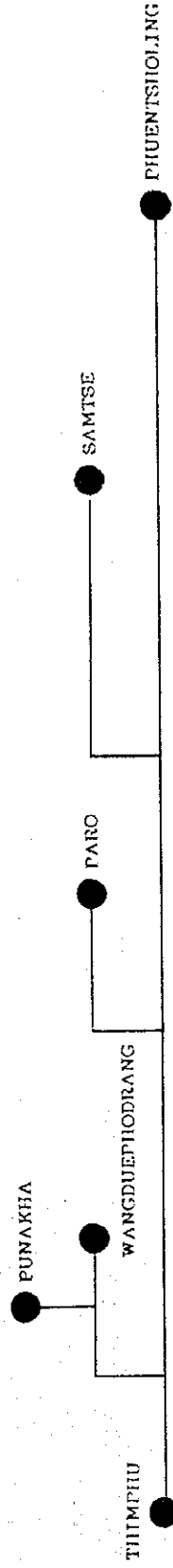
OMNIBUS ORDERWIRE SYSTEM

● : ORDERWIRE TELEPHONE SET



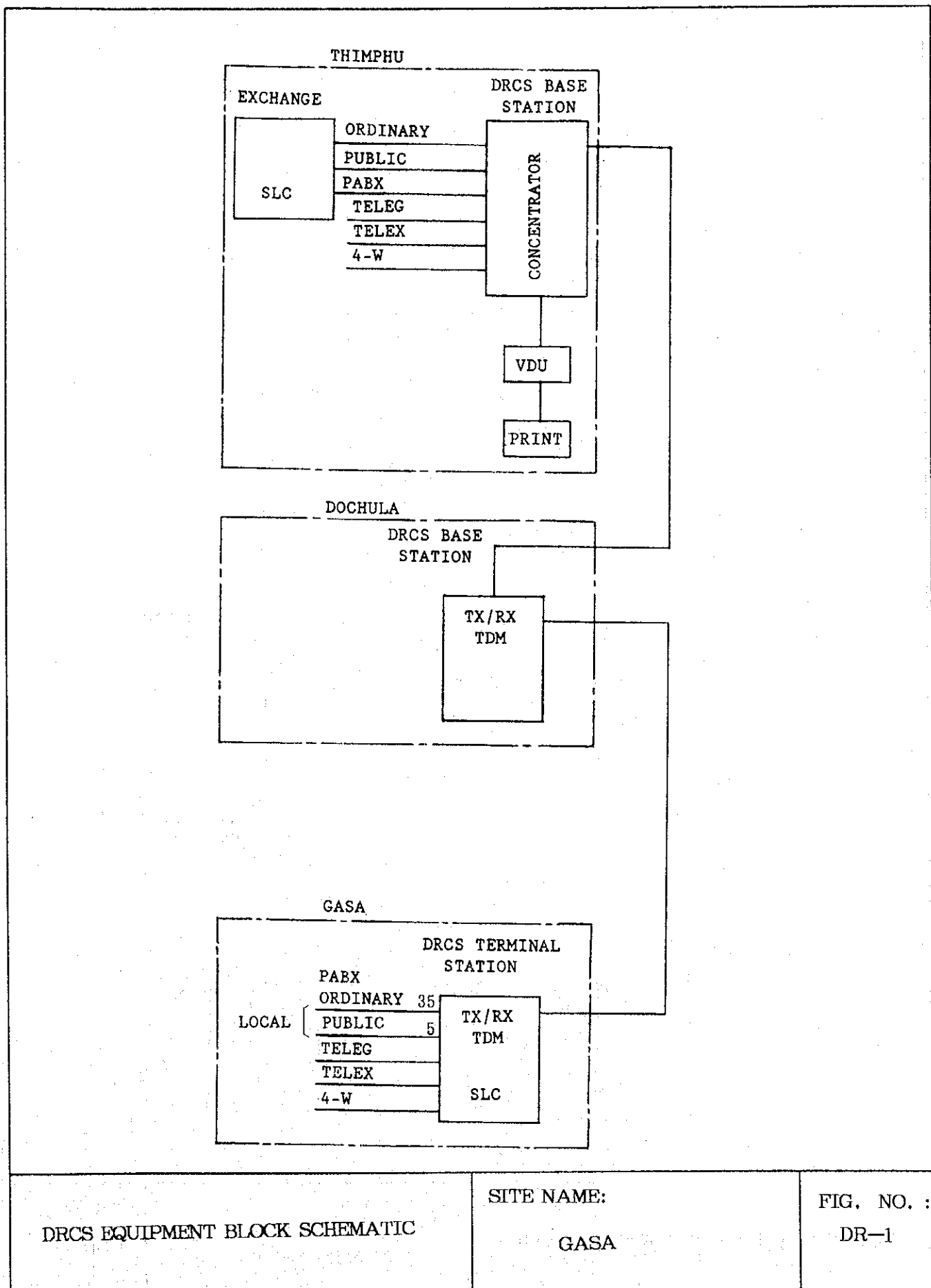
EXPRESS ORDERWIRE SYSTEM

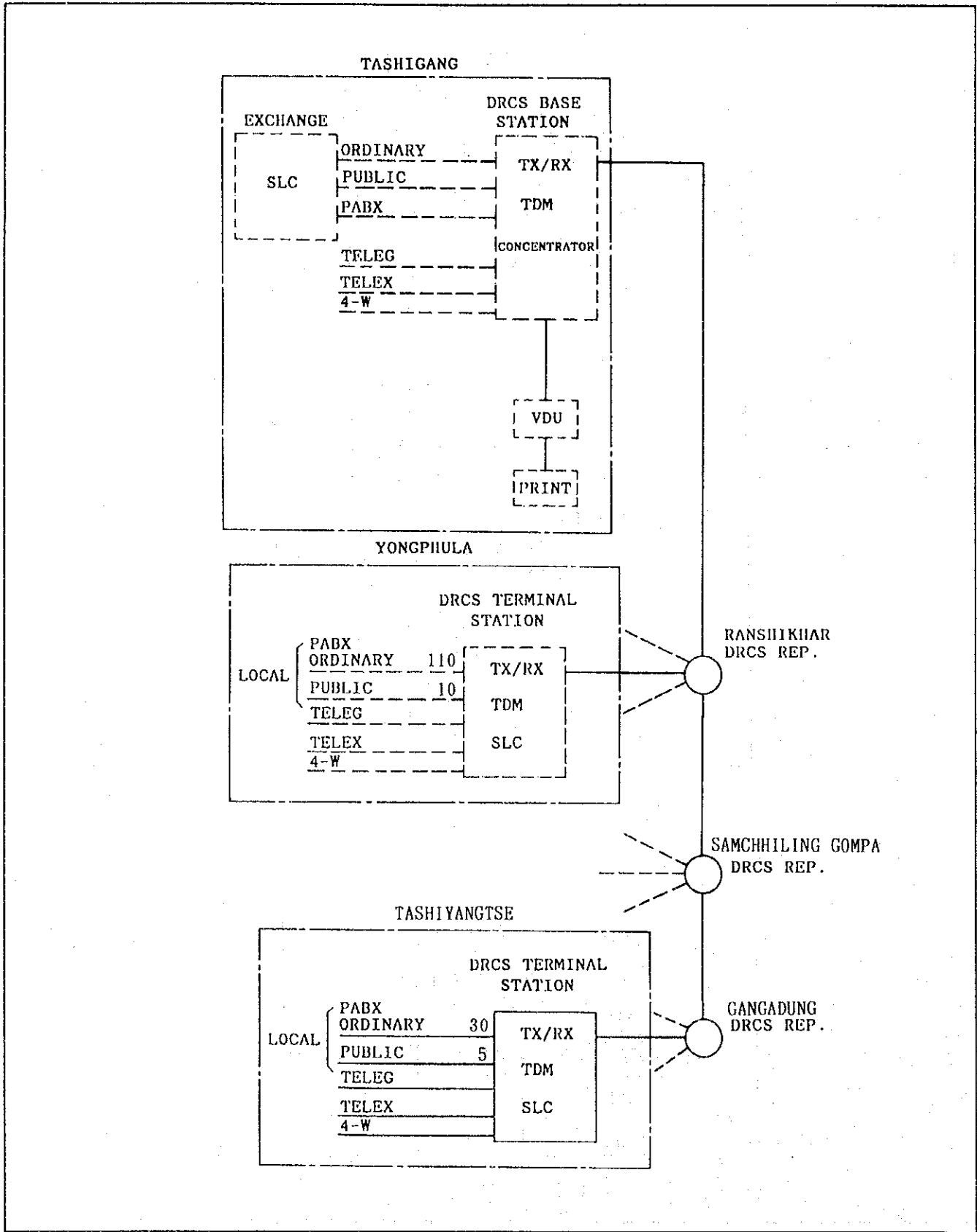
● : ORDERWIRE TELEPHONE SET



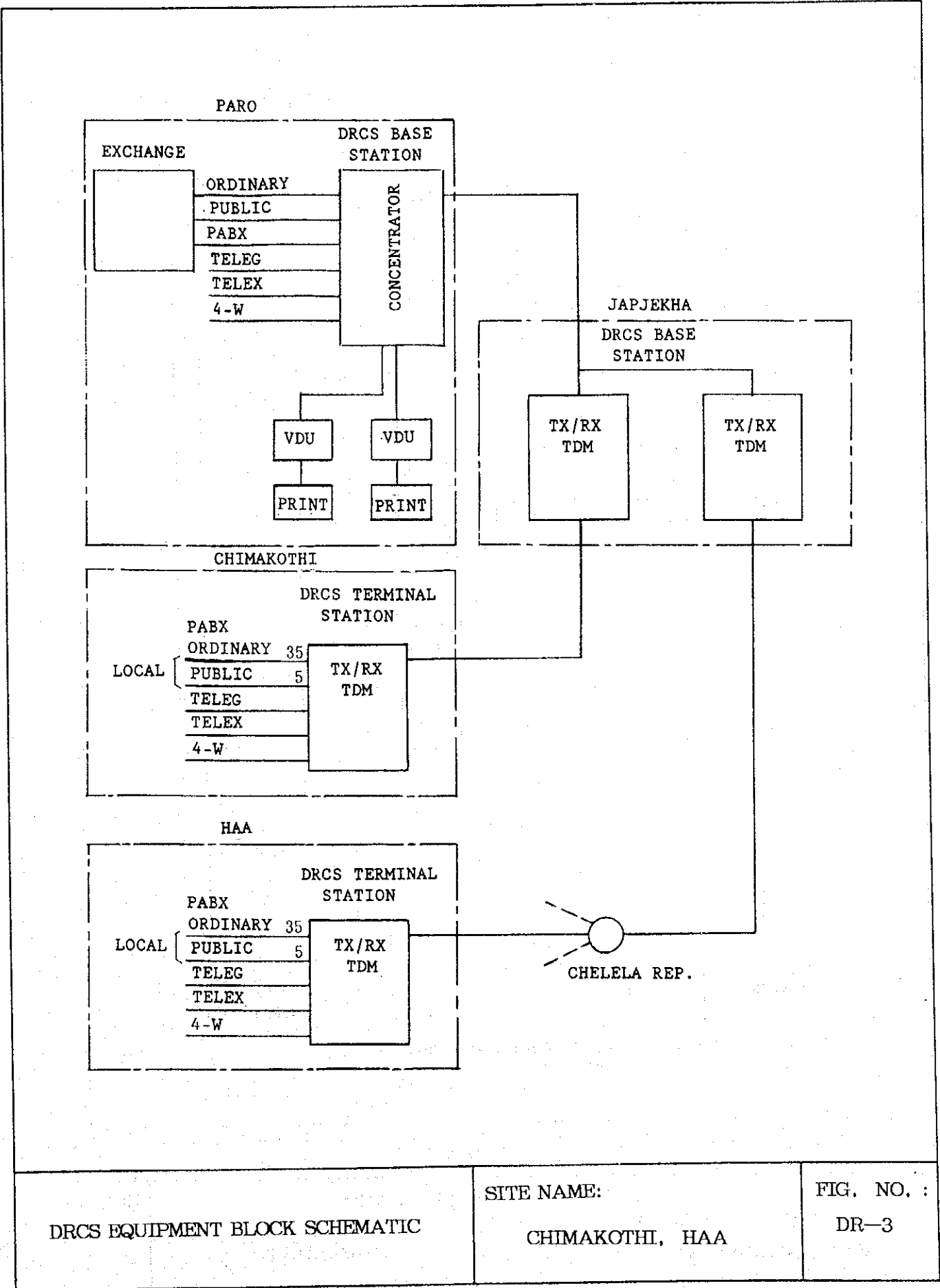
SYSTEM CONFIGURATION OF ORDERWIRE SYSTEM

FIG. NO. : TR-8





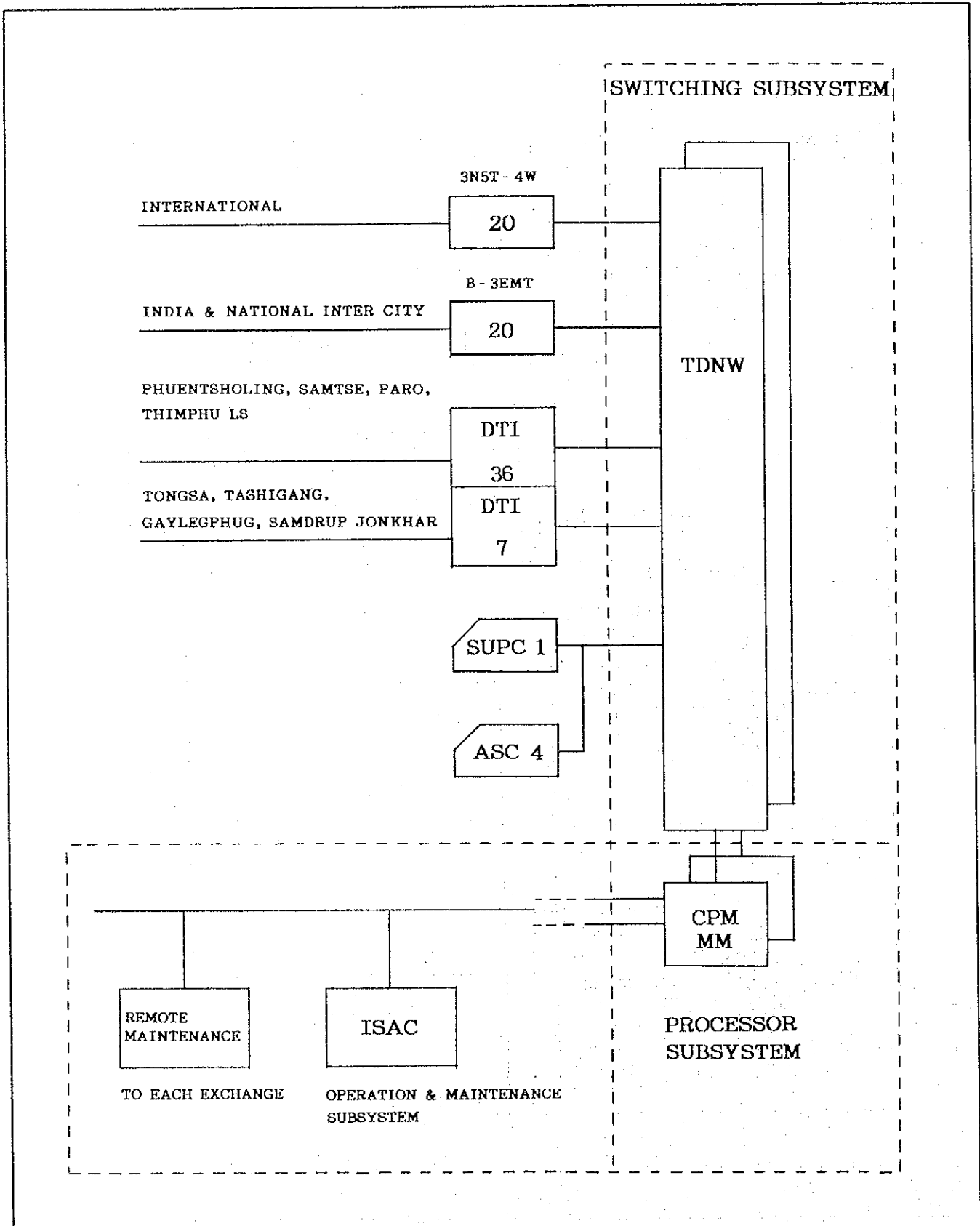
<p>DRCS EQUIPMENT BLOCK SCHEMATIC</p>	<p>SITE NAME : TASHIYANGTSE</p>	<p>FIG. NO. : DR-2</p>
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DRCS EQUIPMENT BLOCK SCHEMATIC

SITE NAME:
CHIMAKOTHI, HAA

FIG. NO. :
DR-3



SWITCHING EQUIPMENT
BLOCK SCHEMATIC

SITE NAME :
THIMPHU TDM

FIG. NO. :
SW-1