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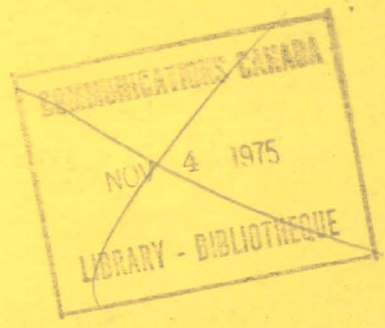


Communications  
Canada

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WORKING PAPER ON POSSIBLE  
INTERCONNECTION OF NON-CARRIER  
OWNED TERMINAL EQUIPMENT AND  
TERMINAL SYSTEMS TO THE PUBLIC  
SWITCHED NETWORKS

NOVEMBER 1972.



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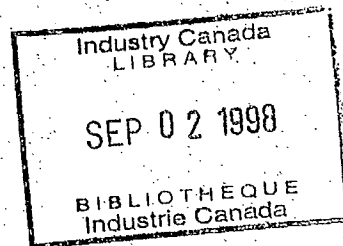


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### APPENDIX I

## P R E F A C E

During the past year, the Department invited interested parties to submit briefs to aid in the development of interconnection policies designed to stimulate innovation and choice in the field of terminal apparatus to be used in conjunction with switching networks of carrier organizations.

The briefs received have been useful in developing a range of options and in identifying the advantages and disadvantages of each. They will also prove helpful in discussions between the Department and the interested parties, thus leading to the best solution, at the next phase of the inquiry. Views and comments are therefore essential to continued deliberations, and are respectfully solicited.

It should be strongly emphasized that the content of the paper is not intended to be construed as meaning that the Department favours, or has decided upon, any specific option. A completely neutral position is essential until all dialogue generated has been analyzed and appraised.

The paper is divided into a series of topics and has been constructed along the following lines. Sections I and II cover the background leading up to the present enquiry, and describe, in some detail the various aspects which constitute the existing situation. Section III covers the program of objectives, constraints, and definitions. Sections IV and V define the options and include some discussions on the pros and cons of each. Section IV outlines some activities which will be investigated in the next phase of the program.

It is intended that this paper will be followed by supplements as dictated by continuing consultations and analyses.

An expression of appreciation is hereby extended to the following organizations for the valuable contributions which their briefs have made in the formulation of this working paper.

...



Carrier Organizations

CN Telecommunications

CP Telecommunications

B. C. Telephone

Bell Canada

Others

Canadian Industrial Communications Assembly

Canadian Motorola Electronics Co.,

Electronic Industries Association of Canada

Interconnect Telecommunications Association of Canada

International Business Machines

Radio Common Carriers Association

Quest Communications

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## SECTION I

### INTRODUCTION

Telephone companies in Canada have traditionally operated as monopolies, been granted protection in their operations, and, at the same time, have been subjected to governmental regulation. The industry has had to compete for its capital needs but has not been seriously challenged by direct competition in the provision of telephone service to subscribers since the early days of the industry. The only effective competition, at this time, is in the market for private services, such as leased teleprinter, radio and television broadcasting, data transmission, etc., where CN/CP Telecommunications provide similar services.

From the earliest days of telephony, the carriers, by a series of amalgamations, take-overs, etc. have reduced the large number of telephone companies in Canada to 15 major carriers serving 10 million telephones; in the U.S. A.T.&T. serves 85 million telephones, and a number of 'independents' serves 35 million telephones.

The industry, like most monopolies, has achieved, a high degree of standardization and has exercised a great deal of restraint in the introduction of new products and devices. Although a low cost and generally satisfactory service has resulted, innovation in the terminal apparatus sector has been geared to a program which would avoid premature obsolescence of existing equipment.

These policies have avoided disturbing the long term amortization structure which has enabled U.S. and Canada to maintain low cost service.

Some users have expressed the desire for a more liberal interconnection policy which would permit them greater flexibility, choice and economy. Systems are available elsewhere which users consider superior, in some respects, to the ones they have today. A policy which would permit a customer to purchase equipment would give some users a tax advantage. This is partly because such companies would be allowed to write their equipment off faster than the telephone companies. Others are aware of situations where it could be more economical for them to purchase or lease from sources other than the telephone companies. Hotels, for example, claim they are helping to subsidize other forms of telecommunication service.

The U.S. has had about three years' experience with a liberalized interconnection policy. It will be useful to examine their experience.

#### BACKGROUND - U.S. EXPERIENCE

With the advent of computers, the demand for data communications developed rapidly and, concurrently, an era of demand for more sophisticated terminal equipment for voice use began to emerge. Up to 1960 very few privately owned terminal facilities were in use. The Common Carriers of North America, protected by restrictive tariffs and legislative acts, prohibited the interconnection of voice related equipment to the public switched networks. On the grounds of ensuring high quality service, the carriers argued the case for end-to-end control of all facilities.

The first real challenge to this carrier viewpoint occurred in the U.S. in 1956 with the Hush-A-phone Case involving a device which fitted over the conventional transmitter to exclude background noise. U.S. courts ruled that existing tariffs were illegal and provided an "unwarranted interference with the telephone subscriber's right to use his telephone in ways which are privately beneficial and without being publicly detrimental". AT&T was ordered to amend its tariffs to permit the attachment of this device.

The second milestone of change centres around the Carterfone case in the U.S. and specifically on the ruling of the Federal Communications Commission (FCC) in November 1967. The case entailed a private antitrust action involving an acoustic device for the interconnection of a base station of a mobile radio service with the public switched networks.

The case came before the U.S. District Court in Dallas which held that, because of its "special competence and expertise" in the field of telecommunications, the FCC is vested with the right to determine "the justness, reasonableness, validity, application and effect of tariff and practices here involved". On October 20, 1966 the Commission ordered a public hearing to be held to resolve the question.

The public hearing was expanded in November 1967 when the full FCC decided to take jurisdiction over the case, saying that it involved "important and novel questions....which merit commission consideration". The public hearing resulted in a ruling by the FCC on June 26, 1968, which stated: "We agree with and adopt the examiner's findings that the Carterfone fills a need and that it does not adversely affect the telephone system....We hold, as did the examiner, that application of the tariff to bar the Carterfone in the future would be unreasonable and unduly discriminatory". What was of much greater impact was the continuation of FCC's ruling which stated: "however....we also conclude that the tariff has been unreasonable, discriminatory and unlawful in the past and that the provision prohibiting the use of customer-provided interconnecting devices should, accordingly, be stricken".

The Carterfone decision compelled the federally regulated U.S. telephone carriers to undertake a fundamental re-examination of their interconnection policies. The FCC required AT&T to put into effect, as of January 1, 1969, modified tariffs which permitted customer provision of various terminal devices, subject only to three important reservations. First, such attached devices must limit the maximum total power output and energy distributed through the audio spectrum. Second, data and voice equipment may be attached by direct electrical connection only by interfacing with appropriate protective devices which are rented from the telephone company. Acoustic or inductive coupling of non-carrier owned equipment is permitted without the protective device only if signal output is limited. Third, AT&T furnishes the address signalling device (i.e. dial) under all circumstances.

The FCC stated they were permitting this arrangement "with the understanding that in doing so we are not giving any specific approval to the revised tariffs".

The FCC then instructed its Common Carrier Bureau "to initiate promptly a series of informal engineering and technical conferences with the telephone industry and interested manufacturers, user groups and government agencies to ascertain what further changes are necessary, desirable and technically feasible in the various tariff offerings of the telephone companies.

To gain more information on technical factors affecting interconnection, the FCC turned to the National Academy of Sciences and requested N.A.S. to comment on:

- (1) the propriety of the network control signalling requirements of the telephone companies and various alternatives to the provision thereof,
- (2) the necessity and characteristic of telephone-company provided connecting arrangements and various alternatives to the provision thereof by the telephone company,
- (3) basic standards and specifications for interconnection and the appropriate method to administer and enforce them.

The N.A.S. report was issued in June 1970 with the following principal conclusions:

- (a) uncontrolled interconnection can cause harm to personnel, network performance and property;
- (b) the signal criteria in (the message toll and private line tariffs) relating to signal amplitude, wave form and spectrum are technically based and valid and, if excluded, can cause harm by interfacing with service to other users;
- (c) present tariff criteria, together with carrier-provided connecting arrangements, are an acceptable basis of assuring protection;

The potential harms which can result from failure to protect the network were listed:

- (1) voltages dangerous to human life;

- (2) signal of excessive amplitude or improper spectrum;
  - (3) improper line balance;
  - (4) improper control signals.
- (d) present tariff criteria, together with a properly authorized and enforced program of standards development, equipment certification, and controlled installation and maintenance, are an acceptable basis of achieving direct user interconnection;
- (e) innovation by carriers need not be significantly impeded by a certification program; opportunities for innovation by users would be increased;
- (f) mechanisms are needed to promote the exchange of information among carriers, users, and suppliers.

The protecting devices were considered as having a limited deterrent effect on customer devices which generate improper spectrum or control signals. The deterrent is in fact contained in the tariff itself which specifies frequency spread and a requirement that the rotary dial address network be furnished by the telephone company.

Economic considerations were not within the purview of the N.A.S.; however, it is apparent that development of standards is related to economic questions and a consideration of technical aspects is only preliminary to the consideration of many other factors.

The F.C.C. engaged Dittberner Associates, a firm of information technology consultants, to analyse and interpret the N.A.S. report and provide additional information pertaining to interconnection. Their conclusions were:

- (1) Maintenance of the existing quality of service and protection from harm of the public telecommunications network, its

personnel and customers are essential goals and in the public interest;

- (2) Uncontrolled interconnection of equipment to the public telecommunications network can cause harm to the network, its personnel and customers, and result in degradation of the service;
- (3) Existing common carrier tariff provisions requiring common carrier owned, installed and maintained network protection and networks control signalling devices, as well as other spectrum energy distribution standards, are sufficient to protect the network, its personnel and customers from harm which could result from inadequately designed or malfunctioning user-provided equipment;
- (4) The level of protection from harm afforded the common carrier network, its personnel, customers and the existing grade of service, by currently common carrier-provided networks access devices is at best, comparable to that of several other 'protection providing' alternatives which can result in greater economic benefits, increased competition, a more rapid pace of telecommunication innovation, and improved quality of service.
- (5) Equipment with network protection capabilities is required to provide an acceptable level of protection. However, network protective 'devices' per se are not required.
- (6) Common carriers should not have an exclusive right to provide equipment with network protective capabilities to the end-user;



- (7) A program of standards, and installation and maintenance organization certification, which is simple, effective and inexpensive, is necessary if the potential benefits from extended interconnection privileges are to be realized without harm to the common carrier network, its personnel or end users.

Both the N.A.S. and Dittberner Reports indicated that, with safeguards, interconnection was feasible and on January 1, 1969, interconnection in the U.S. became effective. Carriers continued to be regulated while others in the terminal equipment field operated under open competition. The basic requirement is that the connection to the network must be made through a protective interface device commonly called a "coupler".

A number of problems developed and, as of May 1972, the F.C.C. has several on-going subcommittees studying various aspects of interconnection. One of the most important to the Canadian situation is the sub-committee on standardization and certification. However, no firm recommendations have, as yet, emanated from the F.C.C. subcommittees.

There is a general similarity between Canadian and U.S. telecommunications systems and it is reasonable to assume that the findings of the Dittberner Report pertaining to technical aspects are applicable to Canadian networks. However, the Canadian system is somewhat different in terms of telephone development, related controls, and financial resources even though Canadian communications adhere generally to North American Standards. Accordingly, it would be unwise to conclude from the U.S. experience (as some have done) that interconnection results in chaos. It would however, be equally imprudent to ignore valuable lessons from the 3 1/2 years of U.S. experience.

It should perhaps be noted that there has been some extreme opposition to interconnection in the U.S. from State Commissions.

The National Association of Regulatory Utility Commissioners (NARUC) has officially questioned the Federal Communications Commission's decision to permit interconnection, and has expressed concern over the "creeping economic impact" on small users. It feels that interconnection in the U.S. greatly benefits unregulated manufacturers of equipment, business customers and other affluent parties. It states that the F.C.C. has not made any study of the economic impact of the Carterfone decision upon the "vast majority of intrastate and local users who will have no need for these services".

In a letter dated July 13, 1972 to the Honourable Dean Burch, Chairman of the F.C.C., Ben T. Wiggins, Chairman of the Committee on Communications for NARUC, stated:

"Therefore, we believe that the Federal State Joint Board convened by the F.C.C. last month in Docket No. 19528 to consider interconnection policy should conduct an in-depth study of what the economic impact of liberalized interconnection would have on non-interconnect users".

Leaving aside the foregoing events, let us now briefly examine the pressures for interconnection in Canada. The computer industry has, in a few short years, achieved a high level of competence in technical matters. Carriers no longer have a monopoly in technical expertise related to communications. Expertise outside the carrier world is being applied to create a range of new products in the terminal area that will be difficult for the carriers to cope with on a monopoly basis.

#### BACKGROUND - CANADIAN EXPERIENCE

Many business users are faced with mounting requirements for speedy transmission of voice and data and are ready and willing to pay for these new devices, and allege they are prevented from doing so by what users refer to as "restrictive" carrier policies. Carrier policy of price averaging has led to rate structures in which some classes of business are thought to be quite profitable. It is these rate structures, where profits are higher in certain areas of the carriers' operations, which provide the rationale for

some business users to want to own their own equipment. Some users believe that by owning their own equipment, they can get their service cheaper. The cost of capital may be lower to certain corporations or institutions or they may operate under government grants for capital construction (schools, hospitals, etc.) or they may be eligible for accelerated depreciation benefits. In some cases, there is a tax advantage. In short, many subscribers want a choice in how they pay for service. Besides the advantage of costs, in some cases subscribers are aware of equipment which is technologically superior to the equipment provided by the carriers and they argue that the advantages of technology cannot be denied.

Many aspects of the problem are difficult to measure. The degree of customer dissatisfaction with the existing choice of equipment is not known. To a limited extent the carriers today permit interconnection. It is not widespread; and the degree to which people have taken advantage of it is not known precisely to the Department.

Under existing conditions, the costs to a customer providing his own equipment may be a deterrent. Not only must the customer pay for modifications to his equipment to meet carrier standards, but he must also pay the regular monthly charge provided for in the carrier's tariffs. In those areas where customers have been refused or have declined interconnection privileges on carrier terms, the Department does not have any statistics on the general level of customer dissatisfaction. Even in the U.S., with over three years experience in interconnection, no one has yet been able to determine the long term operating financial and service impacts of widespread interconnection, with respect to carriers or users. It cannot be denied, however, that a degree of discontent with the existing situation exists within certain segments of the public and industry.

Predictably, prospective interconnection suppliers forecast lower prices for equipment, innovation and greater choice. Equally predictable, the carriers oppose interconnection on a widespread and uncontrolled basis, forecasting losses of revenues which will impact adversely on the cost of local telephone service. The truth probably lies between these two extremes but where within these extremes is difficult to say.

Regulatory matters, such as tariffs, service discrimination, rate of return and related controls on revenues and expense are complex subjects. Unfortunately, precise factual cost, revenue and rate of return data for various classes or service and/or for different types of terminal equipment are not available. Until valid cost-allocation studies of this kind are completed, only assumptions are possible and these are always subject to dispute. It is expected and desirable that estimates and assumptions presented in this work paper be challenged by those in possession of more factual information, ultimately culminating in recommendations supported by factual data.

#### INTERCONNECTION DEFINED

For the purpose of this paper, the term "interconnection" refers to the attachment of non-carrier owned terminal equipment also known as station apparatus. The terminal equipment with which this document is primarily concerned comprises any facility or facilities located on the premises of a private person (be that "person" an individual or corporation) for his or its exclusive use in communication over common carrier networks.

It should be noted that this definition excludes:

- (a) non-carrier owned equipment which is on private or public premises for the purpose of providing the public with communications services (third party re-sale of service),
- (b) non-carrier owned terminal equipment on private (dedicated or leased) lines,
- (c) secondary or tertiary apparatus which generates, decodes and processes (computer processor), and
- (d) interconnection of networks or ways and means by which a customer of one carrier can utilize the facilities of another carrier.

A common carrier network comprises facilities utilized on public or private premises for the routing and conveyance of telecommunications traffic and available to pluralities of persons on a non-exclusive and non-discriminating basis. It should be underscored here that interconnection between common carriers networks is not within the scope of terminal attachment

issues to which this task is addressed. It should also be noted that the subject of "Computer Communications" has been dealt with in a report issued by the Canadian Computer/Communications Task Force under the title "Branching Out".

#### DEPARTMENT OF COMMUNICATIONS' INVOLVEMENT

In September 1969, the Honourable Eric Kierans, then Minister of Communications, announced plans for a comprehensive study of the present state and future prospects of telecommunications in Canada. The general summary of the approximately fifty separate telecommission studies was issued under the title "Instant World" with separate reports prepared for specific areas of telecommunications. One of these studies (8(b)III) dealt specifically with the "Problems Relating to the Interconnection of Terminal Devices with the Common Carrier Provided Telecommunications".

This report concluded: "From this study, there is substantial support for broadening interconnection practices for terminals. Changes must be undertaken, however, with the participation of users, carriers and manufacturers and cannot be made until a number of issues related to interconnection have first been dealt with".

During the course of 1971, it became apparent that the problems of the interconnection of foreign attachments was becoming sufficiently acute to warrant further government exploration. At that time, a program was initiated with a view to formulating government policy to deal with the problems and issues involved.

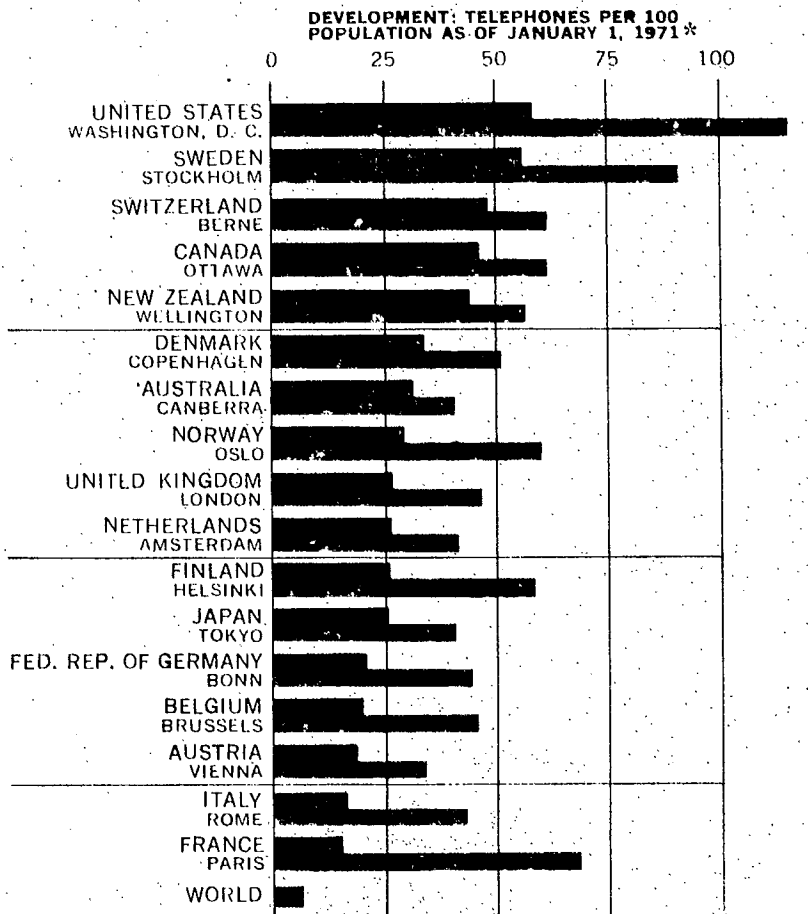
On June 12, 1972, the Minister of Communications, the Honourable Robert Stanbury, in speaking to the Canadian telecommunication Carriers Association, stressed the complexity of the problem and set the stage for the issuance of this Working Paper. As he states, "It is not a policy document full of pat answers or even pat questions. It is a "think piece" and its object is to narrow down the almost unlimited spectrum of options which were on the table six months ago to a narrower range of viable ones, so that the second stage of consultations, with carriers, suppliers, provincial governments and anyone else of the interested public, can proceed to the policy making stage".

OBJECTIVES

The terms of reference of the study team assigned to prepare the "working paper" were as follows:

1. Invite submissions from carriers and others.
2. Define the various options that emerge from study of the material.
3. Prepare background material and discuss pros and cons of interconnection.
4. Outline succeeding steps of the program.

Before discussing the pros and cons of interconnection, it would be useful to discuss the existing situation. This discussion follows in Section II.



REAL GROSS NATIONAL PRODUCT\*  
(billions of dollars)

	CANADA	UNITED STATES
1967	66	815.9
1968	74	890.2
1969	81	948.9
1970	87	986.3
1971	96	1043.0

\*Economic Data prepared by Federal Reserve Bank of St. Louis, Aug. 28, 1972

\* The World's Telephones

NUMBER OF TELEPHONES\* (000's)

	CANADA	UNITED STATES
1967	8,358	103,752
1968	8,818	109,256
1969	9,296	115,201
1970	9,752	120,154

\*FCC Statistics

NUMBER OF TELEPHONES PER 100 POPULATION\*

	CANADA	UNITED STATES
1967	42.1	54.0
1968	43.7	56.7
1969	45.23	58.4
1970	48.	60.
1971		

\*The World's Telephones

## SECTION II

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## SECTION II

### THE EXISTING SITUATION

#### THE CARRIERS - LEGAL AND REGULATORY ASPECTS

There are few industries so carefully regulated on the citizens' behalf as the telecommunications industry. As of December 1969, there were fifteen major telephone companies in Canada. With some exceptions, they observe similar rules and practices. Federal jurisdiction is limited to the following major carriers; Bell Canada, British Columbia Telephone Company, CN/CP Telecommunications, COTC and Telesat Canada. The major telecommunications carriers are owned by a variety of interests. Bell Canada, approximately 98% owned by Canadians, owns or controls the majority of the shares in Northern Telephone Limited, Telephone du Nord du Quebec Inc., the New Brunswick Telephone Company, the Island Telephone Company Limited, Maritime Telegraph and Telephone Company Limited and Newfoundland Telephone Company. Three other companies, British Columbia, and its subsidiary Okanagan telephone Company, and Quebec-Telephone are controlled by General Telephone Electronic Corporation, a U.S. owned communications conglomerate. Manitoba Telephone System, Alberta Government Telephone and Saskatchewan Telecommunications are Crown Corporations of the three prairie provinces. Edmonton Telephone and Thunder Bay Telephone System are municipally owned. CN/CP Telecommunications shows mixed public and private involvement with both Canadian and foreign investment. CN/CP Telecommunications denotes the working relationship between Canadian National Telecommunications (CNT) and Canadian Pacific Telecommunications (CPT). CNT is a department of Canadian National Railways, a crown corporation. CPT is a department of Canadian Pacific Railways, a public company with both Canadian and foreign investment.

In most cases, the federally regulated carriers have the authority to decide on the interconnection of non-carrier provided terminal equipment to their networks. This authority derives from carrier regulations similar to Rule 9 of Bell Canada's General Regulations (see Appendix I) which prohibit any attachment to, or interference with, their plant and equipment without their consent. These regulations, when approved by the CTC and published in the Canada Gazette, have the force of law; however, in the case of Bell Canada alone, the Bell Act (see Appendix I) was amended in 1968 to state that any equipment not provided by the Company shall only be attached to Company facilities in conformity with such reasonable requirements as may be prescribed by the Company. The CTC was also authorized to determine the reasonableness of Bell's requirements for interconnection and to disallow any unreasonable requirements or those contrary to public interest. While the interpretation of this provision is presently before

the courts, it is uncertain whether Rule 9 is, in itself, an unreasonable requirement (thus permitting the affected subscriber to apply to the CTC) or whether the 1968 amendment only applies when the Company chooses to specify requirements for interconnection in particular cases.

In the case of carriers subject to provincial regulation, some provincial legislation gives full authority to the carriers to determine the interconnection of non-carrier owned equipment. In other cases, no specific reference to interconnection is made in the legislation. For further details on the provincial legislation provisions, reference should be made to Appendix I at the end of the report.

It may be argued by the carriers, under some of the options, that competition in the terminal area would free them from the moral obligation to provide general telephone service where none exists. Today, the CTC cannot order the federally regulated carriers to provide service. The only jurisdiction which the Commission has in this regard is by way of a specific provision in the Bell Telephone Act and the Bonaventure and Gaspé Telephone Act. Section 2 of the 1902 amendment to the Bell Act provides:

"Upon the application of any person, firm or corporation within the city, town or village or other territory within which a general service is given and where a telephone is required for any lawful purpose, the Company shall, with reasonable despatch, furnish telephones..... and telephone service for premises fronting upon any highway, street, lane or other place along, over, under or upon which the Company has constructed....a main or branch telephone service or system... provided that the instrument be not situated further than two hundred feet from such highway, street, lane or other place."

It can be seen that this provision applies only under certain limited conditions and does not provide a general right to demand service. Again, it should be noted that these provisions are unique to the two companies concerned and that there is no similar provision for the other regulated carriers.

Recognizing their vulnerabilities as monopolies, the carriers have provided service beyond the limits outlined in the Act and in their rules. Carriers have liberalized their policies in recent years. On June 16, 1969, the members of the Trans Canada Telephone system revised their respective tariffs to permit the attachment of any data communications device, or alerting device activated by signals from the network, to the

public switched network using approved interface equipment. The federally regulated carriers have recently gone on record as not opposing in principle the liberalization of rules for the interconnection of terminal equipment. In general, they recommend that there be an orderly, controlled liberalization to permit the telephone user to acquire terminal equipment from sources other than the federally regulated carriers and to connect this equipment to their networks, subject to very specific stipulations.

While it is desirable that liberalization not have adverse effects on the rates for service to the general body of customers, some carriers have indicated that this aim may be difficult to achieve.

In summary, present legal and regulatory requirements indicate that a more liberal policy of interconnection privileges would require carrier agreement and consent, unless existing legislation is revised.

Having examined legal controls, we now turn to the economic and social aspects involved in liberalization of policies controlling interconnection of terminal equipment.

#### ECONOMIC AND SOCIAL ASPECTS

The investment of carriers in terminal facilities in Canada today is about \$1 billion and is projected to approximately \$3 billion by 1980. Chart II shows the gross plant investment in station equipment (and its relation to other investment categories) in Canada as of December 31st, 1969. Chart III provides quantitative data and an estimate of the replacement costs as of today for station equipment. The projected investment in 1980 is shown for various types of terminal apparatus based on projected annual growth.

Note: Station equipment is an overall term which generally includes station apparatus (the hardware account, including large PBX's) and station connections (the wiring account). The magnitude of station connection costs which may or may not be included in the "liberalized interconnection" portion would vary with the point of interconnection selected for various types of service.

The carriers' operations are marked by a number of particularities which should be appreciated in order to arrive at balanced judgements regarding avenues of future development. In its operating and manufacturing sectors combined, telecommunications provide employment for over 150,000 Canadians and account for approximately 3% of the gross national product. The industry accounts for over \$100 million or some 30% of the \$330 million in national industrial sponsored R & D.

The national average revenue per telephone is approximately \$150.00 per subscriber per year. The breakdown of this revenue to the various expenses is shown on Chart IV.

There are about 10 million telephones and about 20,000 PBX's in service in Canada. The overall investment per telephone station is approximately \$650 at book value and about twice that at replacement value. The telephone set itself accounts for about 2% of today's replacement price of total station investment. Of the \$150.00 revenue, about \$7.00 is retained earnings. This provides only a portion of the funds required for growth and requires carriers to raise about half of their funds externally. Great reliance on external sources of funds and the carriers' ability to borrow have posed some difficulties for innovation and modernization requirements.

Probably the most important aspect of interconnection considerations is rate averaging for the various classes of service. Rate averaging is the practice of applying like prices for like service, rather than setting price relative to costs. Carriers are not required to directly relate tariffs to cost and charges for service offering. For example, a rate level is often independent of a customer's service location (with some minor exceptions). As a result, some offerings, taken in isolation, are quite profitable while others do not earn enough to cover this related cost. In order to make basic telephone service as widely available as possible to remote areas or less densely populated areas, the carriers have generally priced the offerings in these areas below cost. Price averaging rates so derived are the consequence of long practice and approval as to be a matter of established public policy. It is not the purpose of this paper to debate the pros and cons of any rate structure; however, the impact on any revised interconnection practice requires evaluation.

Another practice followed in rate making is to give some weight to the "value of service" concept. Considering the revenues from local telephone services (excluding toll), there is reasonable evidence to support the belief that, in varying degrees, business subsidizes residence service; large centres subsidize small centres and rural developments; extension sets and premium sets (coloured, contempla, touch-tone) subsidize basic service. Residential subscriber revenues are some 30% under the overall average revenue per subscriber. It must, of course, be recognized that this is a very complex matter and opinions on the various approaches to rate making differ sharply.

There are a number of other aspects of the existing situation which should be considered in seeking better alternatives. Canadian communications have developed quite differently from European countries where national ownership is the rule. Canadian carriers have evolved a basic philosophy of pricing quite different from that of most countries. In Canada (and in the U.S.) the system of rates is established to maximize availability of service. Approximately 10% of the actual cost of installing the terminal equipment is billed to the customer as a service charge, with the remaining 90% being paid by the customer over a long period of time. In all other countries (except U.S.), the customer is required to pay an amount close to the total cost of the installation of the terminal equipment when the service is initially provided. Some countries require the customer to purchase his own equipment for expensive installations. (In Britain the customer must purchase any PABX system with over 100 extensions. The equipment must be approved by the Administration and he must sign a maintenance contract). The Canadian system tends to place most of the capital burden on the carrier, which entails a considerable sum in large PABX installations. The fact that Canadian carriers find it necessary to install approximately five to seven telephones to gain one in a current year indicates some degree of favourable treatment to those who move frequently; however, the Canadian pricing system, with its inherent cross subsidization, is not a whim of free option of the carriers. It is the consequence of public opinion expressed through representations before regulatory commissions by individuals, government and special interest groups. Subsidization is institutionalized in the Canadian telephone communications economy of today and could be affected by changes in the terminal sector. Chart V shows basic comparison between Canada, Britain, Germany, France and Sweden.

THE USERS

Several user groups have presented briefs to the Department in support of liberalization of interconnection practices. Although they differ with respect to their interests, they share many problems and objectives.

Under existing rules and practices observed by the carriers, users are denied the right to attach many types of apparatus including PBX's, intercoms and private mobile radio systems. Apparatus which may be of identical design and procured from the same manufacturer as that of the telephone company is not permitted attachment when privately owned. At the same time much of the sophisticated apparatus which is available, particularly in foreign markets, is not offered by the telephone companies and consequently is not available.

As previously mentioned, some types of apparatus are attached provided they are acoustically or inductively coupled, or if hardwired, are connected through a carrier provided protective device (coupler). Since both an installation charge and a monthly rental is levied for the coupler, some customer dissatisfaction has resulted. There are those who are not convinced that the coupler is always necessary on technical grounds. As a result, there are countless "bootleg" hookups which are virtually impossible to police.

During the past two years, there has been a marked increase in the volume of terminal devices reaching the Canadian market. Predominant among these are the automatic telephone answering instruments variously described as answer back machines, electronic secretaries or message centres. In addition, a wide range of alarm devices designed around magnetic tape playbacks and pre-programmed telephone dialers are being used for the automatic sensing and reporting of fires, burglaries, and various other kinds of emergencies or malfunction. Some of these are provided in attractive stylings designed to fit unobtrusively into home decor and find wide application in the protection of cottages, seasonal homes, office buildings and institutions. Other versions of related apparatus are finding their way into the homes of aged and sick people as means of alerting relatives, doctors or family friends in emergencies.

These types of apparatus are permitted attachment through a carrier-supplied protective device, that is, a coupler. Salesmen, however, tend to avoid telling the potential customer about the requirement for a coupler for fear that the negative impact of the monthly charge (typically \$2.00) will "kill" the sale. Others deliberately make bootleg hook-ups knowing that the practice is contrary to tariffs.

United States sources have recently estimated that there are now over 1,500,000 illegally attached answering devices. Knowledgeable Canadian sources estimate that there are about 9,000 to 11,000 such units in operation in Canada, of which only a probable 15% are legally attached. The relatively small quantity of couplers reported to have been supplied by the carriers tend to confirm the latter. Combined sales of these devices are estimated to be averaging around 700 to 750 units a month in Quebec and Ontario alone. A recently introduced hardwired telephone answering unit retailing at \$149.00 from major mail order houses and over the counter in some major department stores is expected to impact the consumer market heavily.

The situation might be compared to the days of the domestic radio receiving licence in which the law was "honoured in the breach". Users who wish to comply with carrier policies on interconnection and who are willing to bear the capital investment to obtain the flexibility and compatibility they desire beyond that available from carriers are frustrated by their inability to do so.

Some users are convinced that they could in fact provide their own standard apparatus at lower cost than it is available from the carriers.

Many business customers in Canada, particularly those with parent companies in the United States, now want the same interconnection privileges as their U.S. counterparts. Entrepreneurs, attracted by the sales potential in the terminal market, are pressing to enter the marketplace.

In Canada, at least one subscriber has taken a denial of interconnection of his terminal equipment to the courts and litigation could develop quickly in a number of other cases. This situation raises the possibility of contradictory

judgements and a narrow case by case approach, rather than policies which could be accepted by the appropriate regulatory bodies.

### EQUIPMENT SUPPLIERS

Coincident with technological developments in the fields of telecommunications, especially in the aerospace industries, there has been an accumulation of expertise in the research and design, manufacturing, installation and maintenance fields that equals and often excels that traditionally possessed by the carriers.

In recent years, especially in countries where private ownership of terminal equipment has been permitted, there has been a proliferation of new apparatus, some from new entrants not traditionally looked upon as telecommunications industries. Canadian manufacturers whose foreign based parent companies have these in their product line are denied access to the Canadian markets. These include some very large organizations whose technical competence and financial strength is impressive.

At least one Canadian manufacturer has already established a reputation as a supplier to American markets of products made possible by liberalization in the U.S.A. Other Canadian manufacturers are known to be actively pursuing the U.S. interconnect market, with apparatus which can only be obtained by subscribers through the carrier at home.

In summary, when the numbers, costs and complexities of new types of terminal equipment are ranged against the Canadian market, doubt arises as to the feasibility of restricting the privilege of supply to the carriers exclusively. The question of capital sourcing becomes more challenging as investments required tend to increase. Changes in usage patterns are beginning to emerge (e.g. modern computer-voice equipment could access the local networks and tie up considerable equipment for long periods of time). There is some good argument for an unbundled rate structure which includes a separate charge for service order, station handling, access line, and a one-time telephone installation which approximates actual costs. Such charges would result in less cross-subsidization.



The accumulation of pressures, technological, social, commercial and political, are such that the issues must be squarely faced. Changes have occurred and we must be prepared to develop new policies and programs which will be adaptable to the world of tomorrow.

CHART II - 1

TRANS-CANADA TELEPHONE SYSTEM MEMBER COMPANY INVESTMENT DATA \*

(as of 31 December 1970)

(figures shown times \$1,000)

<u>Investment Categories (1)</u>	<u>B.C. Tel</u>	<u>AGT</u>	<u>Sask Tel</u>	<u>MTS</u>	<u>Bell</u>	<u>NB Tel</u>	<u>MT&amp;T</u>	<u>Nfld. Tel (3)</u>
Transmission Facilities	\$ 101,707	\$ 94,501	\$ 43,514	\$ 41,359	\$ 472,747	\$ 28,021	\$ 23,350	\$ 3,639
Switching Equip.	173,070	108,052	58,998	67,296	914,824	35,571	43,777	19,010
Outside Plant	184,009	139,683	56,193	103,134	1,205,152	60,740	58,706	22,169
Station Equip.	165,079	87,791	38,921	47,840	814,312	26,836	25,609	11,189
Other Investment (land, buildings, vehicles, etc.)	70,951	70,634	29,924	33,960	373,970	18,129	20,316	6,466
<b>TOTAL</b>	<b>\$ 694,816</b>	<b>\$500,661</b>	<b>\$227,550</b>	<b>\$293,589</b>	<b>\$3,781,005</b>	<b>\$169,297</b>	<b>\$171,758</b>	<b>\$62,473</b>

NOTES:

- 1) The investment figures shown represent gross plant investment of the member companies. Each category represents the total of various book accounts which can be broadly classified under the 5 heading shown.
- 2) In all cases investment in subsidiary companies (including Okanagan Telephone Company) are excluded.
- 3) Newfoundland Telephone leases a significant proportion of their plant from another carrier.
- 4) Station equipment equals 20.6 percent of gross plant investment.

\*Source: Trans-Canada Telephone System

CHART II-2

ESTIMATED REPLACEMENT COST - TERMINAL EQUIPMENT INCLUDING LABOUR

ALL CANADIAN COMMON CARRIERS \*

Class of Service	1 Quantity of Terminal Apparatus (see note 3)	2 Replacement Costs of Station Equipment per Installation Less Drop Wire (see note 4) Jan 1/70 Estimated	3 Total Replacement Cost of Station Equipment Less Drop Wire Jan 1/70 Estimated	4 Projected Annual Increase	5 1980 Quantity of Terminal Apparatus Column 2 at 5% Average Annual Increase	6 1980 Replacement Cost Per Installation at 5% Average Annual Increase	7 Estimated 1980 Investment Less Drop Wire
<b>RESIDENCE:</b>							
Main	5,388,917	40.00	215,556,680	(1975 = 3.9%) (1980 = 3.1%)	7,539,211	65.00	490,048,715
Extension	1,187,703	30.00	35,631,090	12%	3,287,562	49.00	161,090,538
<b>BUSINESS</b>	794,874	150.00	119,231,100	3%	1,036,515	245.00	253,946,175
Main							
Extension	635,006	58.00	36,830,348	8%	1,270,012	95.00	120,651,140
Extension on PBX	1,203,152	60.00	72,189,120	6.7%	2,154,852	6,520.00	211,175,490
<b>PBX</b>	5,157	4,000.00	20,628,000	6.7%	9,205	48,870.00	60,016,600
<b>PABX</b>	15,263	30,000.00	457,890,000	6.7%	27,336	48,870.00	1,335,910,320
<b>PAY TELEPHONES</b>	73,994	800.00	59,195,000	1.0%	82,503	1,303.00	107,501,409
				5 year estimates			
<b>TELETYPEWRITERS</b>	30,000	2,000.00	60,000,000	33%	50,000	3,258.00	162,900,000
<b>MOBILE PHONES</b>	12,402	2,000.00	27,284,400	22.3%	41,931	3,584.00	150,280,704
	9,346,468		1,104,435,738 (note 5)		15,499,127		3,053,521,097 (note 1)

- Notes: 1. Figures do not include miscellaneous equipment in station equipment account, e.g. speaker phone, intercoms, etc. Figures for Trans Canada Telephone System Chart II, which include miscellaneous equipment amount to \$1,217,577,000 for Dec. 1970. Carrier and non-carrier equipment is estimated to exceed \$4 billion by 1980.
2. Estimated capital requirements of carriers for station equipment in 1980 = \$350 million. If C.P.E. = 20% in 1980 carrier reduction of capital = 70 million.
3. Major types of terminal apparatus in service end of 1969.
4. Based on estimated loaded labour rate of \$9.50 per hour.
5. To above totals can be added Estimated Replacement cost of Station Drop and Protector (Estimate \$26.00 per station where applicable).

CHART II - 3

APPROXIMATE COSTS AND REVENUE FIGURES

Average cost of standard telephone set	\$ 25.00
PBX average cost per line - 100 line range	\$ 150.00
Small dial PABX per line - 20 line range	\$ 300.00
Carrier investment per telephone (book value)	\$ 650.00
Carrier investment per telephone (replacement value)	\$ 1,300.00
Percentage investment in station equipment (book value)	20.6%
Station equipment as a proportion of current construction budget	25 %
Telephone	10 million
Gross annual revenue	1.6 billion
National average revenue (per telephone subscriber)	\$ 150.00 per year
Breakdown of \$150.00	
Depreciation	\$ 35.00
Maintenance and operation	\$ 30.00
Administration - Billing - Marketing	\$ 10.00
Interest on Debt capital	\$ 20.00
Corporation Taxes	\$ 30.00
Profit retained for growth	\$ 7.00
Shareholders	\$ 18.00
	<hr/>
TOTAL	\$ 150.00
	<hr/> <hr/>

\* Source - DOC Statistics

Note: This is a table of approximations suitable for order-of-magnitude uses.

CHART II-4

SERVICE CHARGES AND MONTHLY RATE COMPARISONS \*

	CANADA (Bell Canada)	GREAT BRITAIN	FRANCE	WEST GERMANY	SWEDEN
Service Charge New Service Individual line	Business - \$ 18.00 Residential - \$11.00	one charge \$ 87.00  see note 3	one charge \$ 120.00  see note 4	one charge \$ 29.00  see note 5	one charge \$ 60.00  see note 7
Penalty clause for removal	none (except for a few special and/or costly installations)	PABX's over 100 extensions are customer owned. BPO equipment under contract except telephones.	PBX - PABX's are not Carrier owned (contract agreement)	PBX - PABX supplied by private enterprise.	Contracts for all PBX - PABX's.
Local Call Rates	Flat Rate. Varies with class of service and rate group. Unlimited number of calls. No time duration. No service charge.  see note 6.	Message Rate - (note 1) 2½¢ per call. Timed duration - varies. Ser- vice charge - quarterly.  Ind      Pty Bus. \$14.75    \$12.30 Other \$12.30    \$10.00	Message Rate (note 1) 6¢ per call Service charge - quarterly All one line service = \$40.	Message Rate (note 1) 5.75¢ per call. Service charge - quarterly Varies - localities over 100 telephones.  Individual Line Ind.            \$26.00 Party           \$15.00	Message Rate (note 1) 1.8¢ same office. No timed duration. Junction calls - 9 min. timed. Service charge - quart- erly. Individual line = \$80.  see note 2.

Notes: Chart shows charges for basic service only - charges other than Canadian are approximate due to currency conversion.

- (1) Message rate charges are based on the number of completed calls. Where time duration is used, a second unit or call is charged for each time period.
- (2) Sweden - Junction calls are calls to other exchanges in the same local calling area.
- (3) Great Britain - Left-in telephones are reconnected free. Installation charge for new extensions = \$15.00
- (4) France - Left-in telephones are reconnected for 50% of the installation charge or \$60.00.
- (5) West Germany - Left-in telephones are reconnected for 1/3 of the installation charge (unless alterations are required).
- (6) Canada - Nine rate groups for local service - no limit on number of calls or duration of call. A monthly charge is applied to recover remainder of installation costs, and operating expenses. This charge varies with class of service and rate group -  
e.g. Ottawa Residential Individual = \$ 5.95 monthly  
Business Individual = \$ 16.00 monthly.
- (7) Any subsequent change including removal = \$20.00.

\* Sourced from literature provided from Telecommunication Carriers in Countries shown.

#### NOTES ON CHART II-4

In most European countries and in Australia, all communications are under federal control, usually a division of the Postal Department or corporation. In general terms, the expense of supplying special terminal apparatus is paid for by the customer, e.g. in Great Britain the customer must purchase any automatic private system with over 100 extensions. Smaller systems are optional as to ownership, but the costs are recovered by installation charges; in Germany all PBX's - PABX's are purchased by their users. This practice evolved as a means of reducing the burden on the post offices of raising large amounts of capital.

In most European countries the responsibility for maintenance is retained by the Carrier; they view that arrangement to be essential. Due to retention of maintenance responsibilities, the range of approved terminal equipment for various uses is restricted as are the number of "attacher or interconnect" companies, where these are permitted to install and or maintain equipment. There are some exceptions to the general pattern; however, where maintenance is not the responsibility of the carrier, maintenance contracts are mandatory.

Pressures for a wider range of offering and greater choice are being encountered in Europe and Australia. The reaction is to expand the choice and to alter rates to provide a fair rate of return on each service segment.

### SECTION III

#### PROGRAM OBJECTIVES, CONSTRAINTS AND DEFINITIONS

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## SECTION III

### PROGRAM OBJECTIVES, CONSTRAINTS AND DEFINITIONS

#### OBJECTIVES

The objectives of the present inquiry are to develop policies and programs which would:

"Maximize the benefits of innovation, diversity and choice, to the public generally, with respect to the attachment of station apparatus to the public telecommunications networks"

If the liberalization of interconnection policy is to be in the public interest in terms of the innovation, choice, and diversity that it would offer, the following constraints should be met:

#### CONSTRAINTS

1. The integrity of the public switched networks must not be impaired by consequence of the application of any possible new rules and procedures,
2. As a result of a liberalization policy designed to benefit those requiring greater choice and innovation, there must be no significant increase in the cost of basic and essential services. At a minimum, this would include one line residence and business. Also there must be no impairment in the quality of service generally.
3. No person must be unjustly or unreasonably discriminated against in the matter of rates for basic and essential telecommunications services.
4. The existing degree of Canadian control of telecommunications must not be diminished. Control refers to instruments such as corporate ownership, management, planning and design, engineering, and supply. It involves the viability of domestic industry in the



context of domestic and world markets.

These constraints should help to set some outer boundaries on the scope and acceptance of plausible options.

#### DEFINITIONS

The following defines terms used in this working paper:

Subscriber Terminal Equipment - any facility on the premises of a private person or corporation for his or its exclusive use for communication over

- (a) a private facility
- (b) a public common carrier to a restricted directory of address
- (c) a public common carrier without restriction as to addresses in the common carrier directory

Note: Such equipment could require corresponding type approval (a) (b) or (c).

Private Network - a facility consisting of terminal equipment transmission and switching apparatus, in any combination, which are purchased, leased or otherwise procured and dedicated to the exclusive use of a private person or corporation.

Restricted Common Carrier - a facility which is partitioned by space, frequency, time or other mode of division into effectively separate entities each of which is dedicated to the exclusive use of a private person or corporation.

Note: In the case of a form of time division in which the carrier contracts with a subscriber to make available for the subscriber's exclusive use a prescribed amount of time within a prescribed waiting time in queue is in fact within the scope of this definition. It is clear that "availability" and "exclusiveness" in this case

are defined in statistical terms rather than deterministic static terms and that the certification of contractual undertaking and execution is less straightforward than is, say, the space division case.

General Common Carrier - a facility consisting of any configurations of circuits or channels which is available to the public on a non-exclusive and non-discriminating basis.

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## SECTION IV

### OPTIONS

The options described in the following pages cover the entire spectrum from the status quo to unrestricted competition. Although the option space is continuous in nature and lends itself to any fine degree of subdivision, it can, for practical purposes, be ordered in terms of six discrete options. It should be understood, however, that as subsequent phases of the program are completed, a decision may be taken to implement an option "in between" those described herein; moreover ensuing courses of action may be evolutionary as distinct from moving directly to a final option.

#### 1. The Status Quo

This option refers to the situation as it exists today, which is to say, the continued provision of almost all terminal facilities connected to the public switched networks by the common carriers under the regulation of the designated government agencies. Under this option, the rate of innovation for carrier provided terminal equipment would be determined by the carriers recognizing public demand. The decision to allow the attachment of a greater variety of customer provided equipment to the public switched networks would continue to remain entirely with the carriers.

#### 2. Modified Status Quo

Under this option, the carriers would continue their franchise to provide and connect attachments under the present regulatory structure. Terminal devices to be attached to the public switched networks would be furnished alternatively on the following basis:

- a) Leased by the subscriber from the carrier as at present,
- b) Purchased outright by the subscriber from the carrier and maintained by the carrier.

The carriers would be obliged to offer a wide range of terminal equipment as approved tariffed items, featuring products from many manufacturers. The attachment of non-tariffed or special items would be allowed when requested by the user, provided they met the specified technical criteria. When

the demand for a particular non-tariffed item reached a viable level, it would be adopted and tariffed as a standard item by the carrier. The user, therefore, would be given a much wider choice in selecting equipment to meet his particular needs. All carrier tariffs would continue to be regulated by government as at present. Regulatory bodies might authorize faster write-off periods for terminal apparatus in order to make possible a higher rate of innovation. Effective avenues for public complaint with regard to the carriers' failure to offer such choice would be incorporated in regulations. All costs incurred by the carriers in procuring, installing and maintaining special equipment, would be tariffed to be fully compensatory.

The option can be considered as a range of options designed to encourage more choice and a greater rate of innovation than the status quo. In its weakest form, it is really nothing more than the present situation, modified by the assumption, that the carriers would recognize that more innovation is required of them in the terminal sector and by the assumption that they would voluntarily move to a more liberal interconnection policy. In its strongest form the carriers would be required (by legislation, if necessary) to provide, attach, and maintain any equipment type-approved by an organization to be established for this express purpose.

### 3. Selective De-regulation

This option comprises a substantial variety of possibilities and makes provision for price competition in the terminal area of telecommunications. It provides for selective price de-regulation for specified categories of station apparatus, in specified regions, serving specified categories of users where effective competition can be established. In these sectors competition would replace regulation in determining prices. The carriers may operate in the competitive terminal equipment field through separate companies whose operations have been split-off from the regulated portion which comprises switching, distribution, transmission and any residual-terminal operations of the regulated company. Entry of additional interconnect companies would be controlled by the same licensing procedure as for the carriers subsidiary. Criteria for licensing could include such things as the adequacy of resources, infrastructure, technical competence, the size of the market and the scope of apparatus offered. This option requires the establishment of some organization or group to develop interface standards,

certify and approve terminal equipment and enforce procedures for installation, maintenance, and acceptance. The carriers would have the right to disconnect "for cause" and such decisions would be open to appeal.

#### 4. General Price De-Regulation

Just as the term "selective" in the preceding option referred to apparatus, locale, and user, the term "general" implies de-regulation of all terminal apparatus, in the entire service area of a given carrier with regard to all categories of users, be they residential, business or institutional. The de-regulation of prices under this wider option also requires effective competition between licensed entrants. Licensing would consider the scope and resources of all interconnect firms to assure the public the benefits of fair pricing in the absence of regulatory protection. Interface compatibility, attachment type approval, acceptance and maintenance standards would be subject to the authorization of appropriate public agencies. The carriers would have the right to disconnect "for cause" and such decisions would be subject to appeal.

#### 5. Limited Laissez-Faire

In this option, the carriers would continue to be regulated as at present. Competition with the established carriers would be from unlicensed firms who would not be subject to regulatory mechanisms, price control, conditions of entry, standards of installation and maintenance, or scope of operations. This alternative is similar to the situation in the U.S. where the AT&T and System companies remain regulated in the terminal equipment field under the FCC. State and municipally regulated companies are exempt from any FCC rulings.

#### 6. Unrestricted Laissez-Faire

This option is identical to the Restricted Laissez-Faire option except that the carriers, as well, would be freed from price regulation in the terminal sector. Again competitive entry would be "wide open". No restrictions on entry to the terminal equipment field and no standards for equipment installation or maintenance would be imposed.

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## SECTION V

### DISCUSSION OF OPTIONS

#### BACKGROUND CONSIDERATIONS

The proposal for customer provided equipment (and competition in the terminal equipment field implied by some of the options) embraces a number of general considerations. It will, therefore, be useful to discuss some of these issues before turning to a discussion of the options one by one.

One of the vital questions which must be posed in any examination and discussion of interconnection is "Would a federal government policy which liberalized the existing terminal attachment practices be beneficial to the public?" Examination of the existing situation indicates some changes to meet changing conditions are inevitable, and the industry, including the federally regulated carriers, has recognized the need for development of new approaches. However, it is not deemed to be in the public interest to be stampeded by pressures into an irreversible process. The advantages to any one segment of the public, however meritorious and rational they may be, judged within their own context, may not be universally applicable in such a highly interactive and integrated sector of national life as communications.

#### THE ADVANTAGES AND DISADVANTAGES OF INTERCONNECTION

In any balanced treatment on the subject, one must be cognizant not only of the benefits but also of some of the possible pitfalls to a more liberalized interconnection policy.

The interconnection of non-carrier owned terminal devices to the public switched networks of the federally regulated carriers is an involved issue. It affects many hundreds of thousands of telephone company subscribers. It impacts on industry. It includes economic, technical and jurisdictional questions involving many levels of governments, both provincial and federal. Many of the advantages and disadvantages are difficult to quantify and weigh. Some of the anticipated benefits claimed by proponents of a more liberal interconnection policy may never materialize, while some of the difficulties anticipated may well be avoided by an orderly introduction of a new policy, and by learning from the U.S. experience.



One of the more difficult aspects of the problem to quantify is the value that should be placed on innovation in any liberalized foreign attachment policy. Advocates of liberalization have used the hydro utility as an analogy to the communications network. While this analogy does not stand up to close scrutiny from the point of view of network integrity, it is useful in explaining the proliferation of gadgets that could result from a wide open attachment policy. Electrical manufacturers have continually developed new appliances. Electric tooth brushes, snow blowers, hedge trimmers, can openers and even electric combs have made their appearance and achieved customer acceptance. The electrical industry has benefited from this introduction of new products and, in an unrestricted environment, many of the initial innovative advances in the terminal equipment field might similarly be of limited usefulness while still resulting in some benefits to the industry.

On the other hand, a liberalized terminal attachment policy, which would attract other manufacturers in the telecommunication supply area, could result in equipment being better designed at lower costs. Innovation and competition could lead to new uses, better methods, and new procedures which could stimulate the general use of telecommunications and help lower businesses' total operating costs. It would undoubtedly stimulate and help develop genuine new customer needs. Although the carriers themselves could greatly increase the amount of innovation by shortening their amortization periods, competition is more likely to provide the incentive needed.

A clear statement on interconnection policy holds certain attractions for the carriers as well. This would help remove the threat of case by case decisions being made in the courts involving any legal disputes concerning the interconnection of privately owned equipment to the public networks. Customer ownership removes for the carriers some of the risks of obsolescence. The use of shorter planning horizons together with a greater number of penalty-type leases and lease-purchase options may help reduce to an extent some of the carriers capital requirements. Alternative sources of supply would disarm carrier critics, who would be free to shop around for their terminal requirements. Finally, competition for the carriers could mean freedom from regulation in the competitive area of their business. Substituting competition for regulation would remove the limitations which have been imposed on the carriers' earnings. If the carriers were able to compete in all of their terminal operations on an equal basis with their competitors, there would be many cases in which they

would have a competitive advantage at least at the start. By raising prices in some of these areas and vigorously competing (in price and service) with their competitors in others, they could minimize the financial impact due to erosion of their terminal business.

One would expect, as competition increased and as more effort was put into satisfying existing and new customer needs, that the total amount spent on telecommunications might increase. This could provide new opportunities for employment and manufacturing in Canada but would create equal opportunities for off-shore manufacturers, many of whom already market their equipment in Canada. The exigencies of the competitive climate will force carriers and attached companies alike to purchase equipment at lowest possible price, which will present a continuing challenge to the competitive ability of Canadian manufacturers.

Many people who are presently satisfied with the cost, variety, and level of service may be forced to pay more to support those who want more innovation and choice. There are a number of factors which could contribute to such a situation:

- 1) Under competition, subsidization would tend to disappear in that competitive services would tend to function on a self-compensatory profit-and-loss basis. Competitors would tend to enter into those areas of the business where the cross-subsidies (and the profits) are the highest. New competitors, if unrestricted, would obviously concentrate in geographic and equipment areas where the profits were highest and therefore "skim-the-cream" off the more lucrative parts of the business. To compete the carriers would be forced to lower some prices and to raise other prices in order to recover such losses,
- 2) As new models proliferate, equipment would be written off in a shorter period of time in order to offset a higher rate of obsolescence,
- 3) As new uses materialize, and the number and variety of customer terminals increases, there will obviously be an increase in the usage of the carriers' local and toll switching facilities. However, the cost to the carrier of providing additional switching equipment could be more than offset by an increase in toll revenue, particularly if carriers can continue their

past performance in reducing long distance rates.

- 4) The carriers, whose business has been built on the principles of cross-subsidization and price averaging, may find it difficult to apply the full costs of innovation on those who want it. There is the danger that, even if appropriate mechanism could be designed, at some point the temptation to put some of the costs on to the larger body of users might prevail,
- 5) Other areas in which there may be higher costs are:
  - i) research and development,
  - ii) the development of standards,
  - iii) certification of equipment,
  - iv) licensing of interconnect companies,
  - v) co-ordination,
  - vi) inspection.

These costs are, however, labour intensive and in some sense can be considered a plus since they may increase employment.

There are several other problems which one must consider in some of the options. There is the danger that in some of the options there will be an attenuation of Canadian control of telecommunication services. Some of the competition would be in the form of foreign made equipment. This would have implications for Canadian manufacturers.

Some impairment of service could occur unless there is co-operation between interconnect company and carrier. Under some of the options, certain services and apparatus might not be available on the same basis to everyone. Under a fully competitive structure, there would be no compulsion for any interconnect company to provide all services on the same basis to everyone in all parts of the country. Divided responsibility for installation and maintenance could cause delays and complications for customers (i.e. the possible need to deal with two or more companies).

Under competition, the traditional stability of the carriers will be affected. As the demand for highly trained technical people increases, the carriers could be faced with some attrition in their skilled personnel.

The liberalization of to-day's foreign attachment policy will inevitably impose several problems for the carriers and the regulatory authorities with regard to the effect that a change in policy might have on rate structures. New tariffs may be required for those categories of subscribers owning their own equipment or leasing equipment from some interconnect company. Eventually, new tariffs may have to be devised to recognize the frequency, length of haul and duration of calls of a local as well as a toll call for certain categories of subscribers (e.g. computer utilities and their subscribers, etc.)

### TECHNICAL ASPECTS

The technical considerations included in the prerequisites of the carriers are covered in detail in the reports of the Telecommission Study, the N.A.S. investigation and the report prepared by Dittberner Associates. In essence these reports stress four potential harms, the most challenging, in terms of foreign attachments, being network signalling and control.

If carriers lose end to end control over communications, care must be taken to guard against the following problems. Improper network control signalling, of both the addressing and supervisory types, can cause wasteful use of central office, transmission and administrative facilities. Failure to provide proper addressing information, either by incorrect pulses, foreign currents, noise or excessive amplitude, results in wrong numbers, second trial failures of equipment, repeated call attempts and a high ratio of uncompleted calls, culminating in excessive maintenance expense, central office overloads and customer dissatisfaction. Carrier switching centers are engineered to provide a particular grade of traffic services based on expected busy hour traffic loads. When busy hour traffic loads occur which are greater than the expected level, the grade of service declines. Improper network control signalling can serve to increase the overall traffic load (through wrong numbers, incompleted calls, etc.) on the system at any given point in time. The effect that faulty network control signalling can have on the network during busy hour periods is cumulative and builds up at a greater than linear rate.

#### Examples:

- (1) Transmission of improper multi-frequency signalling from touch-tone devices can unnecessarily

tie up the originating registers in a central office. In this case, the originating register ignores the faulty signal and usually times-out causing the customer to return to dial tone.

- (2) There is a greater potential for disruption of the network through the introduction of faulty dial-pulse (rotary dials) addressing signals into the central office switching mechanism. In this case, a certain degree of call completion will occur, i.e. call completed to a wrong number, or, where no such number exists, the caller will receive a re-order signal, reach intercept position, or, in the case of insufficient digits, receive nothing.

Faulty network control signalling can also result in annoyance to other users and the improper billing of toll charges.

Terminal equipment must be designed to provide acceptable transmission when connected to various types of local loops. Equipment must be designed for the transmission zone in which it is located, or in other words, must be compatible with the network design involved.

Input of excessive power into the telecommunication network can cause transmission quality impairments of various degrees. Excessive power induces various signals in adjacent channels, both in cable or carrier systems. Probably the most common of these is cross talk. The same effect can be caused by a failure on the part of the interconnection user to adequately maintain the longitudinal balance of the local loop.

The above indicates that the analogy to a hydro electrical system requires considerable qualification. A defect in an electric stove cannot affect the entire electrical system, whereas a defect in communication terminal equipment can adversely affect other users of the network.

In spite of this consideration, however, there is little to indicate that customer provided equipment will operate less well than carrier provided equipment, provided type approval programs and maintenance standards are adequate.

It is quite likely that these necessary functions can be adequately performed by other than carriers.

Telecommunications and electronics expertise is no longer the monopoly of the carriers and their traditional suppliers. Many companies have the ability to engineer, furnish and install equipment to meet the most exacting carrier and customer requirements.

Provided, therefore, that performance standards are developed for terminal equipment, and some form of certification or type approval is mandatory, the quality of equipment to be connected to the carrier network can be assured, without the necessity for protective interface devices (couplers).

If protective interface devices under control of the carrier are not mandatory, good maintenance of customer owned equipment must be assured. In some countries, where a degree of customer ownership prevails, the maintenance remains with the carriers through a mandatory maintenance contract.

Traffic standards and traffic load evaluation, with the assurance that terminal equipment secured from other than carrier sources meets the customer needs for both inward and outward calling loads, is another present carrier responsibility which, presumably, must be performed by others in a competitive environment.

Having developed some appreciation of the technical problems, we now turn to the economic and social aspects involved in liberalization of policies controlling interconnection of terminal equipment.

### ECONOMIC AND SOCIAL ASPECTS

As previously noted, liberalization involves controls, for the magnitude of the estimated present and projected investment in terminal equipment in Canada (\$1 billion today, an estimated \$3 billion by 1980) could become sufficient to disturb the financial stability of the regulated carriers and to have detrimental effects on the Canadian telecommunications manufacturing industry, unless appropriate interconnection policies are developed. Carriers will be seeking capital in the order of three billion dollars in the course

of the next five years for plant expansion and replacement, plus mandatory long term debt payments. This could turn out to be a conservative figure, especially if the demand for new and diversified terminal equipment develops traffic patterns and changing message parameters which impose increased traffic loads on carrier networks. The carrier's total capital requirements of approximately 10% of the capital being found annually from Canadian resources looms large in appraising the impact of customer ownership of terminal equipment. If the quantity of customer provided equipment proved to be only a small percentage of the whole, then the capital relief would be limited. The U.S. interconnect penetration with open competition for all terminal equipment, (somewhat restricted by the rental cost of couplers) in 1971 was only 0.8% and in 1972 is estimated to finish at 1.1% of the total plant on customer premises.

If we consider only PBX's and associated extensions as being in the competitive market, estimates for Canada show capital requirements for carriers being reduced by about \$2 million in 1973 and about \$25 million in 1975. These estimates are based on U.S. forecasts. However, should a workable solution for liberalization be developed which proves attractive to a large percentage of customers, relief from capital needs by the carriers may become more substantial.

Carriers present marketing policy of retaining control of almost all the equipment required to produce communication service may pose problems under increased liberalization. They do not require customers to rent the equipment for any specified period of time (except for some large or special installations). Thus the carriers not only finance the equipment but they bear the risk of removal and obsolescence. In order to keep up with the demand for innovation and provide it at rates "equivalent" to any outside competitors, the carriers might find it necessary to raise the price of some other service (either basic or premium). This could mean that basic or premium services would subsidize those who desire innovation. A second possible approach would be to develop new rate structures for access lines to customer provided equipment which would compensate for increases in depreciation expense.

There are several sectors in the equipment area where competitive suppliers could provide equipment at lower cost than the carriers because of the carriers' policy of price averaging. If the carriers continued to be regulated and were required to provide a complete range of service in all areas and competitors were allowed to select only the high-

profit, low-cost items and concentrate on the large urban centres, and on the lucrative "low cost of installation" PBX offerings, ignoring the scattered remote areas, then competitors would be practising "cream-skimming" (the practice of selecting a competitive area in which only high profit items are at stake). This practice could affect the balance of the existing rate structures; therefore the resolution of the cream skimming problem becomes a major issue for consideration in selecting interconnection options.

Having discussed at some length the general factors which will impact to some degree on any of the options described in Section 4, we can now turn to a discussion of the pros and cons of each option. The discussion represents a compendium of views gathered from a variety of sources. The "pros and cons" of the various options are evaluated not only in terms of the constraints introduced earlier but also a number of other considerations such as variety and innovation, rate structures, public protection, control, ease of implementation, etc.

First, some general remarks are in order. The Department did not receive sufficient quantitative information, either from the carriers or users of a sort which would unequivocally rank the cost-benefits of one option over any other. Information on the rationale of actual or contemplated tariffs; the anticipated degree of penetration, substitution and market stimulation by major segments of apparatus; the nature of degree and return on investments; the cost of hardware; possible foreign penetration; and many other issues, although requested, were not provided. In some instances no explanation for failure to produce data was given. In other cases it was intimated that specific information taken out of context could be improperly used. Often it was stated that information in the form required for analysis was not available. In general the inquiry has benefited by extensive partisan opinion formulated in qualitative terms. What quantitative data was received was insufficient to prove any hypothesis or disprove any other. With these qualifying remarks an analysis of the options follows:

#### 1. THE STATUS QUO

This option meets all of the constraints listed in Section 3. There is however, evidence to indicate that the carriers have not provided the diversity and choice required by the public.



## (Option - Status Quo continued)

There is always some temptation to leave the present situation alone. The cost of telephone service is low; service is generally available and reasonably good in most parts of the country; quality is generally high; Canadian control of research, design, and manufacturing remains intact, and regulation is undisturbed. In summary, the many problems which would be introduced by liberalizing the foreign attachment policy would be avoided.

Yet, the status quo, as described earlier, contains rigidities and limitations on innovation that are not satisfactory at least to some segments of the public. Restrictions on the attachment of customer owned equipment encourage illicit attachment of these devices. As well, current restrictions afford little relief to entrepreneurs anxious to tap the foreign attachment market. In any event, preservation of the status quo may be somewhat illusory in that changes occurring both in carrier policy and in the attachment of devices clandestinely without benefit of any general policy, may necessitate the application of more stringent controls.

2. THE MODIFIED STATUS QUO

This option is really a range of options designed to remedy the principal defect (i.e. insufficient variety and innovation) of the status quo. In its weakest form, it entails little more than the intent that the carriers will voluntarily broaden their list of tariffed items on a purchase or lease basis. In its strongest form, it would be mandatory for the carriers to provide, install and maintain any terminal equipment requested by any customer, provided only that the equipment requested has received "type approval" by an organization established for this express purpose.

The carriers would offer a wide range of terminal equipment as tariffed items, featuring products from many manufacturers. The attachment of non-tariffed or special items not included in the product lines would be allowed, when requested by the user, provided they met the specified technical criteria. When the demand for a non-tariffed item reached a viable level, it would be adopted as a tariffed item by the carrier. The user, therefore, should be given a much wider choice in equipment to meet his particular needs. All costs incurred by the carrier in procuring, installing and maintaining special equipment, plus a reasonable return on investment, would be borne by the customer employing such equipment.

## (Option - Modified Status Quo continued)

Assuming the carriers were fully prepared to make this option work, this alternative could go a long way towards meeting many of the benefits of a freer interconnection policy. Users would be given a wider choice of terminal equipment and associated service features which they may lease or own. The rate of innovation might be stepped up and all manufacturers/suppliers could have an opportunity to participate by competing for a share of the market. But most of all, it would guarantee uninterrupted continuance of the high standard of service which is currently available throughout Canada.

Since the carriers would, under this option, continue to install and maintain all terminal equipment, preservation of the integrity of the network would appear to be no problem. The costs of basic service should virtually remain undisturbed. The additional costs associated with the supply of a wider variety of terminal gear, including any higher rate of obsolescence, would be paid by those who want it. Service would continue to be available to everyone everywhere, as at present, and the rental charge and the selling price would be reasonably uniform throughout the carrier's operating territory, that is, the principle of price averaging would likely continue to be employed. Federal/provincial regulatory jurisdiction would remain undisturbed. The essential aspects of Canadian control would be maintained since the carriers would continue to exercise a very high degree of Canadian control over the telecommunications system.

On the other hand, it might be argued that this option is just "too little" - and does not provide enough of a change from the status quo. Under the weakest variation of the option, it might be just too much to expect the carriers to voluntarily move enough in the direction of greater choice and variety. Even under the strongest variant of this option, where the carriers would be compelled by legislation, if necessary, to supply, install and maintain certified terminal equipment requested by a customer, the carriers might be tempted to discourage such requests. They could "drag their feet", in spite of the customer's right of appeal.

This option would place a number of additional strains on the carriers. They would require, and might be authorized by the regulatory bodies, to adopt faster write-off periods for terminal equipment in order to make possible a higher rate of innovation. This would increase the carriers' need for capital. As the carriers expand the number of items carried, they might not have sufficient technical know-how

(Option - Modified Status Quo continued)

to properly service the increased variety of equipment, and training would become a larger problem. Retaining their monopoly, in the terminal area, would continue to put the carriers in the position of being the only one to whom people could go. As such, they would continue to come into much warranted and unwarranted criticism. Because of the immense size of some carrier organizations, they might not be flexible enough to handle the many "non standard" requests efficiently and effectively - causing in some cases hard feeling on the customer's part and abnormally high costs for some items.

Public reaction to this option would likely be somewhat mixed. Although the general public would likely be indifferent and apathetic, there might be elements within the business community, and the industry as well, who would feel such a decision was a token gesture.

Although increased competition would take place at the supplier/manufacturer end, one might like to see some expansion of their marketing effort into the "retail" trade; there is little doubt that the potential benefits of competition would not be as great as if there were a number of competing businesses marketing, installing and maintaining terminal apparatus.

There is also a problem of developing an appropriate rate structure. This involves leaving the cost of basic service undisturbed, providing for any additional costs to be paid by those who want innovation, and leaving the carriers' overall rate of return relatively undisturbed.

It is perhaps worth noting, that in some European countries, where carriers have access to resources greater than those available to Canadian carriers, they have liberalized interconnection through paths roughly comparable to the modified status quo option described herein.

### 3. SELECTIVE DE-REGULATION

This option is really a family of options in which specific terminal devices or types of devices, in specific regions, serving selected categories of users, could be removed

## (Option - Selective De-regulation continued)

at an acceptable time from the regulation of telecommunications tariffs. Coincident with the removal of tariffs, adequate competition would be introduced as a substitute for price regulation.

The following attributes are common to all variants of this option:

- (a) all entrants would be licensed,
- (b) only equipment that was type-approved for compatibility with the network could be attached,
- (c) a new rate structure may be necessary for access lines serving subscriber owned equipment. It may require a system of rates which recognizes the frequency of use, duration of call and distance involved, and
- (d) the transmission, switching and distribution functions would remain under regulated monopoly as at present.

Under one variation of this option, entry would be limited to subsidiaries of existing carriers. This limitation would greatly facilitate the procedures associated with licensing firms to compete in the terminal equipment field and assures Canadian control. It may, however, unduly limit price competition by restricting severely the number of firms permitted to operate in the terminal equipment field. If the performance of the subsidiaries of the carriers was such that they were not providing the degree of variety and innovation necessary and the general level of prices was unsatisfactory, additional entry could be permitted. Clearly, it would be inappropriate to suspend price regulation unless competition were adequate. It might, for example, be deemed appropriate to commence price de-regulation with one type of terminal equipment where sufficient competition exists. This might start only for installation in regions above a certain size and for specified categories of users.

Under another variation of this option, carriers could operate in the terminal equipment field through licensed subsidiaries or companies whose operations would be split-off from the regulated switching, distribution and transmission

## (Option - Selective De-regulation continued)

operations of the regulated company. Entry of additional interconnect companies would be controlled by the same licensing procedure as for the carrier's subsidiaries which could take into account such things as the adequacy of resources, infra-structure, technical competence, the size of the market and the scope of apparatus offered. This option also requires the establishment of some organization or group to develop interface standards, certify and approve terminal equipment, and enforce approved procedures for installation, acceptance and maintenance. The carriers would have the right to disconnect "for cause" and such decisions would be open to appeal. De-regulation in the context of this discussion relates only to price. It does not imply that other aspects, such as standards for equipment and maintenance, are exempted from surveillance.

The word "selective" refers to a number of possibilities available under this option to obtain the degree of de-regulation desired. Any combination of types of equipment, applicable to any class of service, for any geographical area, could be selected under one or more of the following three basic headings.

A. Selective with respect to Apparatus

Clearly, the de-regulation of tariffs could be done selectively, and on a phased basis with respect to certain items or classes of equipment. The de-regulation of tariffs with respect to all apparatus might be impracticable.

In order to provide some feeling for the problem, we can categorize terminal apparatus under the following major headings:

i) General Telephone Accessories

This represents a potential market of two hundred and fifty million dollars serving possibly one million users. It would include such items as answer back devices, amplifiers for the deaf, recorders, acoustic and inductive couplers, alarms, decorator telephones, and so on.

## (Option - Selective De-Regulation continued)

ii) Record Message Services

This category encompasses about 40,000 devices, now in existence, and covers such items as teletypewriters, facsimile, etc.

iii) Mobile Services

This class includes devices to permit talking over radio facilities as well as remote paging. Including taxis and all forms of mobile radio services, it currently exceeds 100,000 devices.

iv) Multi-Station Systems

This covers all forms of private switching systems located on customer premises. They provide a switching and concentration facility, either manual or automatic. For purposes of classification, it includes all forms of terminal apparatus and related features in and behind the switching equipment. They vary in complexity from 10 lines to large switching systems similar in size and function to some telephone exchanges. There are approximately 20,000 such devices (carrier owned) in service today.

v) Computer and Computer Peripherals

These devices form a very important category of equipment with their own special problems. They **are**, in fact, already being studied within a selective framework as a sequel to the CCCTF report. It is, nevertheless, recognized that a large number of computer peripheral devices may be general purpose devices, utilized for computer access as one or even a minor one of their uses. Uniform sets of rules and practices relating to such general peripheral attachments is within the scope of the present inquiry.

(Options - Selective De-Regulation continued)

B. Selectivity with Respect to Locality

Under the Selected De-regulation option, rates for specific items or classes of service could be de-regulated with respect to price in some localities and not in others. It is unlikely that one uniform policy could be developed for all regions which would be equally beneficial and acceptable in all localities. Considering the various provincial jurisdictions involved, it would be difficult to get acceptance of one uniform policy right across the country. For example, a certain device could be de-regulated in one province but not in another and in one jurisdictional area but not in another.

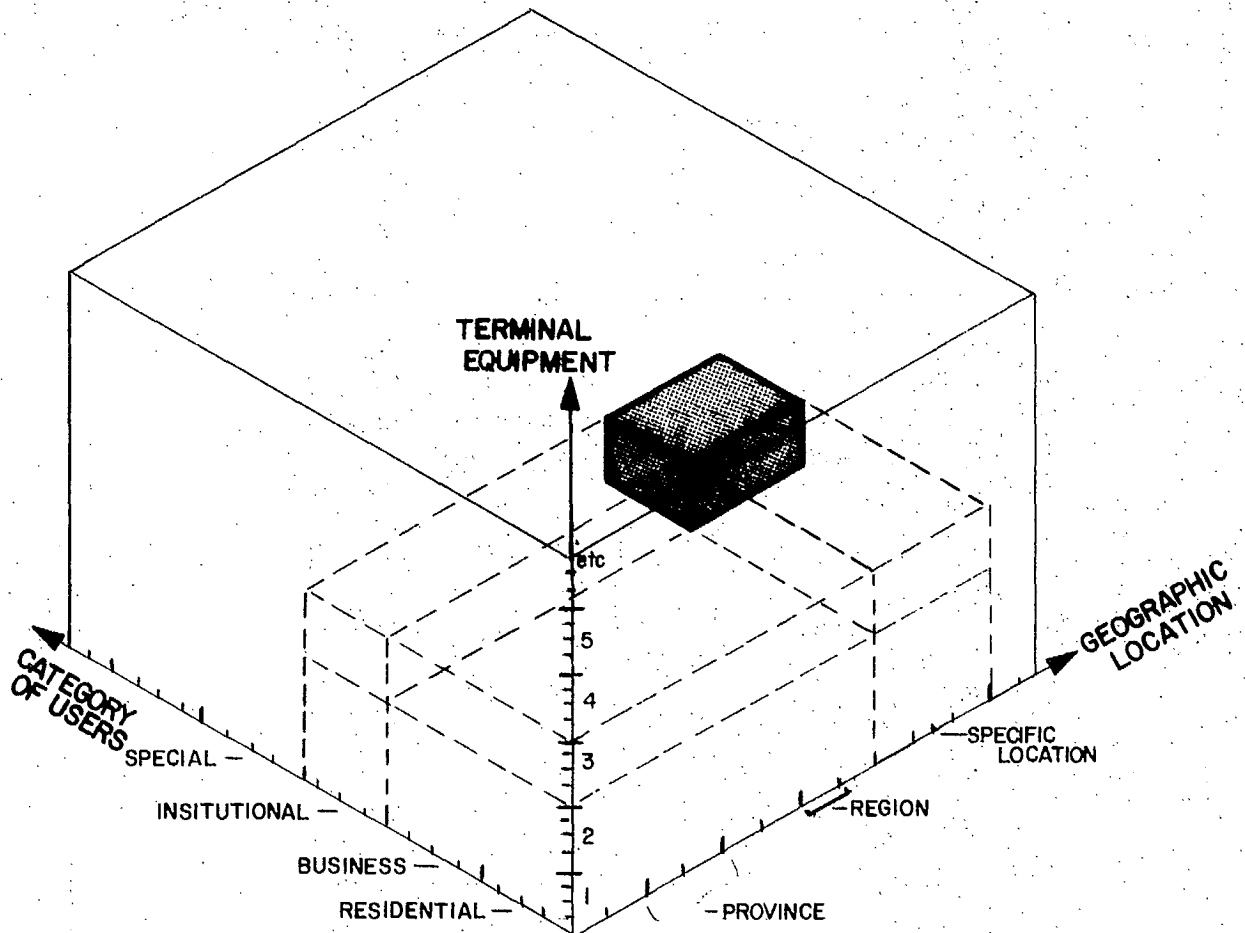
C. Selectivity with Respect to Category of Users

The Selective De-Regulation option recognizes that certain categories of users might be restricted from dealing with other than carriers for certain items or classes of equipment, while other categories of users are not; and that this policy could vary from one region to the next. Thus, for instance, residence customers could be treated differently from business customers; institutions (e.g. hospitals) differently than large businesses; and the public sector differently than the private sector. For example, prices could be de-regulated with respect to some devices for institutions and government in Ontario but not for other business customers.

D. Illustration of Selective De-Regulation

Diagram V-1 is useful in conveying the high degree of flexibility associated with this option. The "category of user" axis includes, for example, such sub-categories as hospitals, hotels, police, etc. under "Institutions". The "terminal equipment axis" is broken down into five categories mentioned on the chart. The axis labelled "Geographic Location" could refer to regions, e.g. Southern British Columbia. The example depicted by the shaded three dimensional box, indicates a situation where a mobile service is freed from price regulation in a specific location for institutional use only.

SELECTIVE DE-REGULATION WITH RESPECT  
TO TERMINAL EQUIPMENT, GEOGRAPHIC LOCATION  
AND CATEGORY OF USERS



**SOME CATEGORIES OF TERMINAL EQUIPMENT**

1. GENERAL TELEPHONE ACCESSORIES
2. RECORD MESSAGE SERVICES
3. MOBILE SERVICES
4. MULTI-STATION SYSTEMS
5. COMPUTER AND COMPUTER PERIPHERALS

Diagram V-1



(Option - Selective De-Regulation continued)

E. General Discussion of Selective De-Regulation

Price de-regulation has recently occurred to a very limited degree in connection with private mobile service where a customer is now permitted to own his mobile equipment, interconnected to the carrier network as a customer of the carrier.

One of the chief features of this approach is the degree of innovation and choice that would be introduced to the customer. As the carriers' monopoly is gradually replaced by a competitive environment, the variety and features available to the public should become greater. In those areas of the terminal equipment field where innovation has been slow and where prices are relatively high compared to costs (i.e. those which today crosssubsidize other areas of the carriers' business), prices could come down.

Flexibility and the capability of implementing this option piece-meal and gradually, as required, is another important merit of this plan. This option recognizes that the same approach at a given point in time may not be appropriate for all localities with respect to all customers or for all categories of terminal equipment. It further recognizes that some variation within this option space entails substantial departures from the status quo. Accordingly, disruption might be minimized by a gradual implementation process.

Too, with a greater number of competing firms, it would be expected that there would be a greater degree of flexibility in meeting new customer needs. There would probably be a high degree of specialization, and less pressure would be placed on the carriers to become expert in all systems and terminal equipment.

Public reaction would probably be favourable from the standpoint that there would be a greater variety of terminal equipment from which to choose and a larger number of firms with which to deal. Suppliers should react favourably since this could expand their potential markets.

(Option - Selective De-Regulation continued)

The integrity of the public switched networks would be protected. With the development and enforcement of adequate standards for equipment and maintenance, including interface specifications, there should not be any serious network problems.

Although the need for additional capital would increase in total, it should take some pressure off the carriers' own requirements. However, the amount of capital that the carriers would save relative to their other requirements would probably be nominal in the early stages.

Under the more competitive variations of this option, there may be some tendency to dilute the existing degree of Canadian ownership and control, as pressure to purchase at the lowest possible price would be intensified.

Such dilution might be controlled to some degree through licensing requirements for interconnect firms and type approval requirements for terminal equipment.

The selective de-regulation option requires considerable co-ordination amongst different levels of government and the telecommunications industry. Additional variety in terminal equipment and possible increases in maintenance costs may generate some increase in the total costs of communications. However, additional variety and flexibility will be gained. All options, other than the status quo, entail some increase in costs as the price of variety. There is little to indicate that the additional costs associated with the selective de-regulation option are significantly greater than the additional costs associated with the other options. In part this is the case because the flexibility of this option permits the avoidance of excessive increases in cost. If, for example, it was suggested that price de-regulation of some classes of terminal equipment in a particular geographic area be effected but it became apparent, through detailed examination that installation and maintenance cost would rise drastically under competition, the suggestion could be denied.

#### 4. GENERAL PRICE DE-REGULATION

This option represents the extreme end of the Selective

(Option - General Price De-Regulation continued)

De-regulation option. All terminal equipment would be price de-regulated in the entire territory of the regulated carrier and would apply to all subscribers and to all categories of service. As before, equipment would be type approved and provision would be made for suitable installation and maintenance procedures to assure the integrity of the networks. The carriers would "split-off" the terminal segment into a subsidiary company which would compete on the same basis as any other certified interconnect company.

One would expect greater innovation and choice through the entry of more interconnect companies. With a greater number of competing firms, there would likely be a greater degree of customer satisfaction. Public reaction (apart from negative effects of any possible price increases) should be positive. The integrity of the public switched networks would still be protected. This option could have the advantage of taking even more pressure off the carriers' requirements for capital.

Important disadvantages of this option are that it "rides roughshod" over regional differences, makes no provision for a gradual departure from the existing situation and encourages a greater degree of market penetration by foreign suppliers. Accordingly, resistance might be expected from some regions. Variation in prices between areas could be considerable, and might prove somewhat confusing and difficult to explain, especially to those who move frequently. Some additional relaxation of Canadian control would likely be required to assure sufficient competition in all geographical areas and in respect to all types of terminal equipment.

Some aspects of maintenance might be even more difficult to control under this option, and identifying and correcting complaints would likely become more involved. The risk of producing unwanted results in some geographical areas may be considerable. Service may not be uniform and available equally in all parts of a carrier's territory. The practical problem of developing standards, certification, acceptance, etc. would be very significant because of the variety and types of equipment involved. It might be expected that either incomplete and insufficient standards and controls would be developed, or the implementation of this option would have to be delayed until such problems were satisfactorily resolved. This could take considerable time. This option could result in a further loss in jurisdictional control. Once implemented, any unwanted results would be extremely difficult to correct.

## 5. LIMITED LAISSEZ-FAIRE

In this option, anyone wishing to compete with the carriers in supply of terminal equipment would be allowed to do so on an unregulated basis with respect to price. The carriers would continue, however, to be regulated both for their public network as well as their terminal operations as at present. No requirement for entry would be imposed. Nor would any standards or procedures be developed to preclude the sale or rental of any inferior equipment to the public. Any terminal apparatus, regardless of its quality, whether inferior or superior to the standards for the equipment supplied by the carriers, must be attached to the public networks through a "coupler".

This variant is similar to the current situation in the U.S. Although this option has tied the hands of the A.T.&T. in that it must play under different rules than its competitors in the terminal equipment field, inroads into the A.T.&T.'s domain have been modest to date. However, it cannot be safely inferred that similar results would come about in Canada, under similar conditions. Canada's largest carrier is less than one-tenth the size of A.T.&T. and its financial strength is, accordingly, much less. It does not appear that the Canadian carriers have resources sufficient to wage an unequal battle of this type, particularly if large, unregulated multi-national corporations are free to enter the Canadian market for terminal equipment.

## 6. UNRESTRICTED LAISSEZ-FAIRE

The Unrestricted Laissez-faire option completely eliminates all forms of regulation from the terminal equipment field. All competitors would compete on an unregulated basis with one another. The "arms-length" subsidiary of the carriers would operate on a separate basis from the switching, distribution, and transmission operations. No requirements would be imposed on the entry of any new company into the market, and no standards would be imposed on any terminal equipment. Terminal equipment could be leased or purchased, Terminal apparatus attached to the carriers' networks, must be connected via a coupler leased from the carrier involved.

This system has several advantages, the chief one being the degree of innovation and choice made available to the

## (Option - Unrestricted Laissez-Faire continued)

general public. With a wider range of Canadian and imported apparatus, the user would virtually have unlimited choice. This could spur innovation in Canada, to some extent. On the other hand, the influence of foreign competition could have a debilitating effect on Canadian industry.

With the increased scope of equipment and suppliers to choose from, it would appear that some business customers in particular would be attracted to such an option. This should tend to stimulate the telecommunications industry and give rise to new services. As the number of entrants increased, the competition for the users' telecommunication dollar should spur the various companies to provide better service and to meet the customers' needs.

Under this option, the potential costs for the development of standards, certification, etc. would disappear. The requirements for capital, although more in total, would be spread among more companies. The need for some of this capital would shift to other countries where some of the manufacturing would take place.

If one does not consider the effects of any possible increases in costs to the customer, public reaction should be positive. No longer would the customer have only one company with which to deal. Some of the warranted and unwarranted criticism of the carriers would disappear, and there would be segments within the industry which would welcome the opportunity to compete in this area.

On the other hand, a number of problems may develop under this option. Experience in the U.S. suggests that some smaller interconnect firms are likely to fail. This situation may lead to maintenance difficulties, lack of spare parts etc., with resulting public dissatisfaction. Although the integrity of the network would not be threatened because couplers would be mandatory, this would add to the cost of the customer.

There would be some loss of Canadian control, since equipment would be purchased at the lowest price regardless of country of origin. If a large proportion of equipment was procured offshore this would probably diminish the R. & D. and innovative capabilities of Canadian manufacturers. Given the number and size of multi-national corporations capable of

## (Option - Unrestricted Laissez-Faire continued)

exploiting the Canadian market, compared with the size and number of Canadian counterparts, it is possible that the supply sector would be dominated by a few multi-national enterprises in a short period of time. It would therefore be of some concern that, in any de-regulation strategy, associated steps be taken to assure Canadian industry an equal chance and that reciprocity develop in the case of foreign supply.

Some aspects of service might be worse under this option. For instance, with a larger number of interconnect companies, the problems of identifying, correcting and assigning responsibility for trouble would become more serious. In some parts of the country some services would not be available since no company would be obligated to provide it. Rates would be set more in relation to costs, therefore, the costs of some services might rise while others fell.

SUMMARY

The benefits and costs of the liberalization of the foreign attachment policy are difficult to appraise. The Department does not possess sufficient evidence, either from the U.S. situation or elsewhere to suggest that wide-open interconnection is generally wanted and would produce significant benefits. It does, however, possess evidence that a change in the existing situation is required and that greater choice and innovation is desirable. It is within the fabric of our society and our makeup to believe, and with some justification, that competition begets innovation, and innovation in this context will eventually provide for the user the choice and diversity that exists in most other business sectors.

The evidence and arguments put forth seem to point to the gradual liberalization of interconnection together with the greater degree of choice and innovation which could develop. Everything points to the necessity of maintaining the integrity of the networks through proper standards and controls without the use of couplers. Today the standards are high and are controlled by the carriers themselves. The essential challenge is to develop a policy which would allow for a greater degree of innovation and choice and which would result in any additional cost being born by those who benefit. If it is decided that liberalization is desirable in order to create more choice and innovation, the question seems to be whether it should be accomplished inside or outside a regulated structure.

## SECTION VI

### PHASE II PROGRAM

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### APPENDIX I

## SECTION VI

### PHASE II PROGRAM

The following prospectus is intended to advance the inquiry and develop recommendations leading to acceptable agreements on interconnection by concentrating on specific groups or categories of terminal equipment. It can be assumed that a liberalization of policy permitting interconnection of terminal equipment will not be uniform in all parts of Canada due to jurisdictional variations. An option which may work well in Ontario may fail to meet the needs of another province. The elected governments will, therefore, be required to select the approach best suited to public needs.

This working paper sets the stage for Phase II, the first part of which involves intra-government and inter-governmental discussions. The purpose of these discussions will be to develop policies tailored to both provincial and national needs and thereby establish the respective jurisdictional responsibilities of both levels of government applicable under selected options. It is proposed to commence consultative meetings with provincial regulatory authorities in November 1972.

These meetings will be followed by consultations with carriers, users and manufacturers to resolve the many operating problems involved. This portion of the program has two objectives. First, the development of an acceptable format for the selection of specific types of terminal equipment for price de-regulation and second, the preparation of such basic controls as network specifications, type approval specifications and procedures, acceptance procedures, traffic load control techniques, maintenance policies for non-carrier owned equipment and the licensing of interconnect companies wherever these controls are deemed essential.

Before providing a structure for the Phase II program with associated explanatory remarks, it is relevant to stress the delicate balances in the complex area of communications. There are forces for change that must be recognized, (e.g. the spill-over from the U.S. and the current defiance by entrepreneurs of existing 'foreign-attachment' regulations). On the other hand, studies of the intricate problems and operating complications encountered by other countries in administering a more liberal interconnection policy, make



it clear that change must take place in an orderly fashion. Phase II, therefore, proposes to examine the actual needs of Canadian communication users, the first step of which would involve segregating terminal devices according to their basic function. Using this approach, interconnection requirements and associated problems could be resolved in accordance with demand. Further analysis in Phase II may well point to advantages in commencing price de-regulation of devices required by users that do not directly address the network. By selecting terminal devices which function only after the connection has been completed, the requirements and controls for a successful interconnection program could be established without the risk of costly and irrevocable mistakes which might develop if network addressing and control signalling were involved in the preliminary development of control methodology. In subsequent stages, as factual information and expertise are accumulated, the expansion of foreign attachment privileges could be extended to include equipment which addresses the network. The concept of evaluating each group as a separate entity and developing interconnection specifications and procedures on a "one at a time" basis has merit and would help to assure that no degradation of communications develops due to lack of foresight and control. Accordingly, terminal equipment has been segregated into the operational categories outlined under Selective De-regulation as discussed in Section V. These categories are shown in chart VI-I on the following page, together with the associated work areas, involved in Phase II.

A brief outline of the components of the work required follows for each category of terminal equipment as shown on the chart. In addition, separate work papers are presently being prepared as guide posts for future interconnection policies for each category. These work papers will provide detailed information on the constraints, problems and considerations involved in possible interconnection to the public switched networks of equipment classified under the various operational categories.

#### OPERATIONAL CATEGORIES

##### General Telephone Accessories

General telephone accessories can be divided into two classes (1) Mechanical Attachments and (2) Electrical Attachments. Electrical Attachments may be further subdivided into a number of types (e.g. type 1 - alarm systems; type 2 -

General Operations Work Program	General Telephone Accessories	Record Message Services	Mobile Services	Multi-Station Systems	Computer and Computer Peripherals
<u>Preparation Of:</u> Network Specifications					
Hardware Type Approval					
Acceptance Testing					
Traffic Load Control					
Inspection and Maintenance					
Reliability					
Licensing Policy and Practices					
Cost Studies					

Chart VI - 1

telephone answering equipment; type 3 - loud speaking telephones; type 4 - repertory dialers, etc.). Terminal equipment in this category represents a large potential market with considerable customer demand. Many terminal devices in this category are presently authorized for interconnection to the networks by some, if not all, major carriers. However, existing interconnection arrangements are through a carrier provided interface device. It is anticipated that on-going studies in Phase II will indicate many devices in this grouping which are desired by the public and which will provide experience as pilot projects for the establishment of interconnection techniques and controls.

#### Record Message Services

This category of terminal equipment has been selected for individual study in the Phase II program because of the unique problems involved and the changing technology in record message transmitting and receiving. The group comprises teletypewriters, electric typewriters, facsimile and may involve a different set of interconnection requirements than for conventional voice equipment.

#### Mobile Services

The mobile telephone and associated radio paging systems represent a rapidly expanding and controversial terminal area which requires special attention to meet customer needs in a controlled environment.

Mobile radio as it currently exists can be divided into four general categories. These are the Public Mobile Telephone Service (MTS), multi-user shared private mobile radio, private dispatch mobile radio and one-way radio paging (tone only and tone plus voice). The first of these is now provided, on a network interconnected basis by the telephone companies. Multi-user service is provided as a restricted public commercial service licensed as Restricted Common Carrier Mobile Radio Service (RCCMRS). Private dispatch radio is licensed on an individual basis as Private Commercial Service, and may be either on a shared channel or an exclusive use basis. One-way radio paging is provided on an interconnected basis by many of the carriers and on a non-interconnected basis by private operators offering paging services to the public.

Working papers will evaluate the interconnection of Private Commercial Services, RCCMRS and one way radio paging terminals to the public switched networks. A review of carrier provided MTS will also be included.

Mobile radio systems must interface with the public networks through terminal facilities associated with a fixed base station. A variety of apparatus, ranging from simple acoustic devices, manually coupled, to elaborate hard-wire terminals providing fully automatic two-way signalling, are in existence. An objective of the Phase II Program will be to identify and categorize these devices for the purpose of developing interface specifications. It will be necessary to rely heavily on the carriers for the provision of network parameter information as a basis for establishing these interface specifications. These specifications will serve as guidelines for mobile radio terminal manufacturers in the engineering, manufacture and quality control of attachment hardware. The relationships between interface specifications and the overall type approval program will be identified.

In addition to the technical aspects, the regulatory considerations of interconnected RCCMRS and radio paging systems will be dealt with. These will provide a basis for inter-government consultations.

Traffic load capability, that is the availability of facilities to handle peak loads on an acceptable basis, will also be discussed. As part of this discussion, the need for standards will be developed as a basis for future consultations with the industry. The responsibility for traffic studies and associated requirements will be highlighted.

#### Multi-Station Systems

These include PBX-PABX and the recently introduced PCABX, together with call directors, push button telephone systems, interphone systems etc. and the more complicated emergency reporting and alerting systems not included under general telephone accessories. Collectively, this group of terminal systems has received the most attention from entrepreneurs pressing for interconnection privileges, largely due to expected revenues involved. However, this category of terminal equipment represents, by and large, a combination of all the complexities of interconnection, both in terms of

specifications and overall control. The purpose of the Phase II paper embracing this group of terminal equipment is to identify and segregate the problems and, in consultation with carriers and manufacturers, develop acceptable interconnection criteria. It should be noted that the ultimate solution may well require more time to structure than that required for other groups previously identified. However, much of the knowledge and expertise secured from tackling the less complicated devices first will tend to simplify the more complex task of interconnection of multi-station systems.

### Computer and Computer Peripherals

As previously mentioned in Section V, these devices form a very important category of equipment with their own special problems. They are, in fact, already being studied within a selective framework as a sequel to the Canadian Computer Communications Task Force report. It, nevertheless, is recognized that a large number of computer peripheral devices may be general purpose devices utilized for computer access purposes as one or even a minor one of their uses. Uniform sets of rules and practices relating to such general peripheral attachments is within the scope of the present inquiry.

### WORK PROGRAM

The column of Chart VI-1 headed "Work Program" sets out the basic tasks of Phase II. It is recognized that under certain options some or all of these work areas would not be required. However, all essential requirements which may be involved in any option are identified and the work requirements stipulated. This should enable the reader to evaluate more completely each option in terms of specific control requirements.

#### (1) Network Specifications

A primary requirement prior to any expansion of interconnection rights to interconnect companies is the development and publication of "network specifications", often referred to as carrier interface specifications. These specifications define the carrier policy, and the technical requirements of the networks in respect to particular types of attachments. Usually these specifications are issued in two categories. The first category deals with specifications applicable to

equipment used for the transmission of speech. The second category deals with equipment used for the transmission of record message services. In very abbreviated terms, these documents inform interested parties as to carrier policy, what can and what cannot be interconnected to their networks and under what conditions. The specifications outline the procedure for securing permission to interconnect and the acceptance processes involved. Essentially, they outline the technical requirements, the responsibilities for updating to conform to carrier requirements and the rules governing changes, additions and deletions of authorized equipment. The general network specifications usually refer to specific supplemental specifications which define the network requirements of specific types of equipment. These individual specifications are found necessary due to the variation in network requirements to effectively accept and process the various types of signals for both inward and outward signalling, transmission and call processing.

Basically, the common carriers would stipulate precisely the "external" dimensions of signals which are acceptable for consignment and conveyance. Detailed description of the interface criteria necessary to protect the network must be established. This involves various requirements for network control signalling, voltages, longitudinal balance, return loss and signal power. Some carriers have commenced the preparation of these specifications. Although different characteristics of different networks require variation in specifications, standardization is desirable to the extent permitted by technical considerations. Firm decisions on interface techniques are required.

The carriers, in their specifications, should clearly describe and specify the grade of service they can guarantee and accordingly must assume the responsibility for design specification, maintenance, control and other operating functions relating to the handling of the signal in the course of its conveyance. Carriers will be required to make whatever arrangements that might be reasonably necessary to meet this responsibility.

Consultative processes are required to develop, to the extent practicable, network specifications applicable to all Canadian networks.

## (2) Hardware Type Approval

On the user side of the interface, hardware technical standards must be developed to ensure that the integrity of the networks is maintained. The areas of concern are network control signalling, hazardous voltages and currents, undesirable cross-talk and noise, and average signal power. The Department will coordinate a joint carrier-industry-government working group to develop standards, and a quality assurance program including appropriate methods and procedures to effect type-approval of terminal devices.

The technical standards should clearly define, for manufacturers and for any authority which may be set up to type approve equipment, the requirements for compatibility with the networks under the varying conditions encountered in the marketplace, e.g. the various options required to be built into the product for operation with Step by Step exchanges, Crossbar exchanges, Electronic Switching System exchanges and their limitations when connected to various Manual systems.

The working papers in the Phase II program will strive to develop a background to facilitate agreement on the criteria to be established to ensure that any multi-station system consistent with the criteria specified will perform satisfactorily when interfaced with any presently known central office equipment through any properly designed loop configuration. The specifications ultimately prepared should prescribe the attributes of the multi-station system involved. Consideration of terminal equipment, such as station sets, auto-dialers, data modems, teletype machines and other devices likely to be attached to some of these systems, is essential.

The specifications developed in the hardware type approval program should "spell out" the basic requirements prior to "type approval", e.g. the loop limits involved; the noise levels permitted; power requirements; ground resistances; protection, etc. Usually type approval specifications also delineate what is required from the manufacturer to describe the equipment submitted for certification (e.g. manufacturers general specifications, facilities provided, options provided, electrical specifications, power supply and requirements, operating instructions, protection, circuit description, installation instructions, schematic prints, maintenance and operating limitations).

Options affecting network protection must be considered. An additional work area related to some types of multi-station systems is the requirement for such things as tie lines and tie trunks that interface the network, E and M signaling for DID trunks, automatic identification of outward dialing, etc.

The requirements and the methodology of type approval are complex problems in a competitive environment where a substantial number of suppliers operate. Essentially the equipment must meet at least the minimum specifications established for the networks. However, the degree of compatibility with various types of exchanges, traffic load carrying capacity, the relationship of trunks to locals, the flexibility of design change for addressing the network, and the various tones provided for call progress, etc., are controversial items which, under certain options would no longer be dictated by the carrier. For example, should a manufacturer elect to produce a terminal device which is operational only in a Step by Step office, will it receive type approval or must it be readily adaptable to any dial type exchange? What levels of transmission are mandatory under all conditions? These and many other similar problems must be resolved by consultation with carriers, manufacturers and industry representatives prior to and coincident with the preparation of hardware type approval specifications and procedures shown as a Work Program item on Chart VI-1.

### (3) Carrier Acceptance Tests

This involves the final tests, usually undertaken by carrier personnel, prior to or coincident with interconnection to the network. The basic objective is to assure the integrity of the network by appropriate tests to ensure that the equipment installed meets the network specifications previously issued by the carriers. The tests specified will vary with the equipment involved, ranging from tests applied from the exchange testing facilities, in the case of relatively common devices (e.g. telephones) to extensive "on the job" tests of complex customer-owned switching systems. Compilation of these test procedures will be done basically by the carriers. However, to the extent practical, uniformity of application and requirements should be the objective of the work program.



#### (4) Traffic Load Control or Availability of Facilities

This is the continuing problem of relating calling rates and average holding times to the availability of facilities. The bases of measuring calling rates are the number of lines (or extensions on a multi-station system), the average number of calls per hour and the average holding time (duration of call). The study, to be meaningful, must be taken during the busy hours. In simplified terms, it is the technique of relating customer calling rates and usage practices to equipment availability. The normal service objective (service to costs) is to provide equipment such that no more than one call attempt in each 100 calls will encounter delay (known as PO1 service).

Traffic load studies are presently conducted by the carriers on a pre-determined schedule to ensure that equipment and loads remain in balance, e.g. if a PABX study indicates "all trunks busy" with any degree of consistency during the busy hour, the customer is informed and requested to arrange for additional trunks. In a competitive environment load control procedures can become controversial. In Great Britain charts showing maximum loads allowable for each approved PBX - PABX installation are prepared and the customer must agree in his contract to purchase additional facilities when the maximum allowable levels are reached. Traffic load studies, interpretations and remedial measures are complicated processes little known to entrepreneurs. The question of how this essential contribution to good service will continue to function effectively under competition is another task of the Phase II program.

Another aspect of the problem concerns the degree of access to the network afforded to various types of individual services. Some services are offered at reduced rates to compensate for a limited level of service. This is exemplified by rural party-line and mobile services. Rural lines are usually loaded to 8 - 10 subscribers per line. This provides these subscribers with a service which is less costly but inferior to individual service (the cost of which could be prohibitive in some situations). Mobile service in some centres is restricted by a scarcity of suitable frequencies. This will require a review of the spectrum usage including associated tariffs as part of the Phase II inquiry.

Inspection and Maintenance Practices

Experience in other countries permitting interconnection suggests that maintenance is the major problem associated with the attachment of customer provided equipment. Failure in this respect can result in serious degradation of service, gradual at the outset but with rapid acceleration of problems that are difficult and costly to control. There is little doubt that customer ownership and the associated divided responsibility expands the potential for poor maintenance and necessitates careful consideration of appropriate control. The work program on maintenance will be highly controversial. There are several possibilities open:

- (a) insist on the carriers retaining the responsibility for maintenance. This involves many obvious pros and cons as essentially it would involve maintenance contracts covering a wide range of equipment supplied by others,
- (b) make a maintenance contract mandatory between the supplier of the equipment and the customer,
- (c) enforce a "strict removal from service until fixed" concept,
- (d) leave it entirely the "owners responsibility", and
- (e) other possibilities.

Reliability

Associated with maintenance is the question of the reliability of the product under operating conditions and over reasonable time periods. The work program will examine this aspect of non-carrier owned equipment and evaluate the need for and the extent of checking and follow up procedures.

(5) Licensing Policy and Practices

In order to protect the public and to ensure against possible harm to the carriers' networks, non-carrier provided equipment must comply with certain standards and be installed and maintained in a proper fashion. The question is how?

Phase II of the ongoing inquiry will attempt to resolve this question, at least in part, and the role that licensing should play in it. Licensing involves at least two dimensions - the possible licensing of interconnect companies, and the question of whether craftsmen should be licensed to install and maintain equipment. It may also involve studying the practicality and feasibility of setting up licensed independent laboratories, or some alternative, for the testing and certification of equipment to ensure that any equipment which is deregulated would comply with the issued interface standards.

There are a number of problems which have to be resolved, for instance:

- what are the criteria that must be met by a prospective interconnect company?
- what rights should a license permit?
- is more than one type or class of license necessary; for instance, must an interconnect company hold one kind of license if it deals exclusively with installation or maintenance of non-carrier equipment, and another type if only marketing of such equipment is involved?
- should the responsibility for licensing interconnect companies, technicians, and independent testing laboratories be the responsibility of federal or provincial government or in some cases should an independent organization be involved. For instance, licensing of technicians could be performed by the federal or provincial governments, by the interconnect industry itself, or possibly through the unions.

- are the services of a qualified professional engineer mandatory for the approval of certain types of specially designed systems for specific applications?
- who is responsible for the costs involved, and how should they be recovered? and
- who should coordinate the licensing effort?

The following plan of action has been developed:

1. Review the various licensing procedures now in existence in various countries and those now employed in Canada (e.g. CRTC).
2. Solicit suggestions from those who have submitted briefs as well as from various levels of governments, and interested groups.
3. Arrange joint federal and provincial working consultations and obtain essential agreement on priorities, methods and procedures.
4. Prepare and issue joint federal and provincial working papers as guide lines to the participants.

## APPENDIX I,

### FEDERAL

The Railway Act provides only for interconnection between telephone companies. As such it does not cover interconnection of privately provided terminal equipment or systems to the public network. Such interconnections are controlled by the telephone companies, by regulations which have the force of law (5.51 Railway Act) when approved by the Canadian Transport Commission and published in the Canada Gazette. Rule 9 of Bell Canada's General Regulations provides that:

"The Company's equipment and wiring shall not be rearranged, disconnected, removed or otherwise interfered with, nor shall any equipment, apparatus circuit or device which is not provided by the Company be connected with, physically associated with, attached to or used so as to operate in conjunction with the company's equipment or wiring in any way whether physically, by induction or otherwise, except where specified in the Tariffs of the Company or by special agreement..."

In 1967 Bell Canada applied for revision of its Special Act. At the hearings of the House of Commons Standing Committee on Transport and Communications, the Company's interconnection practices were contested on the grounds of being discriminatory and inhibiting innovation. Bell Canada's counter arguments referred to the need for compatibility and proper maintenance of terminal equipment. After further discussions on the financial effects that would be caused by permitting the interconnection of non-carrier owned terminal equipment to the public network, Bell Canada admitted that it should make a case in public for its interconnection policies. The Bell Canada Act was consequently amended and now contains the following provisions:

5(4) "For the protection of the subscribers of the Company and of the public, any equipment, apparatus, line, circuit or device not provided by the Company shall only be attached to, connected or interconnected with, or used in connection with the facilities of the Company in conformity with such reasonable requirement as may be prescribed by the Company.

5(5) The Canadian Transport Commission may determine as

questions of fact, whether or not any requirements prescribed by the Company under subsection (4) are reasonable and may disallow any such requirements as it considers unreasonable or contrary to the public interest and may require the Company to substitute requirements satisfactory to the Canadian Transport Commission in lieu thereof or prescribe other requirements in lieu of any requirements so disallowed.

5(6) Any person who is affected by any requirements prescribed by the Company under subsection (4) of this section may apply to the Canadian Transport Commission to determine the reasonableness of such requirement having regard to the public interest and the effect such attachment, connection or interconnection is likely to have on the cost and value of the service to the subscribers."

In the case of Perception Industries, Bell Canada refused to install and connect a privately purchased telephone system, and invited Perception Industries to have CTC determine if such a refusal was "unreasonable". Perception Industries had the system installed by other than Bell Canada personnel with direct connection to Bell lines. Bell Canada disconnected the service, whereupon Perception Industries commenced proceedings in the Supreme Court of Ontario, claiming an injunction directing Bell Canada to reconnect its lines and seeking damages for breach of contract. Bell's position was that it did not permit interconnection since "the telephone needs of Perception Industries are of a type regularly supplied by this company" and that the action should be dismissed since only CTC has jurisdiction to determine the reasonableness of its requirements. An ex parte injunction was pronounced directing Bell Canada to restore service and giving Bell the opportunity to inspect the installation. The inspection found the installation acceptable and Bell now maintains the equipment pending the final outcome.

## PROVINCIAL

### Newfoundland

Provisions prohibiting foreign attachments are contained in the Newfoundland Telephone Acts as follows.

Section 12 of the Act of 1938 states:

- 1) "no person, except with the permission of the

Company in writing, shall connect or suffer to be connected directly or indirectly with any telephone work or works of the Company, any telephone lines, transmitter, receiver or other equipment, apparatus or fitting, which is not the property of or supplied by the Company; and in any case other than a case of emergency such connection . . . shall be made by or under the supervision of an employee of the Company".

There is a penalty for each offence, on summary conviction, not exceeding 25 dollars or imprisonment for a period not exceeding 14 days on non-payment of the penalty.

2) Under the Amending Act of 1943, which provided specifically for the establishment of a telephone service at Bay of Islands and vicinity, Section 18 repeated the prohibition contained in the Act of 1938.

#### Nova Scotia

Section 28 of the Act of 1910, incorporating the Maritime Telegraph and Telephone Company Ltd., provided that

"No person shall lay or cause to be laid, any conductor, which shall communicate with any conductor belonging to the Company, or in any way obtain, utilize or use the wires or electric current or service of the said Company or attach any instrument or apparatus to any conductor or instrument without the consent thereto of the Company".

Section 29 provides a penalty of one hundred dollars for such an offence and a further sum of forty dollars per day during which such communication is continued.

#### New Brunswick

Nil

#### Prince Edward Island

Nil

Quebec

Nil

Ontario

There is no provision that specifically prohibits foreign attachments, but Section 110 of the Ontario Telephone Act contains the following:

"Every person who uses or interferes with or permits to be used any telephone instrument, wiring or other equipment so as to injure or damage it or prevent proper use of the circuit . . . is guilty of an offence . . ."

Manitoba

Under the Manitoba Telephone Act, Section 36 provides that the Manitoba Telephone Commission may prohibit any attachment or device being fixed to any telephone equipment of the Commission if, in the opinion of the Commission, such attachment or device will injuriously affect the telephone equipment or the operating efficiency of the telephone lines or equipment.

Section 37 provides that the recording of messages transmitted along, over or through the lines of the system of the Commission is prohibited except by means of a recorder-connector equipment supplied by the Commission and which is connected so as to emit a signal when a message is being recorded.

No person other than employees of the Commission for service reasons or purposes, shall use any equipment device, apparatus, or contrivance for intercepting and listening to messages passing along, over or through the lines or wires of the Commission, whether by direct connection, induction or by any other means.

Saskatchewan

Nil



Alberta

Under Section 21, of the Alberta Government Telephone Act

- 1) "No person shall fix to any telephone equipment of the Commission any attachment or device intended to be used therewith, that will injuriously affect the telephone equipment or the operating efficiency of the telephone lines or equipment or endanger the safety of workmen".
  
- 2) "Any such attachment or device as is mentioned in subsection (1) shall, for the purposes of this section, be considered to be fixed to the telephone equipment if it is attached or fixed thereto or placed on, over, under or adjacent to any such equipment in such a manner as to be able to be used in connection therewith."

Section 22 provides for a person to connect recorder-connecting equipment supplied by the Commission to enable the use of a subscriber's recorder which shall be so connected that an audible signal is emitted when a message is being recorded.

Section 23 prohibits the use of intercepting and taping devices except by employees of the Commission for service reasons or for telephone answering services approved by the Commission.

British Columbia

Nil



