Meeting -- Thursday, November 6, 1969

Martin Hoffman, Asst. Gen. Counsel
Seymour Joffee
Ed Berg
David Foster

FORM WH-25

EXECUTIVE OFFICE BUILDING
WHITE HOUSE
Washington, D. C.

To: Security Officer, White House Police
Main Lobby, EOB

Please admit the following appointments on November 6 19 69 for (Mr.) (~~Mrs.~~)/(~~Miss~~) Clay T. Whitehead, Agency White House.

Name Time Name Time

Berg, Al
Foster, David
2:00 p.m. Hoffmann, Martin Rm. 110 EOB
Jaffe, Seymour

2:45 p.m. Rm. 272 EOB

Acheson, David C.
Armstrong, Dr. James
Baker, Donald
Battle, Lucius
Beam, Richard
Button, Robert
Crowell, Ray
Ende, Asher
Freibaum, Jerome
Haydon, George
Marsten, Dr. Richard
Nelson, Dr. Boyd
Powers, Robert
Radius, Dr. Walter A.
Reiger, Siegfried
Richardson, John
Roseman, Abbott
Sampson, Gen. George
Scherr, Robert
Serwat, Wilbur
Shapley, Willis
Strassburg, Bernard
Tribus, Dr. Myron
Watkins, William

Meeting Room: Secretary: Eva Daughtrey

Telephone Ext. 2786

Date: 11/3/69

Other appointments may be called in during the day.

* Dr. Drew, Dr. Moore and Mr. Kriegsman have been invited to join Mr. Whitehead in the initial 45-minute meeting with industry people -- prior to their meeting with Domsat Working Group

DOMESTIC SATELLITE MEETINGS
(with industry)

Friday, October 24, 1969

* 10:00 a.m. **AT&T** Rm. 730
1800 G St., N.W.

Ed Crosland, Vice President, Federal Relations
Dean Gillete
Ken McKay, Vice President for Engineering
William Stump
Charles McWhorter, Executive Assistant

10:30 a.m. All will be joined by Domsat Working Group

Tuesday, November 4, 1969

* 10:00 a.m. **COMSAT** Rm. 110

Joseph Charyk, President
Gen. James McCormack, Chairman

10:45 a.m. All will be joined by Domsat Working Group and others from Comsat Rm. 208

* 2:00 p.m. **COLUMBIA BROADCASTING SYSTEM** Rm. 110

William Lodge, Vice President for Affiliate Relations and Networking
Dr. David Blank, Vice President for Economics and Research

2:45 p.m. All will be joined by Domsat Working Group Rm. 272

* 4:00 p.m. **MAXIMUM SERVICE TELECASTERS** Rm. 110

Roy Easley, Assistant Executive Director
Lester Lindow, Executive Director
Howard Head, Engineering Counsel
Henry Goldberg, one of their legal counsel (Covington & Burling)

No meeting with Domsat Working Group

Wednesday, November 5, 1969

* 10:00 a.m. COMMUNICATIONS WORKERS OF AMERICA Rm. 110

Joseph Beirne, President
John Morgan, Administrative Assistant
George Miller

10:45 a.m. All will be joined by Domsat Working Group Rm. 272

Thursday, November 6, 1969

UNIVERSITY COMPUTING COMPANY

* 2:00 p.m. Martin Hoffman, Assistant General Counsel Rm. 110
Seymour Joffee
David Foster
Ed Berg

2:45 p.m. All will be joined by Domsat Working Group Rm. 272

Friday, November 7, 1969

2:00 p.m. Windup meeting of the Domsat Working Group Rm. 272

David Acheson
Dr. James Armstrong
Donald Baker
Lucius Battle
Richard Beam
Dean Burch
Robert Button
Asher Ende
Jerome Freibaum
George Haydon
Dr. Richard Marsten
Dr. Boyd Nelson
Robert Powers
Dr. Walter Radius
Siegfried Reiger
John Richardson
Abbott Roseman
Gen. George Sampson
Robert Scherr
Wilbur Serwat
Willis Shapley
Bernard Strassburg
Dr. Myron Tribus
William Watkins

Meetings with Industry on Domestic Satellite Communications

	Date of Meeting	Representatives	Telephone Number
AT&T	10/24/69 10:00 a.m.	Ed Crosland, V.P., Federal Relations, N.Y. 195 Broadway, NYC 10007	(212) 393-1000
		Dean Gillete	
		Ken McKay, V.P. for Engineering, N.Y. 195 Broadway, NYC 10007	
		William Stump	
		Charles McWhorter, Executive Assistant, N.Y.	(212) 393-4459
		Working Group representatives	
COMSAT	11/4/69 10:00 a.m.	General James McCormack, Chairman	(202) 554-6020
		Joseph Charyk, President 950 L'Enfant Plaza, Wash., D. C. 20024	
		Working Group representatives	
Columbia Broadcasting System	11/4/69 2:00 p.m.	Dr. David Blank, V.P. for Economics and Research	(212) 765-4321, x 3561
		William Lodge, V.P. for Affiliate Relations and Networking	(212) 765-4321, x 3541
		51 West 52nd Street, NYC 10019	
		Working Group representatives	
Maximum Service Telecasters	11/4/69 4:00 p.m.	Roy Easley, Asst. Exec. Director	(202) DI7-5412
		Lester Lindow, Exec, Director	
		Howard Head, Engineering Counsel	
		Henry Goldberg, one of their legal counsel (Covington and Burling)	
		1735 DeSales Street, N.W., Wash., D.C.	

Meetings with Industry on Domestic Satellite Communications

	Date of Meeting	Representatives	Telephone Number
Communication Workers of America	11/5/69 10:00 a.m.	Joseph Beirne, President John Morgan, Administrative Assistant George Miller 1925 K Street, N. W., Wash., D. C. Working Group representatives	(202) FE7-7711
University Computing Co.	11/6/69 2:00 p.m.	Martin Hoffman, Asst. General Counsel 1300 Frito-Lay Tower, Dallas, Tex. 75235 Seymour Joffee Ed Berg David Foster Working Group representatives	(214) 350-1211
Windup meeting	11/7/69 2:00 p.m.	Domsat Satellite Working Group	

Mr. David Acheson		
Mr. William Anders National Aeronautics and Space Council New Executive Office Building Washington, D. C. 20502	3300	
Dr. James Armstrong Post Office Department Room 7119 New Post Office Bldg. Washington, D. C.	(177) 7442	961-7442
Mr. Donald Baker Chief of Evaluation Section Antitrust Division Room 3115 Justice Department 10th and Constitution Avenue, N. W. Washington, D. C.	(187) 2411	
Mr. Richard Beam Director, Office of Telecommunications Department of Transportation Room 834 West 800 Independence Avenue, S. W. Washington, D. C. 20590	(13) 34313	963-4313
Dr. Russell Drew Office of Science and Technology Room 285 - EOB Washington, D. C.	(103) 3570	395-3570
Mr. Asher Ende		
Mr. Peter Flanigan Assistant to the President White House Washington, D. C.	2361	
Mr. Richard Gabel		
Mr. Larry Gatterer Department of Commerce		
Mr. Walter Hinchman Room 493 - EOB Washington, D. C.		
Chairman Rosel Hyde Federal Communications Commission Room 814 1919 M Street, N. W. Washington, D. C. 20554		632-6336

Mr. Will Kriegsman		
Dr. Richard Marsten National Aeronautics and Space Administration Room 5081 - FOB 6 400 Maryland Avenue, S. W. Washington, D. C.	(13) 20888	962-0888
Dr. Thomas Moore Council of Economic Advisers Room 327 EOB Washington, D. C.	(103) 5080	395-5080
Mr. William Morrill Bureau of the Budget Room 10009 New EOB Washington, D. C.	(103) 4684	395-4684
Col. Ward Olsson Office of Telecommunications Management Room 750 1800 G Street, N. W. Washington, D. C.	5190	395-5190
Mr. Robert Powers		
Dr. Walter A. Radius National Aeronautics and Space Administration Room 7101 - FOB 6 400 Maryland Avenue, S. W. Washington, D. C.	(13) 24583	962-4583
Mr. John Richardson		
Mr. Jonathan Rose Administrative Assistant White House Washington, D. C.	2514	
Mr. Robert Scherr Room 4226 New Post Office Building 12th and Pennsylvania Avenue, N. W. Washington, D. C.	(177) 7472	961-7472
Mr. Wilbur Serwat Post Office Department Room 306 Safeway Building Washington, D. C.	(177) 8687	961-8687

Mr. Willis Shapley Associate Deputy Administrator National Aeronautics and Space Administration Room 7137 - FOB 6 400 Maryland Avenue, S. W. Washington, D. C.	(13) 24715	962-4715
Mr. Bernard Strassburg Federal Communications Commission Room 514 1919 M Street, N. W. Washington, D. C.		632-6910
Dr. Myron Tribus Asst. Secy. of Commerce for Science and Technology Room 5884 Commerce Dept. 14th and Constitution Ave., N. W. Washington, D. C.	(189) 3111	
Mr. William Watkins Federal Communications Commission Room 714 1919 M Street, N. W. Washington, D. C.		632-7060

THE WHITE HOUSE

WASHINGTON

October 31, 1969

Memorandum for the Domestic Satellite
Working Group Members

The following meetings have been scheduled in Room 272, Executive Office Building. Would you please let my office know who will be attending.

Tuesday, November 4

10:45 a.m.	COMSAT
2:45 p.m.	Columbia Broadcasting System

Wednesday, November 5

10:45 a.m.	Communication Workers of America
~~2:45 p.m.~~	~~University Computing Company~~

Thursday, November 6

2:45 pm	University Computing Company
~~2:00 p.m.~~	~~Working group meeting to wind up the report~~

Friday, Nov. 7

2:00 pm. Working Group meeting to wind up report.

Clay T. Whitehead
Staff Assistant

Attached is the list
of those who
responded to your
August 19 letter.

(International Brotherhood
(of Electrical Workers
(and
(National Assoc. of
(Broadcasters did not
(send in a reply.

Those unmarked sent in
statements without your
request.

Leonard H. Goldenson
President
X American Broadcasting Companies, Inc.
1330 Avenue of the Americas
New York, N. Y. 10019

Julian Goodman
President
X National Broadcasting Company, Inc.
Thirty Rockefeller Plaza
New York, N. Y. 10020

ITT World Communications, Inc.
J. R. McNitt (James)
X President
67 Broad Street
New York, N. y. 10004

Charles J. Wyly, Jr.
President
X University Computing Company
1300 Frito-Lay Tower
Dallas, Texas 75235

Joseph A. Beirne
President
X Communications Workers of America
1925 K Street, N. W.
Washington, D. C. 20006

George D. Butler
President
X Electronic Industries Association
2001 Eye Street, N. W.
Washington, D. C. 20006

Richard D. DeLauer
Vice President & General Manager
X TRW Systems Group, TRW Inc.
One Space Park
Redondo Beach, California 90278

X Edward B. Crosland
Vice President
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

X S. G. Lutz
Chief Scientist
Hughes Research Laboratories
3011 Malibu Canyon Road
Malibu, California

T. Vincent Learson (President - ?)
International Business Machines
X Corporation
Armonk, New York 10504

L. B. Davis
Vice President
X General Electric Company
777 Fourteenth Street, N. W.
Washington, D. C. 20005

James J. Clerkin, Jr.
Executive Vice President-Telephon
X Operations
General Telephone & Electronics
Corporation
730 Third Avenue
New York N. Y. 10017

Earl D. Hilburn
Executive Vice President
X Western Union
60 Hudson Street
New York, N. Y. 10013

Communications Satellite Corporat
Joseph V. Charyk
X President
950 L'Enfant Plaza South, S. W.
Washington, D. C. 20024

Frank W. Norwood
Executive Secretary
Joint Council on Educational
Telecommunications
1126 Sixteenth Street, N. W.
Washington, D. C. 20036

*John W. Macy, Jr.
President
X Corporation for Public Broadcasting
Suite 630
1250 Connectivut Avenue, N. W.
Washington, D. C. 20036

J. D. O'Connell
Director
Office of Telecommunications Management
Executive Office of the President
Washington, D. C. 20504

*Howard R. Hawkins
President
X RCA Global Communications, Inc.
60 Broad Street
New York. N. Y. 10004

X Indicates organizations to whom the 19 Sep letter frm Mr. Whitehead were forwarded for submission.

Note: Submissions were not received from International Brotherhood of Electrical Workers or National Association of Broadcasters.

*E. A. Gallagher
X President
Western Union International, Inc.
26 Broadway
New York, N. Y. 10004

*Frank Stanton
X President
Columbia Broadcasting System, Inc.
51 West 52 Street
New York, N. Y. 10019

*The Ford Foundation
McGeorge Bundy
X President
320 East 43rd Street
New York, N. Y. 10017

Richard S. Mann
President
The RME Group of Communocations
Companies
100 East Broad Street (Suite 1302)
Columbus, Ohio 43215

M. G. Robertson
President
Christian Broadcasting Network, Inc.
P. O. Box 111
1318 Spratley Street
Portsmouth, Va. 23705

*National Cable Television Association
Inc.
X Frederick W. Ford
President
1634 Eye Street, N. W.
Washington, D. C. 20006

mtg
7/30
1:30

Tuesday 7/29/69

11:00 Note for the file -- -

Martin Hoffman (University Computing Company of Dallas) talked with Tom at the suggestion of Dick Burress.

Mr. Whitehead will see him at 1:30 Wednesday (7/30).

UCC
UNIVERSITY COMPUTING COMPANY

executive offices:
1300 Frito-Lay Tower
Dallas, Texas 75235
214/350-1211

Met with
TW +
Kriegsman
7/30/69

August 5, 1969

Mr. Clay T. Whitehead
The White House
Washington, D. C.

Dear Tom:

You were very kind to chat with me last Wednesday, particularly on such short notice. I was very glad to have the chance to meet you, and it was a most pleasant surprise to have a chance to see Will again.

I will be in touch with you shortly in regard to the communications satellite matter. I hope that we can generate some material and present a viewpoint that would be of assistance to you.

Sincerely yours,

UNIVERSITY COMPUTING COMPANY

Marty

Martin R. Hoffmann
Assistant General Counsel

MRH:dk

UCC
UNIVERSITY COMPUTING COMPANY

executive offices:
1300 Frito-Lay Tower
Dallas, Texas 75235
214 / 350-1211

May 11, 1970

Dr. Clay T. Whitehead
The White House
Washington, D. C.

Dear Tom,

Enclosed please find the full text of the address that Sam recently made at the Spring Joint Computer Conference.

If this submission is duplicative of another transmittal from our direction, please do not hesitate to pass this copy along to a friend.

With best wishes.

Sincerely yours,

Marty

Martin R. Hoffmann

5/14/70

pm

Enclosure

Marty — Good stuff.
T—

The Keynote Address by:

SAM WYLY
CHAIRMAN OF THE BOARD
UNIVERSITY COMPUTING COMPANY

SPRING JOINT COMPUTER CONFERENCE
Atlantic City, N. J.
May 5, 1970

DATA TRANSMISSION:

"THE CRITICAL CHALLENGE OF THE SEVENTIES"

THE GREATEST CAPACITY FOR COMMUNICATION EVER ACHIEVED BY MAN IS AVAILABLE TO AMERICAN BUSINESS TODAY.

AND IT IS NO LONGER ENOUGH.

NOR WILL IT EVER BE AGAIN.

And that, ladies and gentlemen, is what I want to talk to you about this morning.

In the east, Manhattan Island has been described as one big busy signal.

In the west, the California Public Utilities Commission faces one of the largest rate increases ever asked for by a telephone company. In one California telephone exchange, computer terminals stay on the line so long that regular telephone customers find it difficult to complete calls during the day.

Nationally, the Bell system has just completed well over a billion dollars in new financing.

Across the country there are unmistakable indications of a crash program to upgrade the capacity of the telephone network. But crash programs are rarely an economical way to do things, and in these times money is abnormally expensive.

So across the nation the trend may be to increase rates to subscribers -- most of whom know very little about, and have nothing to do with, the factor that's causing much of the commotion.

In the computer industry we must accept the fact that we are a significant part of the telephone industry's problem. For the culprit which has upset the planned progress of the telephone industry is the computer. Because the computer talks in data, and the telephone system is designed to talk in voice.

Because data demands a perfection of transmission that voices do not.

Because the Communications industry did not foresee how soon data would come, or how fast data business would grow.

And because the growth in demand for voice communication has *also* become staggering . . . so staggering that an all-out race to save major cities from overload and breakdowns is under way.

But with all the strain on finances and engineering that the growth of voice communication is causing, by far the *fastest* area of growth is data transmission.

So the real dilemma is how to accommodate both. How to stretch a voice-oriented plant into a data transmission plant, under pressure, and still charge rates that encourage -- rather than inhibit -- the national economy.

For our industry, the dilemma is not academic. It is terribly live.

It is no exaggeration to say that the future of the computer industry depends on the cost, quality, and quantity of data transmission. Whatever slows the use of computers slows not just the sale of them, but the social and economic growth of all the businesses, of all the professions -- indeed of all the nations -- that look to the computer as an incomparable instrument in human service.

The *un*restrained *competition* of the computer industry has created a dynamic new economic force. But the restrained *monopoly* of the communication carriers has come to its moment of truth.

There is a bind, and I believe that bind must be loosened. Progress is being made, but the pace must be quickened. Technology moves faster than monopoly.

Let's look at where we are.

Behind us is the industrial society . . . a century of economic life based on the production of goods. The production of things you can feel. (It was characterized by the development of tools, sources of power, and big transportation networks to move things from one place to another.)

In the industrial society, both the means and the end result were physical.

Now, our society is characterized by the spreading use of the computer. Its influence on business and government is clear. Even inside the industry, we are astonished at the computer's role in man's most amazing technological achievement -- the flight of Apollo 11, or its even more absolute role in the rescue of Apollo 13.

We are making a high-speed transition from work based on slow apprenticeship to work based on the immediate availability of all the information needed to decide something or accomplish something.

We are becoming the "Knowledge Society."

Knowledge, rather than capital, labor, or raw materials, will be the major source of economic growth.

Knowledge will be the new basis of productivity.

Knowledge will be the central economic resource of the future.

And the computer, as the central organizer and repository of information, will be called upon to play a massive role in this new society.

Already, work based on knowledge -- rather than manual skill -- has become the major source of employment.

Aren't you tired of hearing that ninety percent of all the scientists and technologists who have ever lived are alive and working today? It is such a familiar statistic -- but it's *still* impressive.

Knowledge in all its forms is the main cost, the main investment, the main product of the American economy. Its role increases each year. And the demand for knowledge workers increases with it.

Our *industry* needs a million programmers in the next fifteen years, and another half-million systems engineers, systems designers and information specialists.

Our *society* needs millions of specialists in health, education, engineering, and management -- *all* skills based on knowledge.

So *we* need to improve dramatically the ways in which knowledge is used.

We need ways in which the prime source of information -- the computer -- can truly go to work for more of our people than just the scientific and industrial few.

We have a knowledge society -- the successor to an industrial society. There are major distinctions between the two.

The industrial society was typified by specialized tools in fixed locations, and a network of transportation.

But we cannot apply those rules to the "knowledge society." We cannot treat the computer like a machine tool in a fixed location.

We are no longer dealing with the geography of materials. We are dealing with information -- a dynamic, non-static, non-physical thing -- a continuum.

So, when we think of the computer as the power tool of the knowledge worker, we *must* look at it in the context of *accessibility*.

And accessibility means data transmission.

The sixties brought a quantum jump in the capacity of the computer to process information.

It was a quantum jump of staggering proportions.

Now such explosive growth demands a quantum jump in *accessibility* -- a quantum jump in data transmission.

You certainly don't need one more speaker to tell you that the number of data bank applications in education, medicine, business, and government is virtually endless.

But we do need to realize that these will be realities only if they can be tapped. It is futility to have data banks if we don't have the communication capacity to make their information immediate, accessible, and universal.

Immediate . . . accessible . . . universal: These are the attributes of data communication.

But the computer industry has dialed into a busy signal.

Our number one problem is the bottleneck in data transmission. The bottleneck in data transmission. The absence of reliable, high-speed, low-cost, universal access to computers and data banks has stopped us. We are confronted with a crisis in digital communication.

If our industry crisis is not solved, it will become a national crisis. For a crisis in data transmission slows the whole pace of an economy based on knowledge.

Where do we stand today in data transmission?

The initial demand led to the use of the only transmission vehicle available -- the telephone system.

Complicated and expensive arrangements have been made to transmit digital information over this analog system. A system engineered for human conversation.

As a result, we have had a forced marriage of computers and communications. But, as the editor of Communications Magazine so graphically put it, this marriage is on the rocks.

The data processing industry must take the lead in solving the problems. We must take the initiative in demanding better data transmission service from the existing telephone and telegraph carriers. We must also take the initiative in seeking alternatives.

I don't think anyone doubts that the lion's share of the data transmission traffic will always be handled by the existing carriers. But their level of service must improve enormously.

And the computer industry can help.

It can serve as a catalyst to bring about urgently needed improvements.

It can define realistic service goals, establish a reasonable time limit for improved performance, and keep pressure on the carriers until these are met.

This will require a greater liaison with the telephone and telegraph companies to tell them what is needed and to make sure they are listening.

It has to be done.

The computer industry can also study the alternatives which have been proposed for taking part of the data transmission load off the carriers' backs.

These alternatives extend the industry's range of options. They recognize where we're at in computer technology.

What are these alternatives? Don't be surprised if I mention my own first!

One alternative is Data Transmission Company -- Datran -- a subsidiary of University Computing. Datran has filed an application for a transcontinental data transmission network. A digital network for computers.

For seven years we have been increasingly aware of the specialized character of data transmission. And the all-digital Datran network has been engineered to satisfy these demands.

Another alternative for point-to-point, intra-company voice and data transmission is the special service common carriers -- companies you know, like MCI and others which have filed applications in recent months. These new carriers should receive serious consideration as alternatives in their selected situations. They will certainly spur the existing carriers to improve service to meet the competitive thrust.

A panel discussion, "Data Common Carriers for the Seventies," this Thursday will discuss both Datran and the special service common carriers.

A third alternative is satellite transmission. Both the White House and the Federal Communications Commission have encouraged competition in the satellite field, although the high costs of entry will certainly keep the club small.

A national policy on satellites is too recent to say with certainty what directions any new proposals will take.

But you can be sure that some of the new proposals will bring the application of new technology to data transmission.

Datran, special service common carriers, satellites . . . these are some alternatives. But there is <u>no</u> alternative to action!

There is <u>no</u> alternative to the computer industry's seeing itself from now on as the computer/communications industry.

Up to now we have been concerned with the proliferation of computers. We've worked hard to condition the public to accept the wonders of data processing.

But now we're limited. We have a data transmission block.

All of us must know that size, speed, memory capacity, and software developments can only grow as far as data transmission will allow.

That's the bind.

Six years ago I saw a demonstration of high speed, remote batch data processing. At the time, it seemed obvious to me that remote data processing was the destiny of the computer industry.

Because it brings an irresistible ingredient into computing. The ingredient is "convenience." Americans have always elected convenience. You can bet on it.

Remote computing brings the element of convenience to business, government and education. But the development of more data banks -- more essential repositories of information -- has elevated convenience to the status of "necessity."

Now, six years after seeing that first demonstration of remote data processing, I am convinced that the major problem retarding the future growth of our industry is inadequate data transmission.

The full implementation of the convenience to use information is thwarted by a communications bottleneck.

The full extension of the computer's convenience -- the computer's <u>necessity</u> -- stands frustrated by a lack of accessibility . . . an absence of adequate data transmission facilities.

So, I propose two courses of action.

First, I urge the entire industry to accept with me the data transmission crisis as its major problem -- the one door to future growth which must be opened.

Second, I urge that a task force be established by the American Federation of Information Processing Societies to study the problem of data transmission, to work with existing carriers to overcome it, and to look into alternatives that can be pursued in parallel.

Another committee?

Yes, but not just another committee.

I recommend a task force which will nail down this problem before it nails us.

This task force should not include representatives of either the existing carriers or of companies which have proposed data transmission alternatives.

It should report to the industry at the Fall Joint Computer Conference, and at subsequent meetings. It should serve as a clearinghouse of information -- on how severe is our communications handicap, on what is being done, and what needs to be done.

The American Federation of Information Processing Societies . . . a federation. The problem of data transmission absolutely demands federated action.

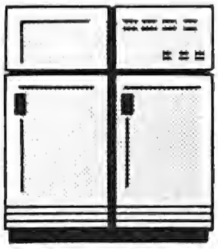
Ladies and gentlemen:

We have a data transmission barrier. I have suggested some solutions. I sincerely hope to generate action on your part.

Action which will put the computer industry in control of its destiny.

Up to now we have been victims of someone else's economics and priorities. I hope that we can become architects of our future. A future in which the computer will become, as the conference theme declares, "A Gathering Force in the Seventies."

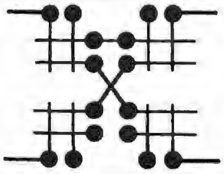
END

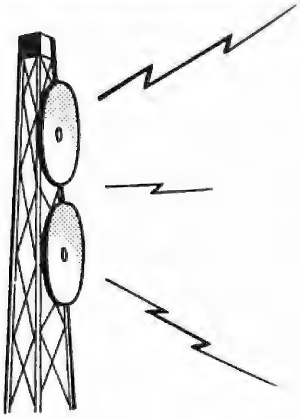


Datran

Data Transmission Company
A UCC Subsidiary

VOLUME I





APPLICATIONS FOR DATA TRANSMISSION NETWORK

By: Michael L. Glaser
Bilger & Glaser
1150 Connecticut Avenue, N.W.
Washington, D.C. 20036
Its Attorney

Charles J. Wyly, Jr.
Chairman of the Board of Directors

Seymour Joffe
President

Edward A. Berg
Vice President, Operations

David H. Foster
Vice President, Administration

Martin R. Hoffmann
Acting General Counsel

6201 Leesburg Pike
Falls Church, Virginia 22044

FCC Form 401
January 1967

Form Approved
Budget Bureau No. 52-R043.17

FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

APPLICATION FOR NEW OR MODIFIED COMMON CARRIER RADIO STATION CONSTRUCTION PERMIT UNDER PARTS 21 AND 25

DO NOT WRITE IN THIS BLOCK

File No.

Call Sign

1. Name and Post Office address of Applicant (Give street, city, state and Zip Code) (See Instruction No. 6)

Data Transmission Company
6201 Leesburg Pike
Falls Church, Virginia 22044

2. Name of radio service in which authorization is applied for: DPRS Point-to-Point Microwave
Class of station Fixed

3. Application for:
☒ New facility
and/or
☐ Change in existing authorization:
File No. .... Call ....

4. Nature of Proposed Changes/Modifications: N/A

☐ Change antenna system
☐ Change antenna location
☐ Change frequency
☐ Add frequency
☐ Other changes (specify)
☐ Add points of communication
☐ Change points of communication
☐ Replace transmitter
☐ Add transmitter
☐ Change power
☐ Add control point
☐ Change control point location
☐ Change alam center location

ENGINEERING DATA (See Instruction 9.)

5. Location of transmitting antenna

City or Town	County	State
San Bruno Mountain (San Francisco)	San Mateo	California

Exact antenna location (street address) (If in area not designated by street, give distance and direction from, and name of nearest town)

1.2 miles south of San Francisco

Geographic coordinates (to be determined in nearest second)

North Latitude	West Longitude
37° 41' 32"	122° 26' 50"

6. If application is for individual mobile user unit, or for mobile units other than those associated with a single permanently installed base station, or for any other class of station at temporary locations, show area of operation. (See instruction 9-A(b)).

N/A

7. Particulars of operation of the proposed station (See Instruction 9(a) & (d))

(a) Frequency (Mc/s)	(b) Emission Designator	(c) Transmitter Power (Watts)		(d) Maximum Modulating Frequency (cycles/sec.)	(e) (For Telegraph Type Emissions) Maximum Transmission Speed (bauds)	(f) (Check One) Polariaztion Plane of Radiated Signal		(g) Azimuth of Radio Path (True Bearing)	(h) Length of Radio Path	(i) Points of Communication
		Input	Output			Vertical	Horizontal			
6256.5	25000F9		5.0	10MHz	20M	X		192°55.5	6.06 km.	S.San Fran.
6137.9	25000F9		5.0	10MHz	20M		X	139° 46'	83.99 km.	Mt. Chual
								° '	km.	
								° '	km.	
								° '	km.	
								° '	km.	
								° '	km.	
								° '	km.	

8. Transmitters

(a) No. of Transmitters	(b) Make of transmitters	(c) Transmitter Type or Model No.	(d) Frequency Stability	(e) Emission Designator	(f) Class of Station
2 + 2 stby	COLLINS	MW-109E	0.002 %	25000F9	Fixed
			%		
			%		
			%		
			%		

9. By what means will the transmitter(s) be rendered inaccesible to unauthorized persons?

Securely locked building with unauthorized entry alarm.

FCC FORM 401

10. Location of Control Point(s) 1/ 2/ N/A

Number and Street

City or Town | State

Can transmitter(s) be placed in an inoperative condition from this control point?

☐ Yes ☐ No

Specify hours control point will be staffed by operating personnel

☐ Continuous ☐ Limited hours (specify)

11. Describe the means by which personnel at the control point can determine when there is a deviation from the terms of the station authorization or when operation is not in accordance with the Commission's rules governing the class of station involved. 1/ 2/

N/A

12. Location of Alarm Center 1/ 2/ 3/

Number and Street At District Office
See Exhibit No. 1, Attachment A

City or Town | State

Can transmitter(s) be placed in an inoperative condition from this alarm center?

☒ Yes ☐ No

Specify hours alarm center will be staffed by operating personnel

☒ Continuous ☐ Limited hours (specify)

13. Describe the means by which personnel at the alarm center can determine when there is a deviation from the terms of the station authorization or when operation is not in accordance with the Commission's rules governing the class of station involved. A brief description of each automatic alarm proposed to be used should be included 1/ 2/ 3/

Local Alarm system furnished
See Exhibit No. 1

14. Will radio facilities be used to connect either control point(s) or alarm center(s) to transmitter(s)? 1/ 2/

☒ Yes ☐ No

If "Yes", identify radio facilities:

See Exhibit No. 1

15. Applicants for individual user units should attach as Exhibit ______ the showing required by Section 21.15(i) of Part 21 (See Instruction 9(i)). 2/ 3/

N/A

16. Do Proposed radio facilities contemplate multiplex type of transmission? 1/

☒ Yes ☐ No

If authorization for the channelizing equipment has previously been granted by the Commission, or is being requested under separate application, specific reference thereto should be made herein

See Exhibit No. 1

17. Transmitting antenna 1/

Make	Type No.
Andrew	HP-8-59 HP-10-59

Maximum antenna power gain over reference half-wave dipole antenna

HP-8-59 41.1 decibels

HP-10-59 43.0 decibels

18. Radiation characteristics of installed antenna system 1/

☐ Non directional in horizontal plane

☒ Directional in horizontal plane with center of main lobe of radiation directed 192 degrees 55.5 minutes clockwise from true North

139 46

Directional antenna pattern (polar diagram) showing power distribution (expressed in decibels of power gain over a reference half-wave dipole antenna) of signal radiated in the horizontal plane is attached hereto as Exhibit No. 2

19. Antenna transmission line data 1/ 2/ N/A

Make	Type No.	Length (feet)	Total Loss (decibels)
N/A			

20. Description of transmitting antenna structure (Heights given should include obstruction light, if required, and any other surmounting appurtenance) 1/ 2/

Overall height in feet above ground	Overall height in feet above mean sea level
81	1056

Submit, as Exhibit No. 3, a vertical profile sketch of total structure (including supporting building, if any) giving heights in feet above ground for all significant features. Clearly indicate existing portion, noting particulars of aviation obstruction lighting already prescribed.

21. Will proposed transmitting antenna be supported by the antenna structure of any other radio station? 1/ 2/

☐ Yes ☒ No

22. Distance from transmitting antenna structure to nearest runway of nearest aircraft landing area= 30,835 feet. 1/ 2/

23. List any natural formation or existing man made structure (hills, trees, water tanks, tower, etc.) which applicant believes would tend to shield the antenna structure from aircraft and thereby minimize the aeronautical hazard of the antenna structure 1/ 2/

NONE

1/ If application is for individual user mobile unit, or for mobile units other than those associated with a single permanently installed base station, this item need NOT be answered.

2/ If application is for temporary-fixed station facilities pursuant to Sections 21.610 and 21.611 or 21.707 and 21.708, this item need NOT be answered.

3/ If application is filed under Part 25 this question need NOT be answered.

24. Topographic data for fixed stations 1/ 2/

Attach, in duplicate as Exhibit No. 4, a topographic map (a U.S. Geological Survey quadrangle or map of comparable detail and accuracy) with the exact location of the proposed station drawn and identified thereon. In cases where FCC Form 401-A, is required to be filed, such map must be furnished in triplicate and should be attached to such Form.

25. Topographic data for base and aeronautical ground stations 1/ 2/

(a) Attach, in duplicate as Exhibit No. N/A, topographic Map(s) (U.S. Geological Survey quadrangles or maps of comparable detail and accuracy) for the area within 10 miles of the proposed transmitter location and draw thereon the following:

(1) Proposed transmitting antenna location plotted accurately to the nearest second of Latitude and Longitude.

(2) Eight uniformly spaced radials each extending to a distance of ten or more miles from the proposed transmitting antenna location in addition to radials in direct line with each co-channel station within 75 miles.

(b) Attach, as Exhibit No. N/A, profile graphs with reasonably large scales for the radials in (a) (2) above. Each graph shall show the ground elevation along the radial and the elevation of the antenna radiation center. Identify each graph by its azimuth bearing from the proposed antenna location. Direction of True North shall be zero azimuth; azimuths of other radials shall be measured clockwise from True North. Show source of topographical data on each graph.

26.(a) From the profile graphs in 25(b) for the eight mile distance between two and ten miles from the proposed transmitting antenna location, and in accordance with the procedure prescribed in the Commission's rules, supply the following tabulation of data: 1/ 2/ 3/ N/A

Radial Bearing (Degrees True)	Average Elevation of Radial (2-10 mi.) in Feet Above Mean Sea Level	Height of Antenna Radiation Center in Feet Above Average Elevation of Radial (2-10 miles)	Effective Radiated Power in Radial Direction (watts)
0°			
45°			
90°			
135°			
180°			
225°			
270°			
315°			
(*)			
(*)			
(*)			
Average Terrain Elev. =	ft.	Antenna Radiation Center Height in Feet Above Average Terrain=	

(*) Radials in direction of each co-channel station within 75 miles. Do not include in determination of average terrain elevation.

26.(b) For any antenna associated with a communication satellite earth station, show the minimum elevation proposed to be used: ______ degrees. N/A

27. Location of Fixed Antennas Receiving Signals of This Station 1/ 4/

(a) City or Town	County	State
South San Fran.	San Mateo	California

Geographic coordinates (to be determined to nearest second)

North Latitude °	'	"	West Longtiude °	'	"
37	38	20.5	122	27	45.5

(b) City or Town	County	State
Mt. Chual	Santa Clara	California

North Latitude °	'	"	West Longtiude °	'	"
37	06	49	121	50	06

(c) List frequencies, call letters, and location of stations to be regularly received by station described in Item 5

Adjacent Stations in Relay System
See Exhibits No. 3 and 5

28. Frequency measurements

(a) What provision will be made for measurement and periodic checking of the station frequency?

Bi-monthly check by precision frequency meter.

(b) If a frequency measuring device is not to be provided, give name and address of frequency checking agency to be employed by applicant

N/A

(If frequency checking agency is shown above, the succeeding subparagraphs of this question are not to be answered)

(c) What type of frequency measurement or calibration apparatus will be used?

SYSTRON DONNER 6316-A-B5-EE

(d) Within how many cycles or within what percentage will this apparatus measure the frequency?

Within 10 Hz

(e) What methods will be used to check calibration of this precision instrument?

Self checking comparison with standard.

(f) How often will calibration of this instrument be checked?

Periodically as required (every 3-6 months)

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING 1/
Engineering Information Submitted in this Application

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application; that I am familiar with Parts 21 or 25 of the Commission's Rules; that I have either prepared or reviewed the engineering information submitted in this application; and, that it is complete and accurate to the best of my knowledge.

By ______ (signed) Victor F. Lohmann, Jr. (printed) Dated this 19 day of November 19 69

Address: 3300 Whitehaven Street, N. W., Washington, D. C. 20007
Number Street City State

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND IMPRISONMENT. U.S. CODE, TITLE 18, SECTION 1001.

1/ If application is for individual user mobile unit, or for mobile units other than those associated with a single permanently installed base station, this item need NOT be answered.

2/ If application is for temporary-fixed station facilities pursuant to Sections 21.610 and 21.611 or 21.707 and 21.708, this item need NOT be answered.

3/ If application is filed under Part 25 this question need NOT be answered.

4/ If communication with one or more foreign countries is proposed, identify the countr(y)(ies) and complete applicable parts of Item 27.

FCC Form 401

LEGAL AND OTHER DATA

29. Applicant is: (check one)

☐ Individual ☐ Partnership ☒ Corporation ☐ Unincorporated Association

(X yes or no)	YES	NO
30. Is individual Applicant or each member of a partnership Applicant a citizen of the United States? N/A		
31. Is Applicant or any party to this application a representative of an alien or of a foreign government?		X
32. If Applicant is a Partnership, attach as EXHIBIT______, one copy, properly certified, of the partnership agreement, or if oral, complete details thereof. N/A	▨	▨
33. If Applicant is a Corporation (Including Joint stock Companies) or Association, answer the following: a. Under laws of what State or Country is it organized?[1/] Delaware (1) Attach as EXHIBIT(s) 6 a certified copy of the Articles of Incorporation (charter) and the By-Laws. (2) Attach as EXHIBIT 6 the names, addresses and percentages held of all stockholders owning and/or voting 10 percent or more of applicant's stock.	▨	▨
b. Give address of applicant's principal office: 6201 Leesburg Pike Falls Church, Virginia 22044	▨	▨
c. Is any director or officer an alien?		X
d. Is more than one-fifth of the capital stock or membership interest voted by aliens or their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country?		X
e. Is Applicant directly or indirectly controlled by any other corporation? (If "Yes" give names and addresses of all such controlling corporations including organization having final control.) See Exhibit No. 6	X	
f. Is the Applicant directly or indirectly controlled by any other corporation of which any officer or more than one-fourth of the directors are aliens? (If "Yes", attach as EXHIBIT______ a statement relating the facts)		X
g. Is more than one-fourth of the capital stock of any controlling corporation owned of record, or may it be voted by aliens or their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign government? (If "Yes", attach as EXHIBIT______ a statement relating the facts)		X
h. Under laws of what State or country is each such controlling corporation organized? Texas (Attach as EXHIBIT(s) 6 a certified copy of the Articles of Incorporation (Charter) and the By-Laws)	▨	▨
34. Has applicant or any party to this application had any FCC station license or permit revoked or had any application for permit, license or renewal denied by this Commission? (If 'Yes", attach as EXHIBIT______ a statement giving call sign of license or permit revoked and relate circumstances)		X
35. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement, or any other means or of unfair methods of competition? (If "Yes", attach as EXHIBIT______ a statement relating the facts)		X
36. Has the applicant, or any party to this application, or any person directly or indirectly controlling the applicant ever been convicted of a crime for which the penalty imposed was a fine of $500 or more, or an imprisonment of six months or more? (If "Yes", attach as EXHIBIT______ a statement relating the facts)		X
37. Is applicant, or any person directly or indirectly controlling the applicant, presently a party in any matter referred to in Items 34, 35 and 36? (If "Yes", attach as EXHIBIT______ a statement relating the facts)		X
38. Is applicant directly or indirectly, through stock ownership, contract, or otherwise currently interested in the ownership or control of any other radio stations licensed by this Commission? If "Yes", give:		X

Call Sign & Service	Location	Name of Licensee
	See Exhibit No. 7	

	YES	NO
39. Has applicant ever been directly or indirectly interested in the ownership or control of any radio stations other than those stated in 38 above? If "Yes", give:		X

Call Sign & Service	Location	Name of Licensee

[1/] If application is for individual user mobile unit, or for mobile units other than those associated with a single permanently installed base station, this item need NOT be answered.

	YES	NO
40. Will applicant offer communication services to the public 24 hours every day? 1/ 2/ If "No", state hours and days during which station will be open for such service: Hours Days	X	
41. Are the charges for the proposed service contained in a tariff filed with the FCC? 1/ 2/ If "Yes", identify: ______ If "No", attach as EXHIBIT 8 a schedule of proposed charges. (The statement of rates required herein does not constitute a filing of schedules of charges required by Section 203 of the Communications Act of 1934, as amended, prior to commencing service.)		X
42. Does local or state law require any franchise or other authorization to maintain or render the services proposed herein? 1/ (If "Yes", attach as EXHIBIT ______ a single certified copy of franchise or authorization)		X

43. If application is for modification of a construction permit: 1/

(a) The time required to complete construction after authority is granted is N/A months.

(b) Attach as EXHIBIT ______ a statement giving: (1) the extent of construction as of the date of this application, and (2) the justification for not having completed construction in accordance with outstanding construction permit.

44. In what businesses, employment or activities, other than communications common carrier, are applicant and its principals engaged? 1/

(Attach as EXHIBIT 9 a statement giving the following for each such activity:

(a) nature of activity
(b) location of activity
(c) hours devoted to each activity

45. What is applicant's relation to station? 1/

☒ Owner ☐ Lessee ☐ Other

(Attach as EXHIBIT N/A copies of all agreements affecting applicant's ownership, operation, use and/or control of the station facilities.)

46. Is applicant directly or indirectly interested in or affiliated with any entity or person engaged in the business of providing a public land line message telephone service. 1/ ☐ Yes ☒ No

(If "Yes", and applicant is not a landline telephone carrier, attach as EXHIBIT ______ a statement relating the facts)

47. Estimated cost to establish proposed facilities:

a. Transmitter(s) and receiver(s)	$ 166,164
b. Antenna(s) and waveguide or antenna transmission line(s)	$ 14,248
c. Power plant, control, and common equipment	$ 14,100
d. Land, buildings, towers, etc.	$ 19,090
e. Channelizing equipment	$ 240,200
f. Miscellaneous	$ 5,561
Total cost	$ 459,363

48. Attach as EXHIBIT 10 a statement showing applicant's financial ability to construct and operate this station. Include the most recent balance sheet of the applicant (must be as of a date at least within 90 days of the filing of this application.) If loans or other credit arrangements are contemplated, duplicate copies of written instruments, other than demand notes, must be submitted. (Copies of standard manufacturer's lease or sales agreements on file with the Commission need not be submitted but should be identified by manufacturer's name and form number, and the material terms and conditions should be outlined.) Names and addresses of all parties to financial agreements must be stated. Oral agreements must be summarized and details submitted with regard to all material terms thereto. 1/

49. Attach as EXHIBIT 11 a statement of the number and description of all technical personnel to be employed directly by licensee for maintaining and repairing the proposed facilities, and describing the specific arrangements for prompt maintenance or repair of the proposed facilities. 2/

50. Attach as EXHIBIT 12 a detailed statement covering the manner in which the proposed service will be operated, including number of persons to be so employed, division of work, and hours of physical supervision by applicant. If facilities are to be operated and/or maintained in conjunction with any other business, give name and address of owner of such business and submit copies of working agreements. 1/

1/ If application is for individual user mobile unit, or for mobile units other than those associated with a single permanently installed base station, this item need NOT be answered.

2/ If application is filed under Part 25 this question need NOT be answered.

51. Applicants not engaged in providing public wire line communication service shall attach as EXHIBIT 13 a statement showing the extent to which the applicant intends actively to participate in the day-to-day operation of the proposed facilities. In the event the applicant does not intend actively to participate in the day-to-day mangement and operation, he should state his reasons therefor and fully disclose the details of the proposed operations, including a showing of how control thereof will be retained by the applicant. The statement shall also set forth the names and addresses of any and all persons (except applicant) who have a substantial interest or responsibility in the supervision, operation, maintenance and/or control of proposed facilities, the relationship of each such person to the applicant and the extent of control to be exercised by such persons.[1]

52. Attach as EXHIBIT 14 a complete statement, setting forth facts which show how the instant proposal will be in the public interest and will satisfy specified needs for service, detailing the number and activities of prospective customers and disclosing all relationships, affiliations or connections between the applicant and prospective customers. If surveys or solicitations have been made, the nature and detailed results thereof should be submitted. The statement should contain the names of any common stockholders, officers, directors, employees or individuals closely related to the management or control of the facilities of the applicant or any subscriber. Applications for authorizations in the Point-to-Point Microwave Radio service proposing the rendition of service to community antenna television systems should include a statement indicating whether or not the proposed customers have obtained whatever necessary local authorizations are required for the operation of the CATV systems.[1] [2]

53. Is applicant personally familiar with the provisions of Part 21 or 25, as applicable, of the Commission's Rules? ☒ Yes ☐ No

EXHIBITS AND APPLICABLE SEC. and/or ITEM NO. OF RULE OR FORM (See Instruction 7)

Exhibit Number	Sec. and/or Item No. of Rule or Form	Exhibit Number	Sec. and/or Item No. of Rule or Form	Exhibit Number	Sec. and/or Item No. of Rule or Form
1	13, 14, 16	12	50		
2	18	13	51		
3	20, 27 (c)	14	52		
4	24				
5	27				
6	33 (a), (e), (h)				
7	38				
8	41				
9	44				
10	48				
11	49				

CERTIFICATION

The APPLICANT waives any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests a construction permit in accordance with this application. All statements made in the attached exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that the statements made in this application are true, complete and correct to the best of his (her) knowledge and belief, and are made in good faith.

Dated this 21st day of November, 19 69.

WILLFUL FALSE STATEMENTS MADE ON THIS APPLICATION ARE PUNISHABLE BY FINE AND IMPRISONMENT [U.S. Code, Title 18, Section 1001] AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT [U.S. Code, Title 47, Section 312(a)(1)]

Applicant Data Transmission Company
(must correspond with that shown on page 1)

By Edward A. Berg (printed) Edward A Berg (signed)

Title Vice President
(position held by person signing for applicant)

---

[1] If application is for individual user mobile unit, or for mobile units other than those associated with a single permanently installed base station, this item need NOT be answered.

[2] If application is filed under Part 25 this question need NOT be answered.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1967 O - 248-928

EARTH STATION INTERFERENCE ANALYSIS

The station proposed in this application is within the coordination distance of the Communication Satellite Corporation's earth station at Jamesburg, California. Since the proposed station operates in the 5925-6425 MHz band, calculations have been made to determine possible interference between the proposed station and the COMSAT earth station.

Since the COMSAT receive station is in a different frequency band, the proposed transmitters will not cause interference to it.

The attached calculations, made in accordance with Part 25.251 of the FCC Rules and Regulations, indicate that no interference will be caused to the proposed receiving station.

The calculations do not include the receiver selectivity due to difference between the proposed frequency and COMSAT frequencies. This factor will further add to the margin indicated.

EARTH STATION INTERFERENCE ANALYSIS

LOS RECEIVING SITE	San Bruno Mtn.
EARTH STATION	Jamesburg, Calif.
DISTANCE EARTH STATION - LOS RCVR SITE	159.9 km
AZIMUTH TO EARTH STATION	153 ° 24'
AZIMUTH TO LOS XMTR	139 ° 46'
ERP EARTH STATION	8 dBW
ZONE (Ref. Part 25.251 g)	A/B
BASIC TRANSMISSION LOSS (Ref. Part 25.251 h) Figure 1-6	> 175 dB
MISCELLANEOUS LOSSES (Filters, Feeders, etc.)	2 dB
Rx ANTENNA GAIN (Ref. Isotropic) (On Azimuth to Earth Station,	34 dB
NET PATH LOSS	168 dB
INTERFERING RECEIVE LEVEL	-160 dBW
MARGIN TO-132 dBW	22 dB

FCC FORM 714
JULY 1967

FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

Form Approved
Budget Bureau No. 52-R176.1

SUPPLEMENT TO APPLICATION FOR NEW OR MODIFIED RADIO STATION AUTHORIZATION
(concerning antenna structure notification to FAA)

PART I - Instructions

1. When required, attach this form (ONE COPY ONLY) to application for radio station authorization (other than broadcasting) and submit to Federal Communications Commission, Washington, D. C. 20554. If more than one FAA Notice (see Part III below) was sent to FAA for antenna structure(s) covered by the attached application, submit a copy of this form for each such notification.
2. If the attached application is for modification and original application file number is known, enter file number in item 3 below.
3. Do not correspond with the Federal Communications Commission concerning Part 77 of the Federal Aviation Administration (FAA) Regulations. Information concerning FAA Rules should be obtained from one of the FAA Regional Offices listed on the reverse of this form.
4. Form FAA No. 117 "Notice of Proposed Construction or Alteration" is to be used for antenna structure notification to the Federal Aviation Administration. That form may be obtained from any one of the offices listed on the reverse of this form and should be returned to the Federal Aviation Administration.

PART II - Identification of Applicant

1. Name of Applicant (must be same as shown on attached application for radio authorization)
Data Transmission Company

2. Name of Radio Service
DPRS Point-to-Point Microwave (Fixed)

3. Application File Number (see Instruction 2 above)
N/A, New Facility

PART III - Status of Notice to FAA

The Federal Aviation Administration requires notification of proposed antenna structure construction or alteration in accordance with its Part 77 Regulations, "Notice of Construction or Alteration affecting Navigable Airspace". Check 1 or 2 below and furnish the information requested.

1. ☐ NOTIFICATION HAS BEEN SUBMITTED TO FAA

a. Name used (individual, company, corporation etc.) in making notification of construction or alteration to FAA

b. FAA regional office where filed

c. Date of notification to FAA

d. Location of Antenna Structure as reported to FAA
City
State
Geographical Coordinates
Latitude N
Longitude W

e. Height of completed Antenna Structure as reported to FAA
Overall Height above ground level ft.
Overall height above mean sea level ft.

2. ☒ NOTIFICATION HAS NOT BEEN SUBMITTED TO FAA - The proposed antenna structure(s) covered in attached application being submitted to FCC has been analyzed under Part 77 of the FAA Regulations and it has been determined that notification to FAA is not required.

PART IV - Certification

I certify that all of the above statements are true, complete, and correct to the best of my knowledge.

Date Signed 3 November 1969

Signature of person certifying

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

INTRODUCTION

The applicant proposes to construct and operate a nationwide digital communications network specifically designed and engineered for data transmission. The applications which are accompanied by this Exhibit represent the basic, backbone microwave and switching systems which will constitute the network in its initial operational configuration.

A SUMMARY DESCRIPTION follows this introduction. In this description, the geographic locations of the main trunks and other system elements are depicted together with a breakdown of the operational elements of the proposed system. Distinguishing technological aspects of the system will be found in this description, as well as an introduction to the developmental scheme upon which the system outlined by the applications is based.

SYSTEM PHILOSOPHY (Page 3) outlines the present philosophy and planned additional development, as a means of accentuating the continuing utility of the proposed facilities.

SYSTEM SERVICE CHARACTERISTICS (Page 5) lists the service attributes of the system. These characteristics serve to distinguish the data transmission capabilities of the proposed system from the capabilities of existing communications common carriers.

DIGITAL TRANSMISSION (Page 7) contains the rationale for selection of the digital mode of transmission for the system, together with the attributes of digital transmission which distinguish it for use in the transmission of data.

TIME DIVISION MULTIPLEXING (Page 9) describes the state-of-the-art multiplexing techniques to be used in the proposed system. These techniques have significant implications for efficient use of the frequency spectrum as well as for maximum system transmission efficiency.

TRUNKING (Page 11) describes in detail the backbone trunk and spurs. Also described are the supporting facilities, routing and channelization plans and the order wire, alarm and control systems.

SWITCHING (Page 18) contains a description of the switching systems which provide network control. This description includes the more salient functions to be performed by each switching office and a description of the equipment to be used.

LOCAL DISTRIBUTION (Page 22) outlines the local distribution concept that is integral to the design of the proposed system. Local distribution or "tail circuit" capabilities are essential to the applicant's end-to-end service concept.

COMPLIMENTARY TRANSMISSION CAPABILITIES (Page 27) relates the applicant's proposed system to other transmission capabilities such as cable and satellite.

SYSTEM IMPACT ON FREQUENCY SPECTRUM (Page 28) relates the proposed system to the electromagnetic radio frequency spectrum as a vital, exhaustible national resource.

OPERATOR ASSISTANCE (Page 29) contains a description of the method of providing assistance to subscribers as required.

CONNECTION PROCEDURE (Attachment A) is also included to provide a step-by-step description of call procedures.

1. SYSTEM DESCRIPTION

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

SUMMARY DESCRIPTION

The network proposed by the applicant has been structured to serve the national data communications market, taking advantage of the economies of scale which will result.

The proposed system will traverse the United States with a high-channel-density, microwave backbone trunk following a route between San Francisco, Los Angeles, Dallas, Minneapolis-St. Paul, Atlanta and Boston (See Figure 1-1). Spur routes from the backbone trunk will provide service to additional cities planned to accommodate growth in demand for service.

The system has been designed to include service characteristics responsive to the expressed demands of the present data communications market, as well as in anticipation of requirements for this market's future.

These characteristics include:

High Reliability
Rapid Connection
Ability to Accommodate Different Data Transmission Rates
Grade of Service (Circuit Availability)
System Availability
Availability in All Locations

The system utilizes Time Division Multiplexing (TDM) techniques in providing an all digital transmission path. The inherent advantages of a digital transmission system include:

Reliability
Maximum channel density in assigned frequency bandwidths
Efficient utilization of transmitted power
Maximum potential for system expansion
Flexibility of system configuration

The system and its components are modular in design so that, as the demand for service increases, terminal capacity can be easily and economically expanded. Digital processors control the switches, optimize call routing and provide off-line reports for billing and other administrative functions. All switching centers feature redundant equipment to reduce the probability of loss of service due to component failure.

Wherever possible, identical equipment is utilized in the system to minimize logistic problems and facilitate centralized spare parts distribution.

The system represented by the applications accompanying this Exhibit is a basic operational system. Future expansion is contemplated, upon completion of the basic system, in order to more fully satisfy the needs of the emerging data communications market. This expansion has been taken into full account in the design of the system, to insure that no degradation of transmission characteristics, or reduction of system efficiency, will result from an increase in system capacity.

The system is composed of three basic elements: trunking system, switching system, and local distribution system. These elements are integrated into an end-to-end data communications system specially designed for the transmission of digital data.

The system will be equipped with order wire, alarm and control facilities to insure maximum reliability by providing the capability for rapid maintenance response to outages.

The TDM transmission mode of the system provides for maximum conservation of the frequency spectrum. For data transmission purposes, the proposed system provides significant channelization advantages over a fully data loaded Frequency Division Multiplexing (FDM) type of system. Frequency studies have been made in preparing the instant applications, and the integration of complementary transmission capabilities-such as cable and satellite-have been considered in planning the system.

THE DATRAN SYSTEM

FIGURE I-I

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

SYSTEM PHILOSOPHY

It is generally agreed, as is discussed in Exhibit No. 14, that the market for data communications services will assume large proportions upon the availability of economical, switched digital communication services. As that Exhibit sets forth, the problem is how best to translate anticipated national market requirements into a realistic network design within constraints imposed by practical and regulatory considerations of financing, procurement and management.

The proposed route of the system was mapped to afford the largest possible number of potential subscribers ready access to the system. This selection was accomplished by identifying for initial service, cities which are considered to have the greatest potential need for data communications. The principal indicators utilized in identifying each city are total population, number of corporations, dollar sales volume, number of computers, number of communicating terminals, and the number of employees of the corporations. These indicators indentified a larger number of cities than it is feasible to serve immediately, due to financial and other constraints. Therefore, the 35 cities selected for initial service were determined on the basis of their immediate high potential interaction of data communications, as well as their proximity to the trunk.

The applicant recognizes that the demand for its services may not materialize precisely as initially forecast. Any forecast is necessarily a "snapshot" of a point in time, and the demand for data communication service will increase substantially and will vary in complexion in the years ahead. It is for this reason that in the design of the system great emphasis was placed on engineering flexibility. Channels of communication can be increased as needed to provide for an increase in traffic on a particular route.

The system switch and control is capable of optimizing the utilization of the transmission facilities by precise, instantaneous control of traffic routing. The applicant has determined that ten locations designated as District Offices and one location designated as a Regional Office will initially be needed to perform this function at the point in time of the market "snapshot" relied upon in this application. A modular technique has been adopted throughout the system to facilitate not only additions to the initial system capability, but rapid geographic augmentation to meet market demand.

The applicant proposes to phase the services to be provided the public, which shall be compatible with existing and anticipated data requirements. The services to be offered are:

Initial Services

1. Establish a switched point-to-point connection between two compatible subscribers within the network;
2. Manual or automatic addressing by the sender;
3. Abbreviated addressing;
4. Broadcast transmission to up to six compatible subscribers simultaneously;
5. Originating requested call back;
6. Controlled privacy.

Additional service features are planned to be provided in the future depending on market demand. These are:

1. Speed conversion within specified ranges;
2. Code conversion between any two permissable code formats;
3. Speed and code conversion;
4. Expedited Information Transfer Service (EXIT) to provide the originating subscriber the option of forwarding data to a switching center with positive control over the time of delivery to the desired subscriber(s).

At no time, however, will the applicant offer services other than communications services.

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

SYSTEM SERVICE CHARACTERISTICS

The applicant's nationwide data communications network is designed to meet the following major objectives.

High Reliability

The proposed system is designed to provide a degree of error rate probability less than 10^{-7}. The design goal of 0.9999999 will result in an average of no more than one error during transmission of 10 million bits of data.

The reliability of the system is derived from a number of technological features which are set forth in DIGITAL TRANSMISSION (on Page 7). The advantages in integrity and continuity achieved by the system's TDM transmission mode are detailed there. Other contributing factors to this high degree of accuracy include state-of-the-art design, off-the-shelf equipment where available, and conservative path engineering including space diversity reception.

Rapid Connection

A data transmission path between any two compatible subscribers will be established within three seconds following receipt of the last digit of the address identifying the destination.

Ability to Accommodate Different Data Transmission Rates

A graduated scale of data rates are offered on a switched service basis to accommodate the growing demands for reliable, available and economical data transmission facilities, while maintaining compatibility with existing data communicating terminals. Initially service up to 2000 bits per second (bps) in the asynchronous mode and up to 14,400 bps in the synchronous mode of transmission will be provided on a switched basis (See Figure 1-2). The proposed network is planned to accommodate greater speeds of switched services as the market requires. In addition to the above speeds 19,200 bps and 48,000 bps offerings will be available, initially on a private service basis as market demand requires.

EXHIBIT NO. 1

Grade of Service (Circuit Availability)

All channels, trunks, and switch matrices integrated into the network are designed and calculated to meet a grade of service goal of P.01 during the busy period. On an average no more than one busy indication in one hundred attempts should be encountered due to network control. Outside of busy periods the grade of service will approach that of a non-blocking network. For intra-office traffic a grade of service of approximately P.005 is expected.

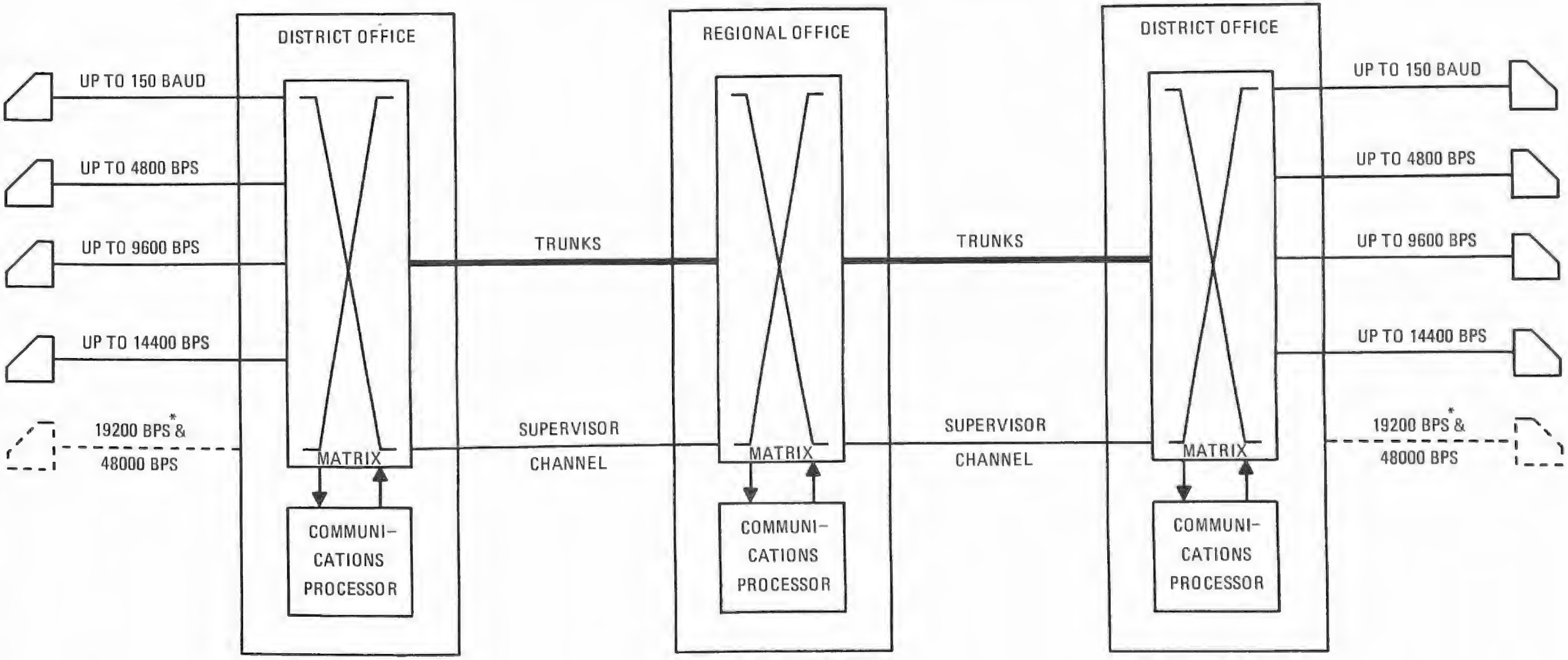
System Availability

The network is designed to provide greater than 99.98% availability. The transmission system provides battery reserve standby power and alarm and order wire systems at all remote sites. Both transmission and switching systems maximize reliability by means of redundant equipment.

Availability in All Locations

The proposed system ultimately will serve all locations desiring the service. At all stages of system development, and thereafter, the applicant will stand ready to interconnect with other carriers or authorized communications entities on a realistic basis in order to provide service to all locations, as well as to offer flexibility to meet individual customer requirements. The applicant is actively pursuing possibilities for interconnection arrangements in order to assure the enhancement of national communication capabilities.

PROPOSED SWITCHED SERVICES



*––FUTURE SERVICES

FIGURE 1-2

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

DIGITAL TRANSMISSION

The selection of the digital mode of transmission for the proposed network was dictated by the nature of the traffic which the system has been designed to transmit. Digital data is uniquely different from the voice and personal message traffic for which the present analog common carrier facilities were designed. The present analog systems have grown over the years from simple beginnings involving few of the present requirements of the nationwide data communications market. In attempting to meet new demands, these systems have been modified again and again, always with the requirement that compatibility with the analog transmission of voice signals was of prime importance. Ingenious but complicated means have been developed to permit transmission of more information over each analog circuit. For the most part these techniques have relied upon frequency selective means exclusively, which have been combined into the Frequency Division Multiplexing (FDM) systems now used by most communications carriers.

Because of inherent design limitations involving relatively expensive filters and other components, the limitations of these FDM systems have become more apparent over the past three decades. In recent years, however, large scale digital data handling and computer systems have come into widespread use, adding a new and large dimension to communications market demand. Today a digital computer terminal must of necessity utilize the facilities of the common carrier analog communications systems, systems whose transmission characteristics are dissimilar from the data to be transmitted.

Accordingly, signal conversion equipment - modulator - demodulators (modems) - has been made available both by the common carriers and independent manufacturers to convert digital signals for analog transmission. This equipment is inherently complex, even for use in low speed data transmission. But for transmission at high bit-rates, such equipment can become prohibitively expensive. The requirements for modems in the current analog networks creates discontinuity in the transmitted signal, which is generally considered a major impediment to the efficient transmission of digital information. In the proposed system, a subscriber need not convert his signals to a different transmission mode, since the system transmits the digital signal in its original form. Maximum continuity is preserved and transmission efficiency is heightened.

EXHIBIT NO. 1

A further significant characteristic of a digital transmission system is the manner in which the signals are relayed. Each microwave station on the system is regenerative: it restores the symbol or bit pattern, and transmits a new, clean and conditioned signal. Thus, noise is not cumulative as it is in analog transmission systems, and errors in transmission are reduced accordingly.

In the system proposed by the applicant, provisions for higher bit rate capability can be accomplished by a wiring change at the multiplexer servicing the subscribers. Installation of new equipment is not necessary, and no other changes are required in the basic transmission system.

The applicant's digital transmission system has been engineered to a design goal of one bit error in 10^7. This design goal represents a highly significant increase in reliability over that described in the much referenced Alexander, Gryb, Nast report.[1]

For the user with simple terminals having no capability for error detection and correction, the proposed system will offer the material advantage over present systems in that far fewer errors in transmission will occur. The order of reliability is such that the frequency of retransmission due to network introduced errors will be substantially reduced over that occurring in present systems.

In short, data transmission by means of an end-to-end digital system has become not only attractive but essential to effective and efficient data communications. The applicant's proposed digital network will meet the needs of the data communications market with the same basic effectiveness with which the present analog systems have met the demands of the communications markets for which they were designed.

[1] Capabilities of the Telephone Network for Data Transmission*, BSTJ Vol. 39, pp. 431-476, May, 1960. *A.A. Alexander

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

TIME DIVISION MULTIPLEXING

General

Applicant's proposed network makes full use of Time Division Multiplexing (TDM) techniques, with simple phaseshift keying of the radio transmitter to increase the efficiencies of data transmission. The same techniques are utilized throughout the entire network, including the main trunk, spurs, and local distribution systems.

The transcontinental trunking system is designed so that the average hourly error rate will not exceed one bit error in 10^7 bits transmitted in the system (See Figure 1-3).

Errors occur mainly during the periods of deepfading (50 db or more), and considering the low probability that more than ten links in a given circuit will undergo such deep fades during the same hour, it is conservative to allocate a link error design objective of 10^{-8}. Estimations are based on Rayleigh probability distribution for description of link behavior.

The signals resulting from this multiplexing process are applied to a modulator, which generates a multi-phase signal (See Figure 1-4). This signal is further amplified by the transmitter and applied to the antenna for transmission. The modulator can be replaced with other modulator equipment with higher indices, so that approximately four thousand 4,800 bps channels may be transmitted simultaneously over a single radio path.

The receive signal is amplified, demodulated and conditioned to provide a clean, high speed data signal as an input to the demultiplexer. This demultiplexer separates the composite, high speed signal into constituent channels, which appear as separate data channels at the digital circuit switch intermediate distribution frame located in a District Office. This switch directs the appropriate signal channels to the desired subscriber via the local distribution loop. Operation of the total system is full duplex (two-way simultaneous transmission).

The TDM techniques embodied by the proposed network assign to each data channel a specific time slot for the transmission of data. In this way, the full power of the transmitter is delivered to each discreet time slot, avoiding the problems in conventional FDM systems caused by varying load conditions which occur where power must be shared with each additional channel added. The processing of each channel is identical to all other channels, and degradation in system performance due to variance loading is avoided.

The channelization equipment, or multiplexers, are modular in design permitting economical initial installation. Expansion is readily accomplished by the installation of additional multiplexers and by making necessary adjustments to the radio equipment.

Low speed channels (150 bps) will be derived from 4800 bps channels, again using TDM equipment. Special switched service groups. such as 9600 bps and 14,400 bps can also be provided by combining 4800 bps channels. The multi-channel capability required for this class of service requires only a wiring change. Additional channels required to accommodate an increase in service can be provided on a plug-in basis. The proposed transmission system is not limited to an upper range of 14,400 bps. Higher bit speeds are available upon special order in increments of 4,800 bps. The channel capacity of the radio system will permit a reasonable upward extension of channels so that the capacity of the initial network can be increased without requiring additional radio circuits.

Modularity

Functional components in the system are packaged in modules for economic installation and ease of upgrading. This procedure permits segments of the network to expand as the demand for transmission of data increases.

State-of-the-Art Design

All the many packages requiring integration to form the data communications network are within current technological design capability. These elements are dealt with in the following sections of this Exhibit.

Standardized Equipment

To minimize logistic problems and facilitate centralized parts distribution, all sites will use identical equipment in quantities depending on the number and type of subscribers being serviced. This standardization of equipment permits more efficient installation of facilities.

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

TRUNKING

General

The data carried on the system is transmitted over a high density microwave channel backbone trunk traversing the United States on a route which has been designed to serve the major data concentration points in the country (See Figure 1-1). Spur trunks, utilizing identical electronic equipment, carry the data to city locations, specified as District Offices, lying off the backbone trunk route.

This trunk will consist of microwave stations, each of which is either a repeater or a branching repeater. Each repeater receives, amplifies, and transmits all channels in the microwave path; a branching repeater has the additional capability of allowing a portion of the channels to be inserted. The channels dropped may be terminated at that point or may be transmitted over a microwave spur to provide service at locations not located on the primary route.

Connected to the microwave system are Regional Offices (RO) which control the activity of the network. Each RO has direct control of up to 10 District Offices (DO), where switches are located. Each District Office in the network can communicate with all Regional Offices, and can economically provide termination points for 1,000 to 6,000 terminals.

Support Facilities

The applicant's communications equipment, and associated multiplex and auxiliary equipment, will be housed in buildings or shelters of sufficient size to accommodate auxiliary power generation equipment and local battery supply in separate fireproof rooms. These buildings will generally be of masonary construction, with design modifications to allow for differences in environmental conditions. Depending on local conditions and regulations, some locations will utilize prefabricated fireproof shelters. All buildings will be constructed in conformance with local building codes and regulations. Where the applicant's proposed site is on public land, the desires of the Government agency controlling the property regarding construction of communications facilities will be strictly adhered to.

TRANSCONTINENTAL DIGITAL CONNECTION

INTER-OFFICE CALL

LOS ANGELES TO NEW YORK

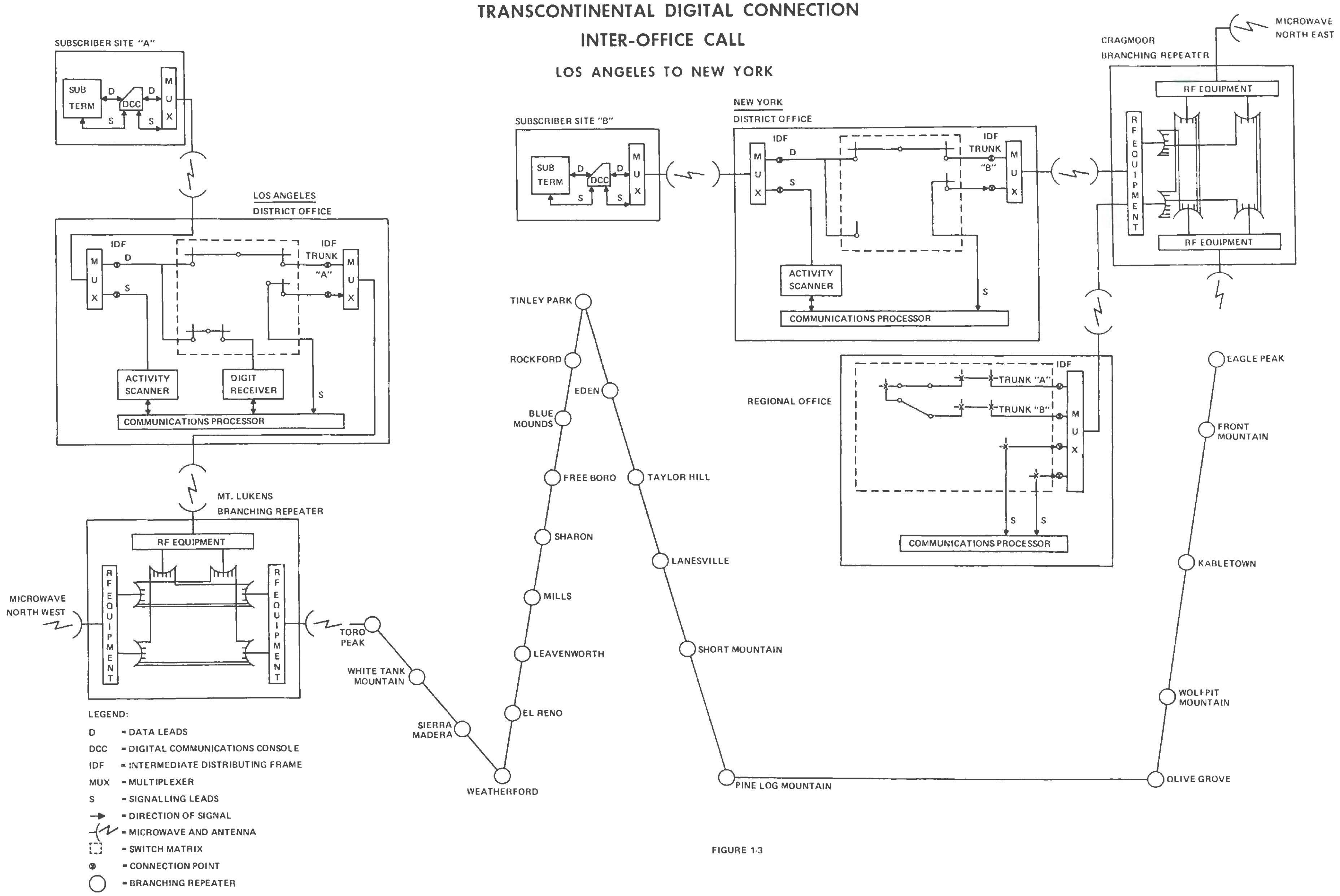
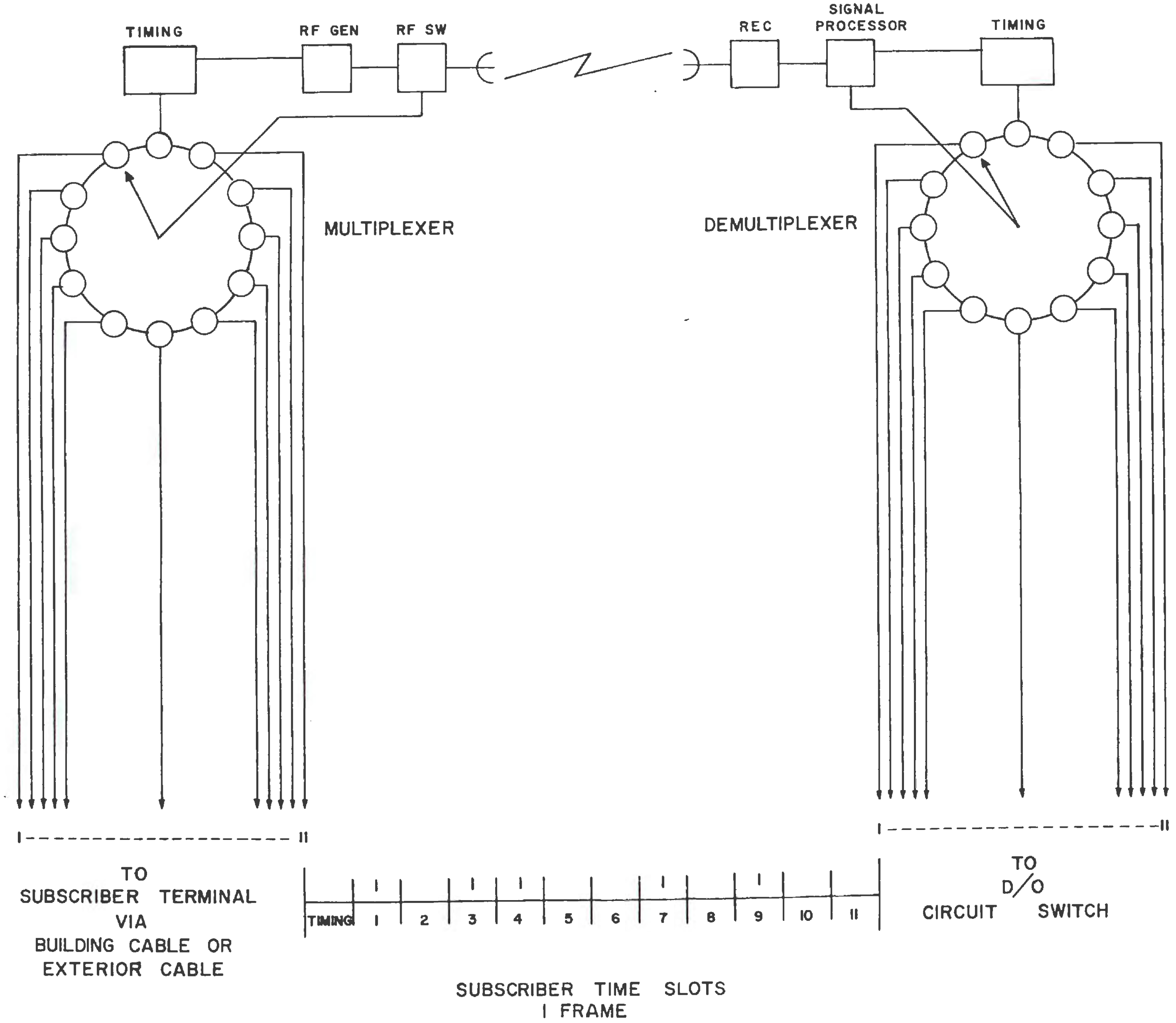


FIGURE 1-3

TRANSMISSION LOGIC



12 CHANNEL MULTIPLEXER SHOWN TYPICAL FOR "N" CHANNELS IN SYSTEM

FIGURE 1-4

The applicant is reasonably assured of the availability of sites for the proposed system. Sufficient property will be obtained to accommodate the building, outside fuel supply and tower foundations. In most cases, the perimeter of the property will be fenced and locked.

Commercial or locally generated electric power is available at all proposed sites. Additionally, a battery supply will be provided at each site with reserve capacity capable of maintaining equipment operation for at least eight hours without recharging. Each site will also be equipped with standby generators to provide power automatically to the batteries in the event of primary power failure. Power generation equipment will be sequenced automatically at regular intervals to insure availability.

The station alarm system will provide the maintenance control point with status information regarding system status at each of the stations under its surveillance. For example, the status of power is shown whether the station is operating from primary or standby power or solely on battery reserve. A number of other conditions is shown also, such as transmitter and receiver operation, tower light operation, unauthorized entry and the like. A capability exists to control certain functions at the stations from this alarm point such as start generators, reset transmitters and turn on floodlights. In each building, provision will be made for ambient temperature control as required by the environmental demands of the site. Space air conditioning will be provided where warranted; otherwise, properly filtered and humidity controlled ambient forced air ventilation will be furnished. Thermostatically controlled electric space heaters will be provided to maintain a constant temperature during the winter season.

Towers will be of sufficient height to allow for necessary clearance and space diversity separation between antennas. The towers will generally be self-supporting, and will be engineered in accordance with current EIA standards applicable to tower design.

High performance, shrouded antenna reflectors with diameters appropriate to path performance requirements will be used throughout the proposed system. Low-loss eliptical waveguide, factory cut to pre-engineered lengths, will be used to insure ease in installation and maintenance, and to insure low-loss performance. Radomes, or reflector cloths, will be utilized where local winter conditions so dictate.

EXHIBIT NO. 1

Routing

The proposed network is configured, and the applications software is designed to permit a District Office receiving a request for service to contact directly the Regional Office servicing the destination District Office to secure a trunk assignment. In the event a primary trunk to the destination is not available, the Regional Office will select an alternate route, and thereby complete the connection. In either event, a maximum of three switching centers is required to complete the connection. This network configuration and the computer software disciplines, combined with efficient and reliable high speed switching equipment, is designed to provide rapid resonse (within 3 seconds), and reliability required for the present-day and future data communications user.

Channelization

Concurrent with the design of the transcontinental communications data network, studies of traffic loads without estimation of channelization were undertaken. These studies, in addition to providing the geographical location of segments of the communications market, can be used in simulating the effect, actual or anticipated, that data traffic characteristics have on the proposed network.

These simulations provide an extremely flexible, closely coupled package which may be used on a continuing basis to insure system growth in cadence with the data market.

The information which follows represents that point in time when the proposed microwave system and the ten switching centers have been installed. One of these centers is designed to perform the functions of a Regional Office. The network is configured to provide service to thirty-five geographic locations as described on the next page.

EXHIBIT NO. 1

1. San Francisco
2. Los Angeles[1]
3. San Diego
4. Phoenix
5. Dallas
6. Houston
7. San Antonio
8. Oklahoma City
9. Kansas City
10. St. Louis[1]
11. Omaha
12. Des Moines
13. Minneapolis
14. Madison
15. Milwaukee
16. Chicago[1]
17. Indianapolis
18. Cincinnati
19. Columbus
20. Louisville[1]
21. Nashville[2]
22. Memphis
23. Birmingham
24. Atlanta
25. Charlotte
26. Richmond[1]
27. Washington
28. Baltimore
29. Pittsburgh[1]
30. Cleveland
31. Detroit[1]
32. Philadelphia
33. New York[1]
34. Hartford
35. Boston[1]

1 District Office Location

2. Co-located District & Regional Office

In calculating the quantity of 4800 bps channels required between each point of the transcontinental microwave system, an analysis of calling frequency, by class and traffic characteristics during the busy period, was made. The results are reflected in the trunk segments and interstate channel requirements which follow.

CHANNELIZATION

Main Trunk

Segment	No. of 4800 bps Channels
Boston to Hartford	2600
Hartford to New York	800
New York to Philadelphia	1600
Philadelphia to Pittsburgh	3800
Pittsburgh to Washington	2800
Washington to Richmond	3800
Richmond to Charlotte	4000
Charlotte to Atlanta	3400
Atlanta to Nashville	4000

EXHIBIT NO. 1

Segment	No. of 4800 bps Channels
Nashville to Louisville	3400
Louisville to Columbus	4000
Columbus to Indianapolis	3400
Indianapolis to Chicago	2800
Chicago to Milwaukee	4000
Milwaukee to Madison	3200
Madison to Minneapolis	3000
Minneapolis to Des Moines	2000
Des Moines to Omaha	2200
Omaha to St. Louis	2800
St. Louis to Oklahoma City	2200
Oklahoma City to Dallas	2000
Dallas to San Antonio	1200
San Antonio to Phoenix	1000
Phoenix to San Diego	1600
San Diego to Los Angeles	2000
Los Angeles to San Francisco	2400

CHANNELIZATION

Spurs

Segment	No. of 4800 bps Channels
Hartford BR* to Hartford	2000
New York BR to New York	1000
Philadelphia BR to Philadelphia	2400
Pittsburgh BR to Pittsburgh	3800
Pittsburgh to Cleveland	2600
Cleveland to Detroit	800
Washington BR to Baltimore BR	1200
Baltimore BR to Baltimore	600
Baltimore BR to Washington	800

EXHIBIT NO. 1

Segment	No. of 4800 bps Channels
Richmond BR to Richmond	2400
Charlotte BR to Charlotte	800
Atlanta BR to Atlanta	400
Atlanta BR to Birmingham	800
Nashville BR to Nashville	7600
Nashville BR to Memphis	600
Louisville BR to Louisville	2200
Columbus BR to Cincinnati BR	1000
Cincinnati BR to Cincinnati	600
Cincinnati BR to Columbus	600
Indianapolis BR to Indianapolis	800
Chicago BR to Chicago	3200
Milwaukee BR to Milwaukee	1200
Madison BR to Madison	400
Minneapolis BR to Minneapolis	1200
Des Moines BR to Des Moines	400
Omaha BR to Omaha	1000
St. Louis BR to Kansas City BR	3200
Kansas City BR to Kansas City	1000
Kansas City BR to St. Louis	4000
Oklahoma City BR to Oklahoma City	400
Dallas BR to Houston BR	1200
Houston BR to Houston	400
Houston BR to Dallas	1000
San Antonio BR to San Antonio	400
Phoenix BR to Phoenix	800
San Diego BR to San Diego	600
Los Angeles BR to Los Angeles	4000

*Branching Repeater

EXHIBIT NO. 1

Order Wire, Alarm and Control

Each trunking station shall be provided with alarm and control functions to permit remote site status monitoring, and remote control of some site functions from control stations within the system. Control alarm points, generally located at District Offices where 24 hour monitoring and supervision can be easily provided, will be distributed throughout the system as set forth in Attachment B.

Two types of order wire systems will be installed in the network. An express order wire system will be installed to provide direct communications between control alarm points. A local order wire system will be established to allow station-to-station conversation. Because the order wire systems will be co-located with multiplex terminals, order wire channels can be operated synchronously. A full channel sampling rate of approximately 20 kbs may be used to transmit order wire voice samples and thus provide a reasonable quality of digitized voice transmission. An order wire channel will occupy only one data channel, and the order wire systems will require one data channel for each station.

The alarm transmitting equipment at each station is provided with 32 alarm functions and 16 on-off control functions. One channel of the data transmission system (in each direction) is sub-multiplexed to provide this service. In the alarm subsystem, the encoder will convert parallel alarm sensor inputs into a serial pulse stream with each pulse corresponding to a monitored function. At the master stations, located at control points, the stream is converted to a parallel output by the decoder. These outputs operate the master station alarm and control display circuitry. The control subsystem operates in a similar fashion, but in the reverse direction of transmission.

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

SWITCHING

General

The proposed network represents the combination of digital transmission path(s) with two functionally different types of switching centers. The switching centers are District Offices, which provide the subscriber's connection, and Regional Offices which maintain network control. Both types of offices,use identical equipment to perform identical or similar functions. For functions performed in one office, or the other, a unique complement of equipment is provided.

In all switching centers, redundant equipment insures that the non-availability of any unit will not cause failure of the system. A block diagram representing the configuration of equipment for a District Office and a Regional Office is shown in Figures 1-5 and 1-6.

The salient functions to be performed by each office are as follows:

District Office

1. Provides subscriber terminations
2. Responds to all requests for service
3. Insures subscriber-to-subscriber compatibility via class code distinction
4. Determines and establishes intraoffice switch linkage
5. Coordinates with Regional Office trunk assignments for interoffice transmission
6. Maintains records of all services provided to each subscriber (for billing purposes)
7. Maintains necessary statistical information for future analysis
8. Provides maintenance status and suspect component identification

Regional Office

1. Maintains a complete network directory
2. Assigns all trunks within its area of jurisdiction
3. Determines and establishes intraoffice switch linkage
4. Establishes alternate path as required

EXHIBIT NO. 1

5. Collects network use information from each District Office at prescribed intervals
6. Maintains necessary statistical information for future analysis
7. Provides maintenance status and suspect component identification

Location of Switching Centers

The number and geographical locations of the District and Regional Offices are dependent upon the number of subscribers and their location. System expansion is based upon expected trends in growth of the data communications market. As a consequence, the applicant's network is targeted toward establishment of 35 District Offices strategically located across the United States so as best to serve the needs of the emerging data communications market (See SYSTEM DEVELOPMENT).

Each subscriber will utilize a Digital Communications Console (See Figure 1-7) to interface with the system. Entrance to the network may be either "local" or "remote".

Local subscribers are represented in the District Office switching equipment as a unique appearance. For example, Figure 1-8 depicts subscribers "A" and "B" connected to the District Office by means of a short range microwave path, and Figure 1-9 illustrates subscribers "C" and "D" connected to a District Office through existing analog facilities, using modems.

Remote subscribers are those whose geographic location is beyond the economic range of a District Office (approximately fifty miles). These subscribers will enter the network through a line concentrator (See Figure 1-10). The subscriber may also be located some distance from the line concentrator, in which case connection will be provided via digital microwave stations as shown by sites "C" and "D" or conventional analog facilities as shown for sites "A" and "G". A configuration considered especially beneficial where many subscribers are located in one complex involves the co-location of the subscriber site and the line concentrator (See Subscriber "E" in Figure 1-10).

Equipment

Each switching center is configured in a modular fashion consistent with present packaging techniques and sound economical considerations. The heart of the switching center is a state-of-the-art communications system presenting a new approach to the problem of processor-controlled communications. This system minimizes the need for processor intervention in communications processing, while providing for continuous monitoring of the operating efficiency of the system elements. To accomplish this, the following will be provided:

1. Hardware to monitor the operating efficiency of each of the elements in the system.
2. Highly communications-oriented Input/Output Section.
3. An instruction repertoire and memory capacity designed to facilitate the formating of large amounts of communications data.

The switching common control function in each switching center - Regional or District Office - is provided by a communications processor which controls all other modules and processes the supervisory and subscriber request for source commands. The main storage for the system is a Core Storage Module. The cycle time for core storage is 900 nanoseconds with the validity of data insured by a parity check performed automatically in the communications processors.

Switch Matrix

The unit providing the communications path for the transmission of data from one subscriber to another is the switch matrix which is controlled by the communications processor. The switch matrix uses existing components, repackaged to be more compatible with data transmission characteristics and is modular to facilitate growth. All paths through the switch matrix are full duplex permitting transmission of digital data in each of two directions simultaneously. The size of the communications processors, the number of associated peripherals and the sizes of the switch matrix at any office will be determined by the number of subscribers to be accommodated. System objectives of rapid response, circuit availability, and reliability are maintained.

Digital Communications Console

In the applicant's proposed transcontinental digital communications network, effort was expended to perfect a communications terminal unit offering a subscriber the best in a man-machine relationship. The result is the Digital Communication Console (DDC), which will be installed at each subscriber site and which will provide the subscriber with the means of communicating with the District Office through a key pack display console (See Figure 1-7).

Through the DCC an operator generates the appropriate digits for directing the District Office to establish a switched connection to another subscriber. The DCC may be operated automatically or manually. In either mode of operation, a system of indicators readily scanned by an operator will provide an immediate overview of the operational status.

To describe the ease of use of the Digital Communications Console and the activity generated in the switching centers in the establishment of an end-to-end communications connection, a generalized step-by-step description is contained in the CONNECTION PROCEDURE (See Attachment A of this Exhibit). The responsibility of initiating action to establish a connection from one subscriber to another will, of course, rest with an operator in the manual mode or a properly programmed computer in the automatic mode.

DISTRICT OFFICE

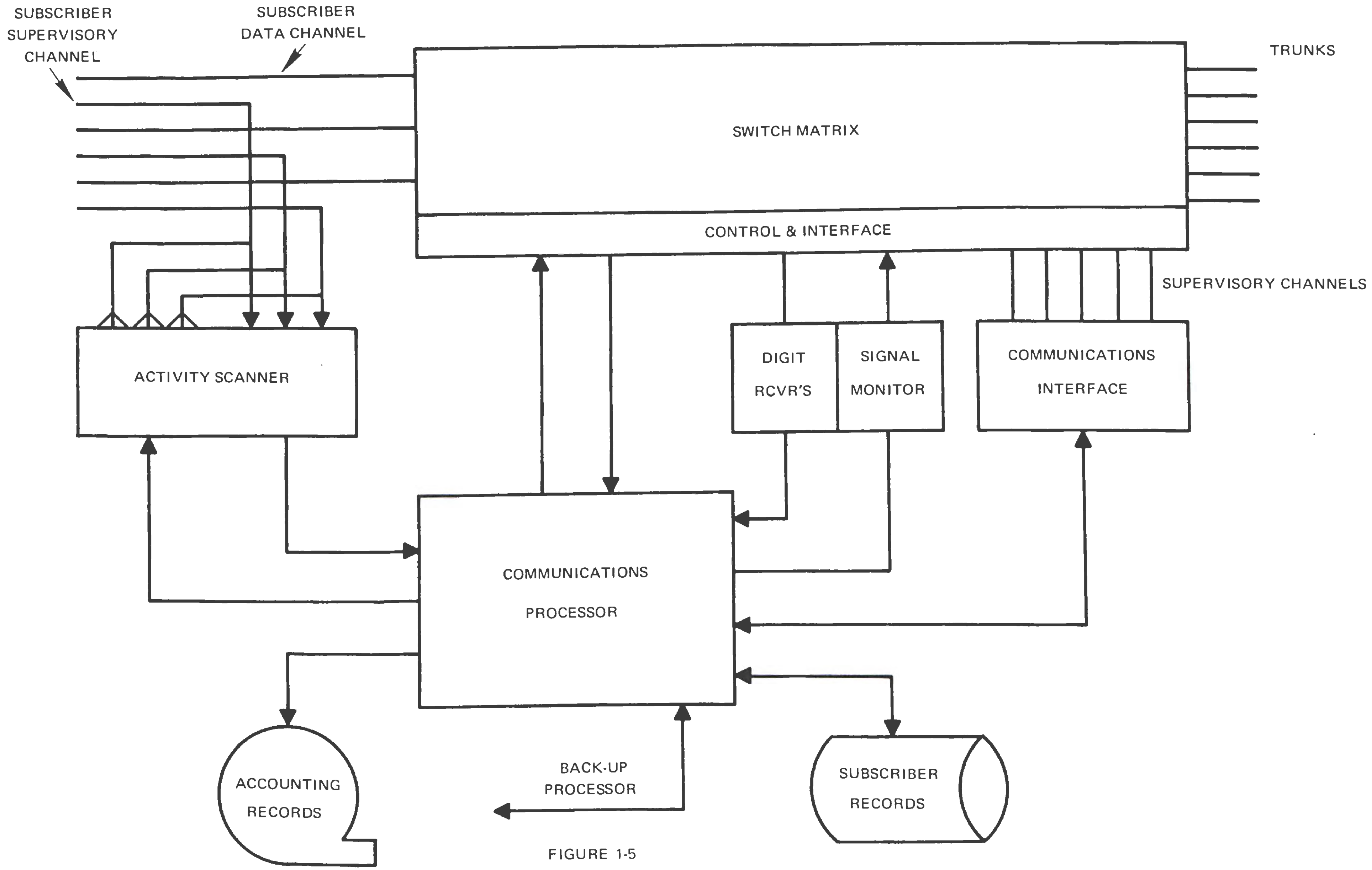


FIGURE 1-5

REGIONAL OFFICE

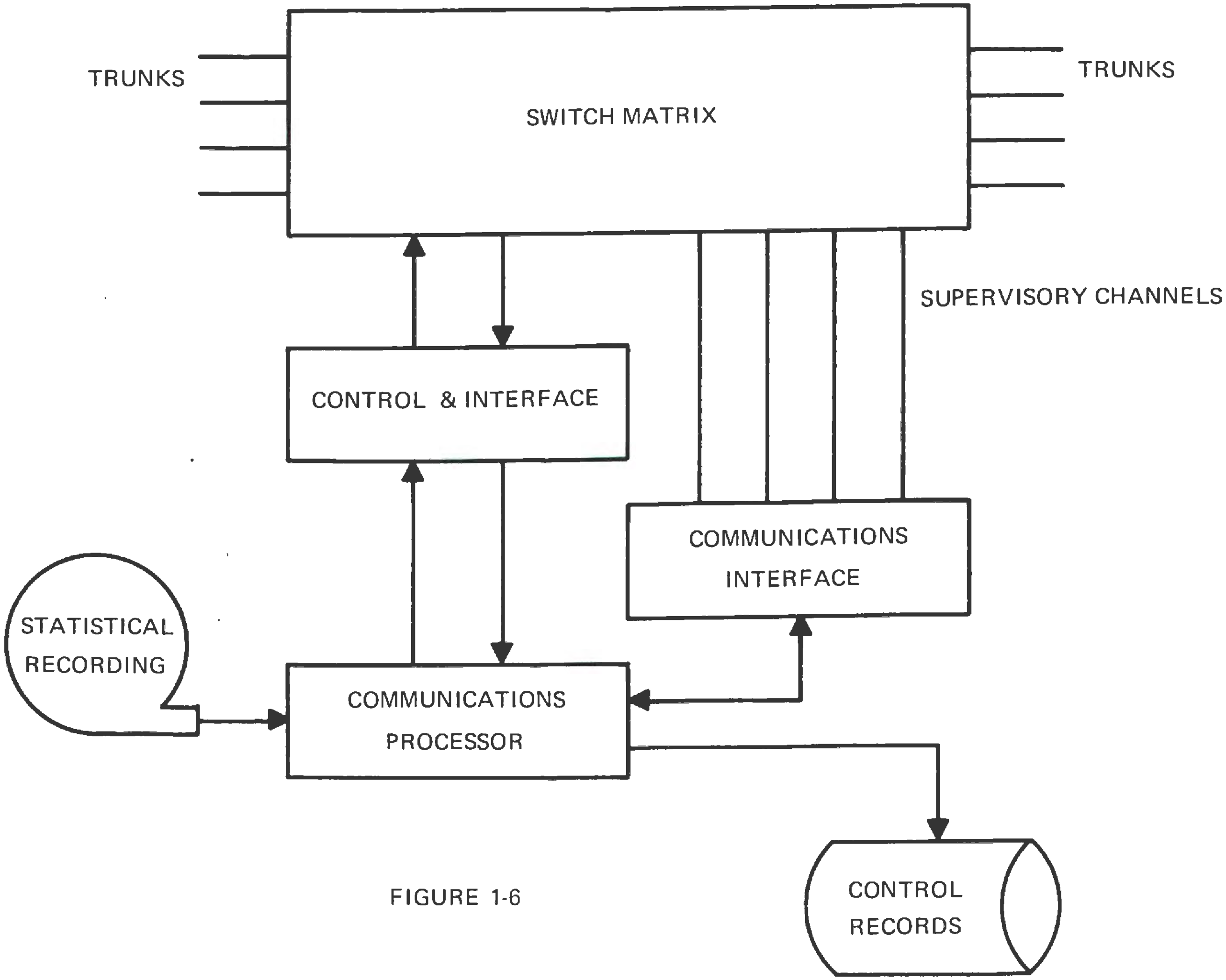


FIGURE 1-6

DIGITAL COMMUNICATIONS CONSOLE

(DCC)

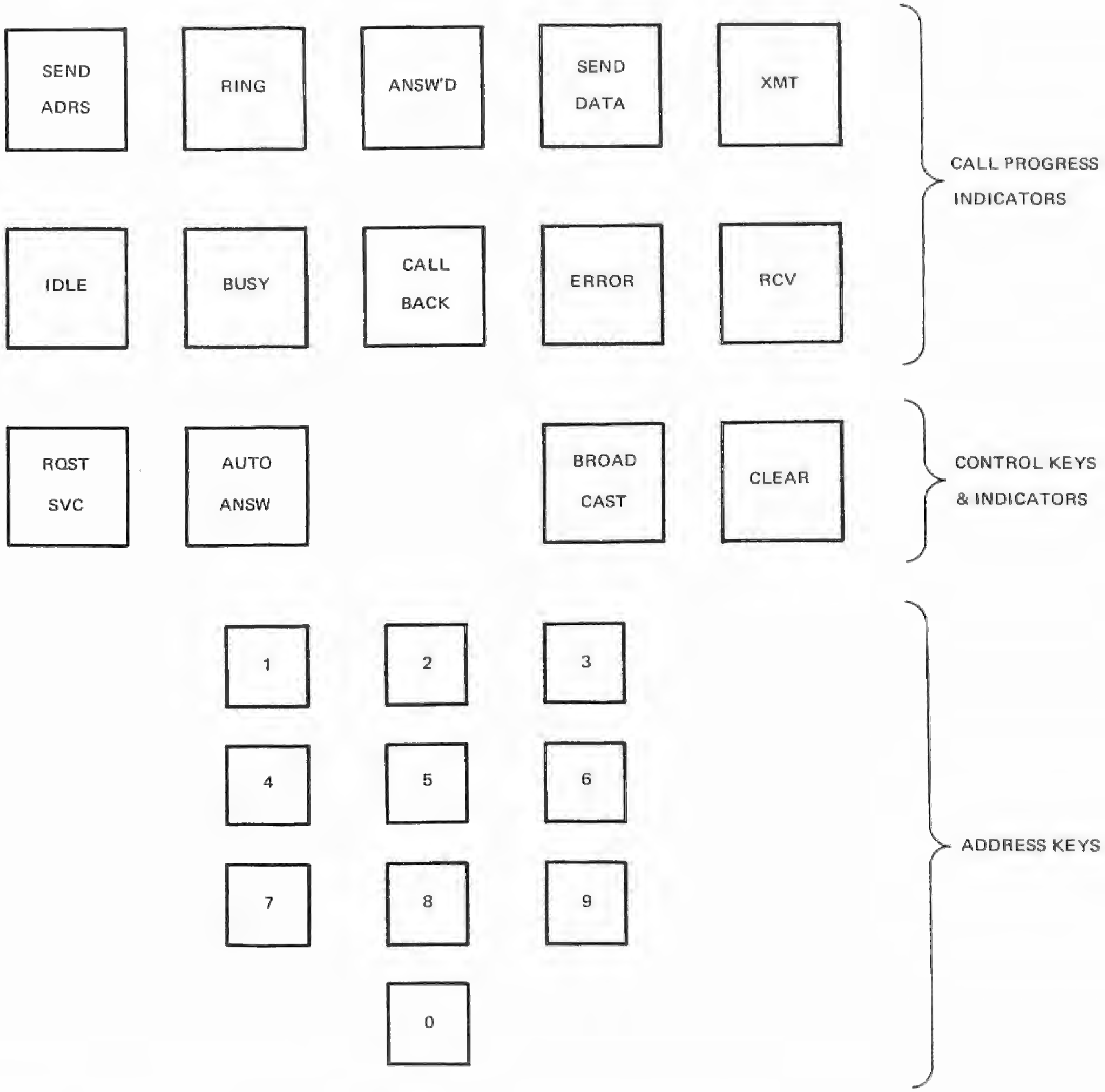
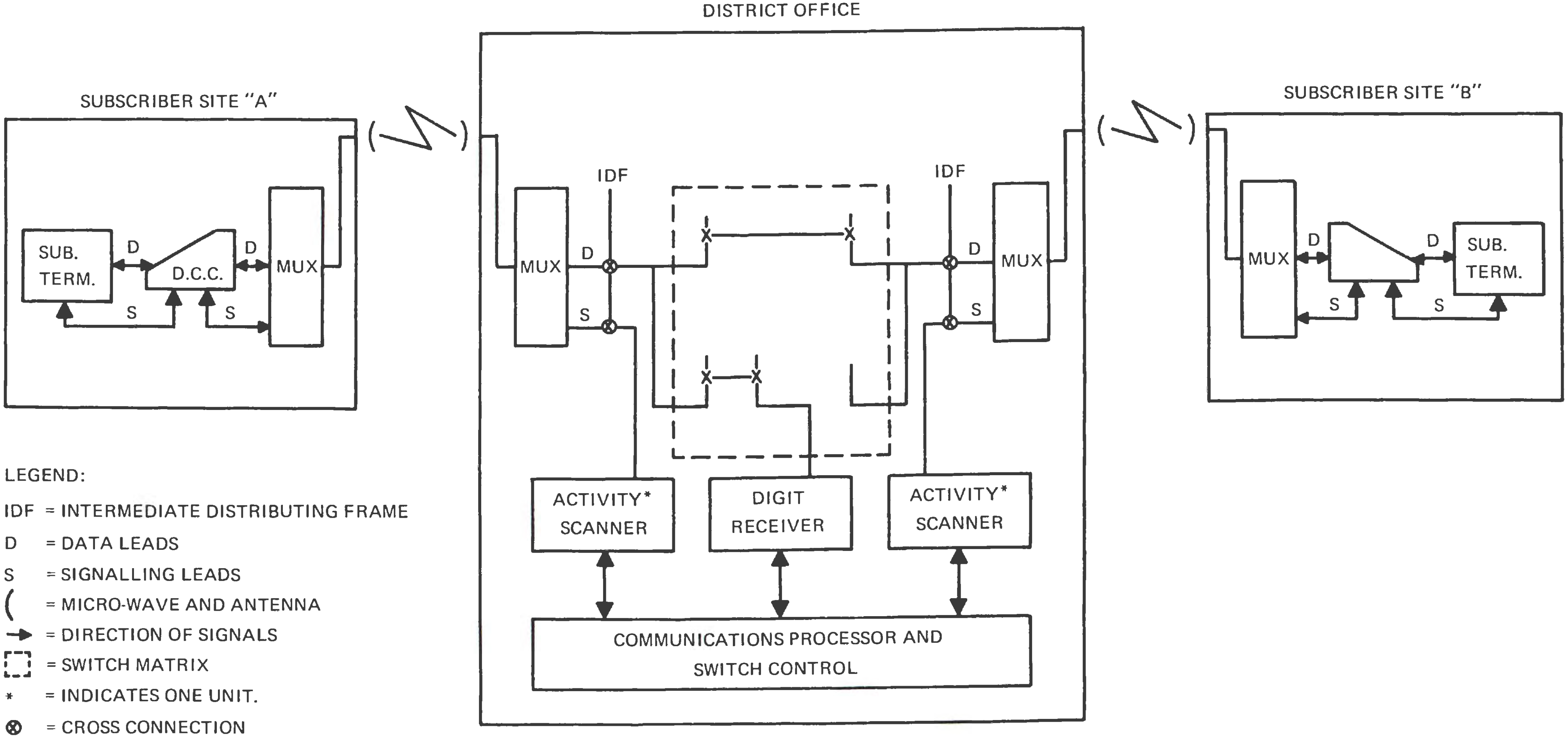


FIGURE 1-7

DIGITAL CONNECTION INTRA-OFFICE CALL



LEGEND:

IDF = INTERMEDIATE DISTRIBUTING FRAME

D = DATA LEADS

S = SIGNALLING LEADS

(= MICRO-WAVE AND ANTENNA

→ = DIRECTION OF SIGNALS

⬚ = SWITCH MATRIX

* = INDICATES ONE UNIT.

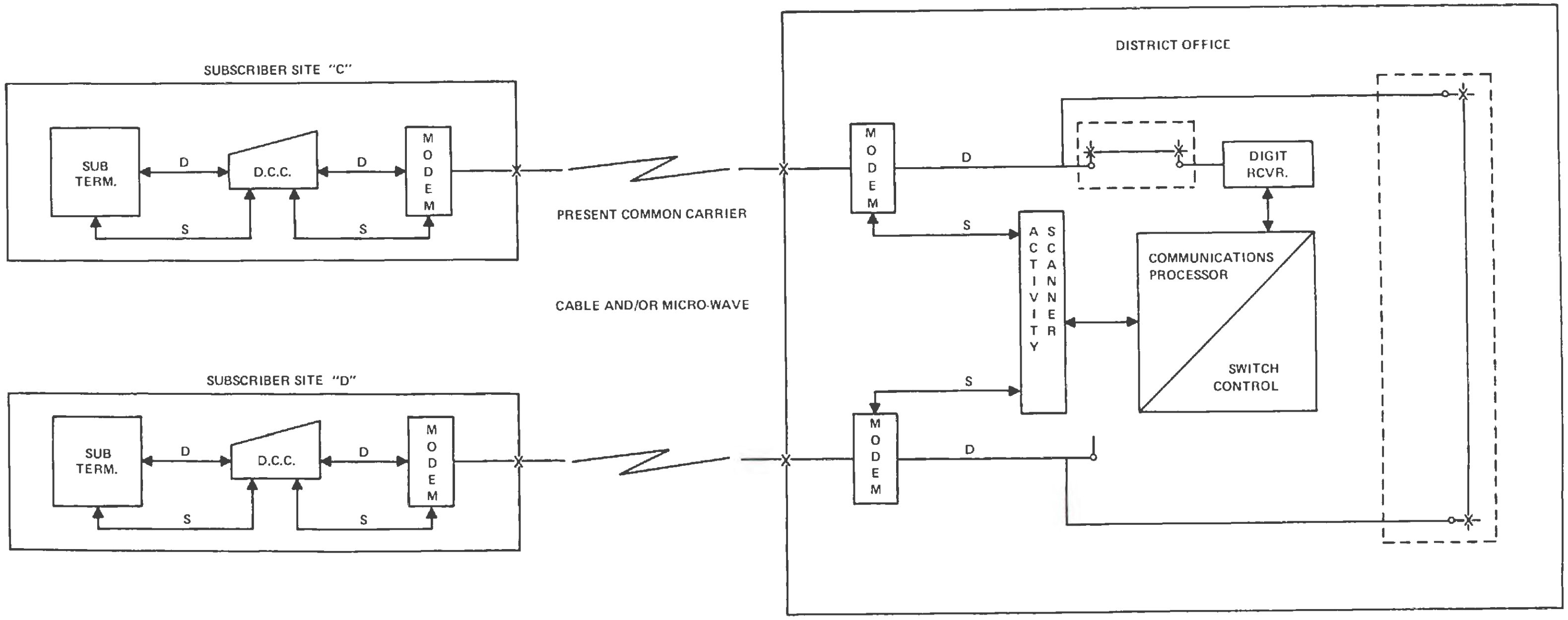
⊗ = CROSS CONNECTION

MUX = MULTIPLEXER

D.C.C. = DIGITAL COMMUNICATIONS CONSOLE

FIGURE 1-8

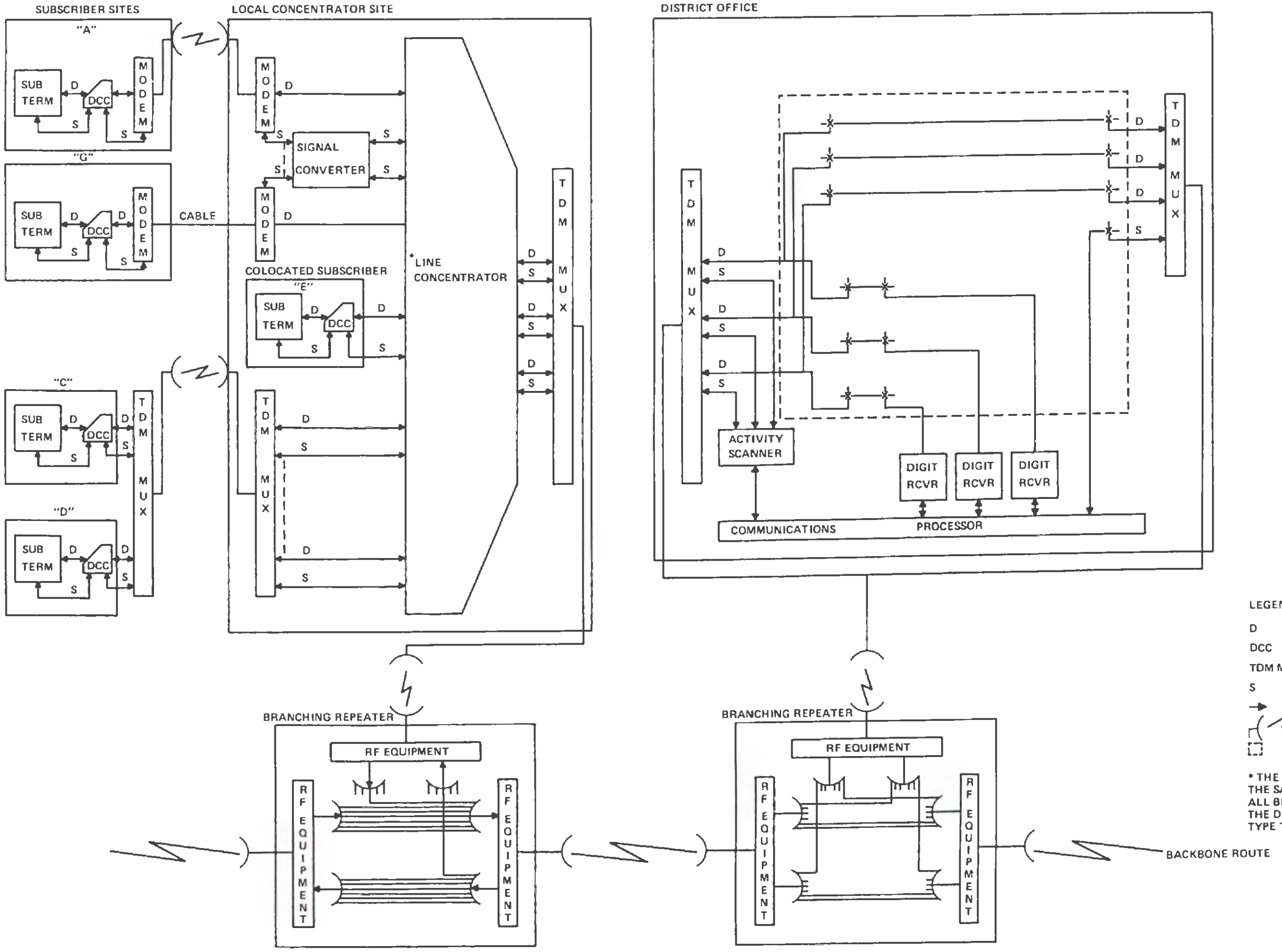
ANALOG LINE — D.C.C. & MODEM
INTRA-OFFICE CALL



D = DATA LEADS
D.C.C. = DIGITAL COMMUNICATIONS CONSOLE
S = SIGNALLING LEADS
→ = DIRECTION OF SIGNALS
X = POINT OF INTERCONNECTION
⬚ = SWITCH MATRIX

FIGURE 1-9

REMOTE LINE CONCENTRATION



LEGEND:

D = DATA LEADS

DCC = DIGITAL COMMUNICATION CONSOLE

TDM MUX = TIME DIVISION MULTIPLEXER

S = SIGNALLING LEADS

→ = DIRECTION OF SIGNAL

(∕ = MICROWAVE & ANTENNA

⬚ = SWITCH MATRIX

* THE SUBSCRIBERS CONNECTED TO THE SAME CONCENTRATORS WILL ALL BE OF THE SAME CLASS GROUP. THE D.O. CIRCUITS WILL BE OF THE TYPE TO SERVE THAT CLASS.

FIGURE 1-10

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

LOCAL DISTRIBUTION

General

The applicant's proposed network has been designed to provide high quality reliable communications service to public subscribers. The applicant recognizes that a highly refined, long distance transmission system must include a means of local connection to subscriber terminals. These local connection facilities must provide a communications circuit with quality consistent with that provided on the transmission system. Accordingly, applicant will file applications to construct the necessary local distribution facilities so that approval therefore may be secured and construction completed in proper phase with the construction of the trunking and switching elements of the system (See Figure 1-11).

Existing data transmission service often provides substantially reduced capability and reliability in total (or end-to-end) communications services because of the reduced transmission quality in local distribution circuits. The applicant proposes to offer a local distribution system compatible in performance with the other transmission elements of the network and consistent also with the communications services to be offered. The subscriber interface will conform to standards described in EIA RS-232C and RS-366; consequently no changes in subscriber equipment will be required.

For those subscribers who prefer to procure their own interface equipment the applicant will make available engineering information to insure system compatibility. This information will also be made available to terminal equipment manufacturers who may wish to incorporate the interface compatibility into their products.

For the subscriber utilizing the applicant's local distribution system, the continuity of the digital signal from the data terminal or computer communications terminal is maintained to its destination. No digital-to-analog conversion is required for local distribution, and the complexity of the communications interface to the network and attendant maintenance and reliability problems are reduced accordingly.

The applicant proposes to offer maximum system flexibility to subscribers, and if requested to furnish service to subscribers located outside of tariffed areas, the applicant is prepared to enter into contractual arrangements with other common carriers serving such areas.

To the subscriber who requests use of existing common carrier local distribution facilities, the applicant will make available modems and the Digital Communications Console to permit such interconnection. However, in these circumstances, the subscriber's data transfer rate will be limited by the class of service provided by the interconnecting common carrier.

Configuration of Local Distribution Facilities

The applicant proposes to construct specially configured, low powered microwave equipment and operate it in the 11 GHz common carrier band. This band is generally free of frequency congestion. In order to optimize the utilization of frequencies, the local distribution system is designed to provide maximum subscriber density on each link.

In a typical city, subscribers may be distributed in cluster arrangements, composed of several concentration points of relatively high density. Such points may be industrial parks, large office buildings, areas of concentrated business bordering circumferential highways, shopping centers and office building complexes. An additional number of data concentration points of lesser density may be designated in other appropriate locations until economic considerations preclude the use of microwave radio equipment for local distribution. The microwave terminals will be used only to provide a digital connection to the District Office. In the vicinity of the terminal, multi-pair cable will be installed radially from the microwave terminal to other subscriber locations.

A multi-tier or ring configuration of microwave terminal locations totaling approximately 50 microwave stations will be used to service the data concentration points basic area covered by a District Office. Maximum radio link lengths are five miles, and signals from distant stations are repeated from the outer tier or ring to the inner ring. To insure availability of frequencies, no microwave station will receive more than four frequencies (See Figure 1-12).

The applicant has selected a large city, which will be served by its proposed system, and applied the principles and concept outlined above to actual locations within the city. The actual locations of potential customer terminals, such as high-rise office buildings, banks, computer centers, industrial complexes, government office buildings, schools and hospitals were identified and analyzed to develop cluster areas which could be served with the type of microwave terminal designated for the local distribution system (See Figures 1-13 and 1-14). Figure 1-13 depicts the overall concept of the proposed system within the representative city. Figure 1-14 shows in detail the connections to the District Office for the area outlined by dashed lines on Figure 1-13. This represents the area of heavy subscriber concentration, and the microwave radio or cable connections to the District Offices.

The applicant has secured quotations from manufacturers for a complete microwave system including solid state, high MTBF, microwave equipment housed in a weatherproof cabinet which could be roof-mounted along with associated channel equipment.

A basic terminal package was developed which will have the capability of dropping and inserting 4800 bps channels as well as the capability of repeating channels from more distant terminals.

The basic microwave terminal package includes a provision for routing a number of channels within the building accommodating the terminal; additionally the terminal will be engineered to extend its coverage via multi-pair shielded cable to adjacent buildings. This cable would extend up to 2,000 feet in various directions from the terminal. Initial installation would include extra pairs to provide for future expansion.

Because of the necessity to repeat the more distant terminal channels at points of channel concentration, radio equipment capable of handling higher density traffic will be employed, together with sufficient slave channel equipment modules to accommodate the additional requirements.

House or building distribution cable will be installed in signal ducts or raceways as dictated by building design. Adequate cost allowance has been made for hardware material necessitated by variance in building design. Drivers will be installed at the multiplex equipment and at the subscriber interface to maintain the required signal level on the cable.

The cabinet in which the microwave equipment will be roof-mounted is designed to protect the equipment against weather and extremes of temperature. This cabinet will be approximately 8 cubic feet in size and a standard installation will include a roof-mount for a 4 foot parabolic reflector to be used for the radio path. It may be necessary in some cases to utilize a short pedestal to mount the antenna in order to provide clearance over penthouse construction, parapets, or similar obstruction. Installation will consist of securing the cabinet to the building structure, providing AC power mains, grounds, and connection of signal cable.

The size of the microwave equipment is such that it will not be displeasing aesthetically.

Connection of a subscriber to the microwave terminal within the building on which the microwave terminal is located will be accomplished by connecting the subscriber from a branch-terminal located within the building to the subscriber location and wiring into a Digital Communications Console. The installation at the end of the outside distribution cable will be handled similarly, the connection being made from the outside cable entrance terminal in the basement rather than from the multiplex on top of the building.

In summary, the local distribution system will consist of 16 basic microwave terminals, each with a one hundred channel drop and insert capability, and two basic terminals with a two hundred channel drop and insert capability. Additionally, the system has 4 high density terminals each with a four hundred to one thousand channel drop and insert capability. As explained above, terminals closer to the District Office are used to repeat more distant stations (See Figure 1-15).

The local distribution system shown in Figure 1-15 has the capability of terminating approximately seventeen hundred 4,800 bps subscriber terminals, without the use of line concentrators. For further expansion, a capability is planned that will allow the use of line concentration (See Figure 1-10). Subscribers having low speed transmission requirements will be accommodated by the use of sub-multiple TDM multiplexers. Subscribers with requirements higher than 4800 bps will be accommodated by strapping input ports of the multiplexers as also described elsewhere in this Exhibit.

It is important to note that any of the basic microwave terminals for this local distribution system can easily be reconfigured for higher growth requirements by the addition of radio equipment capable of handling higher density channel loading, and by the addition of slave multiple or channel equipment modules. As the geographic area serviced by these terminals grows, additional radio equipment can be installed to repeat channels back to the District Office.

The system discussed provides high flexibility to meet the differing geographical and environment conditions imposed by each terminal location. For example, if it is desired to locate a terminal in a building where it is impractical to lay outside access cable, a short range microwave link may be established to this terminal location in lieu of the cable (See Figure 1-16).

Lower density channel equipment (100 channels) will be used until the requirements for this terminal dictate higher capacity capability. As a basic microwave radio is the same, the future expansion is obtained merely by substitution of a channel equipment module of greater channel configuration.

In most cases it will be possible to achieve line of sight range between two terminal points. Where possible, the antenna will be located on the building in a manner to provide shielding to minimize mutual interference with other stations. The low power levels used in the transmitters largely relieve this problem. In those instances where a building or other structure interferes with line of sight, passive repeaters will be utilized. Where active repeaters are required, the basic microwave without drop and insert capability can be used in an extremely low cost installation to repeat the channels.

FIGURE I-11

BASIC LOCAL DISTRIBUTION PLAN

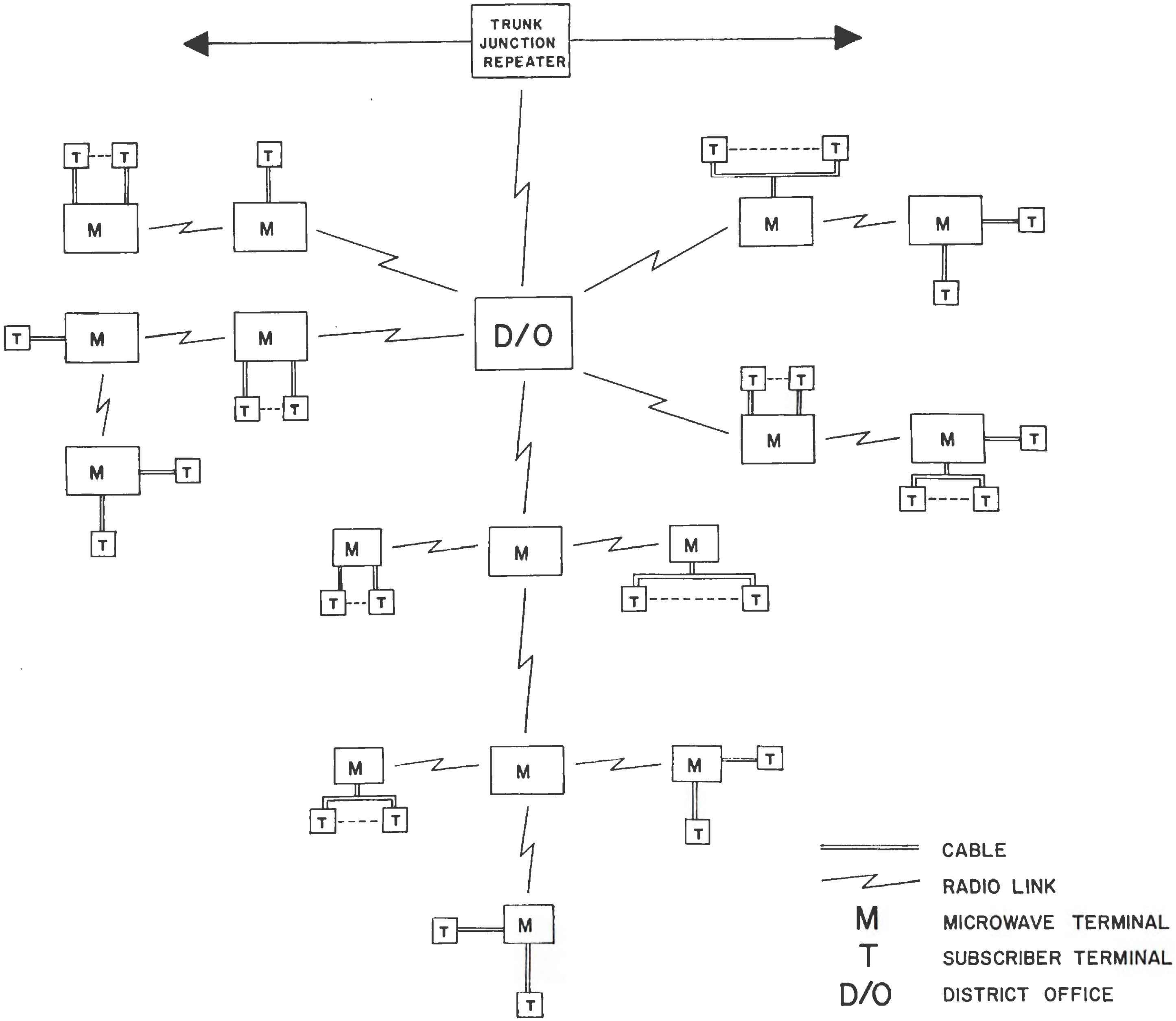


FIGURE 1-12

DATATOWN, USA

CUSTOMER LOCATIONS

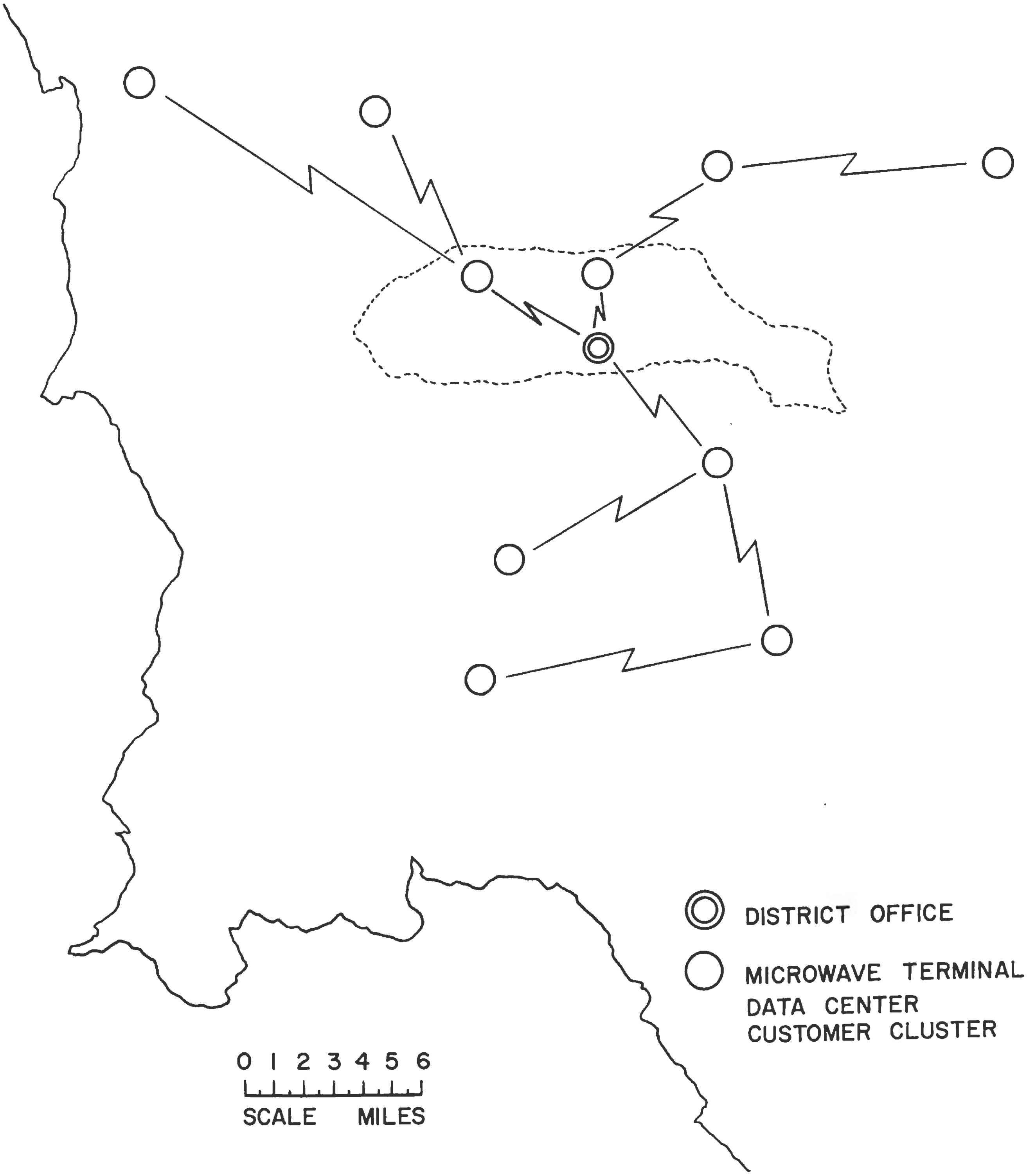


FIGURE 1-13

DATATOWN, USA

CUSTOMER LOCATIONS
URBAN AREA

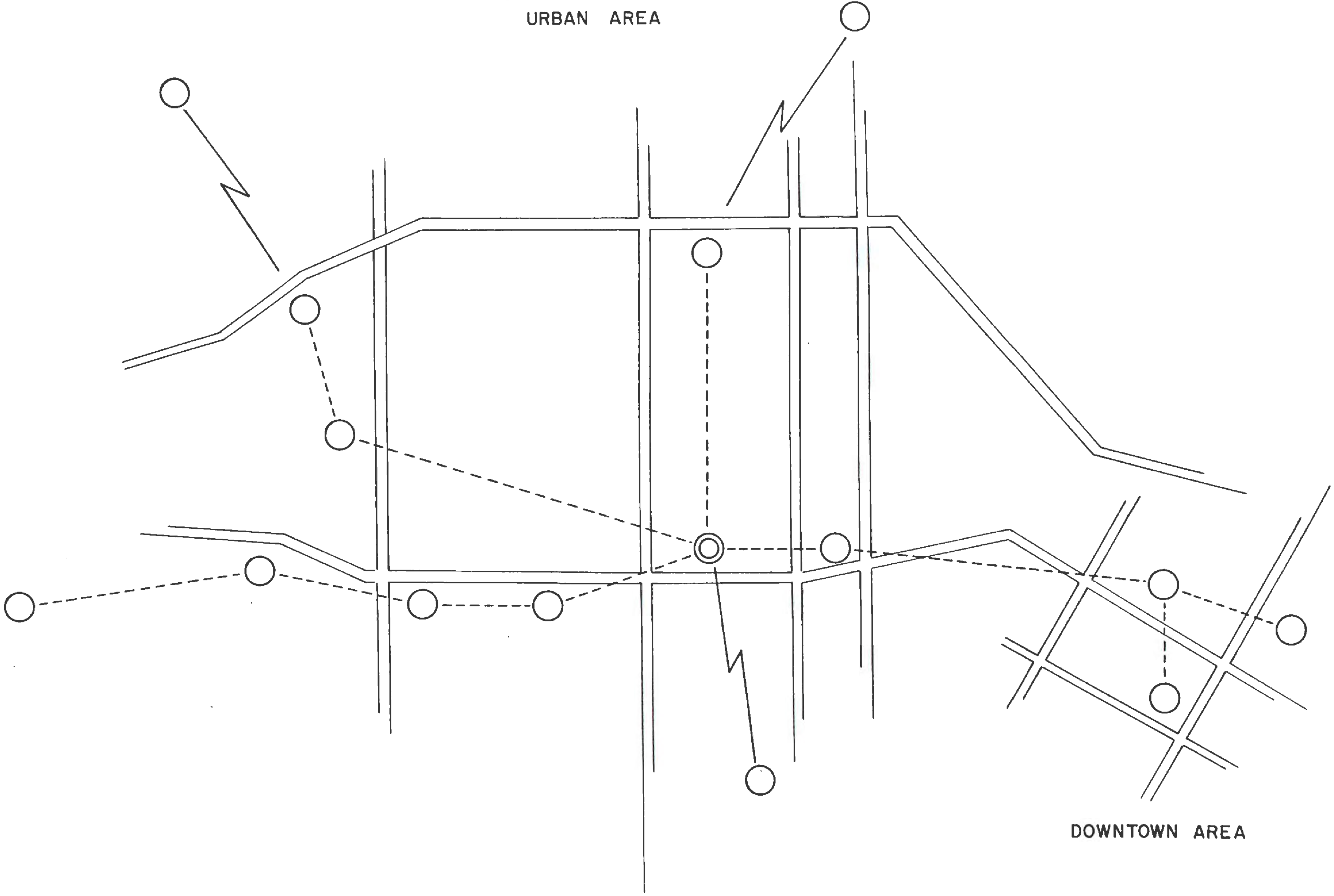


FIGURE 1-14

DATATOWN, USA

BASIC PLAN

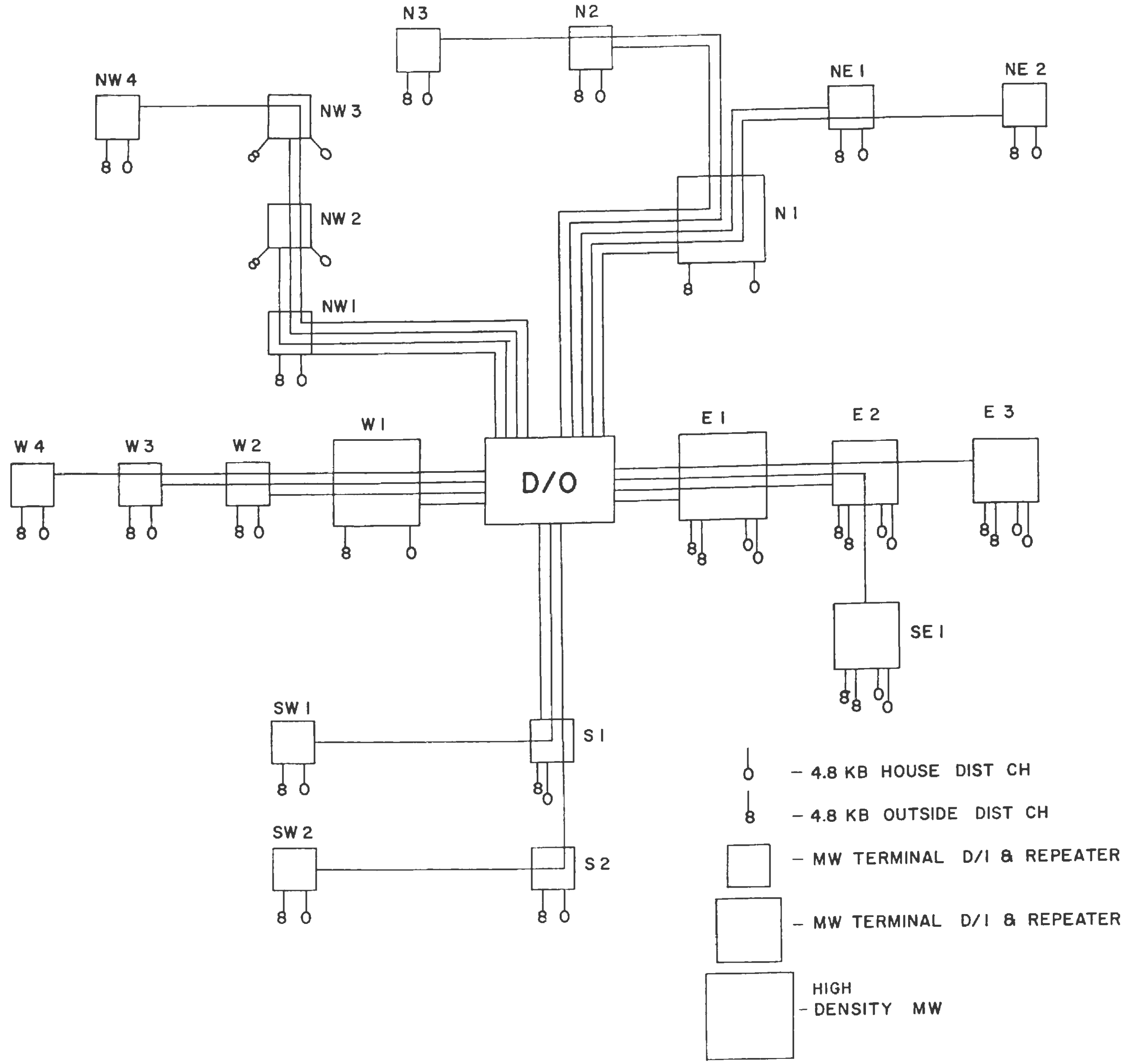


FIGURE 1-15

DATATOWN, USA

LOCAL DISTRIBUTION
ALT. PLAN

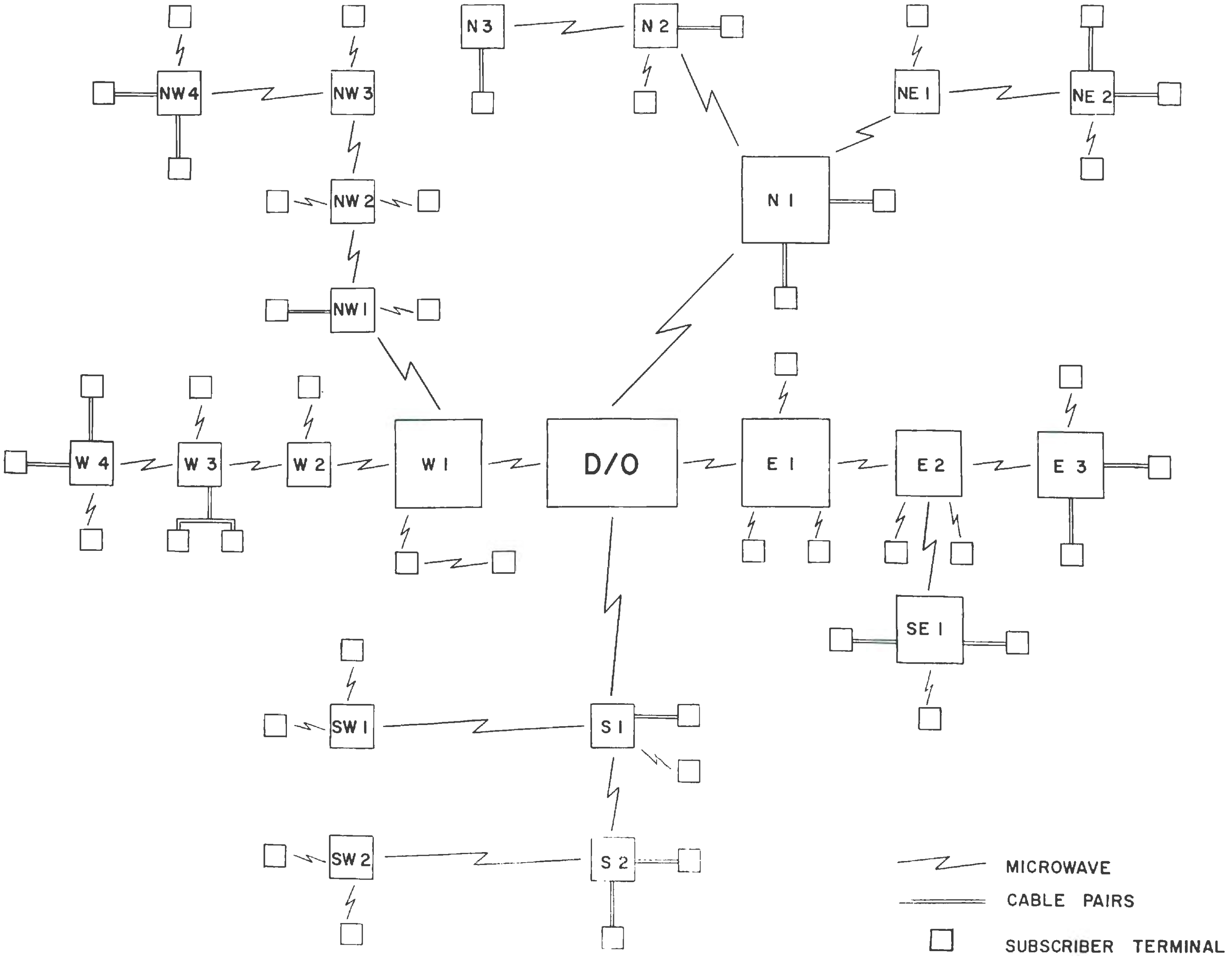


FIGURE I-16

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

COMPLEMENTARY TRANSMISSION CAPABILITIES

The applicant's system is designed to provide interconnection capability with either TDM or analog modes of transmission. The applicant's policy will be to affirmatively seek interconnection with other carriers and other authorized communications entities in order to allow immediate service to all locations, and to augment the capability of the system to meet particular market service demands.

Other TDM carriers can be interconnected directly with the applicant's transmission system at a branching repeater or District Office. Moreover, any repeater on the system can be converted to a branching repeater by installing additional equipment.

Interconnection is not restricted to like-mode carriers. Other microwave carrier or cable systems can interconnect with the applicant's network regardless of transmission characteristics of carrier system. However, appropriate interfacing equipment will be required, and the characteristics of the service to the customer on an end-to-end basis will be limited by the lowest quality characteristics as between the two systems.

Satellite interconnection with the system is expected to be feasible although its implementation may depend on development of suitable terminal hardware to accommodate problems peculiar to the increased transmission distance of satellite transmission.

In addition to interconnection, it will be possible to integrate capabilities other than microwave into the system transmission. Cable applications will become more relevant in areas of high frequency congestion. Additionally, depending on the development and implementation of satellite communication capability, satellite TDM trunking may be possible on an integrated basis not only to provide alternative microwave in congested areas, but also to provide thin-route trunking capability.

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

SYSTEM IMPACT ON FREQUENCY SPECTRUM

Conservation

The applicant recognizes that the electromagnetic radio frequency spectrum is a national resource, the supply of which is not unlimited. Given static supply and an ever increasing utilization requirement due to the increasing national communications needs, economic employment of frequency spectrum in microwave frequency paths is required. The applicant's proposed system is designed to meet the objectives of economical utilization of frequencies.

Frequency Studies

The applicant has developed a frequency plan which, in general, follows the approach used by major common carrier microwave transmission bands. The applicant intends to adhere to this approach in the interest of optimizing overall frequency compatibility.

Satellite Earth Station Interference Analysis

Sites for the proposed system that fall within the required coordination distance from satellite communication ground stations at Jamesburg, California, Rowlesburg, West Virginia and Rosman, North Carolina have been analyzed for interference from the above earth stations in accordance with the Commission's Rules.

EXHIBIT NO. 1

SYSTEM DESCRIPTION & OPERATION

OPERATOR ASSISTANCE

The operator assist function will provide each subscriber with a method of obtaining assistance and/or reporting outages.

All inquiries from a subscriber will be made over the existing voice network by dialing unique numbers according to geographic location. The office established to perform operator assistance will be equipped and staffed according to expected network usage.

In addition to normal telephone equipment in quantities as required, a keyboard display unit connected to the proposed network will be provided the operators. As a special purpose subscriber this keyboard display will be used for items such as:

1. Directory Assistance
2. Transfer of trouble reports to the appropriate DO
3. Class of service verification
4. Return to Service Notification
5. Recording Source and type of calls by location

ATTACHMENT A
to EXHIBIT NO.1

CONNECTION PROCEDURE

General Description

(Intra-Office)

STEP NO.	ACTION DESCRIPTION
1.	The operator after conditioning the communications terminal, depresses the "Request Service" key on the DCC. (See Figure 1-A1)
2.	For subscribers in outlying areas connected to a line concentrator, a connection to an available channel is automatically made and the "Request Service" function forwarded to the District Office (DO).
3.	The "Activity Scanner" in the DO detects the "Request Service" function and notifies the communications processor (See Figure 1-A2)
4.	The communications processor assigns a digit receiver, buffers, and other system components used for originating a call.
5.	Paths through the switch matrix from the subscriber channel to the assigned local equipment are determined by the communications processor and, transferred to the switch control unit where the path is established and tested. After receipt of a test completed satisfactory function, the processor initiates a function to the subscriber's DCC which causes the "Send Address" indicator to light.
6.	The subscriber keys a seven digit destination address by depressing the digit keys on the D.C.C.
7.	The digit receiver receives and passes the destination address to the processor. The destination address is given to the

ATTACHMENT A
to EXHIBIT NO. 1

STEP NO.	ACTION DESCRIPTION
	processor in two segments; the first three digits when received and the last four digits when they have been received.
8.	The processor uses the first three digits to determine the proper destination DO. In this case, for example, the destination DO is itself. The last four digits are used by the terminating D.O. to identify the subscriber being called.
9.	The processor determines to which subscriber the call is to be directed.
10.	The processor assigns all equipment components to be used in completing the call.
11.	A path through the switch matrix is determined by the processor and transferred to the switch control unit. The switch control unit causes the path through the matrix to be established and tested.
12.	When the processor receives the function indicating a satisfactory completion of the path test, a function is sent to the subscriber's D.C.C.'s causing the originating subscriber's "Ring" lamp to light and the destination subscriber's "Ring" lamp to light and an audible alarm to sound.
13.	If the destination subscriber is connected to a line concentrator, the DO sends the last two digits of the subscriber's directory number to the concentrator. The concentrator connects the called subscriber to this circuit. The concentrator returns a connect function to the DO when this has been done. The DO then sends the ring function to the subscribers.
14.	The processor now causes the digit receiver to be disconnected from the originating subscriber's circuit.

STEP NO.	ACTION DESCRIPTION
15.	When the destination subscriber hears the audible signal he depresses the "Request Service" key to answer the call.
16.	This action causes a function to be sent to the originating subscriber's DCC and causes the "Answered" lamp to light.
17.	The answered function is also sent to the DO where the processor causes entries to be made on a storage medium. These entries are used as a starting point for billing information.
18.	When the subscriber terminals are ready to send and receive data the DCC's exchange a function which causes the "Send Data" lamp to light.
19.	The form and control of the data transmitted and received by the subscribers is controlled by the subscriber.
20.	To disconnect, either subscriber depresses the "Clear" key on his DCC. This causes a function to be sent to the DO indicating disconnect.
21.	The "Activity Scanner" in the DO detects the disconnect function and informs the processor.
22.	When the processor detects the disconnect function it makes appropriate entries onto a storage medium. These entries will represent the end of the billing period for this call.
23.	The processor then causes all connections and equipment assigned to this call to be disconnected.
24.	When the disconnect is completed, the processor sends a function to both subscribers which causes the "Idle" lamp to light on the DCC's.
25.	The subscribers may now initiate a new call.

ATTACHMENT A
to EXHIBIT NO. 1

CONNECTION PROCEDURE

General Description

(Inter-Office, Los Angeles to New York)

STEP NO.	ACTION DESCRIPTION
1.	The operator, after conditioning the communications terminal, depresses the "Request Service" key on the DCC (See Figure 1-A1).
2.	For subscribers in outlying areas connected to a line concentrator a connection to an available channel is automatically made and the "Request Service" function is forwarded to the District Office (DO).
3.	The "Activity Scanner" in the DO detects the "Request Service" function and informs the communications processor (See Figure 1-A3).
4.	The communications processor assigns a "Digit Receiver", buffers, and other system components used for call origination.
5.	A path through the switch matrix from the subscriber circuit to the assigned local equipment is calculated by the communications processor and transferred to the switch control unit where the path is established.
6.	Upon receipt of a satisfactory path test function the processor initiates a function to the subscriber's DCC which causes the "Send Address" indicator to light.
7.	The subscriber keys a seven digit destination address by depressing the digit keys on the DCC.
8.	The first three digits, when received by the digit receiver, are passed to the processor.

STEP NO.	ACTION DESCRIPTION
9.	From an examination of the first three digits the processor determines the proper destination DO. For example, the destination DO may be New York. This translation in the processor also results in identifying the Regional Office (RO) on which the destination DO homes.
10.	The processor constructs a supervisory message, "Trunk Assignment Request", which is transmitted to the RO processor over an assigned supervisory channel to the RO through the Mt. Lukens branching repeater, through the main trunk system and the Palmerton branching repeater (See Figure 1-A3.).
11.	When the RO receives the trunk assignment request from the originating DO; the processor determines the proper routing for the call and selects the trunks to be used.
12.	After the assignment has been made the RO constructs a supervisory message containing the trunk assignment which is transmitted to the DO processor at Los Angeles over a supervisory channel.
13.	After sending the trunk assignments the RO processor calculates a path through the matrix between the two trunks and transfers the path assignment to the switch control unit. The switch control unit causes the path through the matrix to be set up and tested.
14.	When the DO processor has received the trunk assignment and the last four digits of the address, a supervisory message, containing the subscriber address is transmitted to the RO over a supervisory channel.
15.	After receiving the trunk assignment the DO processor determines a path through the matrix from the originating sub-

STEP NO.	ACTION DESCRIPTION
	scriber to the assigned trunk, and transfers the path assignment to the switch control unit. The switch control unit causes the path through the matrix to be established and tested.
16.	The RO processor, upon receipt of the subscriber address, constructs a supervisory message containing the trunk assignment and the destination subscriber's address. This supervisory message is transmitted to the DO at New York.
17.	The processor at New York determines the status of the destination subscriber after translating the address included in the supervisory message. The processor also checks to insure compatibility between the the originating and destination subscribers.
18.	When the processor at the New York DO determines that the destination subscriber is available and the two subscribers are compatible it seizes the destination subscriber line.
18A.	If the destination subscriber is terminated on a line concentrator the processor selects an idle circuit to the concentrator and sends a seize function to the concentrator.
18B.	The processor connects a digit receiver to the selected circuit.
18C.	When the line concentrator detects the seize function from the DO it connects a "Digit Receiver" to the circuit and sends back a "Send" function to the DO digit receiver.
18D.	The DO digit sends an identity code representing the destination subscriber, upon receipt of the "Send" function.
18E.	The concentrator uses the identity code to determine to which subscriber to connect the District Office circuit.

STEP NO.	ACTION DESCRIPTION
18F.	When the concentrator has received the identity code it connects the circuit to the subscribers line, sends a "Connected" function to the DO and disconnects the digit receiver from the circuit.
18G.	The DO seize function is forwarded through the concentrator to the subscriber's DCC.
18H	When the DO processor receives the "Connected" function it causes the digit receiver to be disconnected from the line.
19.	The processor now determines a path through the matrix between the assigned trunk and the destination subscriber and transfers the path assignment to the switch control unit. The switch control unit causes the path to be set up and tested.
20.	After the originating DO at Los Angeles has set up and tested a path through its matrix the digit receiver begins transmitting a "Test" character toward the destination.
21.	When the destination subscriber's DCC receives the "Test" character is is transmitted back toward the originator along with a "Verification" function.
22.	The originating DO digit receiver will receive the "Test" character verifying the connection. The "Verification" function is used to insure that the connected subscriber is the proper one.
23.	After a good "Test" and "Verification", the digit receiver transmits a "Ring" function to both subscribers. The digit receiver informs the processor when ring is sent.
24.	The originating DO processor causes the digit receiver to be disconnected from the originating subscriber.

STEP NO.	ACTION DESCRIPTION
25.	When the originating subscriber's DCC detects the "Ring" function, it causes the "Ring" lamp to light.
26.	When the destination subscriber's DCC detects the "Ring" function, it causes the "Ring" lamp to light and an audible alarm to sound.
27.	When the destination subscriber hears the audible, he depresses the "Request Service" key to answer the call and stop ringing.
28.	This action causes a function to be sent to the originating subscriber's DCC where the "Answered" lamp is lit.
29.	This function is also sent to the DO at New York, where the processor constructs a supervisory message containing the "Answered" function and transmits the message on the supervisory channel to the RO.
30.	The supervisory message is relayed by the RO back to the originating DO at Los Angeles, where the processor causes entries to be made on a storage medium. These entries will be used to indicate the start of the billing period.
31.	When the terminals are ready to send and receive data the DCC's exchange a function which causes the "Send Data" lamp to light.
32.	The form and control of the data transmitted and received by the subscribers is controlled by the subscriber.
33.	To disconnect, either subscriber depresses the "Clear" key on his DCC. This will cause a function to be sent to his respective DO indicating disconnect.

STEP NO.	ACTION DESCRIPTION
34.	The "Activity Scanners" in the DO's detect the disconnect function and inform the processors.
35.	In the destination DO, the processor constructs and transmits a supervisory message to the RO. The processor also instructs the switch control to disconnect the path through the matrix.
36.	In the originating DO the processor constructs and transmits a supervisory message to the RO. The processor also causes all connections made during the call to be disconnected and makes appropriate entries onto a storage medium indicating the end of billing on this call.
37.	When the RO receives either disconnect supervisory messages it causes the disconnect of the path through its matrix making the trunks used on this call available to other traffic.
38.	When the disconnect is complete in each DO the processor causes a function to be sent to their respective subscribers which causes the "Idle" lamp to light on their DCC's.
39.	The subscribers may now initiate a new call.

DIGITAL COMMUNICATIONS CONSOLE

(DCC)

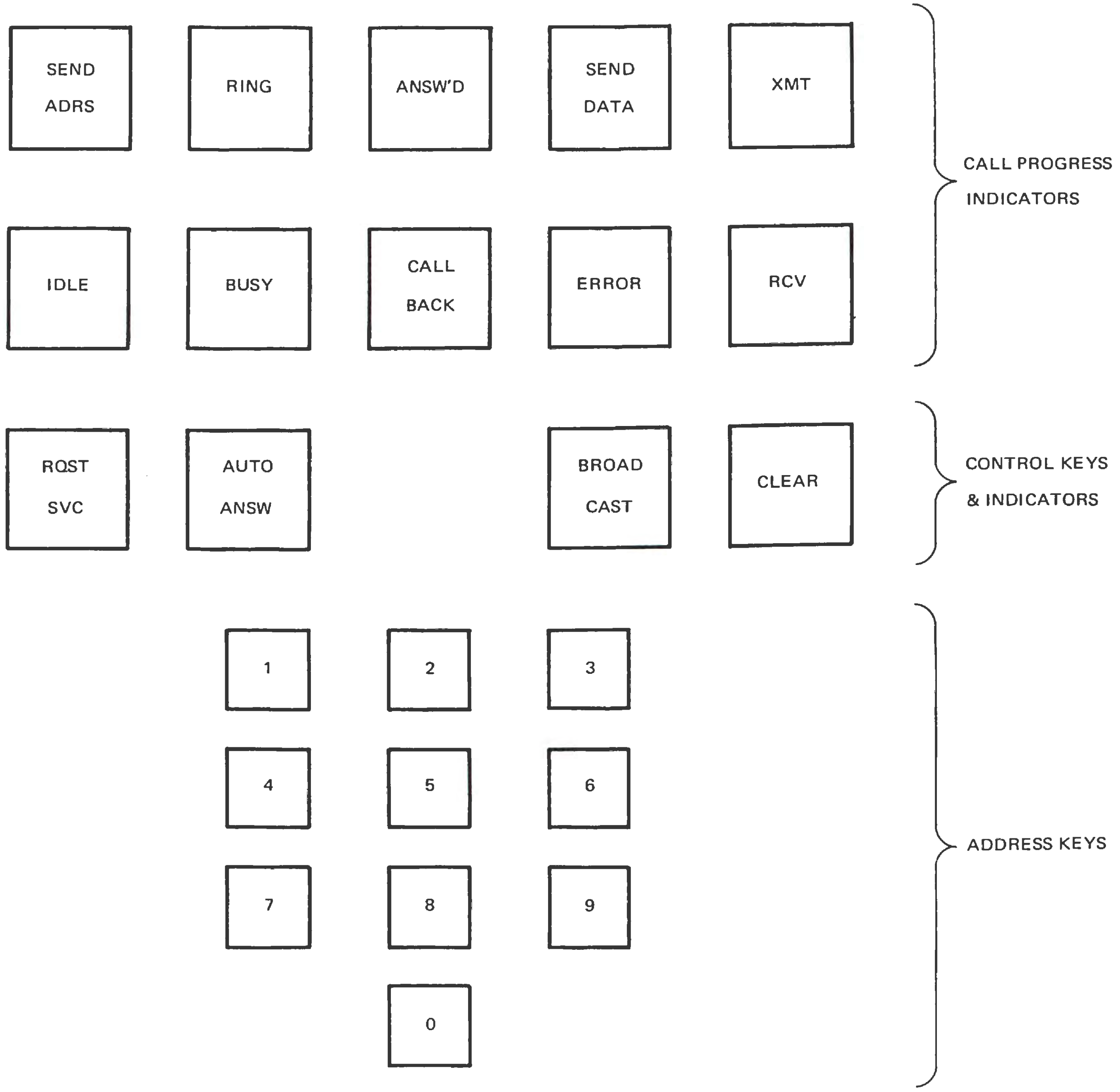
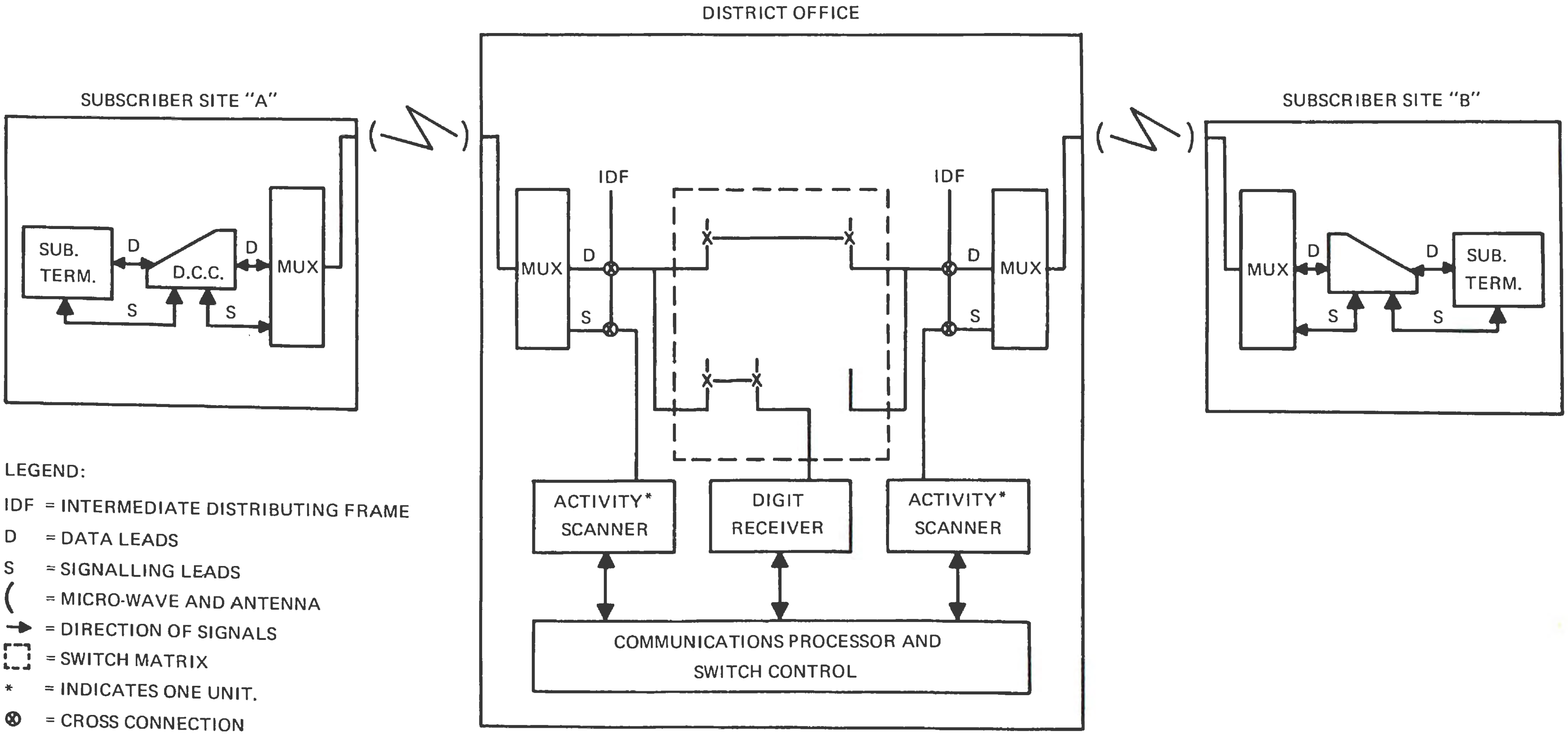


FIGURE 1-A1

DIGITAL CONNECTION INTRA-OFFICE CALL



LEGEND:

IDF = INTERMEDIATE DISTRIBUTING FRAME

D = DATA LEADS

S = SIGNALLING LEADS

(= MICRO-WAVE AND ANTENNA

→ = DIRECTION OF SIGNALS

⬚ = SWITCH MATRIX

* = INDICATES ONE UNIT.

⊗ = CROSS CONNECTION

MUX = MULTIPLEXER

D.C.C. = DIGITAL COMMUNICATIONS CONSOLE

FIGURE 1-A2

TRANSCONTINENTAL DIGITAL CONNECTION
INTER-OFFICE CALL
LOS ANGELES TO NEW YORK

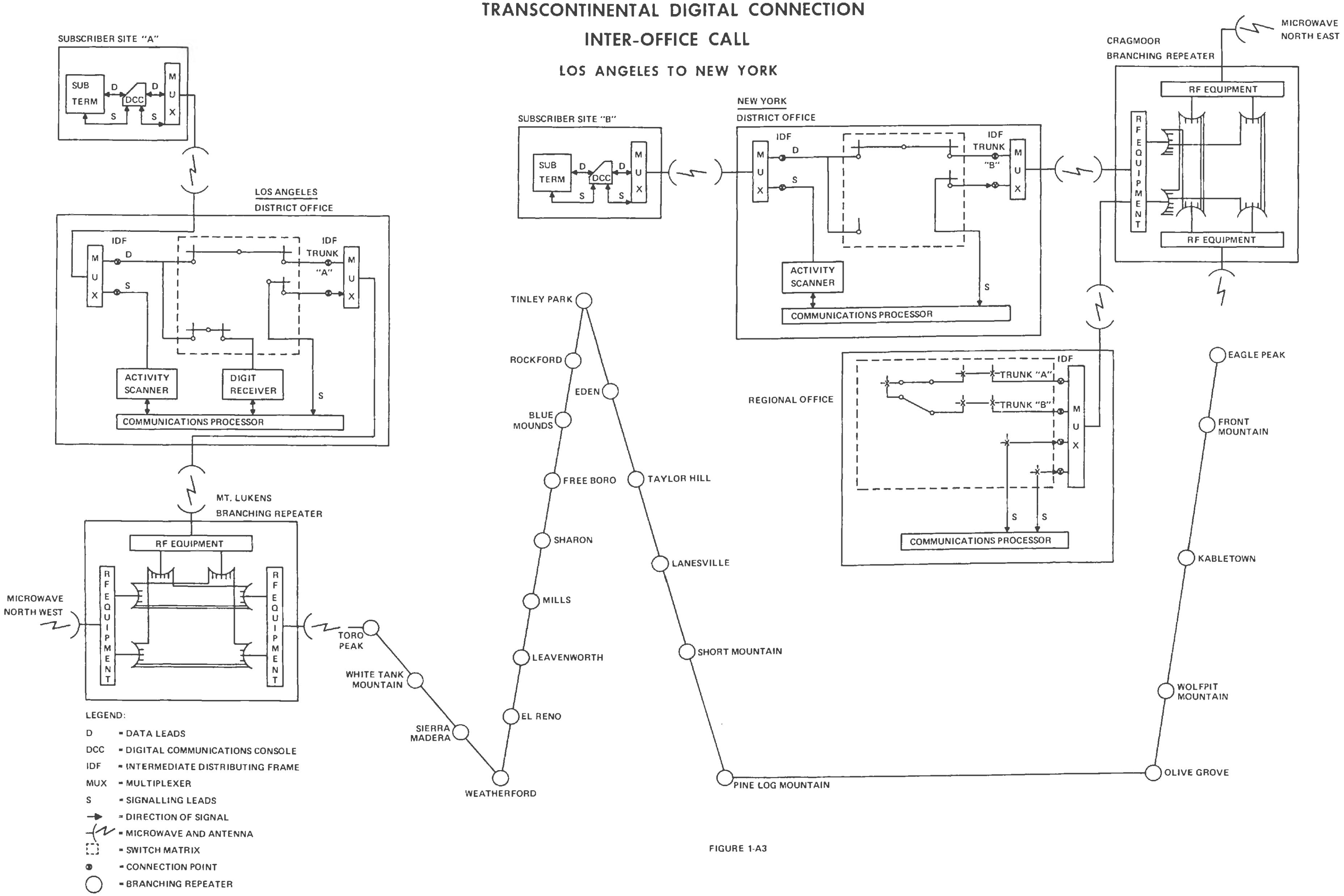


FIGURE 1-A3

ATTACHMENT B
to EXHIBIT NO. 1

STATION ALARM/CONTROL POINT ASSIGNMENTS

STATION	CONTROL/ALARM POINT
South San Francisco Mt. Chual Fremont Peak Call Mountain Calandra	San Bruno Mountain San Francisco, California
Cuesta Peak Broadcast Peak Frazier Mountain Mount Lukens	The 5900 Wilshire Building 5900 Wilshire Boulevard Beverley Hills, California
Modjeska Peak Toro Peak San Miguel Mountain	Home Tower Building 707 Broadway San Diego, California
Black Butte Quartz Peak Telegraph Pass Oatman Mountain White Tank Mountain Mt. Ord	Del Web Building Phoenix, Arizona
Pinal Peak Lone Star Mountain Jacks Mountain Flourite Ridge Aden Hills Anthony Gap Escondido Tank El Capitan Corral Peak Levinson Pecos Peak	Anthony, New Mexico
Sierra Madera Thorn Ranch Richland Government Canyon East Fork Mayfield Ranch Wardlaw Ranch Las Moras Uvalde D'Hanis Rio Medino	National Bank of Commerce 430 Soladad Avenue San Antonio, Texas

ATTACHMENT B
to EXHIBIT NO. 1

STATION	CONTROL/ALARM POINT
East Mesa	Sweetwater, Texas
King Mountain	
Ector Peak	
Pipeline	
Newton	
Big Spring	
Champion	
Sweetwater	
Estes Ranch	
Davis Ranch	
Breckenridge	1949 North Stemmons Building Dallas, Texas
Brakeen	
Mineral Wells	
Weatherford	
Skeen Peak	
Jim Ned Lookout	
Oscar	
Velma	
Rush Springs	
Burleson	
Cedar Hill	
Bristol	Houston National Gas Building 1200 Travis Houston, Texas
Stockard	
Montalba	
Russell	
Mossy Grove	
Willis	
Spring	
Bridge Creek	Liberty Bank & Trust Company 204 North Robinson Oklahoma City, Oklahoma
El Reno	
Guthrie	
Perry	
Camp Creek	
Waresha Creek	
Owasso	
Pryor	
Cleora	Commerce Bank Tower 9th & Main Kansas City, Missouri
Redings Mill	
Arma	
Savonburg	
Kincaid	
Paola	
Olathe	
Leavenworth	
Blair	
Nashua	
Odessa	The Laclede Gas Building 8th & Olive Street St. Louis, Missouri
Warrensburg	
Georgetown	
Tipton	

ATTACHMENT B
to EXHIBIT NO. 1

STATION	CONTROL/ALARM POINT
Sedalia Ashland St. Aubert Herman Fox Creek	
Barada Paul Mills Shelby Storm Lake Webb Fairville	Woodman Building 1700 Farnam Street Omaha, Nebraska
Sharon Dedham Sherwood Adair Webster	KRNT-TV Tower 9th & Pleasant streets Des Moines, Iowa
Thompson Freeborn Northwood Bailey Waseca Montgomery	I.D.S. Center 8th and Nicollet Mall Minneapolis, Minnesota
Harmony Waukon Seneca Highland Blue Mounds Brooklyn Rock Grove	First National Bank Building One South Pinckney Street Madison, Wisconsin
Big Bend Como Rockford Starks	Catholic Knights Building 11th & State Street Milwaukee, Wisconsin
Wheaton Tinley Park Beatrice Medaryville Delong Gilead	John Hancock Building 875 North Michigan Chicago, Illinois
Wawpecong Tetersburg Eden Greenwood Taylor Hill	Indiana National Bank Tower One Indiana Square Indianapolis, Indiana
Greensburg Penntown New Baltimore	Cincinnati Building 5th & Vine Cincinnati, Ohio

ATTACHMENT B
to EXHIBIT NO. 1

STATION	CONTROL/ALARM POINT
Maineville Snow Hill Yatesville	88 East Broad Street Columbus, Ohio
New Philadelphia Lanseville Garret Laymen Knob Nick Pilot Knob South Tunnel	First National Bank Building 101 South 5th Street Louisville, Kentucky
Short Mountain Kelley Creek Cross Keys Langford Brook Crowson Creek Nashville Repeater	Life & Casualty Insurance Company 4th & Church Street Nashville, Tennessee
McGlamery's Stand Nixon Ramer Grand Junction Fisherville Lake	Sterick Building Madison & North 3rd Street Memphis, Tennessee
Fairyland Rocky Face Mountain Pine Log Mountain Pink Mountain Oakway Tryon Sweetwater Creek	Peachtree Center Complex Atlanta, Georgia
Lyndale Pine Grove Whitney Chalksville	5th Avenue & 20th Street North Birmingham, Alabama
Olive Grove New Hope Sauratown Spencer Mountain	Charlotte Jefferson First Union Tower Tryon & College Street Charlotte, North Carolina
Smith Mountain Tower Hill Wolfpit Mountain Watery Mountain Sandy Hook	CNB Building Broad & 3rd Richmond, Virginia
Crystal Spring Downey Jones Mill Arona	Pittsburgh U. S. Steel - Mellon Building 525 William Penn Place Pittsburgh, Pennsylvania

ATTACHMENT B
to EXHIBIT NO. 1

STATION	CONTROL/ALARM POINT
Shalerville Salem Georgetown Amherst	The Terminal Tower Cleveland, Ohio
Castalia Williston Old Port	Cadilac Tower Detroit, Michigan
Front Mountain Overview Eagle Peak Palmerton Welsh Mountain Guthriesville Sugartown	2000 Market Street Philadelphia, Pa.
Hackettstown East Irvington Cragsmoor Cold Springs	Waldo Gardens 38 Waldo Avenue Riverdale, New York
West Farms	750 Main Street Hartford, Connecticut
Mt. Everett Wachusetts Mountain Nobscot Hill	Employees Building 1 Beacon Street Boston, Massachuesetts
Kabletown Waterford Darnestown Oakland Mills Baltimore	North Building Wheaton Plaza Wheaton, Maryland

2. ANTENNA
PATTERN

EXHIBIT NO. 2

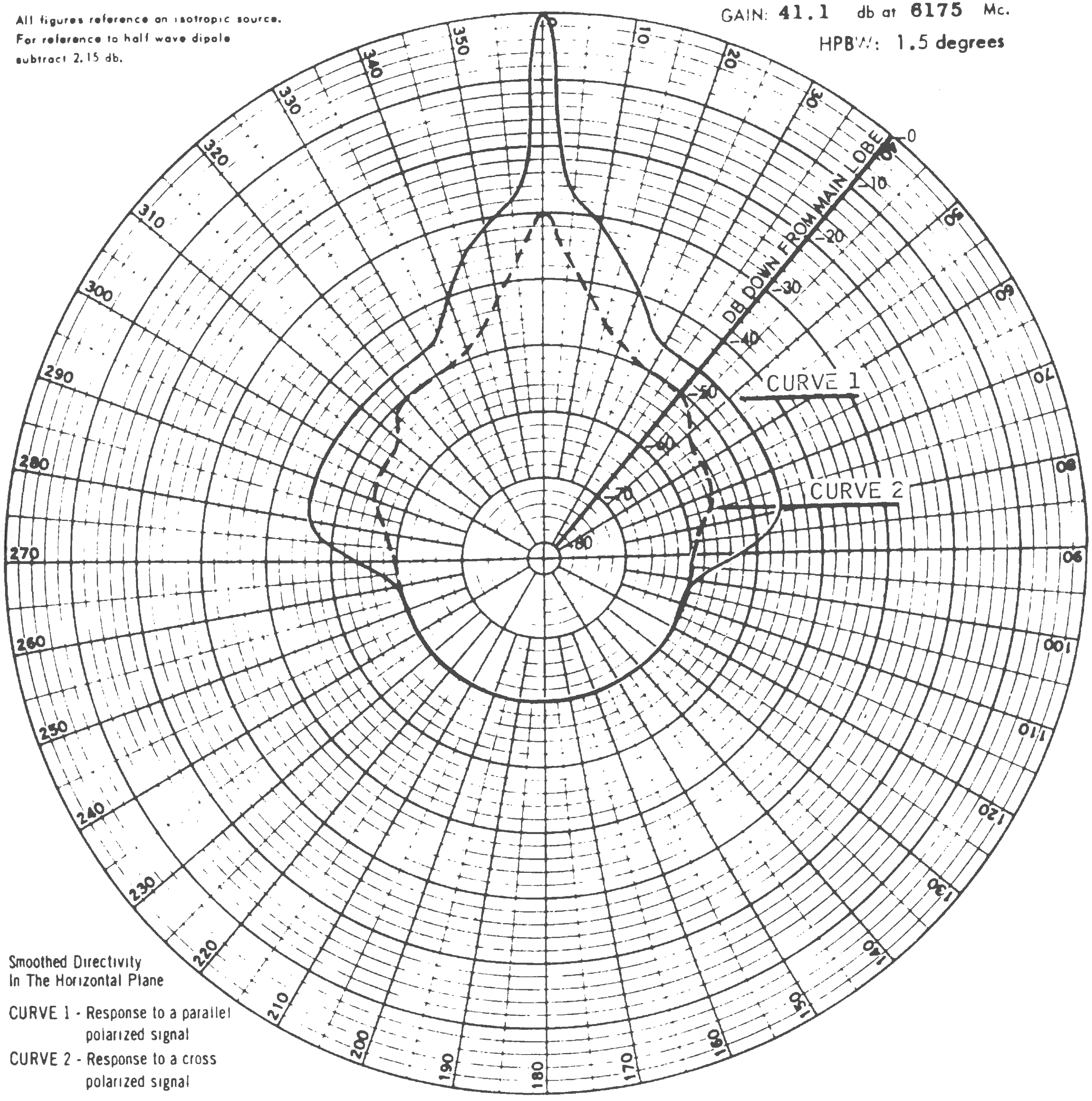
DIRECTIONAL ANTENNA PATTERN

Attached hereto are directional antenna patterns (polar diagrams) showing power distribution of signal radiated in the horizontal plane for each antenna to be employed at the station proposed by this application. The antenna gain specified in Item No. 17 on FCC Form 401 refers to an isotropic radiator, midband.

HIGH PERFORMANCE - SHIELDED
PLANE POLARIZED 8 FOOT ANTENNA 5.925 - 6.425 Gc
DIRECTIONAL PATTERN ENVELOPE-BOTH POLARIZATIONS

All figures reference an isotropic source.
For reference to half wave dipole
subtract 2.15 db.

GAIN: 41.1 db at 6175 Mc.
HPBW: 1.5 degrees



Smoothed Directivity
In The Horizontal Plane

CURVE 1 - Response to a parallel polarized signal

CURVE 2 - Response to a cross polarized signal

Applies to types:
70126A, 70110A,
HP8A-59, HP8-59
75043, 75048

Andrew

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MS - 251
Issue 3, 9/9/66

ANDREW

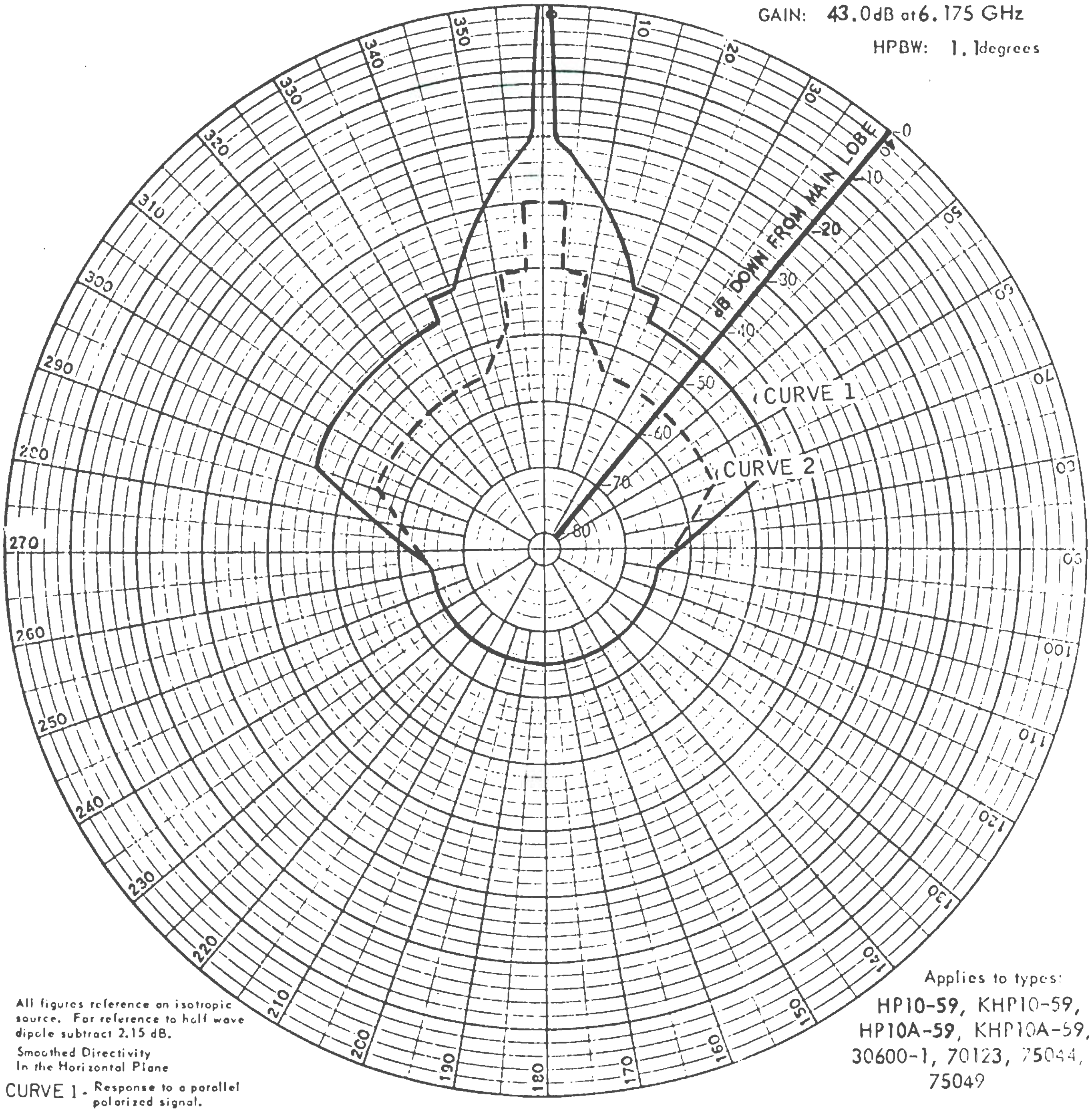
HIGH PERFORMANCE -- SHIELDED PLANE POLARIZED, 10 FT. ANTENNA, 5.925-6.425 GHz

DIRECTIONAL PATTERN ENVELOPE-BOTH POLARIZATIONS

MS 205
Issue 3
Jan. 1968

GAIN: 43.0dB at 6.175 GHz

HPBW: 1.1degrees



Applies to types:
HP10-59, KHP10-59,
HP10A-59, KHP10A-59,
30600-1, 70123, 75044,
75049

All figures reference an isotropic source. For reference to half wave dipole subtract 2.15 dB.

Smoothed Directivity
In the Horizontal Plane

CURVE 1 - Response to a parallel polarized signal.

CURVE 2 - Response to a cross polarized signal.

Andrew

Bulletin 427

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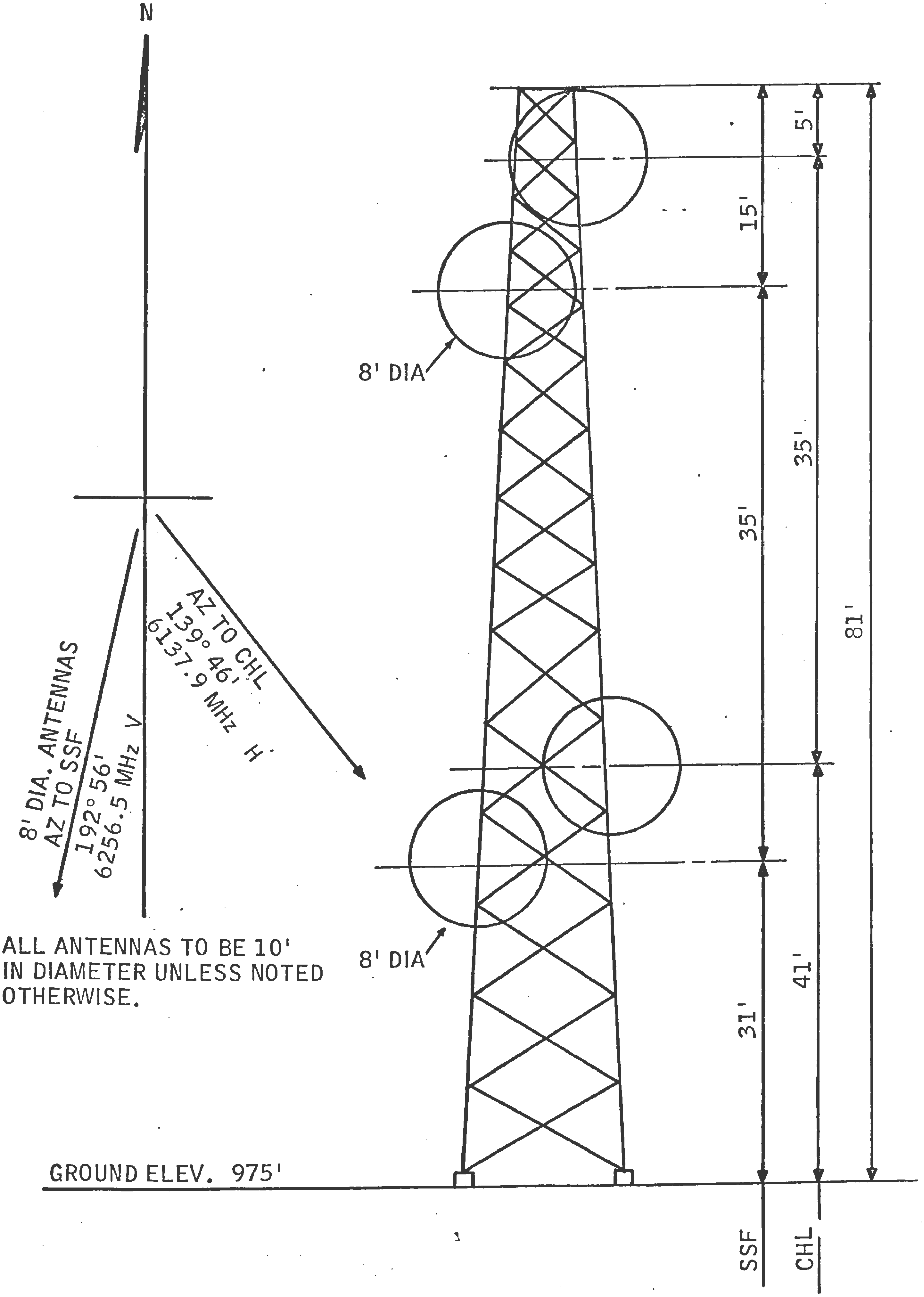
Melbourne, Victoria, Australia

3. TOWER SKETCH

EXHIBIT NO. 3

VERTICAL PROFILE SKETCH

Attached hereto is a vertical profile sketch of the transmitting antenna structure for the proposed station which is the subject of this Application.



ALL ANTENNAS TO BE 10' IN DIAMETER UNLESS NOTED OTHERWISE.

Tower Sketch, San Bruno (BNO)