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PUBLIC BROADCASTING FOR NEW JERSEY

A report and recommendations to New Jersey citizens by
the Commission on Public Broadcasting for New Jersey,
established by Richard J. Hughes, Governor, to study
and develop plans for public broadcasting in New Jersey.

May, 1968

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New Jersey Governor's Commission on
Public Broadcasting for New Jersey

GOVERNOR'S COMMISSION ON PUBLIC BROADCASTING FOR NEW JERSEY

May 6, 1968

The Honorable Richard J. Hughes
Governor of the State of New Jersey
State House
Trenton, New Jersey 08625

Dear Governor Hughes:

In October, 1967, you asked a group of New Jersey citizens to join a Commission on Public Broadcasting which you established "to formulate plans and policies for the development of educational television and radio in New Jersey." You added that educational television and radio -- public broadcasting -- are public resources whose potential has barely been explored.

We are pleased to place the Commission's report before you, the legislators and the citizens of New Jersey for consideration. We present this report knowing that if New Jersey should not act now, it may very well lose the last opportunity for a statewide system of public broadcasting.

New Jersey is rich with resources -- human and physical. It is a leader in many ways. We must sadly report to you, however, that in public broadcasting, New Jersey is lagging far behind most of the states in the nation. We have given thoughtful consideration to all matters attendant to public broadcasting in New Jersey. We have consulted many people in the State and throughout the country. This report is the result of over six months of intensive effort on the part of the members of the Commission and of the many others who joined with us in this study. Our report carefully blueprints a course of positive action to implement a system for public broadcasting that will put New Jersey up among the leaders in the field and one which will fill the public communications need in the State for many years to come.

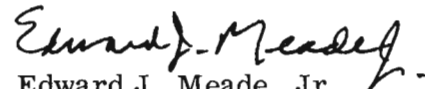
Our recommendations call for quality. We see no other course but to aim at the best if we are to have the most responsive system for public broadcasting for New Jersey. The millions of our fellow citizens deserve nothing less.

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The system we recommend is a public instrumentality that would allow for the more effective and efficient flow of ideas, knowledge, and expressions of the citizens of New Jersey. We believe this public instrument can serve to help bring about fuller understanding of New Jersey, its communities, its people, its problems, and its opportunities.

Last, we firmly believe that the State must act to bring forth public broadcasting in New Jersey. With the support of the people and their elected officials, our recommendations can be turned into realities -- and the time to act is now.

Respectfully,


Edward J. Meade, Jr.
Chairman

VOLUME I

PUBLIC BROADCASTING FOR NEW JERSEY

May, 1968

Governor's Commission on
Public Broadcasting for New Jersey

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FOREWORD

On October 17, 1967, Governor Richard J. Hughes announced the formation of the Governor's Commission on Public Broadcasting for the State of New Jersey. * He selected the members of this Commission after consulting many leaders and citizens of New Jersey. Its members are outstanding men and women in education, communications, engineering, electronics, law, finance, and the arts, all residents of New Jersey. The Governor charged the Commission with the responsibility of formulating policies, plans, and recommendations for the development of public radio and television for the state. He asked the Commission to issue a report that would be used as a basis for action in the field that he intended to place for consideration before the 1968 session of the New Jersey legislature.

The overriding question which the Governor raised for the Commission's consideration is the creation of a system for public broadcasting that can serve the information, education, cultural, and community needs of all the citizens of New Jersey. New Jersey needs a well thought out and organized way of dealing with the organization, administration, and financing of its public broadcasting activities. It was the Commission's job to think out the problem and recommend an approach.

The Commission engaged in observation, discussion, study and analysis of public broadcasting within New Jersey and outside the state. Commission

* The statement by Governor Richard J. Hughes on the Governor's Commission on Public Broadcasting appears in Appendix I.

members and staff evaluated past activities and future plans in other states. * They held public and private meetings to obtain information and views from those in broadcasting and communications personnel and from those whom public broadcasting might serve in education, training, community development, business and industry, government, the military, cultural affairs, research, and professional fields.

Detailed analyses and plans for the technological and organizational aspects of public broadcasting were developed and reviewed. Financial arrangements and schemes also were reviewed. Programs for public broadcasting in New Jersey, in other states, and at the national level were assessed in relation to what might be best used for New Jersey as a whole.

The Commission addressed itself to the matter of what objectives should New Jersey set for the scope and performance of its public broadcasting system and what form and support it would need. Our report and recommendation spell out detailed plans for the organization, programming, technology, staffing, and financing of a first-rate and responsive public broadcasting system for the state.

While this report is a direct response to the Governor's request, it is in a larger sense a report to and for the people of New Jersey. The Commission on Public Broadcasting believes its recommendations represent a major response to a major issue for New Jersey: the use of an untapped public resource to help create a well-informed citizenry more rapidly.

* These evaluations included an analysis of the organization, financing, engineering, and programming of public broadcasting systems or plans for such systems in other states. They were based on correspondence, legislation and statewide plans for public broadcasting and included personal visits and consultations in New York, Pennsylvania, Delaware, Maryland, Massachusetts, and Illinois.

The heart of the matter is the creation and establishment of a public broadcasting instrument that can serve New Jersey well for the foreseeable future. The Commission believes that this report embodies the hope and spirit of a comment made by James Reston after the Congress last year acted in support of public broadcasting at the national level. Such an action, he said, may one day "be recognized as one of the transforming occasions in American life." We sincerely hope that this report and its recommendations may result in a transforming experience for New Jersey and for all of New Jersey's citizens.

In carrying out its assignment, the Commission enjoyed the help and advice of many men and women. We are grateful to the many New Jersey citizens who appeared before the Commission at its public hearings in March. They made it abundantly clear to us that public interest and support for public broadcasting in New Jersey is strong and is growing. *

We are also indebted to many organizations that helped the Commission, including Bell Telephone Laboratories, the Federal Communications Commission, the Ford Foundation, McGraw-Hill Book Company, Montclair State College, the National Association of Educational Broadcasters, National Educational Radio, the New Jersey Broadcasters Association, the New Jersey Education Association, the Radio Corporation of America, Rutgers, the State University, the United States Army Signal Center, and many state agencies including the Department of Community Affairs, the Department of Education, the Department of Higher Education, the Department of Treasury, and the Office of the Attorney General.

* A list of New Jersey citizens who appeared before the Commission on Public Broadcasting appears in Appendix II of this report. Their testimonies are a matter of public record.

Many citizens gave us much of their time and effort. The list is long and we wish to thank them all including: Elias Abelson, Deputy Attorney General; Joseph Durand, Director of Instructional Television, Richard Heffner, Professor of Communications and Public Policy, and Nathan Shoehalter, Director of Radio and Television, Rutgers University; Emma Fantone and Thaddeus Scheft, Associate Professors and Co-Directors, Audio Visual Center, Montclair State College; Stephen Farber, Administrative Assistant to the Governor; Gregory R. Farrell and John Martin, New Jersey Department of Community Affairs; Norman E. Hardy, Deputy State Treasurer; William Hayward, New Jersey Education Association; John W. Kiermaier, WNDT, Channel 13, New York; William King, Director of Audio Visual Services, State Department of Education; Warren A. Kraetzer, WHYY, Channel 12, Philadelphia; Kathleen Lewis, Claire List, Richard Magat, Donald F. Sandberg and Robert Tolles of the Ford Foundation; Jerrold Sandler, National Educational Radio; and Philip Schrager, Office of Economic Opportunity.

The Commission appreciates, as well, the leadership that particular members of the Commission gave to specific aspects of its work, including that of Robert W. Locke in finance, Carroll Newsom in organization, John R. Pierce and G. Edward Hamilton in engineering and technology, and Carl R. Marburger in programming.

Two other acknowledgements must be made, for without this help the Commission on Public Broadcasting could not have worked so well. First, the Commission is indebted to Governor Richard J. Hughes who recognized

that New Jersey needs to move forward in the field of public broadcasting.

Second, the Commission is grateful to the legislators and citizens of New Jersey who allowed the Commission to work in their behalf and to whom we present the report for consideration.

Edward J. Meade, Jr.
May, 1968

NOTE: In preparing its recommendations and report, the Commission on Public Broadcasting adopted the following working definitions of terms:

Public broadcasting -- all aspects of noncommercial radio and television, open and closed-circuit, including the production and dissemination of public and community affairs, educational, cultural, and instructional information to the public at large within the State of New Jersey. For purposes of this report, public broadcasting does not include radio and television transmissions for internal communications, as presently used by public and private agencies in fields such as law enforcement, safety, transportation, traffic control, civil defense and the like.

Public broadcasting telecommunications -- all public broadcasting services relating to those described above including intercommunications, closed-circuit Instructional Television Fixed Service (ITFS) and other services requiring Federal Communications Commission spectrum allocations for transmission of electrical impulses that specifically and integrally relate to New Jersey public broadcasting. Facilities typical for application of these services would encompass microwave interconnection, aural and video TV transmission multiplexing, laser beam utilization, satellite interconnection systems and other appropriate technological devices.

THE DEMAND AND NEED FOR PUBLIC BROADCASTING

Citizens of New Jersey face a bewildering array of problems in common with all Americans. They are affected for better or for worse by events all around the world. They are subject to the vibrations of the national economy. They share the dilemma of reconciling the American dream of unified diversity with the taint and tragic reality of racial conflict. They are affected too by physical problems, such as air pollution and water supply, that respect no state border. The future course of a 500-mile long megalopolis will touch their lives whether they commute from Bergen County to lower Manhattan or work in the farmlands of Atlantic County, and so will actions and decisions in the legislature at Trenton and in county court houses, city halls, and town offices throughout the state -- to say nothing of myriad decisions by industry, unions, churches and voluntary organizations.

The Other Face of the Enterprise

Men and women choose many instruments to help meet their needs and solve their problems. This report is concerned with an age-old instrument in the solution of human problems -- knowledge -- and with a very new mechanism for the dissemination of knowledge, electronic communication.

We draw the definition of "knowledge" in broad strokes. We mean information and insight about the past and about current affairs, of course. But we also mean the path to personal discovery, exposure to the cultural riches of

many civilizations, and enlivenment of the senses . . . all to the end that men and women may lead richer lives and pass on to their children a heritage greater than they received themselves.

There is hardly a citizen in the State of New Jersey who does not know what television is. The evidence is at hand every waking hour. But relatively few of us have glimpsed what television and radio could be, for the universe of television is two-sided and, like the moon, only one is generally known. That one is the vast stretch of commercial broadcasting, providing entertainment, almost instantaneous news, and sometimes penetrating analysis of world and national events and issues.

The other part of television and radio is an underdeveloped world -- the world of public broadcasting, sometimes called educational television. This hardly known new world -- public broadcasting -- is now astir. A year and a half ago the magna carta of public television -- the Carnegie Commission Report -- was published. * Less than a year ago a historic chapter in communications history unfolded with the passage by Congress of the Public Broadcasting Act of 1967, which created a national Corporation for Public Broadcasting and authorized the use of federal funds for certain public broadcasting activities.

Every American citizen would benefit from these momentous developments even if they were confined to the national level. But the exciting prospects are magnified many fold because they go beyond the national level into regional, state, and local dimensions.

* Public Television, The Report and Recommendations of the Carnegie Commission in Educational Television, Bantam Books, Inc., New York 1967.

Prospect and Failure

Thus a great new prospect has opened for every state, and in a sense this report is a first probe of the new opportunities available to the State of New Jersey. As it turns out, our state is the first to make this timely look at the future of public broadcasting. But we also have much lost ground to recover. In fact, this is, as we shall point out later, virtually a last chance for our state.

In the fifteen years since educational television was born virtually every state in the Union has successfully sought in some way to harness this powerful giant to local purposes and to the special needs of its own citizens.

New Jersey, too, has tried, but it has largely failed. Our state has fallen so far behind others that unless a new determination is forged, New Jersey may be irrevocably consigned to second-, third- or last-class status in a field that offers an incalculable yield of riches for individual citizens and a powerful tool for the growth and development of the state as a whole.

Although we must learn from past errors, let us now begin on a clean slate with confidence. The road has been opened by eloquent voices and decisive action at the national level. Both have called for a new era, in which public broadcasting will be as diverse as the nation itself, in which all states and localities will contribute to a rich whole, rather than being faceless, passive observers in a centralized monolithic structure.

As the Carnegie Commission Report said:

"Public Television programming can deepen a sense of community in local life. It should show us our community as it really is. It should be a forum for debate and controversy. It should bring into the home meetings, now generally untelevised, where major public decisions are hammered out, and occasions where people of the community express their hopes, their protests, their enthusiasms, and their will. It should provide a voice for groups in the community that may otherwise be unheard.

Public Television programs can help us see America whole, in all its diversity."

Questions for New Jersey

Our inquiries and reflections persuade us that New Jersey can play a pre-eminent role, that having fallen by the wayside for more than a decade we still have the resources and capability of moving to a position of leadership in public broadcasting. Before embarking on such a venture, the citizens of New Jersey should ask themselves a number of questions that we posed to ourselves and to the many individuals and organizations with whom we counseled:

- What does New Jersey public broadcasting mean for the average citizen and his family?
- Why should public broadcasting be developed at state expense?
- How can a system of public broadcasting -- financed by the state -- be organized and governed to afford responsible freedom of action and be insulated from undesirable political interference?

This report will seek to answer these questions in detail. But it is worth sketching some of our findings in advance:

Public Broadcasting for the Individual Citizen of New Jersey

Public broadcasting is a medium for communicating knowledge. We live in an era that has recognized knowledge for what it is -- not only an adornment for the few but as a necessity for the many. It is a resource, which the state has an obligation to help develop for the benefit of its people.

Public broadcasting also is a powerful means of fostering the creative development of individual citizens and community groups -- the artist, the local theatre company, the museum, the musical ensemble, and innumerable other cultural and artistic institutions. In a state system of public broadcasting they could find outlets for their talents that are rarely available on any national broadcasting system, commercial or noncommercial.

Public broadcasting is potentially a strong bond for community progress. As long as there is strife and violence in the world and in our own society, television and radio will carry the sights and sounds of turmoil. But broadcasting should also carry the knowledge and dialogue about the underlying problems, about the seeds of trouble, and about the alternatives and available means for prevention and constructive solutions. In nearly every aspect of modern life complexity and swiftness of change demand better communications. For example, referring to race relations generally, not simply to riots, the 1968 Report of the National Advisory Commission on Civil Disorders (the Kerner

Report) urges the communications media "to dig out and tell the story of a major social upheaval -- among the most complicated, portentous, and explosive our society has known." *

Broadcasting should convey events, and their underlying issues and alternatives, not just from the great national and international centers of decision-making but from the thousands of local and regional centers. There the elusive force known as public opinion gathers, there people and institutions confront problems face to face, and there lies a great reservoir of ideas and human resources for peaceful progress in our land.

But the channels of national communications have become so elaborate and expensive and so exclusively focused on issues of larger moment that they are virtually closed to the events of local, regional, and state life which may seem prosaic and painstaking to outsiders but which are highly significant to the participants. The printed media grew from local roots, and we still have weekly and daily newspapers. But we have not employed the television eye to focus, on a continuing basis, on the events of our neighborhood, our towns, and cities, and counties, and state -- on matters that often affect our wellbeing quite as much as a bill in Congress or a treaty in Geneva.

There is an increasing interest in television and radio on the part of New Jersey schools and colleges. Many educational institutions have purchased television and radio receivers. Some of them have already installed closed-circuit television systems. Other are wired to install such systems in the future. Certain school districts, today, contribute to Channel 13, New York

* Report of the National Advisory Commission on Civil Disorders, Bantam Books Inc., New York 1968, p. 384.

and Channel 12, Philadelphia for their television programming. The New Jersey Public Broadcasting System -- as conceived by the Commission -- would meet the demands and needs for broadcasting in schools and colleges -- in a way that is unprecedented to this point in history.

Finally, public broadcasting can help bind together the people of the State of New Jersey. Our state is rich in its material, natural, and human resources. We are proud of our diversity, of our seashore, and wooded hills, and towns, and cities. We do not want to see our state homogenized into a grey sameness. But we crave a unity along with our diversity. We want the world to know all our parts, and we want to know them better ourselves.

Forty years ago, one of our distinguished citizens, Chester Barnard, then president of the New Jersey Bell Telephone Company, said:

"... It is fundamental to an adequate recognition and popular support of progressive development of this state that the public be conscious of New Jersey as a single community. It is not so conscious now." *

Even now that consciousness has not adequately formed. The nation, and many of our own citizens, still think of our state as a "corridor," or as the protoplasm for the two great nuclei of Philadelphia and New York City. or as "two Jerseys," south and north, or, to choose another customary division, east and west.

The development of a "New Jersey consciousness" is not simply a matter of state pride or loyalty. It affects the pocketbook of every New Jersey citizen when residents of our state bank or buy elsewhere. It affects

* From a speech to the Camden Chamber of Commerce, 1928.

our educational and cultural institutions when New Jersey citizens seek intellectual stimulation and aesthetic experience elsewhere, often in ignorance of the riches that lie within their own borders.

Barnard called upon leaders of public opinion in New Jersey "to develop a popular attitude and interest that will stimulate active constructive programs to meet the conditions adequately both in time and scope." * They should, he said, emphasize the importance of participation in New Jersey affairs and support of New Jersey projects ... as a matter both of self interest and civic duty ..." **

He made these remarks in the late 1920's. It is appropriate that a communications leader should look ahead to the state's need for identity just at the beginning of the era when radio was in its infancy and when a powerful new instrument for pursuing the dream of a unified New Jersey was emerging from scientific laboratories.

New Jersey still is, as Woodrow Wilson said a half century ago, "the fighting center of the most important social questions of our time ..." *** Public broadcasting can help our state address these questions and thereby realize its greater potential and command the national recognition it deserves.

A State Responsibility

Admitting, then, the unique contribution that can be made by public broadcasting to the life of our state, what are the elements of such a system?

* Idem.

** Idem.

*** From a speech to the Newark Board of Trade, January, 1911.

It must first consist of complex technological facilities and equipment that will turn the state into a studio. It must include a number of production units combining creative broadcasting talent with adequate finances. And it must have a governing body with the wisdom, experience, and dedication to the public interest necessary to guide the growth and development of the enterprise imaginatively and effectively. Each of the four major sections -- Organization, Engineering, Programming, Financing -- of this report will deal with these elements in detail.

As government has created public schools and provided public higher education, so it is challenged in the last third of the twentieth century to provide a system of quality public broadcasting. This principle has been recognized at the national level in the Public Broadcasting Act, and it has been urged on the state level by the Carnegie Commission. Other states have assumed responsibility -- to varying degrees -- for public broadcasting. Statewide broadcasting systems or networks are clearly designed to benefit the citizens of the state. The system designed for New Jersey is no exception. While many sources for financing public broadcasting have been tapped, and many patterns of financing these systems developed throughout the United States, it seems only wise and appropriate, particularly for a state like New Jersey, moving for the first time into the area of public broadcasting, to rely predominantly on the state for supporting a system which is designed to serve its citizens.

It would be one of the most potentially productive investments the legislature could ever make. And like many a fruitful opportunity, it will be least expensive if seized when the time is ripe, as it now is.

The Governing Body

As it is essential that the state provide the major sustenance for public broadcasting, so it is equally essential that public broadcasting be afforded reasonable freedom of action and minimal governmental control of the flow of information.

The system we envisage will not be limited to instructional television and radio; it will deal with social and political controversy, and it will deal with matters of subjective judgment, especially in the arts. The mass media are two-edged. They can be employed for enlightenment, or perverted to indoctrination; they can provide a forum for a variety of ideas, or they can grind the axe of special interests. And so, in our section on Organization, we propose an autonomous governing body that is calculated to advance the general enterprise of public broadcasting responsibly and responsively, with freedom, and with wisdom.

The principle for autonomy with respect to public broadcasting was emphasized by the Carnegie Commission as it deliberated to create a national organization for public television:

"Recognizing areas of special sensitivity, the Commission is persuaded that a nongovernmental institution is necessary to receive and disburse at least a part of those funds. The purpose is not to escape scrutiny but to minimize the likelihood that such scrutiny will be directed toward the day-to-day operations of the sensitive program portions of the Public Television system. What we have sought to design is an institution that will represent Public Television ... free of political interference. The institution itself, erected to serve the public interest, must be created and sustained in a manner that will permit it to assert the public interest." *

* Public Television, p. 37.

What we propose would break new ground in state organization for public broadcasting. We believe it is right for the State of New Jersey, and we look forward with anticipation and pride to the prospect of our showing the way in a field in which heretofore the state has been laggard.

THE GENERAL CONDITION OF PUBLIC BROADCASTING

The United States is the world's most interconnected society. We have fashioned the mass media of communications into both industries and a way of life. We use every conceivable means to "get out the word" --- telephone, telegraph, film, billboards, newspapers, magazines, recordings, radio, television, satellites, and laser beams and other esoteric instruments of telecommunications.

The manner in which we develop and organize communications mirrors our other undertakings. We apply the test of pragmatism in a framework of basic freedoms. We want what works best, so long as it adheres to the American system. The result is that most communications systems are privately owned and operated in the public interest, and often with public assistance. The printed media are assisted, for example, by postal subsidies, and commercial broadcasting is built on a system of frequencies assigned by the Federal Communications Commission (FCC).

Our Commission holds with others that private, commercial broadcasting is essential to the full flow of information American citizens need to be full participants in the democratic process. But even the breadth of private broadcasting cannot accommodate all the diverse interests of the American public. The need for a complementary system of communications was recognized more than thirty years ago in the Communications Act of 1934, which empowered the FCC to insure better communications by allocating

some frequencies to noncommercial radio.

With the advent of television, the same public policy was pursued. Consciously, the American people have resolved that part of this precious national resource -- the signal spectrum -- shall be reserved for noncommercial uses in the public interest. Let us emphasize that this resource is limited. Despite advances in technology, only a certain number of radio stations and television channels can fit into the broadcast spectrum, and demands for allocation far exceed the space available. The FCC therefore has had to be careful and deliberate in allocating stations and channels equitably and wisely to meet all of the nation's private and public communications needs.

So heavy was the demand for new spectrum assignments by 1948 that the FCC ordered a freeze on the allocation of all television channels. The number of available television channels is even more limited than the availability of radio frequencies. The FCC paused in 1948 in order to provide sufficient time for planning and properly distributing the available channel allocations both for commercial and public broadcasting activities. The freeze was lifted in 1951.

A Complementary System

The need for a complementary, noncommercial broadcasting system is intrinsic in the nature of commercial broadcasting. For historical and economic reasons, commercial broadcasting has developed as a service offered to the public without cost. To make this possible, commercial broadcasting is financed through advertising, and advertisers have a legitimate in-

terest in reaching as many people as possible with their message at the lowest possible cost. Commercial television has made great contributions in broadcasting news and cultural affairs. But the time that commercial television can devote to sustained, public-service purposes always will be limited by the need to devote the bulk of its time and virtually all of its prime time, when the greatest audiences are available -- to the revenue producing fare.

Thus public broadcasting -- radio stations and television channels that are public in origin and support -- is necessary to insure a medium for instructional, educational, informational, cultural, and special enrichment programs of limited appeal at all hours. The more congested and diverse a population the greater its needs. Yet areas such as New Jersey, which have such a wide and varied range of audiences, tastes, and needs, face a paradox. New Jersey's needs are greater, but it lies along the axis of two great commercial radio and television centers, where the costs of operations, and the need to obtain maximum revenue from broadcasting, are greater than in other areas. Commercial television therefore is even less capable of serving the public service needs of individual citizens and communities of New Jersey than many other states. And our need for a strong system of quality state-based public television is comparably great.

Fifteen Years of Development

Behind the new era introduced by the Carnegie Commission Report and the Public Broadcasting Act of 1967 lies a fifteen year period of

uphill development of public broadcasting across the country. From a perilous start, the number of noncommercial television stations now stands at 185. Moreover, the rate of growth is increasing. Some noncommercial channels are strong, creative programming centers, serving their communities with rich material appealing to large and small audiences of every conceivable taste. Other noncommercial stations are still striving to attain first-rate quality and diversity, and a few are merely daytime conduits for school instructional programs and nighttime conveyors of material produced at national programming centers.

Alongside the development of individual stations, regional and national public broadcasting resources have evolved. The most powerful is National Educational Television (NET) a center that provides several hours a week of new programming and distributes a rich backlog of material, with the capability of commissioning first-class material and with access to broadcasting from throughout the world. The Public Broadcast Laboratory, a weekly experimental program of public affairs and cultural material began broadcasting nationally last November on Sunday evenings. A few regional networks -- notably the Eastern Educational Network -- have also developed.

The State Level

Any citizen whose television set is within range of a noncommercial station may enjoy the yield of these national and regional enterprises. But to citizens in some states, a bonus is available. Where state-based systems

of noncommercial television and radio stations have developed, school and college programs are enriched by instructional and informational broadcasts and teachers are being trained through broadcasting; workers are being upgraded and retrained; doctors, lawyers, and other professionals are being provided with information to help them keep abreast of the latest developments in their fields; low-income families or people living far from training centers are being educated; news in depth about community and state affairs is being heard and seen by citizens everywhere, and programs on local and state issues are being broadcast to help citizens understand problems of air and water pollution, conservation, transportation, civil rights, education, and community rehabilitation.

In short, many states -- most, in fact -- have through public broadcasting literally added new channels for the dissemination and use of the abilities of the people within their borders. New Jersey is not among them.

THE CONDITION OF PUBLIC BROADCASTING IN NEW JERSEY

The poverty of public broadcasting in New Jersey is even more stark when viewed against the richness of the state's experience in the field of communications. In New Jersey such giants in the science and technology of communications as Armstrong, DuMont, Edison, Mergenthaler, Zworykin, applied their genius in assisting man better to understand his world and his fellow man. In their train, a vast communications industry has grown. Hundreds of electronic manufacturers and communications research laboratories dot the New Jersey landscape. Thousands of New Jersey citizens are engaged in research, experimentation, production, sales and marketing in the communications field. Our scientific, technological, and human assets in communications are rich and our potential even richer.

With its proud history and endowed presence in communications, New Jersey is a logical and likely place for the very best broadcasting systems -- public and private. In public broadcasting, however, such is not the case. New Jersey is not in the forefront of public communications, particularly public radio and television. We lag behind, even at a time when public broadcasting is on the threshold of its most exciting and challenging hour.

The story of this failure is a tale not of blindness but of lost opportunities.

Our Commission was dedicated to the constructive purpose of planning for the future. It was not our task to rehash the past. But we could not

work in a vacuum, and we saw a constructive purpose in searching out and recalling the record. In that record we see a call -- a warning -- to our fellow citizens: If the past tells us anything in this matter, it is to draw a blueprint for action clearly and take hold firmly on this new chance. We have walked up to this challenge before and faltered. This is probably our last chance.

The Commission made a careful assessment of the state's past efforts to assume responsibilities and seize opportunities in public broadcasting. The record is dismal. It is spotted with some remarkable pioneering ventures and some ambitious beginnings. (Indeed practices developed in New Jersey experiments in public radio and television are now in commonplace use in other states, but not in New Jersey.) But for the most part it is a history of inadequate follow-through and failure to take positive decisions when the time was ripe and favorable conditions present. Never have we gone beyond first steps.

Chronicle of Failure

In 1951, the FCC removed the freeze on allocation of all available television channels. It announced an allocation plan that included assignments for educational (public) broadcasting channels as well as commercial channels. The plan was based on present and future broadcasting needs in terms of population and services. Using the results of engineering studies, the FCC mapped out channel allocations that would develop the television spectrum by per-

mitting the greatest possible coverage with the least overlapping interference and other disturbances to the flow of television signals.

Then as now, New Jersey was a center for television technology in the nation. Our state was also in the forefront of experimentation with educational television, principally through projects at Rutgers University and Montclair State College.

Under the FCC allocation plan, New Jersey was awarded six ultra high frequency (UHF) television channels, specifically for public use for the entire state. No very high frequency (VHF) television channels were available for public use in New Jersey. These public television channels were distributed as follows: Andover, Montclair, New Brunswick , Freehold, Hammonton, and Atlantic City.

At this point, 1951, Governor Driscoll of New Jersey appointed a legislative Commission on Educational Television to study and recommend how best to activate, maintain, and use these six UHF channels for public purposes. Composed of distinguished citizens, the Commission was headed by Elmer Engstrom of RCA. *

* Mrs. S. Hobart Anderson, Alan B. DuMont, Robert B. MacDougall, Samuel L. Bodine, Charles W. Hamilton, Sampson G. Smith, Thomas J. Hillery, H. W. Voorhees, J. Lindsay deValliere.

In the meantime a construction permit to build facilities to activate Channel 19 at Rutgers in New Brunswick was granted to the New Jersey Department of Education.* At the time this permit was issued, no educational television stations were on the air anywhere in the nation.

The Commission on Educational Television issued its first report in 1953, stating,

"Knowledge pertinent to the application of television to educational purposes has not developed to the point where final conclusions regarding widespread educational television operations could be reached. There was . . . evidence . . . to warrant the conclusion that further experimentation in educational television should be actively pursued."

The Commission issued a second report in March, 1954. It reported on the success that experimental programs had achieved in closed-circuit transmissions to four high schools in Middlesex and Union Counties. Given the fact, again, that this was a pioneering effort, it is not surprising that the report also stated that some "discouraging technical difficulties" were also experienced.

* Construction permit issued December 3, 1952.

Significantly, however, the Commission recommended moving forward. It urged that the remaining five allocated television channels be activated: "The current situation seems satisfactory to educational television with respect to channel reservations. However, again, there is no cause for complacency. If these channels are not used in due course for educational purposes, they will be lost to other services, and it is important that plans for use of the channels proceed with all proper dispatch. We believe, in New Jersey, implementation of the recommendations of the Commission for the establishment of an initial station, and the consideration of educational stations for statewide coverage without unjustifiable delay thereafter, will meet the situation with regard to channel reservation as it is now foreseen." *

This call to action was heeded by the State Department of Education, which requested an appropriation of approximately \$300,000 to cover "the operation of the closed-circuit program and its conversion into station operation as soon as the station can be constructed." Unfortunately, the request was subsequently denied and a project of great impetus, importance, and foresight died.

While New Jersey had no state program for public broadcasting, many other states proceeded to make plans and take action that established functioning systems for public broadcasting. In some cases, states obtained federal and philanthropic funds to help establish their systems.

* Legislative Committee on Educational Television, March, 1954.

New Jersey stood still for nearly another full decade. A group of New Jersey educators formed the New Jersey Educational Television Corporation in 1963. The Corporation received a construction permit for Channel 77 in Glen Ridge on condition that the Corporation demonstrate financial competence. As a non-profit organization, the Corporation could rely only on assistance from the community. It looked particularly to the northern New Jersey communities that would be served by Channel 77. Through the Corporation's efforts, enabling legislation was passed to permit local school boards to grant funds to educational television stations for instructional television.

Establishment of the Corporation and the opening of the door to public school assistance to educational television were two important steps in New Jersey's second serious effort to enter the mainstream of public broadcasting. Both steps were frustrated, however, by an apparent lack of interest in instructional television by state officials at the time.

Thus public television in New Jersey, which had already been denied financial support at the state level, was also barren of moral support. Since few school systems wished to risk the investment into an activity which lacked affirmative support at the highest levels in the state, the New Jersey Educational Television Corporation was unable to generate adequate financing to satisfy the condition for receiving a construction permit.

In 1965, the warning issued in the 1954 report of the Commission on Educational Television was borne out. A new table of allocations for tele-

vision channels was issued by the FCC, and New Jersey's allocations were reduced from six to four. The new assignments were designated as Atlantic City (Channel 18), New Brunswick (Channel 19), Trenton (Channel 52), and Glen Ridge (Channel 77). *

We noted earlier that television channels are finite. As a precious and scarce commodity, they are subject to competition and to heavy and altogether legitimate pressures. The FCC which is under a mandate to make use of these resources, will not indefinitely permit them to remain idle. By not acting, New Jersey has lost two of the six it had. The handwriting is on the wall; if we do not act now, it is only a matter of time before the state loses the others.

The normal competition for allocations is sure to be accelerated by the new era opening in public television nationally. Moreover in the case of UHF channels, pressure is mounting because manufacturers are now required to equip new sets to receive UHF stations, and the cost of UHF reception is bound to decline while the quality of signal increases. All this spells an even shorter decision time for the State of New Jersey.

At the present time, there are 8 non-commercial educational radio stations licensed to educational institutions in the State of New Jersey. In addition, there are two applications pending before the FCC.

*It is interesting and ironic to note that under the enabling legislation some New Jersey school systems are contributing to school television services from out-of-state stations, namely Channel 12, WHYY, a Philadelphia station licensed to Wilmington, Delaware and Channel 13, WNDT, a New York Channel licensed to Newark, N. J., even though such services are intended primarily for schools outside New Jersey. These school districts evidently attach value to instructional television programs even if they are not designed primarily for their schools.

Ultimately, a live, interconnected educational radio network -- an integral part of the total public broadcasting system -- is undoubtedly in the best interests of the state. However, if the existing educational radio stations in New Jersey were interconnected, coverage, at best, would be spotty. Many of these stations, operating at low power, reach small areas. Their program philosophies range from strictly on-campus, in-school needs, to modest attempts at reaching the broad community. Further, the great majority of citizens do not currently perceive these stations as a major communications source. If the educational radio stations in New Jersey were ever to form the central core of a statewide network, major changes would be essential, e.g., higher operating power, an education-promotion campaign throughout the state, and a carefully coordinated plan for general upgrading of each station's overall service.

Given the current status of educational radio in New Jersey and the state's needs, a different approach to creating a viable educational radio system may be necessary.*

Since New Jersey communities, schools, colleges, and citizens have no state system of public broadcasting, they must fend for themselves-- either-- by linking up to services intended for out-of-state audiences or by developing their own local facilities and services, which by their nature must be sharply limited in scope and quality.

* See Appendix III, Educational Radio for the State of New Jersey.

By denying ourselves public broadcasting we are foregoing a vital aid to crystallizing the true identity of New Jersey and advancing understanding of the state among its own citizens and the rest of the nation. We are also denying New Jersey communities and citizens full access to the information, knowledge, and education they need for their fulfillment and for their role as productive, participating citizens. And we are constricting the flow of communications so necessary to the full development of our potential, as individuals, communities, and a state.

Acutely aware that decisions must be made, and soberly sensitive to what the lack of decision has cost New Jersey in the past, the Commission recommends positive action to develop a public communications instrument for the State of New Jersey.

What follows is a plan to move ahead and secure a system for public broadcasting for New Jersey. The recommendations are based on the work of the Commission on Public Broadcasting over a six-month period.

The plan takes into account the experiences in public broadcasting throughout the United States and that of New Jersey. It is a blueprint for action on a system that should serve New Jersey well for some time to come.

We have made every effort and consulted talented experts to insure that the plan is feasible and imaginative. We believe it can be effective and efficient. We believe it will vastly facilitate communications

in, for, and about New Jersey and advance understanding of its problems and opportunities. We believe it is flexible, capable of serving everyone in New Jersey -- the children of the state and their parents, New Jersey's institutions and industries, and its agencies of government. If New Jersey takes decisive action now on public broadcasting, it can arm itself with a unique new instrument for helping our citizens make better decisions about their own lives and the destiny of their state.

SUMMARY OF RECOMMENDATIONS

The following Summary of the Commission's Recommendations for a Public Broadcasting System for New Jersey is divided into four parts: The Organization of the System; its Engineering capability; the types of Programs to be generated; and, finally, the System's Financing.

ORGANIZATION

The Commission recommends that the Governor and the State Legislature act promptly to authorize and establish the New Jersey Public Broadcasting Authority -- a state-chartered, publicly-supported, autonomous instrumentality, charged with the responsibility for administering and managing a system of public broadcasting in the State of New Jersey. The Authority should be conceived as a free-standing institution. It should be organized as a non-profit, nongovernmental public body or as a new, specially designed and specially administered state agency. It should be empowered to receive and disburse government and private funds in furtherance of its authorized purposes. The Authority, established to serve the state's public interest, should be designed and maintained in a manner that will permit it to respond to and promote that interest. The Commission believes that such an Authority is fundamental to an effective public broadcasting system for the State of New Jersey. It will enhance diversity and excellence in programming and provide the citizens of the state with a public broadcasting system that reflects freedom, imagination, and initiative and is truly responsive to local, regional and state needs.

ENGINEERING

The Commission on Public Broadcasting recommends that a broadcasting complex be developed providing maximum utility to the populace of New Jersey. The system will be of high quality, and will include color technology. The complex will be an integrated system for reaching the mass population on an open-circuit basis as well as a system for reaching public agencies, instructional and public service commitments via closed-circuit techniques.

The broadcasting complex is so conceived as to provide the following services and facilities:

(1) Deliver television signals to the New Jersey population, on a predicted basis of some 97.7 per cent coverage, via four ultra high frequency (UHF) transmitters located in the vicinity of Atlantic City, Trenton, New Brunswick, and Glen Ridge.

(2) A distribution-center-complex for the purpose of disseminating programs to each of the transmitter locations and/or receiving programs from each of the transmitter locations described in (1) above. This will make feasible simultaneous broadcasting from all four UHF transmitters, or separate broadcasts from each of the four transmitters. The distribution-center-complex will be integrated with a production facility in the New Brunswick area so as to permit the most economical use of recording and playback equipment as required for distribution and production.

(3) Studio and production facilities so that each of the above stations can be supplied programming as specified by FCC rules and regulations, part 73.613, pertinent to studio location. This will be accomplished through two primary centers of program-originating studios -- one located in Trenton and the other more state-centrally-located near New Brunswick. In like manner, there will be smaller studio facilities established in Atlantic City and Glen Ridge. A radio news production unit will be developed at one of the above locations.

(4) Interconnection of each of the four television transmitters and production facilities with the distribution-center-complex.

(5) Three mobile television units for originating programs at any location within New Jersey, in order that the state can be a studio. Two of the units will be equipped for color. A mobile power generating plant will be available for use with any one of the mobile units.

(6) In addition to the four UHF mass audience, open-circuit transmitters described in (1) above, each transmitting site will include a cluster of four closed-circuit transmitters for distribution of public service programming to teacher training centers, hospital and medical interconnected learning establishments, instructional television to school buildings, adult educational programs, police and fireman training and the like.

(7) The design of the public broadcasting facilities anticipates the continuing progress of the state of the art of communications technology. The facilities, therefore, are designed to accommodate the broadcasting techniques of the future, such as dial access, satellite transmission, and information and retrieval systems.

At each transmitting area, then, there will be a total of five possible TV transmissions of which one is for the mass open-circuit audience and four are for closed-circuit public services. There will be studios and production facilities as are required to program the system. The system is conceived to make use of all modern technology inclusive of color. The system is designed with maximum orientation toward professional broadcast quality with provision to accommodate expansion of broadcasting and telecommunications in the future ahead.

PROGRAMMING

The Commission on Public Broadcasting's recommendations in the area of programming are divided into three distinct elements. First, programs that deal with issues, events, and activities that are of interest to most of the citizens of New Jersey. Second, programs of a similar nature, but with a more regional and community focus, will be prepared and broadcast. Third, programs of an instructional nature aimed at children and adults in and out of schools and colleges.

Programs that deal with issues, events and activities that are of interest to most New Jersey citizens, would, for example, cover such events as natural disasters, civil disorders, governmental announcements and other general information. They would cover cultural events and art collections in the state's public and private colleges and in the state and community museums. Public affairs programming can focus attention on the important issues affecting our state such as the proposed jetport and coverage of a recent study on civil disorders. Programs of statewide interest would also be aimed at teachers, consumers, pre-school children, elderly citizens, migrant workers, etc. They would inform New Jersey's citizens about their state and give the state officials a voice to their people. In short, public broadcasting would work in a myriad of ways to unify the State of New Jersey, to bring her citizens together on matters of statewide interest and concern.

When stations are not carrying statewide programs, they will broadcast programs of special interest to their local audiences. For example, such programs might cover the continuing problem of water pollution in the Raritan Valley; the inner city problems of Newark, Jersey City, Camden and Paterson; language problems of specific minority groups; town meetings, and numerous federal, county and local governmental programs in the fields of housing, health care, education, welfare, legal assistance and the like.

Third, programs of an instructional nature will be prepared and broadcast over the proposed closed-circuit channels at each of the four transmitter sites. These programs will be planned by and used at the discretion of the local school systems and colleges. An innovative aspect of closed-circuit television will be the utilization of the system by industry, labor and governmental organizations for the express purpose of providing direct instructional information to specific adult audiences.

It is further recommended initially that a New Jersey news production facility be organized to provide programs for radio stations within the state and eventually news programs for public television. It is the Commission's view that such a news service will serve to unite the state by bringing information to all citizens from all parts of New Jersey.

FINANCING

The Commission on Public Broadcasting recommends that the state assume the major financial responsibility for constructing, maintaining, and operating a public broadcasting system for New Jersey - a system which, by design, is aimed at substantially enriching the lives of all citizens in the state.

The Commission estimates the initial total capital expenditures of the system at approximately \$15.75 million; the cost of its operation at approximately \$6 million annually.

While supplementary funds may be available to the system from other public and private sources (e. g. , foundations, corporations, individuals and -- most particularly, overtime -- the federal government). the Commission finds that it would be unwise, unrealistic, and inappropriate for the state to rely on these funds to any major extend for the financing of a public broadcasting system that is designed to serve its citizens.

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ORGANIZING FOR PUBLIC BROADCASTING IN NEW JERSEY

The Commission recommends that the Governor and the State Legislature act promptly to authorize and establish the New Jersey Public Broadcasting Authority -- a state-chartered, publicly-supported, autonomous instrumentality, charged with the responsibility for administering and managing a system of public broadcasting in the State of New Jersey. The Authority should be conceived as a free-standing institution. It should be organized as a nonprofit, nongovernmental public body or as a new, specially designed and specially administered state agency. It should be empowered to receive and disburse government and private funds in furtherance of its authorized purposes. The Authority, established to serve the state's public interest, should be designed and maintained in a manner that will permit it to respond to and promote that interest. The Commission believes that such an Authority is fundamental to an effective public broadcasting system for the State of New Jersey. It will enhance diversity and excellence in programming and provide the citizens of the state with a public broadcasting system that reflects freedom, imagination, and initiative and is truly responsive to local, regional and state needs.

In reaching a decision about what would be the desirable organizational form for a statewide public broadcasting and public broadcasting telecommunications system within New Jersey, the Commission has been keenly aware of the traditional interest of Americans in fostering the expression and interchange of free ideas and the communications of responsible information to its citizenry. As with others who have concerned themselves with these important questions, the Commission has recognized the special sensitivities inherent in the field of broadcasting as well as the need to establish an institution which can effectively serve the citizens and public broadcasting needs of the State of New Jersey. For us, this has meant designing an organization which can be sustained and operated on behalf of the public, but which is insulated from undesirable political interference, controls, and entanglements.

In the course of its work, the Commission has studied the possibility of having the public broadcasting system for New Jersey operated by an existing division or section within a present department of the state, e. g. The Division of Curriculum and Instruction, Department of Education; Division of Information, Department of Agriculture; the Office of Community Services, Department of Community Affairs. But because of the specific mission and designated responsibilities of these existing divisions and sections, the Commission is persuaded that it is unreasonable and unrealistic to expect -- or require -- them to direct their energies to providing a dynamic and fully comprehensive public broadcasting system within the State of New Jersey.

The Commission has also looked into the possibility of creating a new state department or a new division of an existing department devoted solely to public broadcasting. Under current arrangements for organizing and operating state agencies, such a new department or division would not adequately serve the ends and the full needs of New Jersey public broadcasting as we perceive them. As has been stated earlier, the Commission firmly believes that direct government involvement in public broadcasting should be kept to a minimum in order to provide for the fullest flow of information. A new department or division of public broadcasting could only be a viable alternative if organized to provide the desirable degree of flexibility for action and insulated from interference - an insulation which is necessary to promote diversity, experimentation, innovation, and freedom of creativity in public broadcasting. Furthermore, because of the special professional

skills and competencies required to administer and operate a quality public broadcasting system and the shortage of creative, qualified talent in these fields, we conclude that it would be undesirable to limit staff recruiting to the classified state civil service requirements and regulations. In this regard, the Commission's conclusions are in line with the findings of the Carnegie Commission on Educational Television and the expression of public policy set forth in the federal Public Broadcasting Act of 1967.

The Commission considered a third possibility, namely the confederation of noncommercial radio and television stations within the state. The Commission believes this to be the least effective organizational design as there are clear disadvantages inherent in this type of arrangement. Technical and fiscal inefficiencies and duplication can easily arise. Second, while New Jersey noncommercial stations must stand as the bedrock for a diversified and effective public broadcasting system, it is doubtful that a confederation of the stations could provide the kind of statewide leadership -- and perspective -- required for a viable New Jersey public broadcasting system. Obviously, any form of confederation raises questions of imbalances in financing. Such imbalances would lead to an unsatisfactory rationalization of the limited private and governmental funds needed to serve a statewide public broadcasting system and its stations.

The Commission considered the possibility that Channel 12, Philadelphia and Channel 13, New York might be able to meet the public broadcasting needs of New Jersey. However, after much deliberation and after hearing testimonies from Channels 12 and 13, the Commission concluded that these two channels could not fully meet the public broadcasting re-

quirements of the State of New Jersey.

There are several elements underlying this conclusion: first, given their own markets and program priorities, Channels 12 and 13 would have inherent constraints -- inflexibilities and limitations -- in designing programming for New Jersey. The program needs of the people of New Jersey, then, would be sacrificed if the Commission recommended that Channels 12 and 13 -- individually or together -- serve the state's entire public broadcasting needs. Further, without developing its own statewide public broadcasting system, New Jersey will lose -- at once and forever -- the four UHF channels now allocated to it. Without the statewide system, closed-circuit channel usage would, in all probability, be reduced to spotty, uncoordinated local applications; and the effectiveness of the statewide interconnected facilities would be lost.

It is for these many reasons that the Commission recommends the creation of the New Jersey Public Broadcasting Authority -- a state-chartered, publicly supported, autonomous instrumentality, charged with the responsibility for administering and managing a system of public broadcasting in the state. The Authority should be conceived as a free-standing institution. It should be organized as a non-profit, nongovernmental public body or as a new, specially designed and specially administered state agency. The Authority, established to serve the state's public interest, should be designed and maintained in a manner that will permit it to respond and promote that interest.

We propose that the Authority be governed by a board of commissioners composed of fifteen New Jersey citizens who would serve for six-year terms. The Commissioner of Education, the Chancellor of Higher Education, the Commissioner of Community Affairs, the Attorney General, and the State Treasurer should be members of the board as officers ex officio. The remaining ten members should be chosen from distinguished citizens, prominent in fields such as education, cultural and civic affairs, industry and labor, and the arts (including radio and television). The citizen board should provide a broad representation of various talents and experience appropriate to the functions and responsibilities of the Authority, and selection of members should be made on a nonpolitical basis. Board members should be appointed by the Governor with the concurrence of the New Jersey State Senate, initial appointments being for two, four, and six years to provide for staggered terms of office of the board. The Governor should designate one member of the original board as chairman; thereafter the board would annually elect one of their members as chairman. Members of the board should serve without compensation for their services.

The Board of Commissioners should appoint a full time chief executive officer charged with the customary responsibilities of the chief officer of a non-profit corporation and such other officers as are deemed necessary to carry out the purposes of the Authority. Because of the unique nature of the Authority, all appointments to the staff should be made without regard to state civil service requirements or under the unclassified state civil service arrangements. No political test or qualification should be used in selecting,

appointing, promoting, or taking other personnel actions with respect to professional and nonprofessional staff of the Authority.

In light of the non-profit and nonpolitical aspects of the Authority, the Authority should have no power to issue stock or declare or pay any dividends; and no part of the income or assets of the Authority should inure to the benefit of an officer, director, employee, or any other individual (except as may be provided as salary or reasonable compensation for services). Finally, the Authority should be prohibited from supporting or opposing any political party or candidate for public office, elective or otherwise, and from attempting to influence legislation. The Authority should not, however, be precluded from promoting full discussion of public issues.

With respect to the Authority's activities in the field of instructional television, under no circumstances are they intended to conflict with the determination of educational policies or curriculum content which are the responsibilities of the Commissioner of Education, the Chancellor of Higher Education, and local school and college governing bodies.

The Authority, when organized, should be empowered and authorized to do the following:

- Establish, own, and operate noncommercial educational television or radio broadcasting stations, one or more public broadcasting and public broadcasting telecommunications networks or systems, and interconnection and program production facilities.

- Apply for, receive, and hold such authorizations and licenses and assignments and reassignments of channels from the Federal Communications

Commission (FCC) as may be necessary to conduct its operations and prepare, and file and prosecute before the FCC all applications, reports, or other documents or requests for authorization of any type necessary or appropriate to achieve the authorized purposes of the Authority.

- Provide coordination on matters relating to public broadcasting and public broadcasting telecommunications among the agencies of state government, all facets of New Jersey public education and individuals, associations, and institutions working in these fields both within and without the state.

The Authority will have available personnel who, upon suitable request, will provide information on broadcasting and telecommunications to governmental agencies, schools, individuals, etc.

- Establish statewide equipment compatability policies and determine the method of interconnection to be employed within the State's public broadcasting system. This does not imply a desire on the part of the Commission to dictate the kinds and types of equipment to be purchased for public school use.

- Assume responsibility for the character, diversity, quality, and excellence of programming which is released via its licensed facilities. The Authority would be responsible for presenting programs or series of programs of a controversial nature in its broadcasting activities with balance, fairness, and accuracy.

- Provide appropriate advisory assistance to other agencies of the state and local and regional groups regarding public broadcasting techniques, planning, budgeting, and related issues.

- Advise the State Legislature on state expenditures relative to public broadcasting and public broadcasting telecommunications equipment and facilities and on questions of compatibility.

- Receive gifts, contributions, and funds from public and private sources to be expended for public broadcasting and public broadcasting telecommunications operations, facilities, and programming consistent with with furthering the purposes of the Authority.

- Cooperate with federal agencies, for the purpose of obtaining matching and other federal funds and providing public broadcasting and public broadcasting telecommunications facilities throughout the state and to make such reports as may be required of the state. The Authority should likewise provide appropriate advisory assistance to local school districts and others on such matters.

- Contract with program production organizations, individuals, and noncommercial educational television and radio stations within and without the state to produce -- or otherwise to procure -- educational television or radio programs for use by noncommercial stations within the state.

- Establish and maintain a library and archives of educational television and radio programs and related materials and disseminate information about such programs.

- Conduct explorations, research, demonstrations, or training in matters related to public broadcasting and public broadcasting telecommunications in the State of New Jersey, directly; or through contracts with appropriate

agencies, organizations, or individuals; or by grants to nonprofit, noncommercial organizations such as colleges, universities and noncommercial television and radio stations.

- Acquire through lease, purchase, or otherwise real and other property and to hold and use this property for public broadcasting and public broadcasting telecommunications purposes.

- Contract for the construction, repair, maintenance, and operations of public broadcasting and public broadcasting telecommunications facilities including program production center, stations, and interconnection facilities.

- Make arrangements, where appropriate, with companies or other agencies and institutions operating suitable interconnection facilities (e. g., landlines or satellites).

The Authority, when established, would fill a presently unmet need in the State of New Jersey by providing an institutional forum to which in-state (and out-of-state) individuals and organizations can look for guidance, counsel, and direction regarding New Jersey public broadcasting and public broadcasting telecommunications. No such focal point exists within the state at the present time. Many of the persons who appeared before the Commission at its public hearings told of their frustrations through the years at the lack of a state coordinating agency in public broadcasting. This has reinforced the Commission's view that the Authority can answer this need.

While providing an institutional focal point for New Jersey public broadcasting activities, the Authority must remain responsive to the needs and requirements of local stations, local communities, and regional groups

at the same time that it maintains an appropriate statewide overview and perspective. Clearly, however, the Authority should not pre-empt local autonomy and determination in programming and program selection and choice. The Commission recommends the establishment of local and regional citizen committees to advise the stations owned and operated by the Authority to insure that those stations are sensitive to the interests and needs of the community. In addition, it is recommended that the Authority cooperate with other noncommercial television and radio stations within and without the state and, where appropriate, provide production and programming services to these stations.

Public broadcasting and public broadcasting telecommunications, like the communications field in general, are in the process of development and change. Consequently, it is expected that the Authority's role will evolve over a period of time. It is the Commission's conclusion, therefore, that the Authority should not be established under some restrictive organizational straitjacket, but must be designed, organized, and operated as a viable instrumentality which is capable of responding to the present and future public broadcasting and public broadcasting telecommunications requirements of New Jersey.

Finally, in light of the urgency of the circumstances and the late entrance of New Jersey into these key areas of communications, the Commission recommends that the Governor and the State Legislature act with prompt dispatch to establish the New Jersey Public Broadcasting Authority. The Commission is firm in its conviction that authorizing and establishing the legal

framework for the Authority is a fundamental, first step and a prerequisite for the development of a New Jersey public broadcasting system.

ENGINEERING FOR PUBLIC BROADCASTING IN NEW JERSEY

The Commission on Public Broadcasting recommends that a broadcasting complex be developed providing maximum utility to the populace of New Jersey. The system will be of high quality, and will include color technology. The complex will be an integrated system for reaching the mass population on an open-circuit basis as well as a system for reaching public agencies, instructional and public service commitments via closed-circuit techniques.

The broadcasting complex is so conceived as to provide the following services and facilities:

- (1) Deliver television signals to the New Jersey population, on a predicted basis of some 97.7 per cent coverage, via four ultra high frequency (UHF) transmitters located in the vicinity of Atlantic City, Trenton, New Brunswick, and Glen Ridge.
- (2) A distribution-center-complex for the purpose of disseminating programs to each of the transmitter locations and/or receiving programs from each of the transmitter locations described in (1) above. This will make feasible simultaneous broadcasting from all four UHF transmitters, or separate broadcasts from each of the four transmitters. The distribution-center-complex will be integrated with a production facility in the New Brunswick area so as to permit the most economical use of recording and playback equipment as required for distribution and production.
- (3) Studio and production facilities so that each of the above stations can be supplied programming as specified by FCC rules and regulations, part 73.613, pertinent to studio location. This will be accomplished through two primary centers of program-originating studios -- one located in Trenton and the other more state-centrally-located near New Brunswick. In like manner, there will be smaller studio facilities established in Atlantic City and Glen Ridge. A radio news production unit will be developed at one of the above locations.
- (4) Interconnection of each of the four television transmitters and production facilities with the distribution-center-complex.
- (5) Three mobile television units for originating programs at any location within New Jersey, in order that the state can be a studio. Two of the units will be equipped for color. A mobile power generating plant will be available for use with any one of the mobile units.

(6) In addition to the four UHF mass audience, open-circuit transmitters described in (1) above, each transmitting site will include a cluster of four closed-circuit transmitters for distribution of public service programming to teacher training centers, hospital and medical interconnected learning establishments, instructional television to school buildings, adult educational programs, police and fireman training and the like.

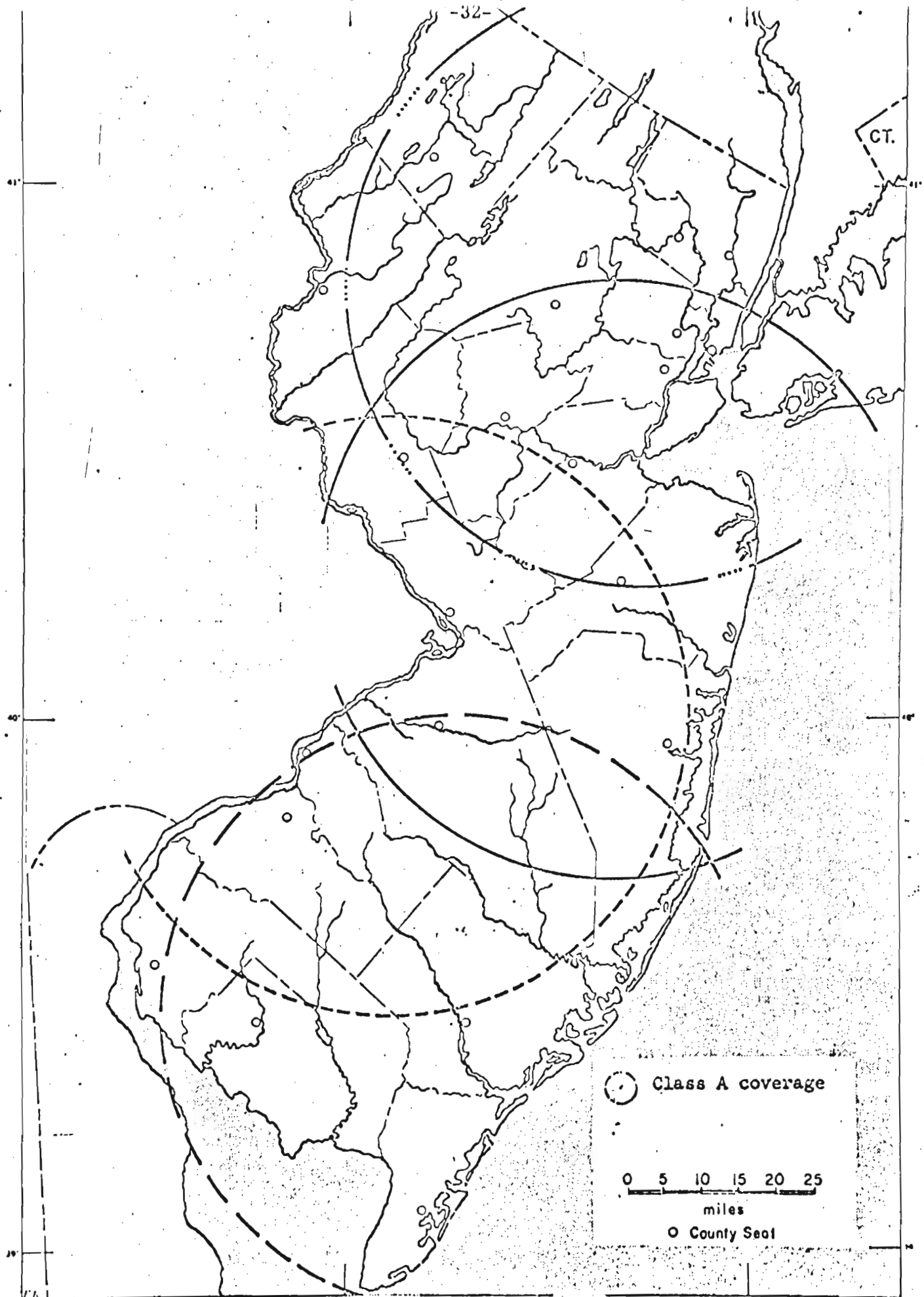
(7) The design of the public broadcasting facilities anticipates the continuing progress of the state of the art of communications technology. The facilities, therefore, are designed to accommodate the broadcasting techniques of the future, such as dial access, satellite transmission, and information and retrieval systems.

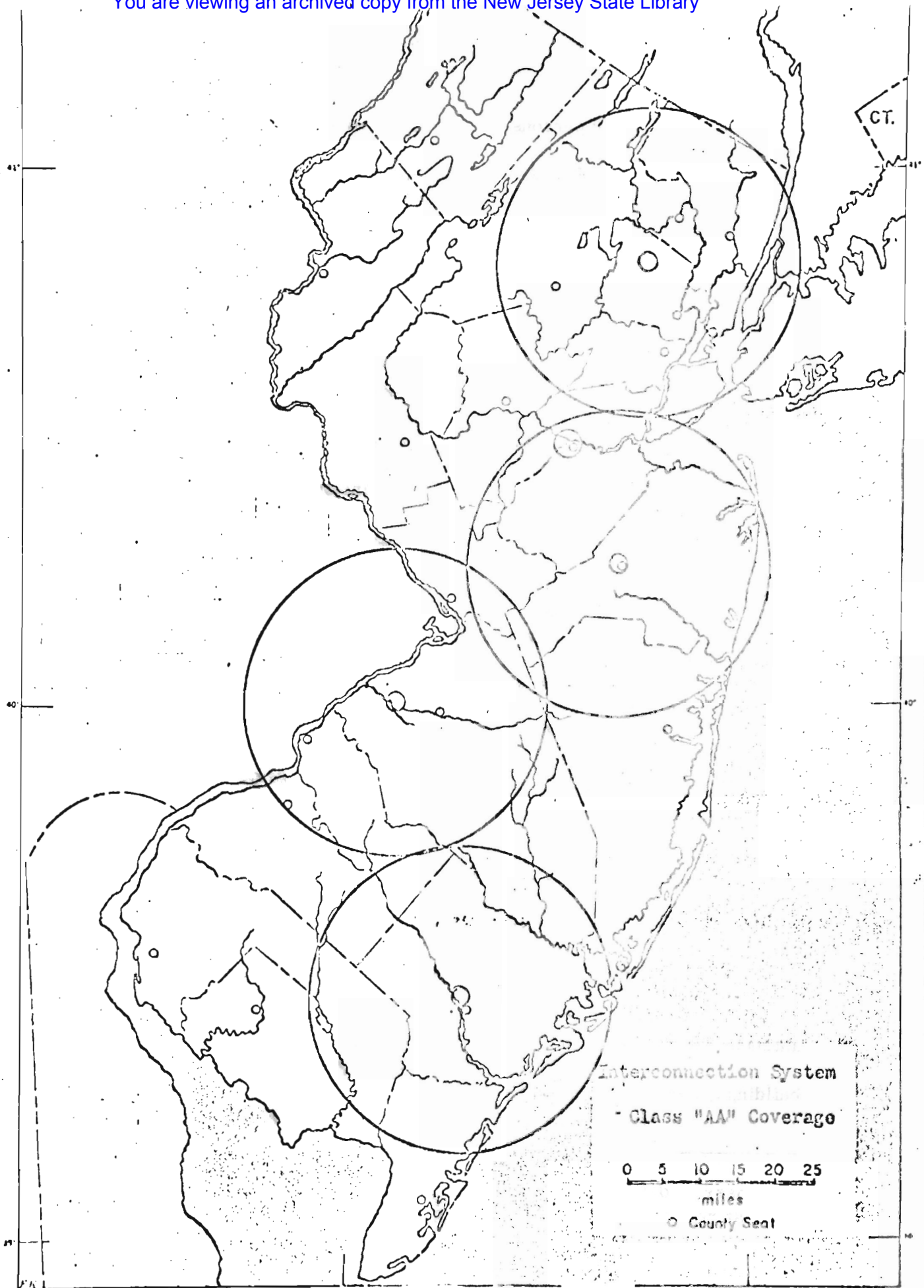
At each transmitting area, then, there will be a total of five possible TV transmissions of which one is for the mass open-circuit audience and four are for closed-circuit public services. There will be studios and production facilities as are required to program the system. The system is conceived to make use of all modern technology inclusive of color. The system is designed with maximum orientation toward professional broadcast quality with provision to accommodate expansion of broadcasting and telecommunications in the future ahead.

I. System Concept for New Jersey Public Broadcasting Transmitting Facilities

Four UHF television channels have been allocated by the Federal Communications Commission to New Jersey for educational use. Studies have been conducted to determine the feasibility of statewide coverage by from one to four television broadcast stations. Four channels are necessary for substantial coverage of New Jersey's area. Two channels would cover a lesser portion of New Jersey's population but would fail completely to serve some areas of low population density. In order to cover the state completely, it will be necessary to augment the four broadcast stations with translator systems in the northwestern limits, due to mountainous and irregular terrain. This facet of translator requirements has not yet been resolved. Figure 1 shows preliminary site recommendations and predicted coverage for the four UHF television stations on the basis of FCC grade "A" service which meets current accepted commercial television criteria. Based on studies conducted by the New Jersey Bell Telephone research group, coverage of better than FCC grade "A" service is shown in Figure 2 as grade "AA". Supporting data on signal propagation is included in Appendix IV. It will be noted that certain of the sites have been relocated (within a 15-mile radius from the FCC-assigned city) so as to effect a better population and area coverage. The State of New Jersey has a total population of some 7,078,400 persons.* If location of the transmitters were restricted to the allocated sites (center of cities), the four channels would

* Report, New Jersey Department of Conservation and Economic Development, 1967. (Projected New Jersey population, July 1967.)





cover some 6,677,190 persons. By leaving the Glen Ridge site as designated, but by moving the New Brunswick transmitter to Freehold, the Trenton transmitter to Mt. Holly, and the Atlantic City transmitter to Mays Landing, coverage would be increased by 239,850 persons. This would result in a population coverage of 6,917,040 or some 97.7 per cent.

Simultaneous installation of the four television transmitters and the accompanying studio/production facilities is recommended so that all areas of the state can benefit from the project. The planning and construction costs will be minimized with this technique and the burden of increasing costs in the future will be negated.

Although there are many factors involved in predicting signal propagation relative to UHF transmission, measurements made at Bell Laboratories for this report indicate that a good picture results with an input power level of -75dbm. Thus we may expect excellent coverage in most locations out to 25 or 30 miles. For a poor receiving antenna location (indoor antenna, lossy lead-in,* or poor connections), an additional loss of 15 to 30 db could be incurred, reducing the coverage range to between 5 and 20 miles. On the other hand, a good antenna raised above surrounding obstacles should result in good reception out to 60 miles and beyond.

Those individuals and institutions that provide themselves with a proper antenna installation, with a 10-20db gain and elevated well above surrounding buildings, can count on good to excellent reception out to 60 or 70 miles. The

* Lossy lead-in refers to a low-quality antenna-to-television-receiver cable that results in loss of signal energy at the receiver.

average home installation (moderate gain antenna above the roof) should provide excellent reception out to 20 miles. An antenna installation such as provided by indoor "rabbit ears" might limit reception to 10 miles. Details pertinent to costs for individuals and institutions may be found in the Financing section of this report.

The coverage area surrounding a transmitting antenna is directly related to the antenna height and transmitter power. Thousand-foot antenna towers are recommended for maximum signal propagation. However, Federal Aviation Agency regulations in areas of air traffic will govern tower height.

With respect to the transmitter sites, area investigation and profile studies must be completed as soon as funds are made available for this phase of the project. The study of the tentatively selected sites, of necessity, has been preliminary in form but of sufficient detail for the purposes of this report. However, additional study must be carried out before final recommendations can be made. Costs pertinent to transmitter facilities are described in the Financing section of this report.

Distribution-Center-Complex

As noted previously, this facility is included for the purpose of disseminating programs to each of the transmitter locations and/or receiving programs from these locations. This will permit simultaneous broadcasting from all four UHF transmitters or separate broadcasts from each of the four transmitters for specific area coverage. The distribution-center-complex will be integrated with the production facility in the New Brunswick area so as to permit the most

economical use of technical recording and playback equipment as required for distribution and production. All other television services surrounding New Jersey, including all commercial and noncommercial channels from New York and Philadelphia, will be available at the Control Center. These program sources may be recorded at the Center or routed to any of the New Jersey transmitting sites directly. Similarly, the Eastern Educational Network (EEN)* would be made available to the system. Likewise, any and all types of recorded materials (assuming adequate high standards of quality) can be distributed to any of the transmitting sites. Costs pertinent to the distribution-center-complex are described in the Financing section of this report.

Television Production and Administrative Facilities

Production facilities fall into five categories, namely, the primary production complex centrally located at an easily accessible point; a second production complex established in Trenton; a third production facility for handling production activity in Newark (leased facilities); fourth, two studios associated with the Glen Ridge and Atlantic City areas; and, fifth, three mobile vans capable of moving to various locations anywhere in New Jersey as local and/or programming needs require.

Primary Production Complex. This facility should be located in close proximity to the Control Center in order to effect an economical use of

* EEN is a network of educational or public broadcast television stations extending from Boston and its environs to New York and Washington.

television equipment as related to program recording and playback facilities.

This system will embrace the use of color to the fullest extent, as well as the usual black and white techniques. The complex includes three studios whose projected size would be 60' x 100', 40' x 70', and 30' x 40'. Services necessary for television production, including scene construction and storage, maintenance areas, dressing rooms, graphic production, rehearsal hall, office space, recording and playback facilities, are also planned for the complex. The studios will be equipped, respectively, with four-color cameras, three-color cameras, and three-color cameras. Facilities for recording and/or playback will be color/black-and-white compatible. All switching, distribution, synchronous signal generating, and test equipment will maintain color and/or black-and-white performance.

The Trenton Production Complex. This facility will be color and/or black-and-white oriented with support facilities as described for the primary center, except that it will be a two-studio operation. One studio will be 60' x 100" and the other, 40' x 70'. Each studio will include three-color cameras and common record and playback facilities as required to program the two studios effectively. This facility will be interconnected with the centrally-located distribution center.

The Newark Production Area. This facility will initially consider the use of leased (WNDT) facilities at Symphony Hall (Mosque Theater Building). Arrangements might also be made to use Symphony Hall for Newark cultural programming. The WNDT studio in Newark has only black-and-white facilities.

Color requirements in this area can be accommodated via use of a color mobile van. The eventual location of the Newark Production Area has been left open so that it may fit into the city's plan relative to the Model City Development Program.

Studios in Glen Ridge and Atlantic City. These studios are contemplated to operate in concert with the respective transmitter installation. Each of these studios will be equipped with two black-and-white television cameras. Each facility will encompass sufficient film and video tape playback equipment to permit simultaneous on-air operations as programmed from the distribution center, from local originations, and/or local production of programming for recording. Support functions are also included as required for local production.

Building complexes are required to house each of the above facilities including the production and administrative facilities in the New Brunswick and Trenton areas and the studio-transmitter operations scheduled for Glen Ridge and Atlantic City. Appendix VII shows projected elevation and plan views of the three building structures. It will be noted that the "operational flow" at each facility allows for ease of movement for the various production and administrative functions.

Costs pertinent to the television production and administrative facilities are described in the Financing section of this report.

Interconnection and Network Electronic Control Facilities

Interconnection facilities are proposed as follows:

1. A two-way circuit to be installed between the Control Center and each transmitter. This would provide for feeding program material to each transmitter site from a distribution center located centrally in the state and designated as Distribution and/or Control Center.

2. Additionally, circuits will be provided from the Control Center to each of the transmitter locations in numbers of one, two, or three (as required) to provide closed-circuit television (CCTV) to the transmitter site and then to special service facilities for viewing centers including schools, colleges, hospitals, training institutes, prisons, and police stations.

3. Two-way circuits are to be placed in service between the Control Center and other production center facilities. This will permit the various studios to integrate with other production centers in the state on a transmit and/or receive basis. Appendix V shows the circuit interconnection system describing the manner in which programs may be directed to any area facility, on a basis of simultaneous programming or on the basis of area selectivity as required by the specific needs of New Jersey. Interconnection costs on the basis of purchase and lease are outlined in the Financing section.

Mobile Television Remote and News Facilities

The three mobile vans will accommodate one four-color camera production unit and two black-and-white units, comprising four cameras each. Each of the vans will be equipped with appropriate video tape recorders as

relating to color and/or black-and-white system requirements. One mobile regulated power unit mounted on a trailer will be provided for the vans.

News. The facilities for news coverage of New Jersey are suggested to be made up of three separate units. One would concentrate in the northern, one in the southern, and one in the central portion of the state. Each of these teams would be ready to assist the other whenever necessary. Each news unit would be provided with motion picture and still cameras, sound recorders, associated auxiliary equipment, and necessary transportation. Thus, with such mobility and flexibility, a comparatively small total news staff could cover the entire state efficiently and effectively. Costs for the mobile facilities and the news units are described in the Financing section.

The Commission wishes to point out that there is a distinct possibility of developing "dial access" programming from the Control Center, if and when such equipment is developed. Much progress is being made in this area at present in cartridge-type playback facilities for both audio and video. The Commission has been in contact with CBS, for example, with respect to the use of their newly-developed film "electronic image" technique.

Operation of the entire New Jersey Public Broadcasting complex, as described, represents a complicated integration of facilities and teams of people with specialized talents. Since the system will be operating between two areas supporting a high degree of television expertise (New York and Philadelphia), the thought of securing qualified and trained personnel at low cost is unrealistic. Therefore, for purposes of operational budget preparation, the

personnel cost is based on prevailing pay scales in New York and Philadelphia. The cost factors relative to personnel staffing are described in the Financing section.

In the actual functioning of the network, it is anticipated that some of the work requirements can be met by using student help. Further, it is expected that college and high schools can use the state television facilities as a practical training experience for students interested in this field. These two "labor pools" will result in certain economics that are not reflected in the budget consideration.

Other operating expenses under the classification of "overhead" are also projected as budgetary items in the Financing section. These expenses include equipment maintenance, building maintenance, janitorial services, heat, light and power, vehicle maintenance, duplication, postage, office supplies, fringe benefits, legal, accounting and insurance charges, vehicle supplies, film stock, video tape cost, travel expenses, telephone services, shipping and receiving costs, etc.

II. Quality and Expansion of the New Jersey Public Broadcasting System

The guiding concept during the planning of the New Jersey public broadcasting system has been to build in a high degree of quality in terms of equipment design and freedom from excessive maintenance. Further, the basic design philosophy has been so structured as to include the potential for expansion and change as technology moves forward in both broadcasting and telecommunications. This point of view is reflected in the recommendation that the system include color technology, that high-power-level transmitter operations be effected, and that closed-circuit extensions (via the use of 2500 MHz) be developed to reach into special service areas. This "quality concept" is most necessary in the evaluation of equipment used for recording and playback facilities.

With respect to program origination, it is essential that the highest quality video tape recording equipment be acquired. The recorded or dubbed product will be used in many playback situations, each possibly demanding different requirements of the system. In this regard, the highest quality quadruplex video tape record-playback facilities are essential. Dubbing of programs should also be made of such quality as to permit playback on compatible equipment. With this kind of quality equipment, there is no problem of interchangeability in recording or playback operation.* Appendix IX includes details relevant to this mode of operation in terms of defining all technical and operating

* It is possible to find situations where this claim is not absolutely correct. However, the point remains generally valid.

specifications pertinent to professional quadruplex recording practice regarding the maintenance of high quality video taping standards and methods for handling two-inch tape.

PROGRAMMING PUBLIC BROADCASTING IN NEW JERSEY

The Commission on Public Broadcasting's recommendations in the area of programming are divided into three distinct elements. First, programs that deal with issues, events, and activities that are of interest to most of the citizens of New Jersey. Second, programs of a similar nature, but with a more regional and community focus, will be prepared and broadcast. Third, programs of an instructional nature aimed at children and adults in and out of schools and colleges.

Programs that deal with issues, events and activities that are of interest to most New Jersey citizens, would, for example, cover such events as natural disasters, civil disorders, governmental announcements and other general information. They would cover cultural events and art collections in the state's public and private colleges and in the state and community museums. Public affairs programming can focus attention on the important issues affecting our state such as the proposed jetport and coverage of a recent study on civil disorders. Programs of statewide interest would also be aimed at teachers, consumers, pre-school children, elderly citizens, migrant workers, etc. They would inform New Jersey's citizens about their state and give the state officials a voice to their people. In short, public broadcasting would work in a myriad of ways to unify the State of New Jersey, to bring her citizens together on matters of statewide interest and concern.

When stations are not carrying statewide programs, they will broadcast programs of special interest to their local audiences. For example, such programs might cover the continuing problem of water pollution in the Raritan Valley; the inner city problems of Newark, Jersey City, Camden and Paterson; language problems of specific minority groups; town meetings, and numerous federal, county and local governmental programs in the fields of housing, health care, education, welfare, legal assistance and the like.

Third, programs of an instructional nature will be prepared and broadcast over the proposed closed-circuit channels at each of the four transmitter sites. These programs will be planned by and used at the discretion of the local school systems and colleges. An innovative aspect of closed-circuit television will be the utilization of the system by industry, labor and governmental organizations for the express purpose of providing direct instructional information to specific adult audiences.

It is further recommended initially that a New Jersey news production facility be organized to provide programs for radio stations within the state and eventually news programs for public television. It is the Commission's view that such a news service will serve to unite the state by bringing information to all citizens from all parts of New Jersey.

The value of a transmission system -- television or radio -- is enhanced by the quality and diversity of the programs which are presented. This consideration guided the Commission as it deliberated on the problems of programming. With the recommended system for statewide public broadcasting, the citizens of New Jersey, for the first time, can simultaneously tune in on their state and become a part of its action. For the first time, we have the opportunity to shape a system to further establish New Jersey's identity by making imaginative use of radio and television hitherto untapped in the state. The Commission on Public Broadcasting has seriously considered the charge given to it and now proposes a programming scheme that takes into account those needs and arguments so eloquently presented to it.

The Commission on Public Broadcasting recommends the development of several areas of programming. First a commitment in news, public affairs, and cultural activities that are of interest throughout the State of New Jersey. Second, a commitment to broadcast regional and community affairs. Third, instruction programs for both children and adults. The Commission on Public Broadcasting has found no end of programming ideas for almost every segment of New Jersey's population. Some of them are provided here as examples of what might be done, given the engineering system which is proposed.

The Commission is acutely aware however, that the system should not control the kinds of programs which shall be presented. The programming will be determined by local needs of the community. In the case of instructional broadcasting in schools, colleges and universities, the programming shall be the combined responsibility of the local school district or institution of higher education

and the Commissioner of Education or the Chancellor of Higher Education. The needs of the school system, the college and the university shall be the criteria which determine what is broadcast . The kinds of programs to be presented in the classroom should be determined by individual teachers and administrators.

I. Programs of Statewide Interest

It is an unfortunate example but it is a truism that natural disasters unite people. Some years ago a spring storm caused havoc along the New Jersey seacoast. The news of the impending storm was broadcast by the New Jersey shore stations, but the broadcasts were heard only locally. When, after four days, the damage was assessed, the coverage became widespread and help poured in. Groups of civic-minded citizens in New Jersey organized clean-up teams and banded together in other ways to alleviate the misery and destruction which was caused. The Commission cites this only as a dramatic example of how, with an alert and flexible public radio and television system, New Jersey can be adequately informed almost immediately of, not only natural disasters, but civic disorders, governmental announcements, and other general information.

New Jersey has suffered from a lack of unity. There have been divisions of interests, concerns, and public policy for generations. Now, through public television and radio, there is an opportunity to bring together all these interests.

The many art collections in our public and private colleges and in our state and community museums are seen by only a fraction of the people who

might be interested in them. Public broadcasting through the medium of television can bring these treasures into our homes -- along with commentary that one does not ordinarily get on a personal visit.

Public affairs programs can focus attention on the important issues affecting our state. For a decade or more, need for a jetport in the metropolitan area has touched off a storm of public controversy. Much newspaper space has been devoted to the problem, but far less radio time has been given over to it. To residents of the areas bordering the proposed jetport sites, the problem is enormously important. And if its solution can change their lives, how will it affect others in New Jersey? For example, what are the consequences of a jetport (forget for the moment the precise location of such a facility) in terms of access roads, main roads, housing, drainage, restaurant and hotel facilities, rail travel, and other services required for such a vast project?

These questions deserve a thoughtful response. Public television will provide the forum for the debates. It will give an opportunity to the proponents and opponents to present their arguments. Public television will meet the needs of the people by permitting them to raise questions, hear arguments, and help them reach rational conclusions.

Marcus Cohn, former Assistant General Counsel for the Federal Communications Commission and professional lecturer at George Washington University Law School, has written "The broadcasting industry doesn't create society's problems and it can't solve them. What it can do is to continue to

mirror accurately the social, economic, and political orders of the environment -- with all of their stresses, strains, and sometimes revolutionary spirits -- and then offer constructive criticism of what it finds. Broadcasting will then discharge its fundamental moral and ethical obligation: to participate fully and vibrantly, as mature and emancipated media, in the democratic marketplace of ideas."*

A whole new geographical area, the richest undeveloped real estate in the world -- the New Jersey meadowlands -- is under discussion as this report is being prepared. No New York or Philadelphia television station has covered in New Jersey any of the hearings -- hearings which have produced serious statewide discussion for the first time. Public broadcasting for New Jersey should be reporting the proceedings of these hearings. Public broadcasting for New Jersey will analyze in depth these issues.

Eight days of public hearings on crime in New Jersey early in March have aroused considerable interest and concern. The sensational aspects of this story may be grist for commercial television's mill, but the more profound implications of the findings can best be covered by public broadcasting.

An excellent study of the civil disorders in three cities in New Jersey has recently been published. Of the ninety-nine recommendations it made, few citizens in New Jersey could probably name more than five. If there were public broadcasting now, each recommendation could receive attention and study. If we had daily public broadcasts now, featuring Negroes and whites

* Television Quarterly: Vol. VI, No. 2, p. 45.

in dialogue, we could be learning what the grievances are and how to best overcome them.

An interim report called "Creative Localism: A Prospectus" was published in early March by the New Jersey Legislature's County and Municipal Government Study Commission. The merits of the report, its conclusions, and its relationship to similar studies in other fields call for public discussion. There has been none. But with public broadcasting there would at least be an awareness of what is going to someday affect the way we live and the way our government operates. Further, public broadcasting would help make more meaningful studies of this kind. The airing of this report may allow the legislature to get a better idea of public opinion.

It is well known that New Jersey is a commuter state -- hundreds of thousands of our citizens cross the rivers every day to reach New York City and Philadelphia. But this mass daily migration does not disenfranchise them, nor does it diminish their role as taxpayers and concerned citizens. Public radio and television will act as their line of communication to the state.

Public broadcasting can inform these citizens, help them formulate opinions, and give them a sense of pride that they are Jersey men.

And there are innovations in the use of public broadcasting which have not been exploited. So far in the history of our state, few attempts have been made to try to bridge the gap of problems which have made New Jersey a divided state. The industrial and research-oriented north Jersey citizen seldom appreciates the problems of rural south Jersey citizens. Public broad-

casting can have these citizens meet halfway on public television. (Some years ago, the economic plight of the Lakewood area chicken farmers cried out for explanation -- why, with all the bankruptcies of those farmers, were egg prices still so high? The immediacy of public television could have brought understanding of the problem and more public discussion.)

Having called attention to some immediate problems within the area of community affairs and suggested that the public broadcast media can be useful in our understanding and approach to them, the Commission submits for consideration the following list of specific, additional usages of the media:

Teacher Training: While we recognize that there are problems involved, we feel that television shows promise as an important tool to keep teachers informed of the changes in education. Properly prepared programs, interestingly presented, can present the new math or modern physics, for example. On a state level outstanding authorities can present information to teachers in a number of communities at one time. Modern technology has now made a whole array of new teaching tools available to teachers. Teachers need help in learning how to use these new tools. All schools run workshops of one type or another many times without adequate leadership. Television will enable us to bring in competent authorities to assist the local schools with their workshop problems.

New Jersey is facing a teacher shortage. Teachers are hired from other states, and some districts in our state have to hire teachers who are not fully certified. A whole series of programs, such as "How Children

Learn," - "Diagnosing Needs of Children," - "Teaching Skills," - "Describing and Measuring Children's Growth" could benefit not only these teachers but all teachers.

Teachers can learn effective teaching techniques used by other teachers in others schools by watching them on ETV.

College graduates, while trained as teachers, are usually unprepared to face the problems of teaching in large city school systems. Special in-service programs could be offered on TV to help these teachers.

Credit Courses for Teachers: Teachers who are attempting to become fully certified and those teachers working towards advanced degrees have to travel many hours to take courses at our state college or other institutions of higher education. Some of the basic courses could be offered over our public broadcasting system. This would result in a saving of time, energy, any money. We believe that our colleges will recognize that many more teachers can be reached this way than by traditional teaching methods. We believe that this is an experiment worth trying in New Jersey.

College Courses for Credit: Each college in New Jersey and its faculty will be encouraged to use the facilities of the New Jersey Public Broadcasting System to present courses of general or specific interest for credit to at-home audiences throughout New Jersey. Every college and university will be represented if it wishes. The New Jersey Public Broadcasting System will provide professional guidance on script, format, scenery, and other technical

details. The program material will be determined by the faculty of the college and shall be scheduled by the station management in time slots which will attract the widest appropriate audience.

Consumer Education: Visible comparison shopping via television would be a potent weapon for price cutting; a few discussions of brand versus generic drug names, for instance, could drastically affect buying habits. Perhaps the need for this is greater in the poverty sector of the community, but recent disclosures by Ralph Nader and others suggest that many a well-to-do family might profitable tune in.

Homemaker Services: The television medium could be used to demonstrate a great variety of home management techniques. Courses of varying duration could be offered in basic child care, simple health principles, sanitation, family planning, and many others. Each of these, of course, can be presented by not only course instruction techniques but also by roundtable discussions, films to illustrate methods, real human beings reacting, etc.

Potentially, such programming could have a great impact on the structure of home economics. Moreover, it could lead to both a means and a rationale for revising the whole approach of county extension services, as well as that of other community service agencies serving the poverty population in New Jersey, especially that segment located in urban areas.

Children: Public television can be used as both a custodial and a teaching service for children. Extensive special programming during the day, similar to the New York Welfare Department's Head Start Foster Family Day Care program, would be a great help to home-bound mothers. It could provide examples of painting, or clay modelling, so children at home could join children in the studio learning a variety of skills while being amused and occupied.

This leads to the whole area of television programming for children, which should be drastically revised. Through the media of public broadcasting, New Jersey could make extensive use of the excellent ideas and imagination evidenced in the state libraries and state museums' weekend programs for children -- films, puppet shows, plays and the newly announced Children's Television Workshop. *

Elderly Citizens: The problems of the aged can partially be helped by public broadcasting. Information on social security, welfare benefits, Blue Cross and Blue Shield, and other types of medical and housing problems will do much to allay the fears of these elderly persons. Information about nursing homes and the types of services provided by these homes can also help families

* The Children's Television Workshop will produce a series of television programs, on-the-air, hopefully in the fall of 1969, designed to teach preschool children, particularly from disadvantaged homes. The Workshop is supported by The Carnegie Corporation, The Ford Foundation, the U.S. Office of Education and other federal governmental agencies.

who are faced with the problem of an elderly father or mother. Information to help these citizens make good use of leisure time is also an important responsibility of a good public broadcasting system.

Americans Seeking Citizenship: Approximately 8,000 New Jersey residents are seeking American citizenship. Public broadcasting could play a very important part in helping these people prepare to take and pass their citizenship examination.

Farmers: Such a simple thing as a broadcast of crop information on the radio along the Eastern Seaboard, with appropriate publicity as to frequency, etc., might make it far easier for farmers to obtain labor when and where it is needed and might contribute to regularizing migrant employment patterns. Such broadcasting on a regular basis might revolutionize the entire employment service operation both for farm and industrial worker.

Migrant Workers: With a migrant population of 20,000 to 25,000 in New Jersey each year, the need for special programs of education, day care, health education, and adult literacy training are obvious, and public broadcasting may be as effective a way as any to bring services to this population, particularly if there is some coherence in intra-state programming. Here the Commission recommends the use of both open and closed-circuit television.

Sports: The Commission is acutely aware of the wide interest in sports and sports activities. However, it is also aware of the magnificent

coverage that commercial broadcasting provides in almost any interesting sport activity.

Still, there are a few statewide high school and college contests in any sport that would warrant weekly scheduling on public television. Therefore, the Commission, realizing the interest that arises during end-of-season contests in high school sports, would encourage local public broadcasting station managers to schedule such events when local and regional interest warrant the use of the public broadcasting facilities. The Commission would encourage sports news coverage and occasional sporting event contests on public broadcasting in such popular games as basketball, baseball, football, lacrosse, wrestling, soccer, and track and field contests that have statewide or intense local or regional interest.

Leisure Activities: Hobbies of every type are part of the recreational pursuits of many. The Department of Agriculture, for example, could present information to help gardeners. What type of flowers grow best in Cape May where there is a long growing season but poor soil with a great deal of salt in the air. If you were to start a garden in Warren or Sussex counties, what should you plant? Programs on coin collecting, photography, knitting, stamp collecting, bird watching, model building and many more hobbies could provide a wealth of interesting and informative programs.

Cultural Events: There are many cultural events in the state which

deserve wide dissemination. For example, in the summer of 1968, the Garden State Arts Center, a recreational-cultural development of the New Jersey Highway Authority will begin a series of cultural events at their new facility located at Telegraph Hill Park on the Garden State Parkway. The New Jersey Symphony is another case in point. Its home base is Newark. Only recently has it presented concerts in the southernmost counties of the state, through the financial assistance provided by the New Jersey Council on the Arts. Through public television the orchestra can reach all counties of the state at one time.

Our state capital boasts a beautiful art museum and other cultural buildings. The New Jersey art shows featuring local state artists are another instance of how through public broadcasting we can give a semblance of unity to the state. Besides the art gallery, there are other exhibits that relatively few New Jersey citizens have had a chance to tour. Public broadcasting can take them there.

New Jersey theatre groups can make use of the projected television and radio facilities. Granted that television production is different from stage production, lively little theatre groups will be challenged to use the new media for their plays, motion pictures, or readings. It is anticipated that the theatre groups will proliferate when the public broadcasting system makes time and facilities available to them.

Know Your State: New Jersey since 1947 has been operating under a "new" constitution. The revision of the previous constitution has made the

operation of government relatively more efficient and has limited the number of governmental offices. Many of the Governor's cabinet officers and members of the state legislature, use the limited existing mass media as best they can, but they have little opportunity for a full presentation of their views on television because of the lack of air availability on the commercial stations which border our state.

With public broadcasting facilities, information from the various cabinet officials can be brought to the attention of the public quickly and accurately. There will be no dearth of information from the governmental offices. The efficiency of the departments will be increased since there will exist a central coordinating office for the dissemination of information. At present each cabinet officer and legislator has his own methods and techniques for reaching mass audiences -- some use their own studio facilities, others hire outside services, and still others find newer avenues to communicate. There is needless duplication which can be eliminated -- not only for saving funds but also to make government operation more efficient.

These have been some examples of what public television can do to unify our state. It would be wrong to infer that public broadcasting is a panacea. But it can make everyone aware that New Jersey is an economically and politically strong entity.

II. Local and Regional Programs

The second recommendation for programming is in the area of regional and community affairs. Unlike the ideas suggested for statewide interest which would be aired throughout the public broadcasting system, these regional and community programs would be of particular interest only to those separate local audiences within the range of the stations. When these stations are not carrying statewide programs, they will broadcast programs that will be of special interest to their local audiences. For example, the Raritan Valley faces a continuing problem of water pollution. Despite the expenditures of huge sums of money to construct a sewer system, the Raritan River continues to be polluted. Conservationists, outdoorsmen, and nature-lovers are perpetually embattled with the alleged offenders. Public discussion of the problem is rare. Public broadcasting can bring the parties of interest together to reach those people who are most affected -- the people within the New Brunswick television station range, for example.

Although the inner city problems of Newark, Jersey City, Camden and Paterson do have statewide significance, some of them are only of regional interest. For example, a language barrier exists between some of our newer residents of our cities and the community in which they now reside. These (for the most part) Spanish language citizens should have programs that will help them adjust to their new community. The cultural gap they have to bridge is enormous. They (along with too many others) need prac-

tical problems solved for them. For example, what foods to buy, what are the laws about schools for the children, where to get legal aid, whom to call if housing is needed, and so on. These needs are obvious to some, but unfortunately the services are unknown to them.

Public television can disseminate these and other messages immediately, powerfully, and meaningfully to our citizens. The Commission will rely on the local community leadership to raise the most basic question -- how can public broadcasting help us and our special immediate problems? Public broadcasting will enlist local expertise to help bring about solutions. These and hundreds of other situations like them should and, indeed, must be aired by local public television.

While most of our cities are many times too large for town meetings, part of what the town meeting used to accomplish is within reach of the media of public broadcasting. Moreover, as the Carnegie Commission observed in its report on public television, the matter is all the more important "in an era when cities are suddenly confronted with an unending series of new problems that cannot be met by administrative arrangements alone: problems that demand the engagement of each individual citizen, who must be both informed and moved to act." It would seem that any contemplated public broadcasting system for New Jersey should assume responsibility in this area and discharge it by bringing into the home and into the classroom meetings where major public decisions are hammered out, proceedings and situations where policy is formulated, and

occasions where people of the community express their hopes, their protests, and their will.

The fact is that people in different parts of the state do not have basic information about each other or their government -- information not so much in the form of pamphlets or speeches but in evidence. They require not theoretical talks about law, but courtroom scenes, and arrest procedures, not an article describing the plight of urban education or housing, but visits to the classroom and the tenement. This applies not only to cross-cultural information, or cross-geographical information, but to information about the mysteries of the mechanics of government at every level. Public broadcasting ought to fill at least a portion of this void, particularly at the local level, by reporting the quiet, daily revolutions that affect the operations of the public business.

Besides serving as an enlarged window on the world, however, the public broadcasting media can go one step further. They can serve as a "Neighborhood Service Center of the Air", dispensing information and, in some cases, serving as the citizen's representative with branches of government.

In the field of housing, health care, education, welfare, legal assistance, and the like, there are numerous federal, county and local governmental programs. However, as it is often observed, the people who have the problems often do not know that there are outposts of government equipped to offer a cure. And it is easy for the administrators in their turn to remain

substantially ignorant of the specific needs of the people who fall under their jurisdiction, or perhaps be led to believe that there are no outstanding human needs to be served.

Those who do recognize existing needs, however, spend considerable time and money trying, in various ways, to communicate with those they seek to serve.

The kinds of urban problems susceptible to treatment in a "Call for Action" format are endless. The "Jobathons" broadcast by an increasing number of commercial radio stations are but one example. Public broadcasting in our urban areas could be used to encourage voter turnout in the Office of Economic Opportunity (OEO) community action elections. We can certainly make a much more creative use of call-in shows. Further, there are probably workable limits within which an "Ombudsman of the Air" could be created, to receive and report on citizen complaints, and, in effect, to make justified private grievances into public matters.

Residents of the ghetto who, over a period of time, have met continually with defeat and denial, generally possess a low degree of self-esteem. In attempting to prepare them for employment or channel them into any of a variety of constructive or self-fulfilling pursuits, this fundamental condition is one of the first barriers to be overcome.

The absence of positive community identity is another condition prevailing in the ghetto areas of our state. The press sometimes fails to attract positive attention to the area because of its limitation as a medium.

As such, a forceful public broadcasting medium could substantially aid the development of strong, positive community identity by having a large amount of local programming covering subjects such as the following: local high school competitions, dramatic events, musicals, Police Athletic League and other amateur sporting events, biographic programs of local Negro leaders, Negro history dramatically presented, and personal human interest events, such as the departure or return of young men from service in Vietnam.

Public broadcasting could serve an important unmet information need, as well. Many, if not most, of the efforts to improve ghetto communities go unnoticed by ghetto residents. Usually only a few -- those directly involved-- are aware of these efforts. While these activities have been covered by educational television and commercial broadcasters, such coverage is far too limited generally and almost nonexistent in ghetto areas. Local documentaries on both private and public efforts to improve the community could be shown to broaden awareness, raise the aspirations of the residents, and improve the credibility of the government.

This, then is our concept -- with a few specific examples -- of regional programming. It will serve the needs of local and regional areas by presenting cultural enrichment, documentaries, and commentaries on public affairs, and it will make the airwaves common carriers of opinion and insure that all sectors of community opinion have a chance to speak. *

* It should be noted that the public broadcasting system also could be an important new ground for training and source of employment. Job training in everything from newsboy or cable puller to newscaster can be an integral part of the station's operation. While maintaining quality broadcasting, young people can be given closely-supervised work experience, gaining both practical knowledge and a meaningful entry into a growing career field. Further schooling with scholarships and part-time work grants would be required to make employment in public broadcasting a realistic career choice for low-income youth.

III. Instructional Programming on Closed-Circuit

There has always been confusion of terms and definitions when educational television is mentioned. Does one mean instructional TV or education in the form of general information? For our purposes, instructional television programming means instruction on a systematic schedule used in regularly scheduled classroom situations for credit.

The flexibility of the closed-circuit and open-circuit capabilities of the proposed broadcasting system provide for maximum use by all segments of the community. The open-circuit system has been described. The closed-circuit system -- capable of transmitting four different programs at one time -- is designed for in-school use primarily. During school hours, classes in particular subject matter areas will be transmitted and used at the option of the local school systems.

However, during non-school hours the closed circuit system will be utilized secondarily by such groups as adult education specialists, industry, business executives, professional associations of doctors, lawyers, nurses, engineers, and dentists. In addition, community action workers will find manifold uses for the facilities in teaching leadership and work skills. Again it must be emphasized that the utilization of both the open and closed-circuit system must respond primarily to the needs of the various communities.

There is an increasing interest in television on the part of our New Jersey schools and colleges. Many educational institutions have purchased television receivers. Districts have contributed to Channel 12 in Philadelphia

or Channel 13 in New York City. Some schools and colleges have acquired video tape recorders, and a number of others plan to do so soon. Some of our educational buildings are wired to utilize television.

The Commission believes that New Jersey schools and colleges have a responsibility to find new and creative ways of using instructional television.

The major deterrent to the effective use of instructional television is the bell schedule in which the school day is rigorously divided into class periods. There are many variations of the bell schedule, and, in a like manner, the school curriculum varies from community to community.

The public broadcasting system, as proposed, attempts to overcome these problems by providing special closed-circuit facilities. Four 2500 MegaHertz (MHz) channels have been provided at each of the four transmitter sites. These channels will give a school building a selection of four programs to use in addition to the program being beamed over the air. It will be necessary for school buildings to be properly wired to utilize the 2500 MegaHertz channels.

Schools equipped to receive these 2500 MegaHertz channels, for example, may decide that a series of programs on New Jersey History for grade 5 is important and they would request that such a program be sent over one of these four channels at 10:00 each Tuesday morning. At the same hour, a course on driver education might be transmitted on a second channel, while the third channel could be used by individual schools to replay video-taped programs recorded off the air earlier. Any program sent to the school over any

one of these four 2500 MegaHertz channels as well as the "on-the-air" channel may be recorded for use at the appropriate time. In our judgment, recording (video-taping) such programs and using them when needed is the best way that instructional television may effectively aid the classroom teacher.

Educators will have to spend time planning ways to use this system effectively. It offers flexibility and makes the use of in-school television more feasible.

The Commission recognizes that instructional television cannot replace the teacher. The proposed video-taped courses, therefore, are to be considered merely as aids for classroom teachers. But instructional television can be more than a teaching aid; it represents a new and exciting way to bring to the classroom experiences, ideas and materials that ordinarily are unavailable to the teacher.

The Commission members believe that the kinds of classroom programs to be presented should be determined by individual teachers and administrators. Should a given school need more information for a unit dealing with historical homes in New Jersey for example, such an instructional video-tape series could be produced at the teacher's request for showing at the precise time for it to make its important educational point. This example can be extrapolated in practically any field of study -- science, history, music, art, mathematics, geography, social studies, and the wide range of extra-curricular activities that a school system may offer.

The Commission members have expressed their dismay at the neglect of adult education extension teaching on public television. The Commission recognizes that many publics are in need of mass instruction which could be made available through television -- instructional television.

So-called special interest groups can benefit tremendously from closed-circuit facilities. It is a known fact that only ten years after his college graduation an engineer is using obsolete knowledge; he must be kept informed of new developments in his field. The same kind of obsolescence occurs in most professions -- medicine, the law, teaching.

The president of the New Jersey Medical College in Newark, in reply to a Commission survey, sees the need for three distinct uses of public broadcasting for doctors. This example is given here to indicate one area of instruction that has almost universal interest. First, closed-circuit television could assist in the training of doctors and interns. Second, closed-circuit television could serve to up-date the knowledge of practicing physicians who may not have the time to attend medical society meetings or more formal classes. Here again, regularly-scheduled transmissions in local areas can be posted for the physician. In addition video-tape recordings can be played at the physician's request in his own hospital -- if it is properly equipped. Third, programs dealing with general health problems could be broadcast on the open channels for the general public.

At a public hearing of the Commission, Lewis Carliner, Professor of

Labor Education at Rutgers, the State University, presented some information on the concern of New Jersey industry for adult education. He said that in New Jersey there are available at this time tuition refunds in the sum of twenty-five million dollars. However, he points out that only two per cent of the blue collar workers and six per cent of the white collar workers take advantage of this bonus. The point illustrates the willingness of New Jersey industry to cooperate with its employees and with education to make a better citizen and state. It should be pointed out here that the unused portion of the tuition refund plan might be assigned to public broadcasting and specifically to the instructional television phases.

When public broadcasting becomes a viable instrument in New Jersey, a knowledge gap will occur. Suddenly, hundreds of thousands of people will become involved as viewers and listeners. Lesser numbers will be involved as teachers, producers, and consultants in the uses of instructional television. The Commission proposes that special courses in television utilization be made available for teachers. It is further proposed that this kind of mass training be given on public broadcasting closed-circuit television so that the special interest groups can be informed of the classroom programs and how best to use them.

Generally overlooked are the fine educational programs that many industries sponsor within their own organizations -- programs that deal with sales techniques, case histories, role-playing in supervisory jobs, public speaking, the uses of computers, better typing and stenography and book-

keeping methods, to name a few. The Commission is aware that many companies can use the closed-circuit instructional facilities to reach their employees outside the company plants. It will be possible to gather them in small groups in schools and other public buildings where reception facilities are available so they may take advantage of public broadcasting facilities. This kind of utilization can only serve to strengthen the cooperation between the private and public sectors of our complex society. It would not only benefit the companies using the facilities but it will serve to upgrade labor skills generally in the state through increased education and training.

Local government is of great importance to New Jersey, but its personnel labor under a variety of pressures and handicaps which point to the need for new and immediate methods of training officials to handle increasingly sophisticated professional responsibilities.

Means should be explored by which closed-circuit television could be used in a comprehensive training program for local government personnel.

Such a program would be designed to achieve the following objectives:

1) the development of basic skills and knowledge required to carry out specific jobs effectively and efficiently; 2) the development of an appreciation of the relationship between the specific job and the broader aspects and trends of urban society; and 3) the development of the managerial skills required for the effective direction of a modern, municipal governmental organization.

Finally, the potential of public broadcasting for training is obvious

and almost without limits. For example, the media could serve the training needs of a whole range of personnel in the field of child-development -- teachers, social workers, medical health personnel, on both the professional and non-professional levels.

Special problem areas such as education for the mentally retarded or physically handicapped -- where the pattern of response is important and repetition is necessary -- would be prime targets for any film television technique which would allow home control of speed and timing. Perhaps the closed-circuit approach is the closest we can technologically come to this right now, but the passage of a year or two may provide new techniques to serve these purposes. Thus, public broadcasting policy and program planning should be developed with this possibility in mind.

IV. Educational Radio

To strengthen the state's image -- something which has been written and talked about since the 1700's -- we propose a news service dealing exclusively with New Jersey, or with activities in surrounding states as they pertain to New Jersey. The New Jersey news coverage which is provided now through New York and Philadelphia television and radio stations is inadequate and infrequent. For example, few radio stations and no television stations cover sessions of the New Jersey Legislature. The many and varied cultural events which take place in New Jersey are attended by a handful of people.

Educational radio has been shamefully neglected. New Jersey has only eight currently operating educational radio stations. (Two other stations may join this select group in the near future.) The Commission was distressed to learn that there is little likelihood of joining these stations together to form an active New Jersey educational radio network. The effective power of most stations is so low that they can serve only a very limited area. The most powerful educational station broadcasts during school hours only and is off the air when schools recess for vacations. The Commission feels that the educational radio stations should be strengthened and that special services be provided for them.

Among our recommendations is the establishment of a news bureau for both educational radio and television. Such a news service can help unify

the state by devoting itself exclusively to disseminating New Jersey news to New Jersey listeners and viewers. News about this state is inadequately covered even by New Jersey stations. Although local radio stations serve their listeners quite well, they cannot provide the in-depth coverage of state events needed to keep their listeners sufficiently informed.

It is recommended that a top quality statewide public radio news and public affairs production service be established. Its primary purpose would be to produce news and public affairs programming, without regard, initially, to the existence of a live network as such. A basic core unit could, in fact, be established this year.

Taped programs would be immediately available on a daily basis to all interested stations, educational as well as commercial. At the outset, a minimum of two 10 or 15 minute, tightly produced programs would be distributed daily, one for the daytime, the other for evening use. As the production unit begins to function, it will soon become apparent to all concerned that the work of this vital statewide service will be seriously inhibited without the immediacy and flexibility of a live network capability.

The Commission should give top priority consideration to such a news/public affairs production service for several reasons:

- It is financially feasible almost immediately;
- It is possible to operate the service, initially, via existing broadcast stations;
- It could serve as a vital nerve center to gain support and acceptance for the entire public broadcasting system;
- It could be an important link in developing a sense of state identity within New Jersey;
- It will meet a crucial and unmet need throughout the state by providing in-depth information and opinion on New Jersey affairs to all citizens on a regular daily basis.

Walter Cronkite of CBS News has said, "I've been taught that a democratic society is workable and viable in just about the proportion that its citizenry is informed so that the citizens, the source of the ultimate power, can make or direct the correct decisions."*

A radio station can bring directly into the homes the cultural life of our state. The rigidly structured and clock-oriented broadcasts of commercial stations cannot adjust to a freewheeling discussion or the sampling of, for example, new music. They cannot spare the time for thorough discussions and debates about national and international problems; they do not prepare programs about New Jersey history; they do not broadcast programs dealing with the results of scholarly research about the population structure of our cities. But public broadcasting can and must do these jobs.

The whole matter of the use of radio in schools has scarcely been touched by educators. How effective is radio as a formal teaching device? Can radio be as effective as educational television? What scheduling problems will it pose? These are just the beginning questions which must be explored in order to discover other questions requiring further study and answers.**

* Television Quarterly, Vol. VI, No. 4, ll. 86, Fall 1967

**See Appendix III, Educational Radio For the State of New Jersey.

V. Cooperative Program Arrangements

The Commission has not been as provincial as this report might indicate by its emphasis on New Jersey interests and people. The Commission is aware of the many fine contributions which have been made to the art of public broadcasting by such organizations as Channel 12 WHYY, Philadelphia, and Channel 13 WNDT, New York, National Educational Television, the Eastern Educational Network, Public Broadcast Laboratory, and National Educational Radio, to name but a few. The Commission would encourage an early establishment of relations with these groups and with others who have interests common to the public need in New Jersey. The kinds of program resources that these organizations can bring to public broadcasting are incalculable.

The Commission in its deliberations was pleased to hear representatives of Channel 12, Philadelphia, and Channel 13, New York. The cooperation offered by both stations was gratifying and augers well for future relationships with these two sister states. The Commission will cooperate with the stations, but it realizes that neither of the stations can serve the New Jersey citizen to the full extent of his needs.

The Commission considered the proposal that time and facilities be purchased from Channels 12 and 13. This was quickly laid aside. It was agreed that eventually New Jersey would have to face up to the new media -- television particularly -- and that to delay in the acquisition of New Jersey channels would be disastrous.

In addition, the obvious flexibility of the proposed public broadcasting facility would be lost. The unique opportunity of closed-circuit channels to serve schools, colleges, and industry would be gone and the "bell schedule" would reign.

The Commission realizes the huge responsibility which is inherent in the operation of both Channel 12 and 13. WNDT serves an area covering portions of three states -- New Jersey, New York, and Connecticut. The same is true of Channel 12 -- New Jersey, Pennsylvania, and Delaware. It is virtually impossible for these two stations to accede to the requests for programs dealing with provincial New Jersey issues.

The two stations themselves understand the specific educational and civic needs of New Jersey citizens and have offered assistance to New Jersey in the planning, construction, and operational aspects of the public broadcasting complex. New Jersey will accept programs and other assistance from the two states on a contractual basis. It is expected that, when the public broadcasting stations become operational, New Jersey will be able to offer reciprocal programs to her neighbors.

The programs which are offered by National Educational Television, the Eastern Educational Network, the Public Broadcast Laboratory, and such huge libraries as the Great Plains National Instructional Television Library will also be utilized as occasions dictate. As indicated in other sections of this report, it is expected that 60 per cent of the programs on the public broadcasting network will be New Jersey oriented. It will be a necessity to join with these public broadcasting production companies to ob-

tain programs for the remaining time.

Therefore, the Commission urges full cooperation on a contractual basis with the two large public broadcasting stations in Philadelphia and New York and with other production agencies to assist in the widest range of diverse programming consistent with the needs of the New Jersey citizen.

Summary

It will be possible -- under the New Jersey public broadcasting system as designed by the Commission -- to link the four proposed television stations into a statewide network.

The system is also designed so that the four stations can operate independently, as regional outlets.

An added flexible feature of the proposed public broadcasting system is four closed-circuit television channels at each of the four transmitter sites. While each of the four television stations is presenting on-the-air television programs, each location can also be simultaneously transmitting four closed-circuit broadcast programs to schools and institutions equipped to receive such programs.

Someone once said, "What you don't know can hurt you." After many formal and informal discussions, debates, and arguments, and after reading carefully prepared documents and analyzing surveys conducted for it, the Commission on Public Broadcasting is convinced that the areas of programming which it recommends are sound, objective, and will serve the needs of the New Jersey citizen. Although there may be a quarrel with some of the examples which we have used, there can be no quarrel with the conclusion that public broadcasting -- radio and television-- for New Jersey is a necessity for our children and for a more enlightened adult citizenry. What we do not realize as New Jersey citizens is that we are being deprived of the use of a tremendous natural resource -- television and radio . We are being "hurt." This deprivation is felt most

when we try to examine New Jersey as an entity. Through public broadcasting, we are convinced that the state will be unified. Local and regional use of public television and radio will be enhanced to the degree that it is used by the citizens to discuss and understand their problems, their heritage, their culture, and their unique opportunities. And, finally, the Commission is convinced that the closed-circuit system of instructional television recommended is unique and innovative. The period of experimentation in educational television and radio is over. Educators know that it works and is efficient. Now comes the period of further innovation. Schools and colleges and indeed all segments -- public and private -- in New Jersey have an opportunity now to use a new instrument for a more fruitful and full life.

FINANCING PUBLIC BROADCASTING IN NEW JERSEY

The Commission on Public Broadcasting recommends that the state assume the major financial responsibility for constructing, maintaining, and operating a public broadcasting system for New Jersey -- a system which, by design, is aimed at substantially enriching the lives of all citizens in the state.

The Commission estimates the initial total capital expenditures of the system at approximately \$15.75 million; the cost of its operation at approximately \$6 million annually.

While supplementary funds may be available to the system from other public and private sources (e.g., foundations, corporations, individuals and -- most particularly, over time -- the federal government), the Commission finds that it would be unwise, unrealistic, and inappropriate for the state to rely on these funds to any major extent for the financing of a public broadcasting system that is designed to serve its citizens.

With respect to financing initial capital costs of the New Jersey public broadcasting system, the Commission has considered numerous alternatives. Included are various methods of financing the capital costs of similar systems in other states (e.g., bonding, taxes, general appropriations, matching grants, etc.). However, the Commission feels that this area is beyond our purview and that the final decision of financing the capital costs of the New Jersey public broadcasting system rests, ultimately, in the hands of the state. With respect to the system's maintenance and operation, the Commission recommends that these costs be borne through annual legislative appropriations, based on budgets submitted by the New Jersey Public Broadcasting Authority via the Governor, to the New Jersey Legislature.

The fact is well known that substantial resources are required to develop a viable statewide public broadcasting system. This is especially true when such effort represents a first decision to take action. New Jersey is one of four states that have not moved in the area of public broadcasting. Other states acted early and quickly to activate the educational and public broadcasting medium. Today, they have a hard core of stations and facilities on which to build and expand. New Jersey has no public broadcasting system or facilities. It has a few low-power educational radio stations with little audience and inadequate financing. To develop a statewide public broadcasting system for New Jersey means starting from zero. It means planning, designing, building, maintaining, and operating a system and all of its components -- stations, production facilities, transmission equipment, personnel and the like.

In view of this, the Commission on Public Broadcasting carefully analysed and evaluated a number of public broadcasting systems and alternatives -- gathering information from other states, consulting with various experts, etc. The system recommended, both technically and with respect to its operation, represents the most efficient and effective system that can be created at this point in time. The system is predicated on the concept of quality -- quality in production, transmission, and operation. The proposed system is comparable to any commercial telecasting system. Further -- and no less important -- the system is conceived and equipped to meet present-day needs and designed to be expanded and supplemented to meet the needs of the future.

The benefits to accrue from a public broadcasting system will be reflected in a myriad of ways: an enlightened citizenry, the recapture of the dropout, the greater strengthening of our educational process, the awareness of our citizens of available social services, and vastly better communications within the state. In light of these benefits the costs of financing the system seem little enough.

New Jersey's failure to move into public broadcasting earlier resulted in the loss of public broadcasting resources. Two of the six educational television channels once assigned to New Jersey have been lost; various funds, public and private, that were available to New Jersey for public broadcasting went to other states. These resources are lost to New Jersey forever. There is a matter of urgency; a need to move quickly and competitively to build a top quality public broadcasting system for the citizens of New Jersey.

I. Capital Expenditures to Cover the Initial Costs of Constructing a Public Broadcasting System for New Jersey

A. Amount of Expenditures

The Commission -- based on its own carefully weighed considerations and consultations with numerous experts in the field of broadcasting and technology -- estimates the initial total capital expenditures of a public broadcasting system for New Jersey at approximately \$15.75 million. The initial system is predominantly for television and includes the cost of production and transmission facilities, land acquisition, and other equipment, as outlined in the Engineering section of the report.

The projected capital expenditure includes the cost of building and equipping a first-rate radio news/public affairs production center -- estimated at between \$50,000 and \$75,000. Such a center represents the first step toward a fully developed statewide educational radio network. The Commission cannot estimate the capital costs of establishing a complete educational radio network as part of the New Jersey public broadcasting system. These costs are contingent upon the manner in which such a radio network can be ultimately developed including availability of radio frequency allocation and other factors.*

The projected initial capital expenditures for the New Jersey public broadcasting system are as follows:

* See Appendix III, Educational Radio for the State of New Jersey.

SUMMARY TABLE

INITIAL TOTAL CAPITAL EXPENDITURES FOR
NEW JERSEY PUBLIC BROADCASTING SYSTEM

1. Transmission Facilities	
Four (4) transmitters, terminal/input equipment complete with video-tape/film facility	\$ 2,080,490
Four (4) antenna and towers complete with transmission lines and gasing equipment	735,580
Eight (8) 2500 MegaHertz ITFS transmitters, antennas with associated relay towers and equipment	720,000
2. Television Production and Administrative Facilities	
Primary Production Center	
Building	2,613,240
Electronics	2,333,709
Trenton Area Production Center	
Building	1,370,680
Electronics	1,500,769
Glen Ridge Area Production Center	
Building	671,400
Electronics	349,989
Atlantic City Area Production Center	
Building	671,400
Electronics	349,989
3. New Jersey Network Electronic and Interconnection Facilities	874,000
4. Auxiliary Technical Equipment Facilities (e.g., generators, cameras, distribution facilities)	834,418
5. Radio -- News/Public Affairs Production Center	75,000
6. Specially Manufactured Vans for Mobile Control Units	354,000
7. Service Vehicles (e.g., repair trucks, staff vehicles)	24,000
8. Furnishings and Office Equipment	70,000
9. Shop and Maintenance Equipment	50,000
10. Land Acquisition	140,000
	<hr/>
TOTAL	\$15,743,844

For further details see Appendix X.

It is important to note that these capital expenditures for the New Jersey public broadcasting system are a one-time cost. At no other time will the system require a capital outlay of this magnitude. Quality equipment -- although more expensive initially -- will be less expensive to operate and maintain over the years. It is important to note too, then, that capital costs for a public broadcasting system in New Jersey are less than \$2.50 per person. They are small, too, when it is considered that they are equal to the costs of building five miles of four-lane highway. The analogy to a highway is useful, not only in cost, but also because a public broadcasting system is a highway of sorts -- a highway for ideas, discussion, and for the flow of communications.

B. Sources of Financing

The Commission recommends that the state assume the major financial responsibility for constructing the New Jersey public broadcasting system. With respect to the specific method of financing the system's initial capital construction costs, the Commission considered numerous alternatives -- e.g., bonding, taxation, general appropriations -- and concluded that the final decision in this area rests with the state.

The Commission also recognizes that supplementary funds may be available from other sources to cover certain capital costs -- although probably not at the time of initial construction. However, funds for capital costs may be available -- particularly from the federal government -- in the future, once the New Jersey public broadcasting system is in operation.

More specifically, under Title I of the Public Broadcasting Act of 1967, funds for public broadcasting facilities may be available from the federal government. However, the availability of these funds is unlikely before FY 1969 at the earliest. Further, at that time, no one state -- New Jersey or any other -- would be eligible for more than 8-1/2 per cent of the total amount which, as requested by the President, is \$12,500,000. This means that the maximum New Jersey might receive would be \$1,062,500.* A more realistic possibility, however -- particularly in light of the competing demands of many states -- is probably closer to \$500,000.

Potential capital support for the New Jersey public broadcasting system from other sources -- public and private -- is even more speculative. It seems unwise to expect substantial funds for capital expenditures from any other source. The major private foundation (the Ford Foundation) that has been involved in this area has ended its matching grants program for general public broadcasting support. The likelihood of this kind of philanthropy emanating from other areas is remote.

The Commission's recommendation that the state bear major responsibility for financing the New Jersey public broadcasting system is reinforced by the patterns of financing public broadcasting systems in other states. While the patterns of financing public broadcasting of no two states are the same -- and

* In succeeding years, the amount may increase. For example, the President has requested a total \$15,000,000 for FY 1970. This, too, however, is highly speculative.

the proposed system for New Jersey is no exception -- it is generally true that the state predominantly finances public broadcasting when all stations within the state are licensed and responsible to a single governing body, as proposed for New Jersey; and, when the state is building a system from scratch, as is also true in New Jersey.

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II. Operating Costs for the New Jersey Public Broadcasting System

A. Amount of Expenditures

Based on its own carefully weighed consideration and consultations with numerous experts in the field, the Commission sees need to provide quality trained personnel and quality programming for the proposed New Jersey public broadcasting system. Sacrifice in these areas -- like sacrifice in capital equipment -- would spell disaster for New Jersey public broadcasting at this point in time.

The Commission's investigation of other states reveals a tremendous range in cost of operation and program production among public broadcasting stations. The higher the cost, generally, the better the facility. In major markets, operating and production costs can run as high as \$2 to \$4 million for one public broadcasting station alone. In the case of New Jersey, it must be remembered that high costs are involved by the nature of the state's location -- near the best talent and facilities in the United States.

In light of these various factors, and after weighing a large number of alternatives, the Commission estimates that the cost of annual operation and program production of the proposed public broadcasting system for New Jersey, as outlined in the Engineering section of this report, would be approximately \$6 million to maintain and operate the system, its four production centers, transmission equipment, three mobile units, distribution, etc. Included in these costs of operation and program production for what is essentially a television system is approximately \$177,300 for operating the radio news/public affairs production center described earlier.

These costs are based on the assumption that the New Jersey public broadcasting system will operate on a 16-hour telecast day and will produce 60% of the total programming time; 40% coming from other sources, such as National Educational Television, Eastern Educational Network and the National Center for School and College Television.

SUMMARY TABLE
OPERATING EXPENSES OF
NEW JERSEY PUBLIC BROADCASTING SYSTEM

Personnel Staffing \$2,935,800

Glen Ridge	\$ 321,000
Atlantic City	321,000
Trenton	418,000
Mobile Units	294,000
Primary Production Center	705,500
Distribution/Primary Production Center Master Control	331,000
Radio - operating expenses	177,300
Administration	368,000

Business and Other Operating Costs \$3,237,600

(Publications; heat, power and light; legal,
accounting and insurance; postage; telephone
and teletype; fringe benefits for staff; main-
tenance; travel; janatorial services; and
supplies.)

TOTAL: \$6,173,400

For further details, see Appendix X.

B. Sources of Financing

The Commission recommends that the costs of operating the New Jersey public broadcasting system be financed by annual legislative appropriation, based on budgets submitted by the New Jersey Public Broadcasting Authority via the Governor, to the State Legislature.

As stated in the section of this report on Organization, the proposed Authority has the power and responsibility to generate, for the New Jersey public broadcasting system, funds from other sources, private and public. The experience of other states has indicated that the success of generating funds from such sources -- particularly when the public broadcasting system is centrally governed and primarily state-financed -- depends largely on a creative, energetic management and staff who are integrally involved in the state and community and fundamentally committed to actively seeking and meeting their needs.

The Commission recommends that the following sources of potential private and public funds be energetically pursued for partially financing the operation and program production of the New Jersey public broadcasting system. However, as the Commission stated earlier with respect to generating supplementary funds for the system's capital expenditures, there is no way of realistically determining which or to what extent each of these sources can be tapped.

The Federal Government: Under Title II of the Public Broadcasting Act of 1967, which establishes the Public Broadcasting Corporation, the New Jersey public broadcasting system would be eligible for support for program

production and operation. The Corporation for Public Broadcasting's authorization for a \$9 million federal appropriation from fiscal year 1968 to fiscal year 1969 was moved in the Congress and awaits White House action.

Private Foundations: The Ford Foundation, for example, recently announced a program to support local, regional, and national programming for noncommercial radio as well as television. The Carnegie Corporation of New York also made a recent grant for programming, in this case, to be generated by the Eastern Educational Network (EEN). The New Jersey public broadcasting system -- once established -- would undoubtedly be eligible for such support, although in what amounts and for what purposes cannot yet be determined. Other foundations within and outside New Jersey -- limited in budgets and in support of educational broadcasting activities in the past -- should not be counted on for any substantial amount of support for operation and program production of the New Jersey public broadcasting system.

Corporation and Individual: Experience in other states indicates that individual and corporate contributions to educational broadcasting vary considerably. They are generally highest for stations licensed to nonprofit community groups in large metropolitan areas, e.g., WNDT, New York; WTTW, Chicago; WGBH, Boston, and generally lowest for stations predominantly supported by the state legislature. Every state is different, and it would be foolhardy to overlook corporations and individuals as potential contributors -- in whatever amounts -- to the New Jersey public broadcasting system.

Other: The Commission believes that, with an active educational campaign and meaningful involvement with all of New Jersey's communities, groups, and organizations, the New Jersey public broadcasting system might generate added funds from public and private organizations and groups within the state through technical and professional services, special use of facilities, and special program production.

For example, industrial firms might use the system's facilities for producing and/or distributing training programs. Other groups -- the police and fire departments, the departments of public safety, and various other state and local administrative agencies -- might use the facilities for creating and transmitting programs for their employees. Institutions of higher education and various professional groups -- e.g., the New Jersey Bar Association, the New Jersey Education Association, the New Jersey Medical Association -- might use the facilities in similar fashion. Lastly, clusters of local school systems, faced with a common problem, may wish to contract for the production of specific programs to be used in helping to resolve the problem.

The Commission recommends that the state -- through legislative appropriations -- bear the entire cost of operation and program production for the first full two years of the New Jersey public broadcasting system's existence. Once the system is operative, a portion of these costs might be covered by funds from other sources. Experience in other states has indicated greater willingness to contribute to public broadcasting once a system is on the air and its benefits proven.

In making all of these recommendations for financing a public broadcasting system for New Jersey, the Commission is aware that certain financial costs will fall to the system's users -- to the citizens of New Jersey, to various institutions, and to schools. For any of these users, the Commission feels that the costs are small in light of the public broadcasting system's vast benefits.* With respect to institutions of public education -- e.g., schools and colleges -- the Commission recommends that the public broadcasting system make its general programming available to them free of charge, as it would to other state institutions and citizens. However, public education would be responsible for financing receiving equipment by means of federal, state, and local funds and could draw on advisory assistance in this regard from the New Jersey Public Broadcasting Authority.

In summary, the Governor's Commission on Public Broadcasting recommends that the State of New Jersey support the New Jersey public broadcasting system in the amounts and ways indicated. As designed, the system could be in partial operation within one year of legislative approval and in full operation within 18 months. The news/public affairs production center for educational radio programming could be established immediately. The Commission has considered numerous public broadcasting systems and alternative methods of financing them. It is the conclusion of the Commission that the proposed system and method of financing will provide the best quality public broadcasting for the citizens of the State of New Jersey.

* For details of user costs, see Appendix XI.

VOLUME II

APPENDICES

PUBLIC BROADCASTING FOR NEW JERSEY

May, 1968

Governor's Commission on
Public Broadcasting for New Jersey

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APPENDIX I

STATEMENT BY GOVERNOR RICHARD J. HUGHES ON THE
GOVERNOR'S COMMISSION ON PUBLIC BROADCASTING

STATEMENT BY GOVERNOR RICHARD J. HUGHES ON THE
GOVERNOR'S COMMISSION ON PUBLIC BROADCASTING

I am pleased today to announce the appointment of the Governor's Commission on Public Broadcasting. I have asked this distinguished Commission -- which is composed of outstanding New Jerseyans in education, communications, engineering, electronics, finance, law, and the arts -- to formulate policies for the development of educational television and radio in New Jersey. I shall use the Commission's report as the basis for concrete proposals for action in this field which I intend to place before the 1968 session of the New Jersey Legislature.

In recent weeks, after extensive discussions with members of my Administration and a number of distinguished leaders in education and communications, I have concluded that New Jersey must press forward to explore fully the potential of public broadcasting. Several developments during the past year have emphasized the need for decisive State action in this field. These developments include the highly creative and stimulating report to the Carnegie Commission on Educational Television, which recommended in January that a well-financed and well-administered educational television system should be developed to serve a wide range of public needs; the establishment by the Ford Foundation of the Public Broadcasting Laboratory to strengthen ETV programming; and, most importantly, the historic Public Broadcasting Act of 1967, which President

Johnson proposed to Congress in February. This measure, which has been hailed virtually without exception as a great new force for the enrichment of life in the nation, would provide for the first time substantial support for television and radio programming of high quality for educational and cultural purposes and would create a Corporation for Public Broadcasting to promote and oversee this process. The Public Broadcasting Act, which President Johnson will sign into law later this year, has passed both houses of Congress and is now in a House-Senate conference.

I am convinced that New Jersey, too, must now move forward on the course charted by this landmark legislation. For this measure betokens, first of all, a new era for instructional television. Careful studies of ITV over a decade and more suggest that students can in many instances learn equally as well from television as they do from conventional instruction. In practice, however, the experience of some other states shows that poor programming or inadequately trained personnel greatly reduces the effectiveness of televised instruction. The Public Broadcasting Act, in conjunction with legislation that New Jersey might enact, could help eliminate these shortcomings and usher in a new day for the quality of instruction available in our schools and colleges.

But beyond its use for instructional purposes -- from vocational or literacy training to foreign languages -- television is a public resource whose potential has barely been exploited. Exciting applications of open- or closed-circuit television at the present time -- conducting seminars for

law enforcement officers, providing continuing education for doctors, lawyers, and other professionals, linking hospitals and clinics together with medical schools or major medical centers, making great cultural activities available to a mass audience, and creating a better informed citizenry through reports by leaders in state and local government and industry -- barely suggest the range of possible programming in the public interest. In New Jersey, which is now authorized to activate ETV channels in Glen Ridge, New Brunswick, Trenton, and Atlantic City, I believe that a public television system can prove an invaluable resource and, indeed, a key to the identity of individual communities as well as the State itself.

I am asking the Commission to examine in addition the potential of educational radio. Non-commercial radio has been shown to be both inexpensive and highly useful as a powerful educational resource. In New Jersey, there are non-commercial radio stations associated with the boards of education in Newark, the Ramapo Regional High School District, and Hanover Park, as well as with Glassboro State College, Centenary College for Women, Seton Hall University, and Trenton State College. Furthermore multiplex broadcasting now makes possible the transmission of special educational programs to special audiences -- such as doctors -- equipped with the appropriate receivers. I charge the Commission with the task of exploring fruitful avenues of this kind in educational radio.

Furthermore, I strongly recommend that the Commission, as it develops a strategy for public broadcasting in New Jersey, make full use

of the considerable resources that New Jersey already has to offer in this field. The experience of a number of school systems in the use of instructional television, including Morristown and the Northern Valley Regional Schools, should be highly useful. The paid use of Channel 12 in Philadelphia and Channel 13 in New York by a number of New Jersey school districts within range of these stations also merits study. In addition, a significant number of our institutions of higher education have either undertaken, or are about to undertake, closed-circuit programming. Cumberland County College, for example, is deeply concerned with this instructional tool, as is Rutgers, The State University, which now broadcasts thirty-five hours a week. The Commission should also explore potential relationships with the National and Eastern Educational Television networks and other appropriate organizations.

Moreover the Commission may wish to examine the resources of institutions like the U.S. Army Signal Center and School at Fort Monmouth, where instructional television programs are broadcast over a 21-channel closed-circuit cable system, twenty-four hours a day, five days a week. In addition the Commission should consult at length with such groups as the New Jersey Educational Television Corporation, which through pioneering efforts in the early 1960's attempted to activate Channel 77 in Glen Ridge as the first step toward a State ETV network. Finally the experience of commercial television stations in the State and the expertise of the growing number of New Jersey companies that utilize audio-visual instruction should receive careful study from the Commission with respect to the strategy it develops.

The specific questions I wish the Commission to consider include the following:

1. What is the best pattern for activating the four educational channels now allocated to New Jersey?
2. What relationship should channels 12 and 13, and commercial channels receivable in New Jersey, have with the four educational channels?
3. How can costs for this system be minimized, and how should they be assumed?
4. How can first-rate programming for these channels be insured?
5. How can this system maximize the effectiveness of its service to our schools and colleges?
6. How can this system deliver maximum services to New Jersey communities for the improvement of community life?
7. What arrangements seem best for the governance and administration of this system?
8. What role can educational radio play within this public broadcasting system?
9. What experience and resources, both human and physical, does New Jersey have, in private industry and in public institutions alike, that should be associated with a public broadcasting system?
10. Finally, and most important, what objectives should New Jersey set for the scope and performance of its public broadcasting system?

I have requested the Commission to answer these questions because I believe they are of central importance to the quality of education of our children and the lives of our citizens. James Reston has observed that this year's action by Congress in support of public broadcasting may one day "be recognized as one of the transforming occasions in American life." So too may this Commission's work result in a transforming experience for New Jersey.

This Commission will be chaired by Edward J. Meade, Jr. of Upper Montclair. Doctor Meade is Program Officer in Charge for Public Education at the Ford Foundation. A graduate of Montclair State College and Harvard University, Doctor Meade has rendered distinguished service to education in New Jersey over a period of years, including most recently a paper on educational innovation which he delivered at last year's Governor's Conference on Education.

Because of the high importance which I attach to the work of this Commission I have requested five members of my Cabinet to join Chairman Meade on this Commission: Commissioner of Education Carl Marburger, Chancellor Ralph Dungan, Treasurer John Kervick, Attorney General Arthur Sills, and Community Affairs Commissioner Paul Ylvisaker.

Other Commission members include the following:

William Bowen of Princeton. Doctor Bowen is a professor of economics at Princeton University and also Provost of the University. Author of many works, he co-authored the widely acclaimed Performing Arts: The Economic Dilemma of last year. Doctor Bowen is also a member of the

Board of Directors of the Ford Foundation's Public Broadcasting Laboratory.

John Ciardi of Metuchen. Formerly a professor of English at Rutgers, Mr. Ciardi is a poet, lecturer, and poetry editor of the Saturday Review of Literature.

G. Edward Hamilton of Glen Ridge. Formerly National Director of Engineering Operations for the American Broadcasting Company, Mr. Hamilton has also served as Vice President for Engineering of the Educational Broadcasting Corporation and also of the Corporacion Venezolana de Television.

Frederick L. Hipp of Lawrence Township. Doctor Hipp is executive secretary of New Jersey Education Association.

Harold Kelly of Lincroft. Mr. Kelly is publisher of the Red Bank Daily Register.

Jose Lanza of Newark. Mr. Lanza is Program Director for Spanish Programming of Channel 47 in Newark.

Robert Locke of Far Hills. Mr. Locke is Senior Vice President of McGraw-Hill Book Company with executive responsibility for McGraw-Hill's educational activities at the elementary and secondary level.

Carroll Newsom of Westwood. Formerly Chancellor of New York University, Doctor Newsom is Vice President for Education of the Radio Corporation of America. Doctor Newsom has also rendered great service to New Jersey as Chairman of the Newsom Committee for the study of higher education in New Jersey.

John R. Pierce of Plainfield. Doctor Pierce, the recipient of many national and international awards in electronics, is Executive Director for

Research of the Communications Sciences Division of Bell Telephone Laboratories.

Pete Retzlaff of Blackwood. Formerly a star football player for the Philadelphia Eagles, Mr. Retzlaff is now a television broadcaster.

Dallas Townsend of Montclair. Mr. Townsend is a correspondent for CBS News.

Dionne Warwick of South Orange. A distinguished performing artist, Miss Warwick is especially known for her singing of contemporary popular songs.

October 17, 1967

APPENDIX II

NEW JERSEY CITIZENS WHO APPEARED BEFORE THE COMMISSION

ON PUBLIC BROADCASTING AT THE PUBLIC HEARINGS

MARCH 12 AND 13, 1968

New Jersey Citizens Who Appeared Before the Commission
on Public Broadcasting at the Public Hearings, March 12 and 13, 1968

March 12, 1968

Dr. John Bebout, Director, Urban Studies Center, Rutgers University.

Mr. Thomas Button, New Jersey Jaycees.

Mr. Lewis Carliner, Professor of Labor Studies, Labor Educational Center,
Rutgers University.

Dr. Donald Cicero, Association of New Jersey State College Faculties.

Senator Farleigh Dickinson, Jr.

Miss Emma Fantone, Associate Professor and Co-Director, Audio-Visual
Center, Montclair State College.

Mr. Anthony Ficcio, New Jersey State Federation of Teachers and the
American Federation of Teachers.

Dean Edward Frye, Professor of Education and Acting Director of the Department
of Curriculum and Instruction, Rutgers University.

Mr. Theodore S. Hatrak, Executive Director, Academy of Musical Arts.

Dean Heckel, Rutgers University Law School.

Mr. Irwin Lerner, General Manager, Pharmaceutical Division, Roche Laboratories,
Hoffman-La Roche, Nutley, New Jersey.

Mr. William Liess, President, New Jersey Audio-Visual Council.

Assemblyman Peter McDonough, Chairman, Education Committee, New
Jersey Assembly.

Father James Pindar, Seton Hall University.

Mr. Harry Smith, Assistant to the President, Essex County College.

Mr. George Tapper, Director, Bureau of Community Services, Rutgers University.

March 13, 1968

Mrs. Butler, President, New Jersey Vocational and Arts Education Association.

Mr. Bruce Campbell, Assistant to the Executive Director of the State Federation
of District Boards of Education.

Mr. Warren Davis, Superintendent, Union County Regional High School District, No. 1.

Mr. Edward Dawson, Director Somerset County Media Center.

Dr. John B. Geisinger, Superintendent of Schools, Tenafly, New Jersey and
Representative, New Jersey Association of School Administrators.

Mr. Herbert Hobler, Nassau Broadcasting Company, Station WHWH, Princeton.

Professor Korbobo, Rutgers University.

Mr. Barry Passett, Director, New Jersey Community Action Training Institute, Inc.

Dr. Sample, President, Cumberland County Community College.

Mr. Orville Sather, Director of Engineering, Station WOR, and President, New
Jersey Education Television Corporation.

Mr. George Springer, President, New Jersey Education Association.

Mr. Walter Vail, Coordinator of Instructional Materials, Glassboro Public Schools.

Mr. Arnold Zucker, Rutgers Secretary to the New Jersey Broadcasters Association.

APPENDIX III

EDUCATIONAL RADIO
FOR THE STATE OF NEW JERSEY

A Report Submitted to:
The Governor's Commission on Public Broadcasting

March 25, 1968

Submitted by:
Jerrold Sandler
Executive Director
National Educational Radio
Washington, D.C.

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FORWARD

In September, 1967, Governor Richard Hughes of New Jersey appointed a Commission on Public Broadcasting. He charged the Commission with the responsibility of blueprinting a public broadcasting system for New Jersey and of submitting a plan to him in April, 1968.

The system would be designed to bring the best of public television and radio to the maximum number of children and adults in the State of New Jersey: To improve education, increase involvement in community affairs, and enrich the social, economic and political lives of the citizens of the state.

As part of this charge, the Chairman of the Governor's Commission on Public Broadcasting, Edward J. Meade, Jr., asked me to recommend a plan for educational radio in the State of New Jersey.

The following report is hereby submitted to the Governor's Commission on Public Broadcasting for consideration as part of the overall plan for a public broadcasting system for the State of New Jersey.

The report makes two overriding recommendations for educational radio in New Jersey:

1. That specific plans for educational radio be included as part of the overall plan for a public broadcasting system in New Jersey, as submitted to Governor Hughes by the Commission on Public Broadcasting;
2. That the Commission on Public Broadcasting consider the use of educational radio as an immediate first step in paving the way for acceptance and support of the entire public broadcasting system recommended for the state.

These recommendations are made in light of the state's current educational broadcasting facilities and in light of future needs in order to develop a viable and comprehensive public broadcasting system for the State of New Jersey.

In preparing this report, the author gratefully acknowledges the following people for being so generous of their time and expertise:

Mr. Lloyd Burns, Executive Director, New Jersey Press Association
Mr. Edward Hamilton, Member, Governor's Commission on Public Broadcasting
Mr. William King, Audio-Visual Director, New Jersey Department of Education
Mr. Ted Scheft, Montclair State Teachers College
Mr. Nat Shoehalter, Director, Bureau of Radio and Television, Rutgers University
Mr. Dallas Townsend, CBS News, and Member, Governor's Commission on Public Broadcasting
Mr. Arnold Zucker, Executive Secretary, New Jersey Broadcasters Association

The author is also grateful to the educational radio broadcasters of New Jersey for their ideas and suggestions in a meeting in Trenton, February 16.

Finally, a special word of thanks to Miss Claire List of the Ford Foundation for her many helpful suggestions and editorial assistance.

SUMMARY AND RECOMMENDATIONS

1. It is recommended that the Governor's Commission on Public Broadcasting incorporate radio as an integral part of its statewide public broadcasting plan for New Jersey. Just as television has many unique attributes, so, too, has radio. Both media should be developed and utilized as working partners. Rather than compete, radio and television should work in tandem on behalf of the citizens of New Jersey.

2. It is highly desirable that a live statewide educational radio network be ultimately developed for New Jersey. However, the existing groups of educational radio stations in New Jersey, even if interconnected, are not equipped to meet that challenge. Further, the costs of interconnecting the 71 commercial and educational radio stations throughout the state, via landlines, are prohibitive.

3. As an immediate first step, it is recommended that a statewide radio news and public affairs production service be established.

- . The service would utilize New Jersey's existing educational and commercial radio stations rather than adding new ones.

- . Initial concentration would be on top quality programming rather than on live networking.

- . As the demand for its programs increases, the service would pave the way for acceptance and support of the entire state plan for public radio and television broadcasting.

4. Ultimately, it might be useful to explore acquiring three well-situated, medium high-powered commercial radio stations in the north, mid-state,

and south. These stations could serve as the backbone for a permanent, live educational radio network, capable of reaching virtually every citizen of the state.

5. Ultimately, too, the New Jersey public broadcasting system will include several sub-channels for instructional purposes, whereby radio could be delivered into virtually every classroom in New Jersey.

I. Educational Radio: Its Role in Public Broadcasting

The Public Broadcasting Act of 1967 heralds a new era in educational radio and television. This landmark legislation -- a direct outgrowth of the former ETV Facilities Act of 1962 and the Carnegie Commission's report, Public Television -- includes radio, for the first time in history, as a full, working partner with educational television. This did not happen accidentally, nor is it a minor semantic difference.*

The significance of joining public radio with public television lies in the recognition of radio's new vitality as a mass medium. With the initial impact of television behind us, we are rediscovering radio. Indeed, radio is rediscovering itself. By the middle 1950's, radio was all but forgotten. Commercial radio networking showed dramatic revenue losses, and educational radio's most important asset -- its audience -- moved over to educational television. But the past few years mark a major resurgence of interest in radio. Commercial radio is thriving in its new role as a local service. Educational radio is growing faster nationally than ever before. In fact, two new educational radio stations, on the average, have been licensed each month by the FCC during the past five years. There are now more radios sold in the United States than there are people. Further, FM is moving rapidly toward a dominant position in the broadcast industry. It is conservatively estimated that between 40% and 60% of American homes are equipped with FM receivers, and that one third of all new cars-with-radio sales are similarly FM.

* The Commission's attention is called to a report published last year by National Educational Radio, under a grant from the Ford Foundation: "THE HIDDEN MEDIUM: A Status Report on Educational Radio in the United States". The report is the first comprehensive study of educational radio. A summary is included at the end of this report. The complete study is available, on request, to National Educational Radio, 1346 Connecticut Avenue, N.W., Washington, D.C. 20036.

In view of the medium's new growth and vitality, let us briefly examine educational radio and, in particular, its role in public broadcasting:

A. What is Educational Radio?

Educational radio consists of those stations owned and operated by educational institutions, public and private, on a non-commercial basis, under licenses from the FCC.* There are more than 350 such stations, approximately 75% of which are owned and operated by colleges and universities. Another 20% are licensed to public school systems, and the other 5% are licensed to community organizations, foundations, and other non-profit entities. Most educational radio stations are FM, except for about 20 AM stations. The latter are licensed, for the most part, to land-grant colleges and universities.

B. Who is Educational Radio's Audience?

There are many examples of the diversity of educational radio audiences -- current and potential -- throughout the report, "The Hidden Medium". Increasingly, these stations service more and more specialized groups. Taken separately, each group represents a minority, but together they represent the many-storied mansion that makes up the American people. Many program plans are directed toward expanded and new forms of community service:

... Helping the disadvantaged, the elderly, the chronically ill, the poor, migrants, the retarded, ethnic and racial minorities, the socially ill, juvenile delinquents, criminals, drug addicts and alcoholics;

* This does not include carrier-current, or closed-circuit, campus stations which are not licensed by the FCC, but which, under FCC regulations, must operate with less than 10 watts effective radiating power. Such stations, generally student-operated and controlled, are primarily developed to meet extra-curricular needs of the student body in the dormitories and other nearby areas.

... Enlarging instructional services for students on branch campuses, for adults in their homes, for people taking postgraduate courses;

... Vastly increasing the range and extent of professional communications to physicians, nurses, veterinarians, lawyers, pharmacists; local, state and federal agency employees; farmer, county agents, teachers, et al.

Educational radio's audience coverage varies widely. More than 150 educational radio stations operate at the FCC 10-watt minimum level. Such stations (and New Jersey has several) radiate a signal between 2 and 10 miles maximum. At the other extreme, several powerful educational FM stations reach a wide audience with their primary signal. For example, the University of Michigan's WUOM-FM, when joined by its satellite, WVGR-FM, Grand Rapids, covers more than two-thirds of the state's population. In Wisconsin, an 11-station statewide educational radio network reaches virtually every citizen in the state.

It is worth noting that many educational radio audiences are often thought of as primarily television audiences. Not necessarily so. Many of them are reached at least as effectively -- often more effectively -- via radio, at considerably less cost and time.

C. What Is the Relationship of Educational Radio to Educational Television?

Educational radio is designed to complement, not to compete with, educational television. Radio should not be seen as taking dollars away from television, but, rather as freeing television to do what it does best and permitting radio to do its job. It is not a matter of which medium is best. Rather, it is a matter of using the right medium for the right job.

All too often, radio is perceived as the audio track of a television program. This is no more valid than thinking of television as radio with pictures. Both media are important. Both are needed. It has often been said that television speaks to the eye -- radio speaks to the mind.

There are many things which television, uniquely, can and should do. But television is expensive; it takes many dollars, hours and people to do the job right. Radio, too, has unique features: mobility, flexibility, and low cost. It takes relatively few dollars, hours and people to do the job right. No medium, Fred Friendly has said, can match radio for speed and ease of contact on a worldwide basis. One lone man, wandering a continent with a small tape recorder, can send back wonders.

D. What About the Financing of Educational Radio?

Today, educational radio is clearly underfinanced. As one might suspect, there is a relationship between a station's operating power and its income -- namely, higher-powered stations tend to be the best endowed financially, and in terms of staffing and programming. For example, the University of Michigan's WUOM-FM invests approximately \$300,000 annually for its radio service to the state; and the State of Wisconsin has budgeted some \$750,000 annually for its statewide educational radio network. At the same time, one-third of all educational radio licensees, predominantly low-powered stations, operate with less than \$10,000 annually.

Jack Gould, the New York Times Radio-TV critic, once wrote that, if educational radio were given "the 10¢ left over" from the National Educational Television's \$8 million annual budget -- or \$800,000 -- it would bring forth riches unmatched in the history of broadcasting. In short, radio's programming and operational costs can go a long way compared to television.

In the future, educational radio's financial picture looks brighter.

Under the Public Broadcasting Act of 1967, educational radio, along with educational television, will be eligible for certain kinds of financial aid. Title I, for example, will provide financial support for educational radio as well as educational television stations facilities, up to 75% on a matching funds basis. This applies to new broadcasting facilities, as well as to the improvement and expansion of old ones. The key to Title I lies in the nature and scope of the requesting station's proposed service. The broader the coverage, the more likely the aid. A proposed statewide system such as New Jersey's should fare well. Further, it is likely that an initial number of grants will be made to radio as a new area of support. A request from New Jersey for radio, then, might take precedence over a similar request for educational television, for which HEW's total grant requests already exceed \$35 million.

Title II of the Public Broadcasting Act of 1967 establishes the Corporation for Public Broadcasting which will provide programming, operational and/or interconnection support for both educational radio and television stations and networks. Because the Corporation is not yet active, it is too early to predict the pattern of its financial support. However, it has been suggested that the Corporation, particularly in its first year, will be seeking ways to stretch limited funds. Again, an innovative educational radio project with state, regional and/or national possibilities might receive a relatively high priority.

A word of caution: Congress has, as yet, made no appropriation for Titles I and II of the Public Broadcasting Act. It is unlikely that substantial amounts will be appropriated until fiscal year 1969, at which time, hopefully, \$12.5 million will be appropriated for facilities under Title I, and \$9 million for the Corporation under Title II.

II. Educational Radio in New Jersey Today: A Status Report

At the present time, there are 8 non-commercial educational radio stations licensed to educational institutions in the State of New Jersey. In addition, there are two applications pending before the FCC. At a meeting February 16, representatives of these licensees generally indicated interest in a public broadcasting system for the State of New Jersey and concern that public radio be given a key role in the system. Further, the broadcasters recognized that their stations need and would welcome more staff, money, equipment and facilities. At the same time, educational radio broadcasters in New Jersey, not fully aware of the Commission's basic charge from the Governor, tended to see the problem more in terms of their own institutional needs than in terms of a statewide public broadcasting system serving many publics.

However, as a result of the discussion, the groups unanimously passed the following resolution requesting that it be included in this report to the Commission:

- The establishment of an educational radio network for New Jersey.
- A production center to be established as part of the system.
- Establishment of appropriate mechanisms for implementing the system as soon as possible.

Ultimately, a live, interconnected educational radio network -- an integral part of the total public broadcasting system -- is undoubtedly in the best interests of the state. However, if the existing educational radio stations in New Jersey were interconnected, coverage, at best, would be spotty. Many of these stations,

operating at low power, reach small areas. Their program philosophies range from strictly on-campus, in-school needs, to modest attempts at reaching the broad community. Further, the great majority of citizens do not currently perceive these stations as a major communications source. If the educational radio stations in New Jersey were ever to form the central core of a statewide network, major changes would be essential, e.g. higher operating power, an education-promotion campaign throughout the state, and a carefully coordinated plan for general upgrading of each station's overall service.

Given the current status of educational radio in New Jersey and the state's needs, a different approach to creating a viable educational radio system is clearly indicated. The following recommendations hopefully meet this challenge.

III. An Educational Radio System for New Jersey Tomorrow: Recommendations

A. Establishment of a Statewide Radio News and Public Affairs Production Service

It is recommended that a top quality statewide public radio news and public affairs production service be established. Its primary purpose would be to produce news and public affairs programming, without regard, initially, to the existence of a live network as such. A basic core unit could, in fact, be established this year.

Taped programs would be immediately available on a daily basis to all interested stations, educational as well as commercial. At the outset, a minimum of two 10 or 15 minute, tightly produced programs would be distributed daily: one for the daytime, the other for evening use. As the production unit begins to function, it will soon become apparent to all concerned that the work of this vital statewide service will be seriously inhibited without the immediacy and flexibility of a live network capability.

The Commission should give top priority consideration to such a news/public affairs production service for several reasons:

- It is financially feasible almost immediately;
- It is possible to operate the service, initially, via existing broadcast stations;
- It could serve as a vital nerve center to gain support and acceptance for the entire public broadcasting system;
- It could be an important link in developing a sense of state identity within New Jersey;

- It will meet a crucial and unmet need throughout the state: providing in-depth information and opinion on New Jersey affairs to all citizens on a regular daily basis.

How would the news/public affairs production service be organized and function?

Organization: The news/public affairs production service should be established under and administratively responsible to the body (authority, corporation, or whatever) that is responsible for public broadcasting in the State of New Jersey. It should function as a semi-autonomous unit, with minimum political interference, and maximum mobility and flexibility. At such time when the radio service is broadened to include television, each medium should operate as a semi-autonomous unit with essentially separate budgets and staffs. On the surface, this might appear wasteful. In practice, however, the different nature and needs of the two media demand different solutions. Throughout the broadcasting industry, this approach is becoming increasingly accepted. Television is costly, relatively immobile, and calls for a large staff. Radio, on the other hand, is relatively inexpensive and mobile and can operate efficiently with a modest staff. When television and radio are administratively and fiscally lumped together, there is the tendency to think in terms of the more demanding and complex medium, television. All too often, this inhibits, even prevents, radio from doing its job.

Production Centers: It is recommended that a primary production center, and one or more supplementary centers be established. Insofar as possible, the central operation should be accessible to all points within the state and to pro-

fessional resources -- e.g. university faculty and staff -- and people with a high level of interest in the system.

One of the supplementary production centers might be located in Trenton, at the State House, or the Department of Education, in order to have continual access to the various arms of the state government. A modest unit would enable the Governor, key members of the administration, and members of the legislature to speak directly to the people, on a daily basis if desired.

The facilities of WBGO-FM, licensed to the Newark Public Schools, and serving the northern part of the state and the major urban center of Newark, might be considered for another supplementary center. Some basic facilities already exist at both Trenton and Newark so that only modest additions would be necessary. It is essential that, wherever located, the supplementary centers be tied to the primary center via two-way landline on a regular and continuing basis.

Cooperation with Broadcasters and Newspapers: The news and public affairs production service should be seen as a new and independent entity, thereby enabling it to operate at the highest level of professional broadcast journalism. Existing educational radio stations could regularly contribute program materials to the center for possible use in this statewide service. In fact, their motivation might be heightened by so participating. However, the production service should not be controlled by these affiliates. Rather, it should take leadership in providing them with unique, state-oriented programming otherwise not available from any other source.

Since the overriding purpose of the statewide radio news/public affairs production service is to reach all citizens of the state, cooperation with commercial stations is crucial. It is assumed that these stations would provide free airtime to the state service. However, the proposed budget provides for "stringer" fees which may apply to commercial broadcasters, to some extent, as well as to newspaper reporters.

A two-way working relationship with newspapers of the state is also crucial to an effective statewide radio news/public affairs service. This could be accomplished by a system of "stringer" payments to participating newspapers -- such as the major eight dailies -- for verbal and/or written feature and news material developed for the state network. At the same time, the production unit could provide the newspapers with regular written releases and summaries of major events it covers. Thus, both the radio service and newspapers would benefit from close cooperation, with both media giving credit to the originating organization.

Budget: The following fiscal recommendations, developed with the help of Mr. Dallas Townsend, CBS News, and Mr. Nat Shoehalter, Rutgers University, are based on a major assumption: That, in order to be effective, the news and public affairs service must do a consistently first-rate job. This means a financial commitment adequate to hire professional people fully equipped to deliver the kind of statewide service that the citizens of New Jersey need and deserve. The recommended salary levels in several instances may appear somewhat high. It might be possible to fill these jobs at lower salaries, although we strongly recommend

against such a policy. In the long run, New Jersey will develop a strong and unique public broadcasting system only if quality performance is given top priority from the start.

Staff

News Director (Executive Producer of Unit)	\$ 20,000
3 News Editors (responsible for assigning stories and writing)	
1 Senior Editor @ \$15,000	
2 Editors @ \$10,000	35,000
3 Reporters/Broadcasters @ \$10,000	30,000
4 Technicians/Tape Editors @ \$10,000	40,000
3 Secretaries/clerical @ \$6,000	18,000

Internship Program

6 newsroom assistants @ \$1,200 (These would be college students, chosen from New Jersey institutions of higher education)	7,800
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News Services

AP, UPI (educational rates)	(approx.) 4,000
Newspaper "stringers" (major dailies to supply additional news capability, via phone, landline, and/or in written form)	10,000
Maintenance	7,500
Operating Supplies	5,000
Total Annual Operating Budget	\$177,300
Capital Costs: Tape recorders, duplication equipment, studio and recording equipment, one mobile unit, related equipment and supplies.	Minimum: \$50,000 Maximum: \$75,000

In summary, the new statewide public radio service would begin with programming -- the heart, after all, of broadcasting. As its work becomes known and accepted, the necessary pipeline -- or network -- would be developed. At that time, it will be considerably easier to support requests for a live radio network, when the value of the product is both known and understood. At that time, too -- once regular, daily features are being produced and distributed -- it will be readily apparent which stations are interested and committed to active participation. Then a more realistic and financially feasible plan can be drawn up involving only those stations, commercial and non-commercial, which will truly make up a statewide radio network for news and public affairs. It will also be apparent which stations need landline interconnection; which ones can participate via off-the-air relay, thereby saving vast sums of interconnection lines; and which ones are willing and able to contribute program material, thereby requiring a two-way line.

It should be noted, further, that in recommending a statewide news and public affairs production service, other areas, e.g. cultural and community programs, and in-school service have not been overlooked. News and public affairs are merely the starting point -- addressing themselves to the question of "state identity" and providing a unique and valuable service which has not been done to date.

Within reasonable limits, the news and public affairs unit could begin modest and highly selective programming in other areas, e.g. a weekly instructional program, community affairs documentaries, coverage of significant

cultural activities of interest to the state. It may be in these latter areas that educational radio stations could provide a real service. It may be, too, that one group of educational and commercial stations will want and be willing to broadcast news and public affairs programs, while another combination of stations will be interested in serving cultural and in-school needs.

As the work of the news/public affairs unit progresses satisfactorily, and as live networking becomes more desirable and feasible, the service would be enlarged to include other areas of programming. By that time, the basic direction of the entire public broadcasting system should be clear, and, with it, hopefully, a legislative commitment. Viewed in this context, the daily output of the radio production service could and should help pave the way for citizen and legislative acceptance of the entire state public broadcasting system. In short, it seems realistic to proceed on this kind of step-by-step basis, thereby avoiding the risk of faltering, if not failing, by trying to do too much too soon.

B. Acquisition of New Educational Radio Stations

The need and desire for an ongoing live radio network in New Jersey will grow with the increased demand for programs from the radio news/public affairs production service. Creating a permanent, live educational radio network for New Jersey, however, is a complex matter which may take time to solve. Interconnecting the existing educational radio stations, as indicated earlier, would result in an incomplete and ineffective coverage pattern, at best.

The costs of a live interconnected radio network throughout the state, offering programs to all 71 commercial and educational stations on a non-discriminatory basis, would be prohibitive. Interconnection costs via landlines for the 71 stations is estimated at approximately \$4,800 per month for an 8-hour broadcast day; \$6,000 per month for 24-hour service.

One long-range option that should be thoroughly explored might be to acquire one or more existing FM frequencies to be licensed to the organization responsible for the statewide public broadcasting system. These frequencies could form the back bone of a live educational radio network for the state. Unfortunately, this is not easy. To be effective, such stations must radiate enough power to reach significant portions of the state's population. At the present time it appears unlikely that such medium to high-powered frequencies are available to serve the mid-state or northern areas. **

* Hook-up figures on an hourly basis are not available from the telephone company. Apparently, such an arrangement is not considered feasible.

** Fairleigh Dickinson University is contesting with New York University for the one available channel in northern New Jersey. The matter is currently pending before the FCC, which has already held its hearing in the case. Until a final decision, it should not be assumed that New Jersey will have another station.

For example, in the south, one frequency at Atlantic City is capable of handling only 3000 watts. Station WBGO-FM, licensed to the Newark Public Schools and authorized to operate at 20 kw, conceivably could become the northern anchor station for such a network. However, this might raise the question whether all stations should be licensed to the entity that is responsible for operating the statewide public broadcasting system.

It would take at least three medium to high-powered educational radio stations to cover the entire state of New Jersey. This may involve purchasing more than one existing commercial station, which is not impossible but might prove costly.

Hopefully, too, in the long run, the New Jersey educational radio network might include several closed-circuit audio channels for instructional purposes: i. e. for broadcast into classrooms throughout the state.

C. Providing an Instructional Service

Assuming activation of the four educational television channels reserved for New Jersey, it should be technically feasible to piggy-back radio signals on the sub-channels of the TV frequencies. At least one, and possibly as many as three or four, multiplex sub-channels could be developed for radio, with little additional capital cost involved. This would result in a closed-circuit audio capability, which could have significant ramifications for instructional broadcasting: i. e. such services would be made available -- along with the proposed 2500 megahertz system -- into the state's classrooms, simultaneously with the open circuit TV broadcast signals. One

word of caution: At the present state of the art, the cost of multiplex receivers is relatively high -- ranging from about \$50 to \$200 per unit.

However, this is an area which is being developed rapidly. As multiplexing becomes more of a "mass market", the unit price will go down. Within several years, and certainly within a decade, it should be possible to design and deliver such a specialized receiver into a classroom for about \$25. Some engineers have predicted that the price could go considerably lower than that, particularly if the major manufacturing is done in other countries, notably Japan.

Appendix

The Appendix includes the following which are available, upon request, to National Educational Radio, 1346 Connecticut Avenue, N. W., Washington, D. C. :

The Hidden Medium: A Summary of Educational Radio Throughout the United States

A summary of a meeting with New Jersey educational radio broadcasters on February 16, 1968.

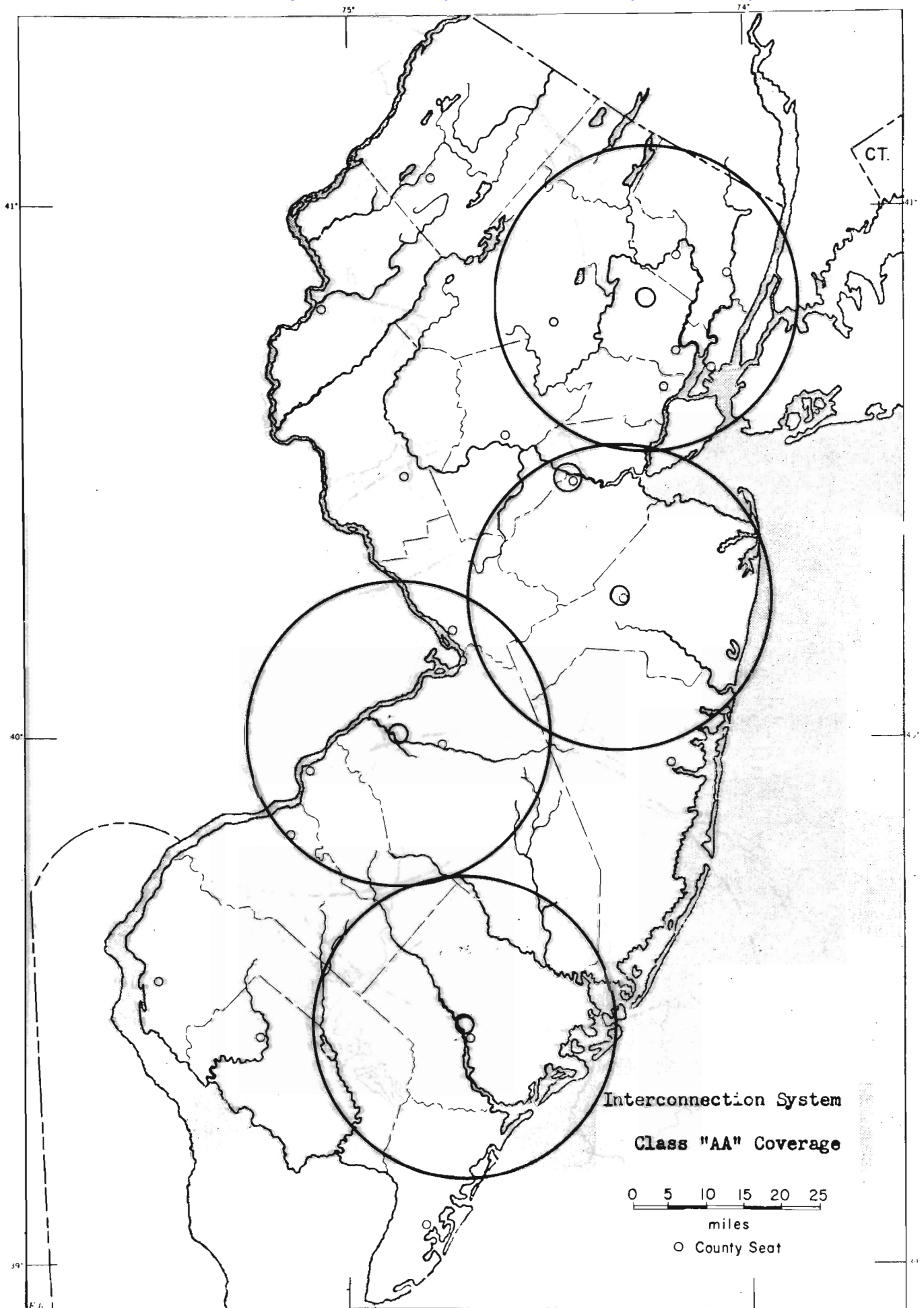
Reprints of magazine and newspaper articles on educational radio.

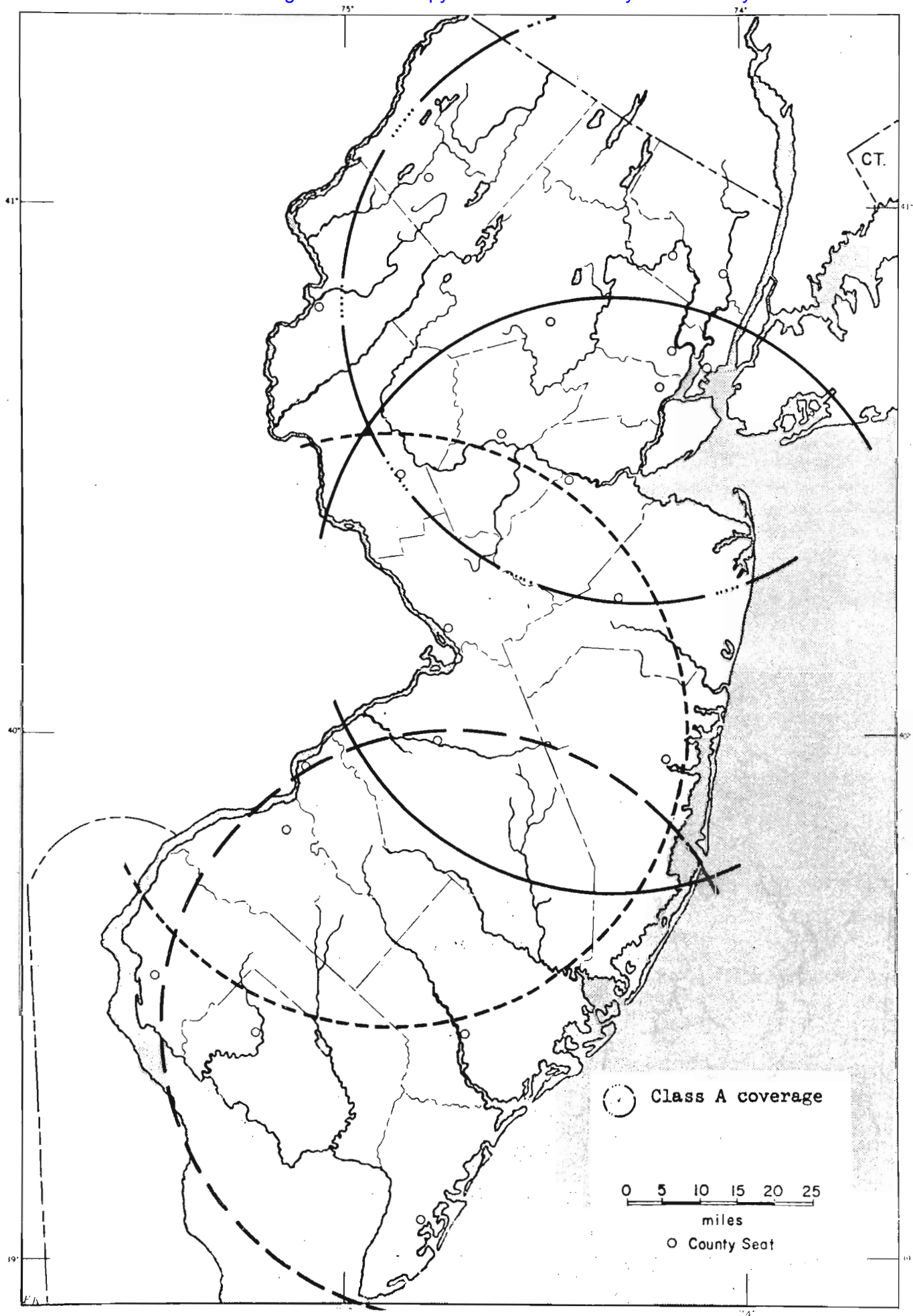
APPENDIX IV

SIGNAL PROPAGATION

pertinent to

State of New Jersey





UHF Propagation and Coverage Estimates

The Radio Transmission Research Department of the Bell Telephone Laboratories undertook a study of UHF propagation in order to estimate conservatively and realistically what coverage could be expected in the New Jersey area for the types of transmitting stations under consideration. Prior studies had been made by others of this particular problem, and these were carefully reviewed in the light of related experience at Bell Laboratories. These studies were then supplemented by measurements made on January 22, 1968, in the north Jersey area which, in general, substantiated the previous work.

Assuming a transmitter with an ERP of 800 kw and a 1000' antenna elevation, we conclude, then, that an average home installation with a modern television set would display a good picture out to about 20 miles in the moderately hilly area in northern Jersey. The "average" installation is assumed to include an antenna of moderate (3-6 db) gain mounted above the roof (but not necessarily in direct line-of-sight of the transmitter) with due care paid to connections, transmission line installation, antenna location, and orientation. A poor installation (indoor antenna) would be limited to 5 to 10 miles. On the other hand, institutions which can afford a proper antenna installation (10-20 db gain, elevated well above surrounding buildings) can probably count on good to excellent reception out to 60 to 70 miles. It should be noted in passing that increased antenna gain does not appreciably increase signal strength unless the antenna is well away from and above nearby

obstacles. However, more gain may help to reduce ghosts in any installation by proper orientation of the antenna.

The above ranges would be reduced by about 25% for a transmitting antenna elevation of 500'. Increasing the power to an ERP of 2.5 mw, on the other hand, would increase the ranges by about the same amount.

The area south of New Brunswick is considerably less hilly, and reception would be correspondingly better, with the poor installation showing good pictures to about 15 miles, the average one to about 40 miles, and the good institutional installation operating to perhaps 80 miles.

The ranges quoted here are for the average case; local terrain variations could, of course, give one much better or much poorer reception than indicated by these figures.

Coverage Calculations

A series of computer calculations was performed to estimate what effect the above television propagation findings would have on the population coverage of one to four television stations. In addition, area coverage calculations were made for some of the cases.

Three reception models were considered, the "school," "rough terrain," and "level terrain" models. Each of these models describes what proportion or percentage of the receivers at a given distance from a transmitter is able to obtain a satisfactory signal. For each model the percentage is assumed to be 100% at short ranges and to fall off to zero beyond some maximum range. The three models

differ in range and rate of fall-off; the curves for the three models are shown in Figure 5.

Separate models were used for school receivers and residential receivers since it was assumed that schools would be able to use masts and high-quality antenna systems where necessary to get a satisfactory signal, whereas for residence this is less likely. Two residential models were used due to the variation of terrain within the state and the desire to indicate how sensitive the results are to the details of the model used. All population figures are from the 1960 census.

The area calculations used the same reception curves used for population; thus a 50 square mile zone in an 80% reception area would be counted as 40 square miles covered.

The four "original" transmitter sites are at Glen Ridge, New Brunswick, Trenton, and Atlantic City. Three alternate sites were also considered: Freehold for New Brunswick, Mt. Holly for Trenton, and Mays Landing for Atlantic City. Each of the alternates is from 15 to 18 miles from the corresponding original site. Population coverages should be compared to a total 1960 New Jersey population of 6,067,000.

The studies sought the answers to three questions for the various transmitter site combinations considered:

- (1) How many people in New Jersey live where they (or their school, as applicable) could receive at least one of the television stations?
- (2) How many could receive two or more stations?

- (3) What proportion of the area of New Jersey would have one or more stations available (to its school or general population, as applicable)?

School Model

This model is based on the propagation study conclusion that with a proper antenna installation, reception would be good out to about 60 miles. The reception probability was assumed to be 100% out to 48 miles, then decrease linearly to zero at 72 miles; thus the probability of reception at 60 miles would be about 50%. With this model, four stations provide coverage of over 99% of the state's area. Two stations at Glen Ridge and Mt. Holly would cover 97% of the state.

Population coverage (in thousands) is as follows:

	<u>One or More</u>	<u>Two or More</u>
Four original sites	6,057	5,870
Glen Ridge and three alternates	6,063	5,974
Glen Ridge, New Brunswick, Mt. Holly, and Mays Landing	6,067	6,032
MARGINAL INCREASES		
Glen Ridge alone	4,986	0
Addition of second site at Mt. Holly	+1,046	2,781
Addition of third site at Mays Landing	+ 31	+1,041
Addition of fourth site at:		
Freehold	0	+2,152
New Brunswick	+ 4	+2,210

"Rough Terrain" Model

This model is based on the propagation measurements across the mountainous areas of northern New Jersey and may be considered conservative. A reception probability with range was assumed which was 100% out to 16 miles, and decreased linearly to zero at 32 miles. In the mountainous areas 16 miles corresponds to the "A contour" and 32 miles to the FCC "B contour" (see Figure 3). Population coverage (in thousands) and area coverage (in percent of the state's area) are as follows:

	<u>Area</u>	<u>One or More</u>	<u>Two or More</u>
Four original sites	--	4,979	2,066
Glen Ridge and three alternates	63%	5,518	729
Glen Ridge, New Brunswick, Mt. Holly, and Mays Landing	--	5,433	2,002

MARGINAL INCREASES

Glen Ridge alone	17%	3,825	0
Addition of second site at Mt. Holly	+19%	+ 916	0
Addition of third site at Mays Landing	+16%	+ 269	+ 54
Addition of fourth site at:			
Freehold	+11%	+ 508	+ 675
New Brunswick	--	+ 423	+1,948

"Level Terrain" Model

This model is included as representative of propagation over the level areas of the state and as an indication of the dependence of results on the details of the model. The reception probability is assumed to be 100% out to 20 miles, then decreases linearly to zero at 60 miles. Despite the difference in medium distance coverages (70% coverage at 32 miles compared to zero for the "rough terrain" model, for instance), agreement on first-station availability is good. Population coverage (in thousands) is as follows:

	<u>One or More</u>	<u>Two or More</u>
Four original sites	5,707	4,398
Glen Ridge and three alternates	5,912	3,745
Glen Ridge, New Brunswick, Mt. Holly, and Mays Landing	5,894	4,643

MARGINAL INCREASES

Glen Ridge alone	4,423	0
Addition of second site at Mt. Holly	+1,125	+ 700
Addition of third site at Mays Landing	+ 189	+ 627
Addition of fourth site at:		
Freehold	+ 175	+2,418
New Brunswick	+ 157	+3,316

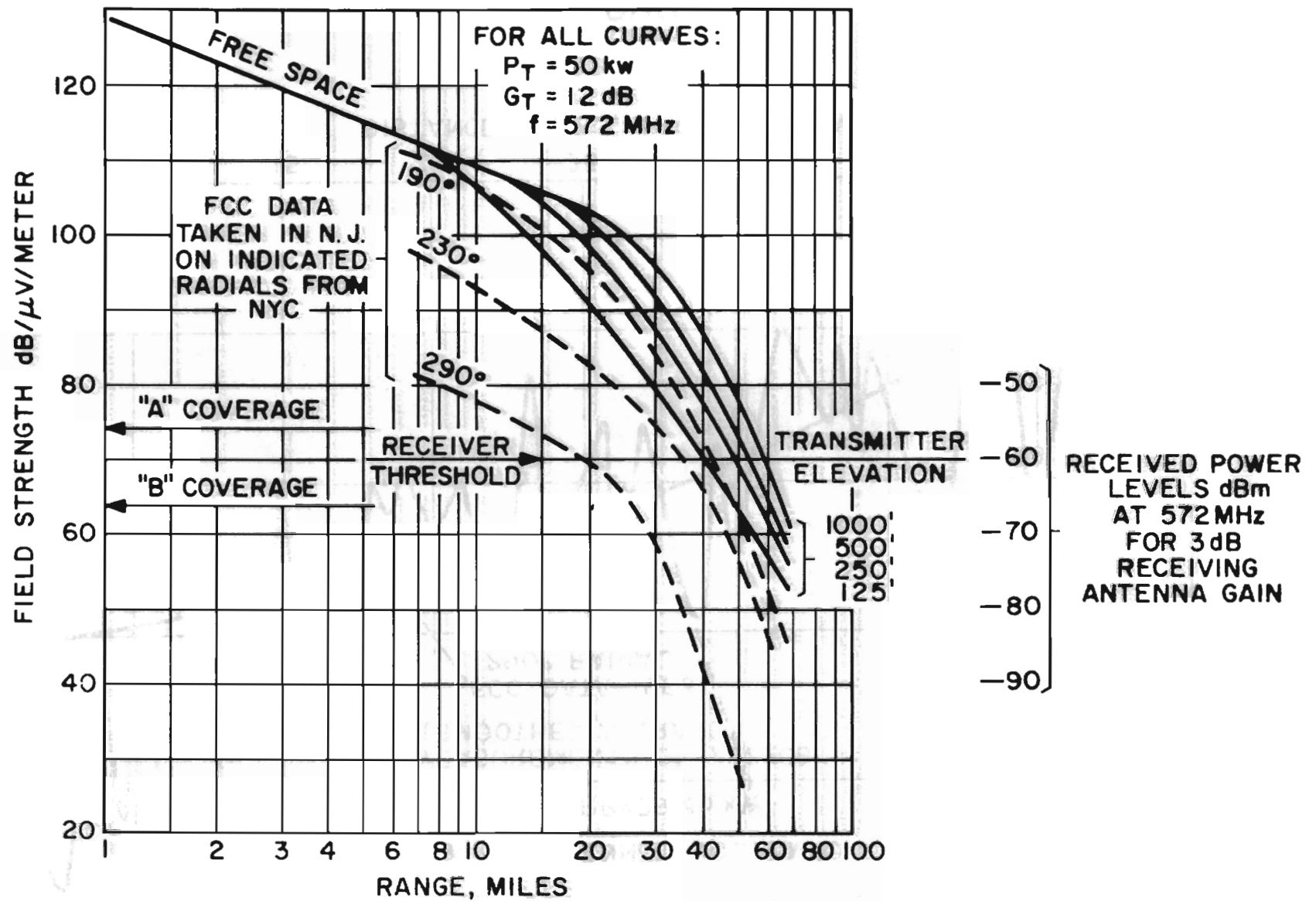
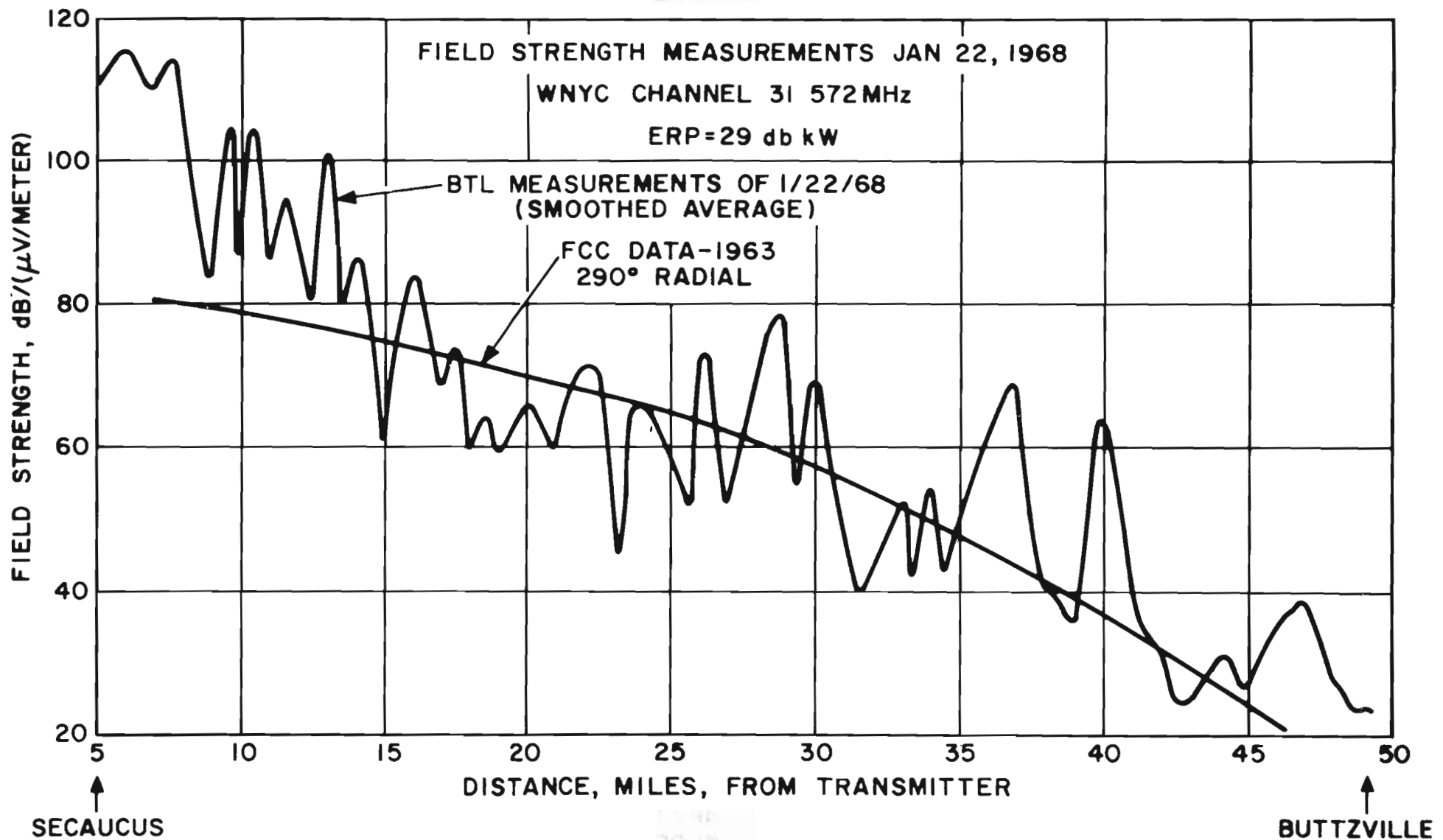
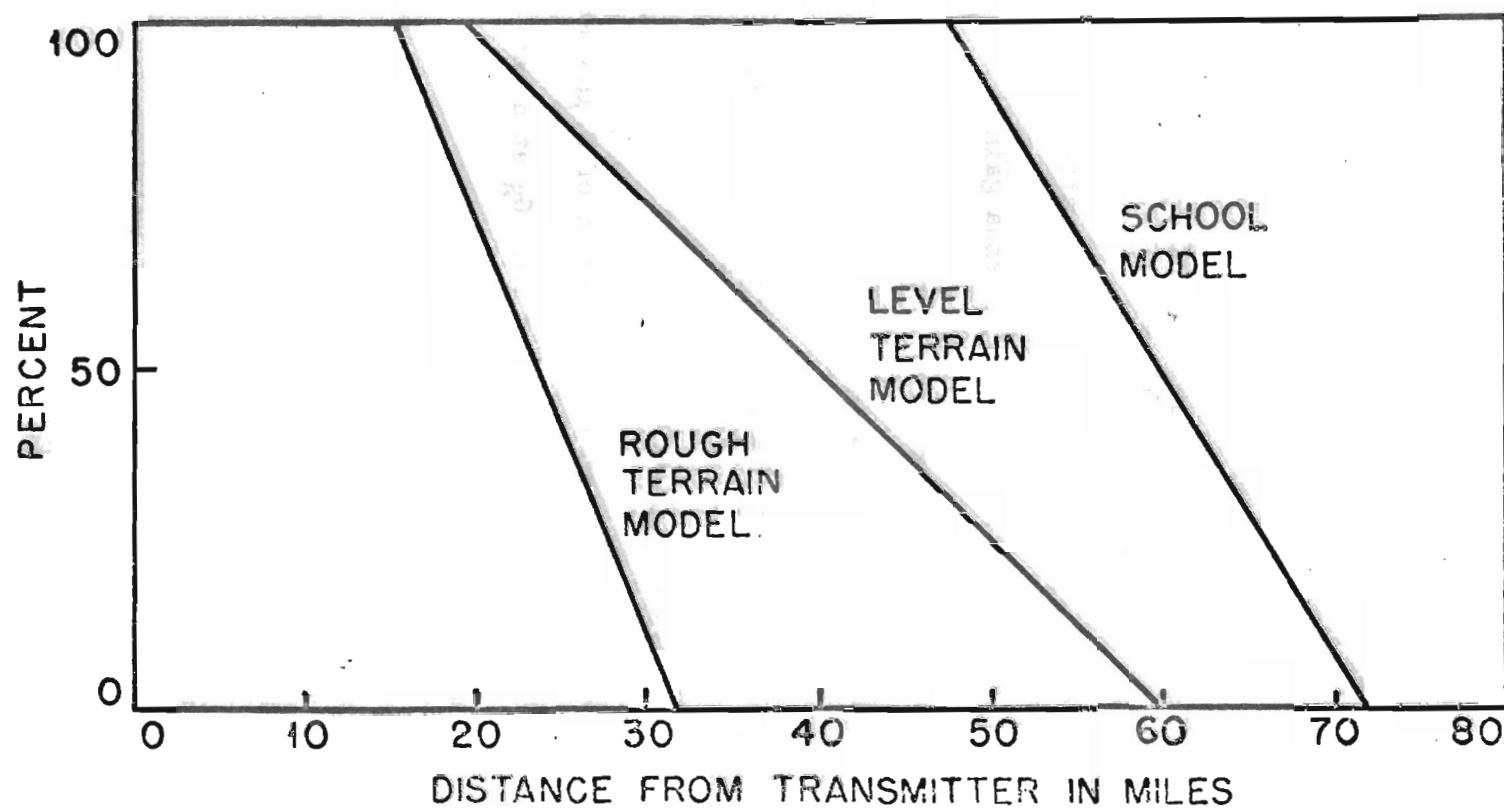


FIGURE
PROPAGATION CURVES



FIGURE

RECEPTION PROBABILITIES FOR THE THREE MODELS CONSIDERED



APPENDIX

1. Basic equations

(a) Free space field strength

$$E = \left(\frac{P_T G_T Z}{4 d^2} \right)^{\frac{1}{2}} = \frac{3400}{d} \sqrt{P_T G_T} \text{ , } \mu\text{v/meter}$$

where P_T = transmitted power, watts

G_T = transmitting antenna gain

$Z = 120\pi$ = free space impedance

d = range in miles

$$20 \log E = 70.6 = 10 \log \frac{P_T G_T}{d^2} \text{ , } \text{db}/\mu\text{v/meter}$$

(b) Received power

With an incident field strength of E , $\mu\text{v/meter}$, the power received by an antenna of gain G_R at a wave-length λ , meters, is:

$$P_R = \frac{\lambda^2 G_R}{4\pi Z} E^2$$

$$10 \log P_R = (E)_{\text{db}/\mu\text{v}} = (G_R)_{\text{db}} = 20 \log \lambda - 126.8 \text{ , } \text{dbm}$$

For "A" coverage: $E = 74 \text{ db}/\mu\text{v/meter}$

At 800 mHz with $G_R = 10 \text{ db}$:

$$P_R = -51 \text{ dbm}$$

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FCC Research Report R-6302, Feb. 12, 1963.
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3. K. Bullington, "Radio Propagation Fundamentals," B.S.T.J.,
May, 1957, p. 593.
4. K. Bullington, "Characteristics of Beyond-the-Horizon Radio
Transmission," Proc. I.R.E., October, 1955, p. 1175.
5. W. Rae Young, Jr., "Mobile Radio Transmission Compared at
150 to 3700 Mc," B.S.T.J., November, 1952, p. 1068.
6. W. C. Jakes, Jr., D. O. Reudink, "Comparison of Mobile Radio
Transmission at UHF and X-Band," IEEE G-VC, November, 1967.

2. Receiver threshold

One sample of a typical modern television set was found to show an acceptable picture with an input power of -75 dbm. This is about 25 db above the observed noise threshold of -100 dbm corresponding to a noise figure of 9 db, which is possibly better than average. A conservative threshold of -60 dbm could thus seem realistic for the average set to display a good picture.

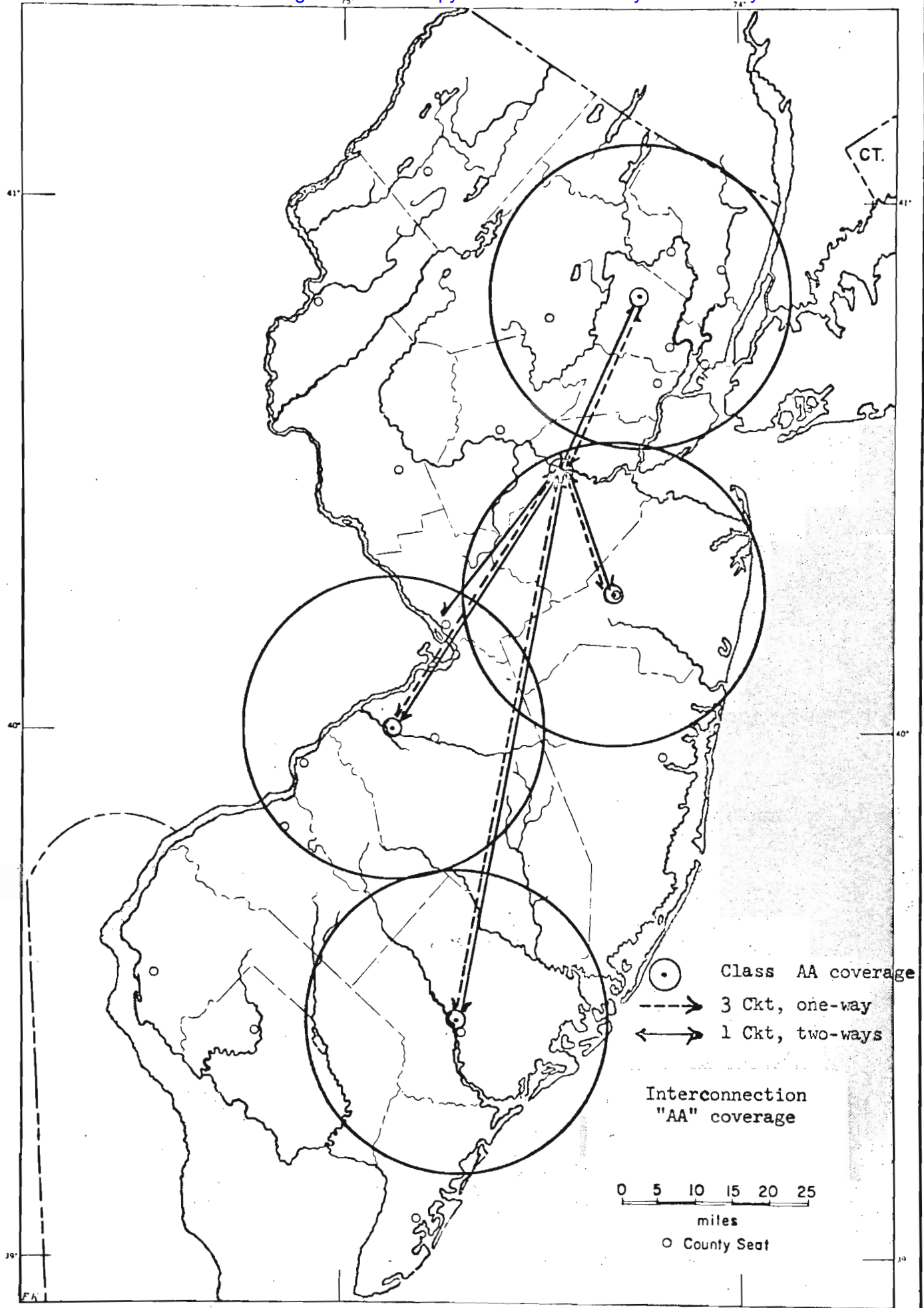
3. Estimation of coverage

Coverage estimates are based on the data shown in Figure 3 (Figure 4 is a plot of the 1968 measurements of field strength and shows the general agreement with previous data). The 290° dashed curve is taken as representative for the hilly section, as it was taken along a radial running roughly NNW (290°) from New York City. Applying the receiver threshold of -60 dbm for the "average" installation yields a coverage range of 20 miles. With 20 db antenna gain and an elevated antenna that approaches free space conditions, one finds the range extended to 63 miles, using the 230° or 190° radial data. Likewise, penalizing the "average" installation 10 db to account for a poor home installation, and using the 290° radial data, the range is reduced to 10 miles. The change in range for other conditions, such as increased power or different antenna heights, can be obtained in similar fashion by judicious use of these curves.

APPENDIX V

NEW JERSEY PUBLIC BROADCAST

INTERCONNECTION SYSTEM



APPENDIX VI

TELEVISION SIGNAL DISTRIBUTION SYSTEMS

PERTINENT TO

SCHOOLS, HOSPITALS, VIEWING CENTERS,
APARTMENTS, HOTELS, AND THE LIKE

TELEVISION SIGNAL DISTRIBUTION SYSTEMS

PERTINENT TO SCHOOLS, HOSPITALS, VIEWING
CENTERS, APARTMENTS, HOTELS AND THE LIKE

THE PURPOSE OF THIS BROCHURE IS TO DESCRIBE IN GENERAL TERMS
THE VARIOUS METHODS FOR PROVIDING MULTI-CHANNEL TELEVISION SIGNALS TO
LOCALIZED AREAS OF VIEWERS SUCH AS SCHOOLS, APARTMENTS, HOSPITALS,
HOTELS, ETC.

TELEVISION BROADCASTING OPERATES IN THREE SEGMENTS OF FRE-
QUENCY ALLOCATION: LOW-VERY HIGH FREQUENCIES (LOW VHF), HIGH-VERY-
HIGH FREQUENCIES (HIGH VHF), AND ULTRA HIGH FREQUENCIES (UHF).
THE LOW VHF CHANNELS ENCOMPASS TV CHANNELS 2 THROUGH 6 AND INCLUDE
FREQUENCY SPECTRUM BETWEEN 54 AND 88 MHZ. THE HIGH VHF CHANNELS
ENCOMPASS TV CHANNELS 7 THROUGH 13 AND INCLUDE FREQUENCY SPECTRUM
BETWEEN 174 AND 216 MHZ. THE UHF CHANNELS ENCOMPASS TV CHANNELS
14 THROUGH 83 AND INCLUDE FREQUENCY SPECTRUM FROM 470 TO 890 MHZ.
SUCH A WIDE RANGE OF FREQUENCIES PRESENTS A SERIOUS PROBLEM TO THE
SYSTEM DESIGNER WHERE BROADCAST SERVICES ARE AVAILABLE FROM EACH OF
THE FREQUENCY BANDS, FROM DIFFERING DISTANCES (PRESENTING WIDE GAMUTS
OF SIGNAL RECEIVED INTENSITY), FROM DIFFERENT DIRECTIONS AND LOSS OR
ATTENUATING FACTORS INHERENT IN EACH ELEMENT OF THE SYSTEM.

THERE ARE THREE BASIC METHODS FOR GETTING TV BROADCAST SIGNALS
INTO THE TELEVISION RECEIVER; NAMELY, (1) THE RABBIT EAR ANTENNA (OR
EQUIVALENT), LOCATED ON TOP OF THE TELEVISION SET OR OTHERWISE PLACED
IN CLOSE PROXIMITY TO THE SET, (2) THE ANTENNA MOUNTED ON ROOFTOP WITH
A CONNECTING TRANSMISSION LINE BETWEEN SAID ANTENNA AND TELEVISION
RECEIVER IN APARTMENT HOUSES. THIS PRESENTS THE TYPICAL FOREST OF AN-
TENNAS, CREATING A MOST UNSIGHTLY APPEARANCE. BOTH OF THESE SYSTEMS
PROVIDE LESS THAN SATISFACTORY PERFORMANCE IN TERMS OF GHOSTING
(MULTIPLE IMAGES), INTERFERENCE (LINES, BARS AND DOTS IN THE PICTURE),
AND POOR RECEPTION FROM ONE OR MORE CHANNELS. BY FAR THE MOST SATIS-
FACTORY METHOD OF PROVIDING HIGH QUALITY PICTURES FROM ALL AVAILABLE
CHANNELS IS TO USE A WELL-CONSIDERED (3) MASTER ANTENNA TELEVISION
SYSTEM, (MATV). IN THIS CASE ANTENNAS ARE MOUNTED ATOP THE BUILDING
COMPLEX, THE SIGNAL IS PROCESSED VIA SUITABLE AMPLIFIERS, FILTERS,
MIXERS, ETC., SO THAT HIGH QUALITY TELEVISION SIGNALS ARE DISTRIBUTED
TO EACH TELEVISION SET IN THE BUILDING AS A FUNCTION OF SEPARATE
APARTMENTS, SEPARATE ROOMS, OR VIEWING CENTERS.

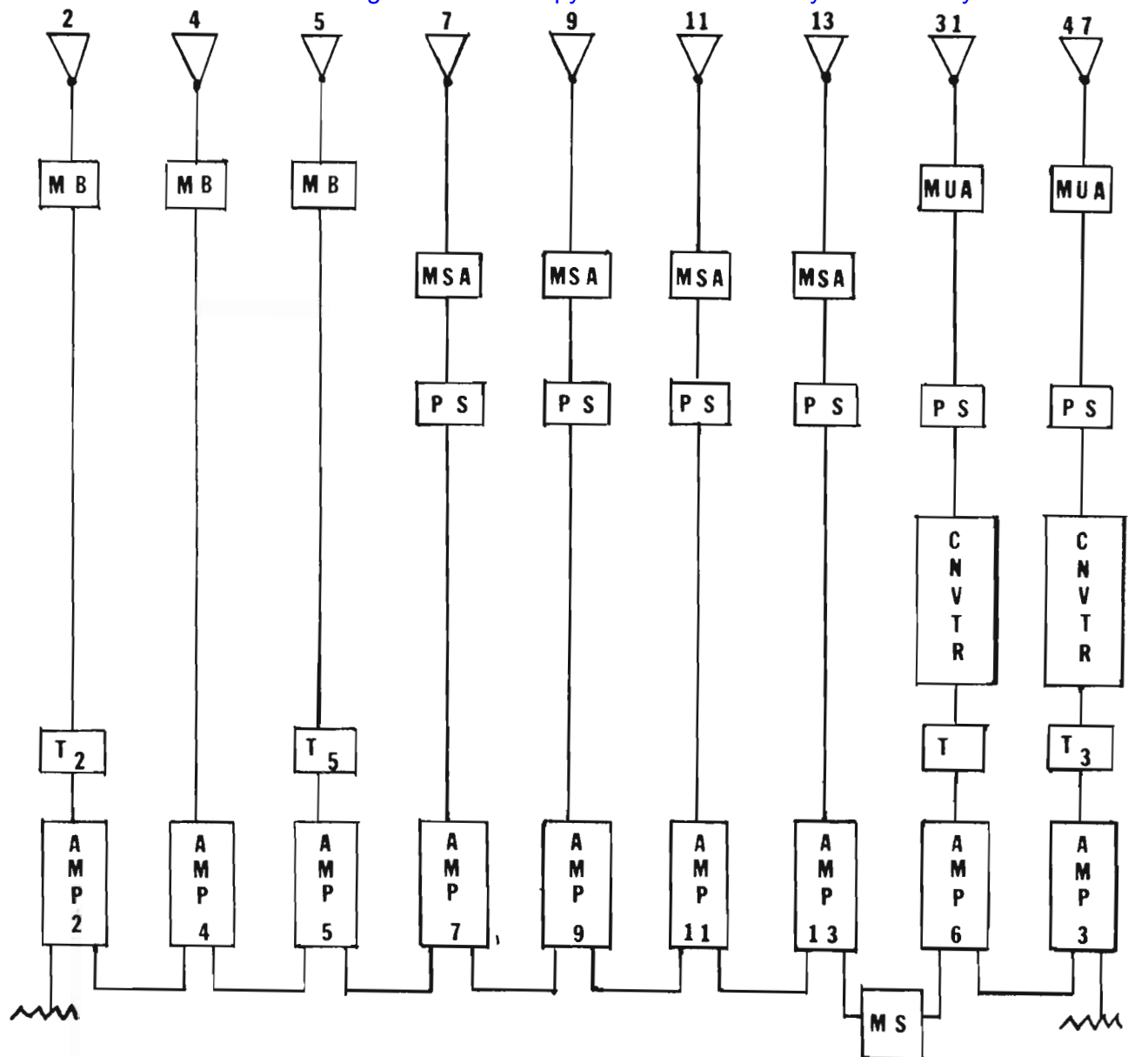
THERE ARE CURRENTLY TWO TYPES OF MASTER ANTENNA TELEVISION
SYSTEMS; NAMELY, THOSE WHICH ARE CAPABLE OF DISTRIBUTING ONLY THE VHF
CHANNELS (CHANNELS 2 THROUGH 13), THEREBY PROVIDING 12 POSSIBLE SIGNAL
SOURCES. IN SUCH A SYSTEM, WHERE ADJACENT CHANNELS ARE USED, SPECIAL
FILTERING TECHNIQUES MUST BE EMPLOYED TO ELIMINATE "ADJACENT CHANNEL
INTERFERENCE." THIS SYSTEM PRECLUDES USING UHF CHANNELS, UNLESS THE
UHF SIGNAL IS "CONVERTED" TO AN UNUSED VHF CHANNEL AND DISTRIBUTED.
THIS NECESSITATES THE USE OF ADDITIONAL EQUIPMENT, SUCH AS HYBRID
MIXERS, TRAPS, ETC., SINCE TV SETS CANNOT DISCRIMINATE BETWEEN ADJACENT
CHANNELS. THE SYSTEM OUTLINED ABOVE (AS RELATING TO UHF CONVERSION)
WAS MANDATORY UNTIL RECENT DATE, BECAUSE OF EXCESSIVE DISTRIBUTION
CABLE ATTENUATION, AMPLIFIER NOISE GENERATION, ETC. FURTHER, ALMOST

ALL TV SETS PRODUCED BEFORE 1964 WERE CAPABLE OF RECEIVING ONLY CHANNELS 2 THROUGH 13. THE LAW NOW REQUIRES THAT ALL NEW TV SETS BE CAPABLE OF RECEIVING CHANNELS 2 THROUGH 83. HIGH OUTPUT, LOW NOISE LEVEL UHF AMPLIFIERS WERE NOT ECONOMICALLY FEASIBLE. SPECIALIZED LOW LOSS SPLITTERS, MATCHING TRANSFORMERS, TAPOFFS, ETC., WERE NOT AVAILABLE. ALSO, DISTRIBUTION TRANSMISSION LINE (OR CABLE) WITH LOW ATTENUATION WAS NOT AVAILABLE. AS A RESULT OF PROGRESS MADE IN THE AREAS DESCRIBED ABOVE, IT IS NOW POSSIBLE TO EFFECT A SECOND TYPE OF MASTER ANTENNA TELEVISION SYSTEM, NAMELY, THE UHF/VHF DISTRIBUTION SYSTEM. THIS TECHNIQUE DISTRIBUTES EACH SIGNAL ON ITS OWN FREQUENCY, ELIMINATING THE NEED FOR CONVERSIONS. THIS BRINGS ALL 82 TV CHANNELS TO THE SET - THE ONLY REQUIREMENT BEING THAT THE TV SET INCLUDE UHF CAPABILITIES.

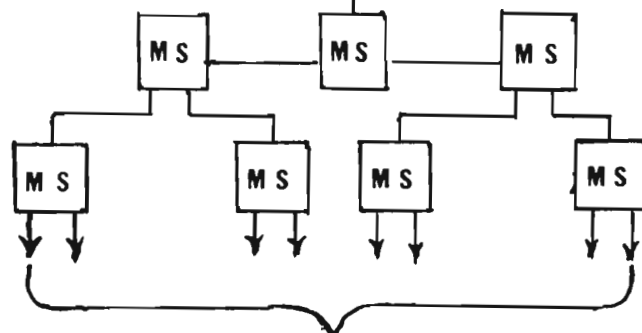
FOR CASES WHERE EXISTING MATV SYSTEMS ARE SATISFACTORILY IN SERVICE BUT WHERE THE TV RECEIVERS WERE MANUFACTURED BEFORE THE YEAR 1964, THE CONSIDERATION MIGHT BE MADE TO UPDATE THE 12-CHANNEL VHF SYSTEM IN ORDER THAT UHF BROADCAST MIGHT ALSO BE RECEIVED. IN CASES WHERE NEW INSTALLATIONS ARE BEING CONSIDERED, THE U/V DISTRIBUTION SYSTEM SHOULD BE INSTALLED. THE MAJOR ADVANTAGES OF THE U/V SYSTEM ARE:

- A) IT IS OBSOLESCENCE PROOF
- B) IT CAN BE ENLARGED EASILY AS NEW CHANNELS BECOME AVAILABLE, WITHOUT COSTLY CHANGE-OVER COSTS
- C) UHF CHANNELS CAN BE DISTRIBUTED ON UHF, THEREBY AVOIDING ADJACENT CHANNEL PROBLEMS
- D) IT IS NOT LIMITED TO 12 VHF CHANNELS, BUT MAY USE THE GAMUT OF CHANNEL AVAILABILITY IN ORDER TO EFFECTIVELY DISTRIBUTE "CLOSED CIRCUIT TELEVISION" SIGNALS WITHIN THE DISTRIBUTION SYSTEM.

ATTACHED AS FIGURE 1 AND FIGURE 2 ARE BLOCK DIAGRAMS SHOWING THE BASIC ELEMENTS USED IN THE 12 CHANNEL VHF AND U/V SYSTEMS RESPECTIVELY. TABLE 1 SHOWS COMPARATIVE COST INFORMATION FOR BOTH SYSTEMS. TABLE 2 SHOWS TYPICAL INSTALLATION COST FOR CONDITIONS OF VARYING OUTLET CONNECTIONS AND FOR NEW AND OLD BUILDING CONSIDERATIONS.



MB-Mast Balun
MUA-Mast UHF Amplifier
MSA-Mast Single Channel Amplifier
PS-Power Supply
CNVTR-Converter UHF to VHF
T-Trap not required
T₂-Sound trap Aural Chnl 2
T₃-Sound trap Aural Chnl 3
T₅-Sound trap Aural Chnl 5
MS-VHF Mixer Splitter



Risers to TV set tap off points
 (Max 15 per riser)

G. EDWARD HAMILTON
 Communication Consulting Services
 P.O. BOX 230
 56 DOUGLAS ROAD
 GLEN RIDGE, NEW JERSEY

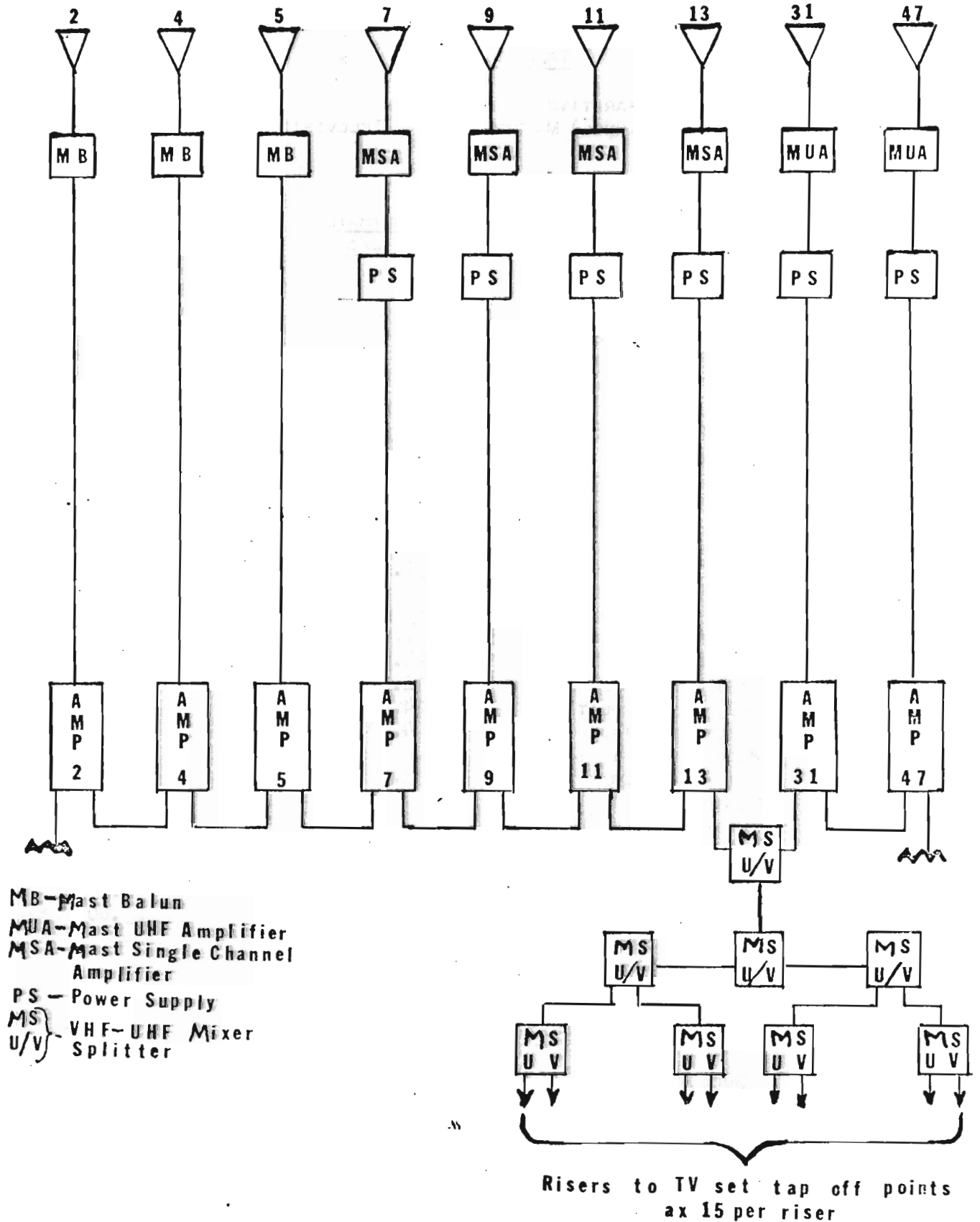


TABLE 1

COMPARATIVE EQUIPMENT COST
VHF (12 CHANNELS) VS U/V (MULTI-CHANNEL) MASTER ANTENNA TELEVISION SYSTEM (96 OUTLETS)

<u>QUANTITY</u>	<u>ITEM</u>	<u>APPROXIMATE PRICE EACH</u>	<u>UHF VHF</u>	<u>VHF - U CONVERSION</u>
9	ANTENNAS	\$90.00	\$810.00	\$810.00
3	(MB) MAST BALUNS	10.25	30.75	30.75
4	(MSA) MAST SINGLE CHANNEL VHF AMPLIFIERS	78.65	314.60	314.60
2	(MUA) MAST SINGLE CHANNEL UHF AMPLIFIERS	59.45	118.90	118.90
6	(PS) POWER SUPPLIES FOR MAST AMPLIFIERS	33.45	200.70	200.70
2	(CNVTR) CONVERTER	287.50		575.00
9	(AMP) SINGLE CHANNEL AMPLIFIERS (VHF)	151.25		1,361.25
7	(AMP) SINGLE CHANNEL AMPLIFIERS (VHF)	151.25	1,058.75	
2	(AMP) SINGLE CHANNEL AMPLIFIERS (UHF)	250.00	500.00	
7	(MS) MIXER SPLITTER (VHF)	12.70		12.70
7	(MS) MIXER SPLITTER (U/V)	24.50	171.50	
1	(MS) MIXER SPLITTER (UHF)	12.70		12.70
1	(MS) MIXER SPLITTER (U/V)	24.50	24.50	
96	CABLE RECEPTACLES	4.30	412.80	412.80
96	RECEPTACLES TO TV SET TRANSFORMER (VHF)	3.15		302.40
96	RECEPTACLES TO TV SET TRANSFORMER (U/V)	4.50	432.00	
96	ADAPTER FROM U-V TRANS- FORMER TO 2 INPUTS	5.00	480.00	
3	(T) TUNABLE TRAPS	68.75		206.25
960'	RG-59/U SOLID/1000'	25.00		25.00
960'	RG-11-FOAM/1000'	79.00	79.00	

TABLE 2

BUDGET ESTIMATE FOR DISTRIBUTION SYSTEM

<u>QUANTITY</u>	<u>ITEM</u>	<u>COST EACH</u>	<u>NEW BUILDING</u>	<u>OLD BUILDING</u>
96	STANDARD OUTLETS	\$30/50	\$2880.00	\$4800.00
96	SPECIAL OUTLETS	50/70	\$4800.00	\$6720.00

CONDUIT FILL CHART

THE NATIONAL ELECTRIC CODE (NEC) RECOMMENDS THAT CONDUITS BE FILLED ONLY PARTIALLY (SECTIONS 346-6). THE GENERAL RULES ARE:

- 1-CONDUCTOR (CABLE) CROSS-SECTION OF CABLE, MAX. 53% OF CONDUIT CROSS-SECTION
- 2-CONDUCTORS CROSS-SECTION OF CABLES, MAX. 31% OF CONDUIT CROSS-SECTION
- 3-CONDUCTORS CROSS-SECTION OF CABLES, MAX. 43% OF CONDUIT CROSS-SECTION
- 4-CONDUCTORS CROSS-SECTION OF CABLES, MAX. 40% OF CONDUIT CROSS-SECTION

FOR RG - 59 FOAM AND RG - 11 FOAM TYPE CABLES, THE FOLLOWING APPLIES:

CONDUIT SIZE (")	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
CABLE						
RG - 59	2	4	7	12	17	29
RG - 11	0	1	2	4	6	10

FOR MULTI-CABLE TYPES . . . ADD TOTAL CABLE AREAS AND DETERMINE CONDUIT SIZE FROM FOLLOWING CHART:

CONDUIT SIZE (")	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
CABLE						
	0.12	0.21	0.60	0.60	0.82	1.34

PRELIMINARY ARCHITECT'S SPECIFICATIONS

SECTION 1 - GENERAL REQUIREMENTS:

- 1.01 THE CONTRACTOR SHALL FURNISH ALL MATERIALS, EQUIPMENT, LABOR, AND SERVICES REQUIRED FOR THE INSTALLATION OF THE COMPLETE MASTER ANTENNA TV SIGNAL DISTRIBUTION SYSTEM.
- 1.02 THE CONTRACTOR SHALL FURNISH PROOF OF PERSONAL AND PROPERTY DAMAGE INSURANCE POLICY AS REQUIRED TO SATISFY THE CLIENT.
- 1.03 ALL WORK SHALL BE PERFORMED UNDER THE SUPERVISION OF AN ACCREDITED INSTALLATION COMPANY OF THE EQUIPMENT MANUFACTURER.
- 1.04 ALL BASIC ELECTRONIC EQUIPMENT, FOR WHICH SPECIFICATIONS ARE HEREIN ATTACHED, SHALL BE PRODUCED BY A SINGLE MANUFACTURER OF ESTABLISHED GOOD REPUTATION AND EXPERIENCE WHO SHALL HAVE PRODUCED SIMILAR APPARATUS FOR AT LEAST THREE OR MORE YEARS AND WHO SHALL BE ABLE TO REFER TO SIMILAR INSTALLATIONS RENDERING SATISFACTORY SERVICE.
- 1.05 ALL BASIC ELECTRONIC EQUIPMENT, AS PRODUCED BY A SINGLE MANUFACTURER, MUST BEAR GUARANTEE THAT SPARE AND REPLACEMENT PARTS WILL BE AVAILABLE FOR A PERIOD OF NOT LESS THAN 10 YEARS.

- 1.06 ALL EQUIPMENT AND MATERIALS INCLUDING WIRING AND CABLING FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE OF THE SYSTEM, AGAINST ELECTRICAL OR MECHANICAL DEFECTS UNLESS SUCH DEFECTS ARE CAUSED BY USER.
- 1.07 THE CONTRACTOR SHALL SHOW EVIDENCE THAT HE MAINTAINS A FULLY EQUIPPED SERVICE ORGANIZATION CAPABLE OF MAINTAINING THE SYSTEM OPERATIONAL AT OPTIMUM PERFORMANCE.
- 1.08 THE CONTRACTOR SHALL BE PREPARED TO OFFER A SERVICE CONTRACT FOR SYSTEM MAINTENANCE AFTER THE GUARANTEE PERIOD.
- 1.09 THE CONTRACTOR SHALL SUBMIT FOR APPROVAL:
 - A) DRAWING OF THE PROPOSED SYSTEM DESCRIBING HOW ALL SPECIFICATIONS ARE COMPLIED WITH
 - B) MANUFACTURER'S SPECIFICATION AND PERFORMANCE DATA SHOWING HOW ALL SPECIFICATIONS ARE COMPLIED WITH
- 1.10 THE CONTRACTOR SHALL SUBMIT FOR APPROVAL AT LEAST A ONE-FOOT LENGTH OF EACH TYPE OF CABLE INTENDED FOR THE SYSTEM. THE SUBMITTED AND INSTALLED CABLES SHALL BEAR THE MANUFACTURER'S NAME AND TYPE NUMBER ON THE JACKET.
- 1.11 THE CONTRACTOR SHALL PRODUCE EVIDENCE SHOWING THAT THE VSWR IS EQUAL TO OR BETTER THAN 1.2.
- 1.12 THE CONTRACTOR SHALL GUARANTEE THAT THERE WILL BE NO SPLICES BETWEEN EQUIPMENT INTERCONNECTION.

SECTION 2

- 2.01 THE DISTRIBUTION SYSTEM SHALL DELIVER A MINIMUM OF 0 DB MV (1000 MV @ 75 OHMS) TO EACH RECEIVER ON EVERY TV CHANNEL UNDER THE CONDITION THAT EVERY OUTLET IS CONNECTED TO A LOAD.
- 2.02 THE SYSTEM AS INSTALLED SHALL BE RATED AND CAPABLE OF CONTINUOUS 24-HOUR OPERATION AND THE STATE OF OPERATING IS "ON" AT ALL TIMES.
- 2.03 THE SYSTEM WILL PASS ALL CHANNELS IN TERMS OF U.S. STANDARD BLACK AND WHITE AND/OR COLOR WITHOUT NOTICEABLE DEGRADATION.
- 2.04 THE SYSTEM SHALL BE INSTALLED SO THAT NORMAL EXPANSION MAY BE ACCOMMODATED.

SECTION 3

- 3.01 THE CONTRACTOR SHALL, UPON COMPLETION OF SYSTEM INSTALLATION, ORIENT ALL ANTENNAS, MEASURE SIGNAL LEVELS AT EACH SECTION INPUT, ADJUST ALL CONTROLS SO AS TO PROVIDE UNIFORM SIGNAL STRENGTHS FROM EACH CHANNEL AND DEMONSTRATE THAT A MINIMUM OF 0 DB MV (1000 M VOLTS AT 75 OHMS) IS PRESENT AT EACH RECEIVER TAP UNDER THE CONDITION OF ALL TAPS BEING TERMINATED IN 75 OHMS.
- 3.02 THE CONTRACTOR SHALL DEMONSTRATE THAT THERE ARE NO INTERFERENCE PROBLEMS INHERENT IN THE SYSTEM AND THAT BETWEEN CHANNEL ATTENUATION IN THE ORDER OF 50 DB IS MAINTAINED.
- 3.03 THE CONTRACTOR SHALL DEMONSTRATE THAT THE SYSTEM DELIVERS ACCEPTABLE PICTURE QUALITY IN BLACK AND WHITE AND/OR COLOR IN ACCORDANCE WITH ACCEPTABLE INDUSTRY STANDARDS.
- 3.04 THE CONTRACTOR WILL FURNISH THE CLIENT A COMPLETE SET OF BUILDING PLANS SHOWING THE ELECTRICAL INSTALLATION, A SET OF OPERATING INSTRUCTIONS, AND DETAIL MECHANICAL AND ELECTRICAL DRAWINGS PERTINENT TO EACH TYPE OF EQUIPMENT INCLUSIVE OF SCHEMATIC DETAIL. A BLOCK DIAGRAM OF THE SYSTEM SHOWING SIGNAL LEVELS AT EACH EQUIPMENT INPUT AND OUTPUT FOR EACH CHANNEL WILL ALSO BE PROVIDED.

ENGINEERING SPECIFICATIONS FOR
MASTER ANTENNA TELEVISION SYSTEMS

PROJECT

1. THE SCOPE OF THE UNDERTAKING INCLUDES FURNISHING EQUIPMENT, ACCESSORIES, AND DISTRIBUTION SYSTEM COMPLETE AND READY FOR USE. THE MATV SYSTEM WILL INCLUDE ALL ANTENNAS, MASTS, TOWERS, PREAMPLIFIERS, MIXERS, AMPLIFIERS, POWER SUPPLIES, PRIMARY POWER CONNECTION, CABLES, OUTLETS, OUTLET TO TV RECEIVER TRANSFORMERS, TERMINATIONS, AND ALL OTHER PARTS NECESSARY FOR RECEPTION AND DISTRIBUTION OF U.S. STANDARD BLACK AND WHITE AND/OR COLOR TELEVISION SIGNALS.
2. ALL BASIC EQUIPMENT SHALL BE THE PRODUCT OF A SINGLE MANUFACTURER OF ESTABLISHED REPUTATION AND EXPERIENCE WHO SHALL HAVE PRODUCED SIMILAR APPARATUS FOR A REASONABLE PERIOD OF TIME AND WHO WILL GUARANTEE THE SUPPLY OF REPLACEMENT UNITS OR PARTS FOR A PERIOD OF TEN (10) YEARS AFTER SYSTEM ACCEPTANCE.
3. THE CONTRAXTOR SHALL SHOW EVIDENCE OF MAINTAINING THE NECESSARY INSTALLATION AND TEST FACILITIES AS REQUIRED TO FURNISH ADEQUATE INSPECTION AND CONTRACT SERVICE TO THE SYSTEM.
4. THE CONTRACTOR SHALL PROVIDE A SET OF BUILDING PLANS SHOWING LOCAL INSTALLATION DETAILS, OPERATING INSTRUCTIONS FOR THE SYSTEM, CIRCUIT INFORMATION AND SERVICE NOTES NECESSARY FOR PROPER INSTALLATION, EVALUATION, AND MAINTENANCE OF THE SYSTEM. A BLOCK DIAGRAM MUST BE MADE AVAILABLE OF THE SYSTEM SHOWING DESIGN AND ACTUAL SIGNAL LEVELS AT EACH INPUT AND OUTPUT TERMINAL OF ALL ELEMENTS OF THE SYSTEM.
5. THE CONTRACTOR SHALL CONSTRUCT THE SYSTEM IN ACCORDANCE WITH BEST PRACTICE ENGINEERING TECHNIQUES IN ORDER TO PROVIDE CONTINUOUS OPERATION. ALL BUILDING CODES AND SAFETY PRECAUTIONS WILL BE FOLLOWED.
6. ALL EQUIPMENT AND ACCESSORY GEAT SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE EXCEPT THAT WHICH CAN BE PROVED TO HAVE BEEN CAUSED BY MISUSE. ALL SERVICE AND PARTS SHALL BE PROVIDED BY THE CONTRACTOR.
7. ALL SYSTEM DESIGN DETAILS, DRAWINGS, AND MATERIALS TO BE USED IN THE SYSTEM SHALL BE SUBMITTED FOR CLIENT APROVAL PRIOR TO FINAL APPROVAL OF CONTRACT FOR SAID PROJECT.
8. THE CONTRACTOR SHALL SUBMIT FOR APPROVAL AT LEAST A ONE-FOOT LENGTH OF EACH TYPE OF DABLE PLANNED FOR INSTALLATION. CABLE TO BE USED MUST BE TESTED PRIOR TO INSTALLATION AND IT MUST BE SHOWN THAT SAID CABLE EXHIBITS A VSWR OF 1.2 OR BETTER OVER THE RANGE OF FREQUENCIES BEING SERVICED. THE CABLE SHALL BEAR THE MANUFACTURER'S NAME AND TYPE NUMBER ON THE JACKET.

SERVICES PROVIDED

1. THE SYSTEM WILL RECEIVE TELEVISION BROADCAST SIGNALS, PROCESS SAID SIGNALS AS REQUIRED, AND DISTRIBUTE THESE "MODIFIED SIGNALS" TO ALL TV OUTLETS TO PERMIT CONNECTION TO EIA STANDARD BLACK AND WHITE AND/OR COLOR TELEVISION RECEIVERS.

2. THE SYSTEM WILL PROVIDE A MINIMUM (UNDISTORTED) SIGNAL LEVEL OF ONE MILLIVOLT ACROSS A 75 OHM IMPEDANCE ON EACH CHANNEL AT EACH OUTLET WITH ALL OTHER OUTPUTS BEING TERMINATED.

3. THE SYSTEM SHALL BE CAPABLE OF EXPANSION TO PROVIDE RECEPTION OF ALL EXISTING CHANNELS OVER A SINGLE CABLE PLUS INCLUSION OF FM, SUB CHANNELS, UHF, AND CCTV. IN THIS RESPECT NO ADDITIONAL CONDUIT OR DISTRIBUTION CABLE SHOULD BE NECESSARY.

4. THE SYSTEM MUST HAVE A MEANS FOR INSERTING ATTENUATING NETWORKS AS REQUIRED TO ISOLATE UNDESIRE SIGNALS BY A MINIMUM OF 30 DB.

5. THE SYSTEM SHALL BE DESIGNED AND INSTALLED SO AS TO OPERATE FULL TIME (24 HOURS PER DAY) UNDER CONDITIONS OF AMBIENT TEMPERATURES BETWEEN -30° AND 150° FAHRENHEIT.

6. THE SYSTEM SHALL RECEIVE, PROCESS, AND DISTRIBUTE THE FOLLOWING TELEVISION SIGNALS:

<u>CHANNEL No.</u>	<u>FREQUENCY</u>	<u>CALL LETTERS</u>	<u>DISTANCE FROM TRANSMITTER</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

7. THE DISTRIBUTION SYSTEM SHALL PROVIDE FOR EASY ATTACHMENT OF TV MONITORS WITHOUT ADDITIONAL EQUIPMENT EXCEPT REQUIRED TERMINATION AND TRANSFORMING FUNCTIONS.

8. THE DISTRIBUTION SYSTEM MUST BE EARTH GROUNDED AND ALL TV RECEIVERS MUST BE TRANSFORMER ISOLATED FROM THE POWER LINE SERVICE. THE TV RECEIVER POWER CONNECTION SHALL BE MADE WITH A THREE PRONG MALE PLUG WITH CHASSIS CONNECTION EXTENDING TO THE GROUND CONNECTION IN THE AC POWER RECEPTACLE.

9. CONNECTION OF ANY TELEVISION SET TO ANY MASTER ANTENNA OUTLET SHALL NOT AFFECT THE OPERATION OF ANY OTHER TELEVISION RECEIVER CONNECTED TO SAID SYSTEM.

MATV SYSTEM DISTRIBUTION

1. THE DISTRIBUTION CABLE SHALL BE COAXIAL 75 OHM TYPE. THE SIZE AND TYPE OF COAXIAL CABLE SHALL BE AS REQUIRED TO KEEP LOSSES TO PRACTICAL LIMITS AS DETERMINED BY SIGNAL STRENGTH LEVELS AT THE RECEIVER CONNECTION POINTS.

2. GALVANIZED STEEL CONDUIT OR APPROVED RECTANGULAR DUCTS SHALL BE USED IN ACCORDANCE WITH NATIONAL AND/OR LOCAL ELECTRICAL CODES.

3. COAXIAL CABLES SHALL BE CONTINUOUS EXCEPT AT TERMINAL POINTS, AND NO SPLICES SHALL BE PERMITTED IN ANY CONDUIT. CABLES SHALL BE INSTALLED SO AS TO AVOID SHARP BENDS AND/OR PHYSICAL DISTORTION.

4. ALL CABLES SHALL BE IDENTIFIED AS TO DESTINATION TO AND FROM.

5. ALL COAXIAL CABLE SHALL BE TESTED FOR VSWR PRIOR TO INSTALLATION AND DEMONSTRATED COMPLIANCE OF BETTER THAN THE RATIO 1.2 SHALL BE SUBMITTED.

ANTENNA DETAILS

1. THE CONTRACTOR SHALL PROVIDE ANTENNA EQUIPMENT ON MASTS AND ADJUSTMENT FOR BEST ORIENTATION BY USE OF FIELD STRENGTH METER AND TV RECEIVER TEST SHOWING FREEDOM FROM GHOSTS AND/OR OTHER INTERFERENCE.

2. THE CONTRACTOR SHALL INSTALL INDIVIDUAL RUGGEDIZED ANTENNAS FOR EACH CHANNEL AND WITH SUFFICIENT GAIN AND FRONT-TO-BACK RATIO SUCH THAT SIGNAL INPUT LEVELS ARE ADEQUATE FOR PROPER PROCESSING.

3. BALUN MATCHING FROM BALANCED TO UNBALANCED CONFIGURATING MUST BE ACCOMPLISHED BY MAST INSTALLED BALUN OR PRE-AMPLIFIER.

4. MASTS AND INSTALLATION HARDWARE MUST BE STRUCTURALLY CAPABLE OF WITHSTANDING ALL WEATHER CONDITIONS AND LIKEWISE SHALL BE PROTECTED BY PAINT OR OTHER PROTECTIVE SURFACING SO AS TO MINIMIZE MAINTENANCE REQUIREMENTS.

ELECTRICAL SYSTEM

A. PRE-AMPLIFIERS

1. PRE-AMPLIFIERS SHALL BE OF SOLID STATE DESIGN, OF RUGGED CONSTRUCTION, WEATHER PROOFED, DESIGNED FOR MAST MOUNTING, AND SHALL BE INSTALLED ONLY WHERE REQUIRED.
2. PRE-AMPLIFIERS SHALL MEET OR EXCEED THE FOLLOWING SPECIFICATIONS:

<u>PARAMETERS</u>		<u>VHF</u>	<u>UHF</u>
GAIN	2 - 6 7 - 13	22 DB 25 DB	16 DB
CHANNEL BAND WIDTH	6 MHZ.	$\pm 3/8$ DB	± 1 DB
NOISE FIGURE	VHF-LOW VHF-HIGH UHF	3.8 DB MAX. 5.8 DB MAX.	10 DB MAX.
OUTPUT SIGNAL LEVEL		340,000 μ V @ 75 OHMS	63,000 μ V @ 75 OHMS
INPUT CONNECTION		300 OR 75 OHMS	300 OR 75 OHMS
OUTPUT CONNECTION		75 OHMS	75 OHMS
MOUNTING		MAST	MAST
OPERATING TEMPERATURE RANGE		-30°F TO +150°F	-30°F TO +150°F
POWER SUPPLY VSWR			
DISCONTINUITY		1.22	1.22
POWER SUPPLY INPUT		115V AC	115V AC

B. HEAD-END VHF AMPLIFIERS

1. ONE EACH HEAD-END CHANNEL AMPLIFIER SHALL BE USED AS REQUIRED. IT SHALL CONTAIN ITS INDIVIDUAL POWER SUPPLY, SEPARATE MANUAL GAIN AND AGC CONTROLS SO THAT FAILURE OF ANY SINGLE AMPLIFIER ELEMENT WILL AFFECT ONLY THAT ONE CHANNEL THROUGHOUT THE SYSTEM.
2. HEAD-END VHF AMPLIFIERS SHALL MEET OR EXCEED THE FOLLOWING SPECIFICATIONS:

<u>PARAMETERS</u>	<u>PERFORMANCE VHF</u>
GAIN	NO LESS THAN 3.5 DB FOR CHANNELS 2 THROUGH 13
2 OUTPUTS	MINIMUM OF 1.0 VOLT RMS AT EACH OF THE TWO OUTPUTS AS MEASURED ACROSS 75 OHMS
CONNECTIONS	75 OHM COAXIAL FITTINGS MATCHED TO 1.2 VSWR OR BETTER
AGC	20 DB INPUT VARIATION SHALL RESULT IN A MAXIMUM DEVIATION OF $\pm 1\frac{1}{4}$ DB AT THE OUTPUT
BAND PASS	6 MHZ $\pm \frac{1}{2}$ DB
POWER REQUIREMENT	115V, 60 Hz
SKIRT SELECTIVITY	MINIMUM OF 22 DB DOWN AT 9 MHZ FROM CHANNEL CENTER FREQUENCY

3. EACH AMPLIFIER SHALL BE INTERCHANGEABLE WITH AN IDENTICAL REPLACEMENT UNIT ADJUSTED FOR THE SAME FREQUENCY.

C. HEAD-END UHF AMPLIFIERS

1. SAME AS #1 ABOVE.
2. HEAD-END UHF AMPLIFIERS SHALL MEET OR EXCEED THE FOLLOWING SPECIFICATIONS:

<u>PARAMETERS</u>	<u>PERFORMANCE UHF</u>
GAIN	40 DB MINIMUM
OUTPUT	2.0 VOLTS ACROSS EACH OF 2 - 75 OHM OUTPUT TERMINALS
MANUAL GAIN VARIATION	15 DB MINIMUM
VIDEO CARRIER INPUT REQUIRED FOR TASO GRADE 3 PICTURE	150 M VOLT MINIMUM
BAND PASS	6 MHZ ± 1.5 DB PER CHANNEL
INPUT IMPEDANCE	75 OHM - UHF FITTING VSWR MAXIMUM 1.2
OUTPUT IMPEDANCE	TWO BRIDGING OUTPUTS FOR BRIDGING WITH MAXIMUM VSWR 1.2
POWER REQUIREMENTS	115V, 60 Hz @ 0.3A
POWER CONNECTION	LINE CABLE WITH NEMA GROUNDING PLUG FOR INSERTION IN CONVENIENCE OUTLET
FUSE PROTECTION	LINE $\frac{1}{2}$ AMP - DC POWER OUT 1/8A
MOUNTING	STANDARD RACK MOUNTING

1. TRAPS SHALL BE CAPABLE OF ATTENUATING A SINGLE FREQUENCY BY 60 DB. FREQUENCIES 1 MHZ AWAY FROM REJECTION FREQUENCY SHALL BE ATTENUATED LESS THAN 3 DB. FREQUENCIES MORE THAN 6 MHZ AWAY FROM REJECTION FREQUENCY SHALL BE ATTENUATED BY NO MORE THAN 0.25 DB.
2. INPUT AND OUTPUT IMPEDANCE OF REJECTION FILTER SHALL BE 75 OHMS AND SHALL INTRODUCE A VSWR DISCONTINUITY OF NO MORE THAN 1.2 (EXCEPT AT THE REJECTION FREQUENCY).
3. REJECTION FILTERS MAY BE USED AS REQUIRED TO REDUCE SOUND CARRIER FREQUENCIES OF SPECIFIC TV CHANNELS -15 DB WITH RESPECT TO ASSOCIATED PICTURE CARRIERS IN THE UPPER ADJACENT CHANNEL.

LINE SPLITTERS AND MIXERS

1. LINE SPLITTERS SHALL HAVE A FLAT FREQUENCY RESPONSE OVER THE ENTIRE OPERATING BAND FROM 10-216 MHZ AND FROM 470-890 MHZ. THE UNIT SHALL BE OF HYBRID DESIGN WITH A 75 OHM MATCH ON INPUT AND OUTPUTS AND A VSWR OF NOT GREATER THAN 1.4.
2. TWO-WAY LINE SPLITTERS SHALL HAVE A SIGNAL LOSS OF NOT MORE THAN 7 DB AT VHF AND 8 DB AT EACH OUTPUT. ALL UNUSED OUTPUTS ON THE SPLITTERS SHALL BE TERMINATED WITH 75 OHM TERMINATIONS.
3. FREQUENCY FILTER NETWORKS SHALL BE USED FOR MIXING HIGH AND LOW BANDS AND SHALL HAVE A MINIMUM REJECTION OF 20 DB BETWEEN BANDS AT DESIGNATED OUTPUT TERMINALS. INSERTION LOSS SHALL NOT EXCEED 1 DB ON ANY VHF CHANNEL. THE INPUT AND OUTPUT IMPEDANCE SHALL BE 75 OHMS.
4. FREQUENCY FILTER NETWORKS SHALL BE USED FOR MIXING VHF AND UHF BANDS AND SHALL HAVE A MINIMUM OF 19 DB ISOLATION BETWEEN BANDS. INSERTION LOSS SHALL NOT EXCEED 0.5 DB.
5. POWER LINE FILTERS SHALL BE INSTALLED IN EACH AMPLIFIER AND CONTROL CABINET. SAID FILTERS SHALL PROVIDE A MINIMUM OF 60 DB ISOLATION BETWEEN POWER LINE INPUT AND OUTPUT WITH RESPECT TO 10 MHZ TO 1000 MHZ.

OUTLET CONNECTIONS

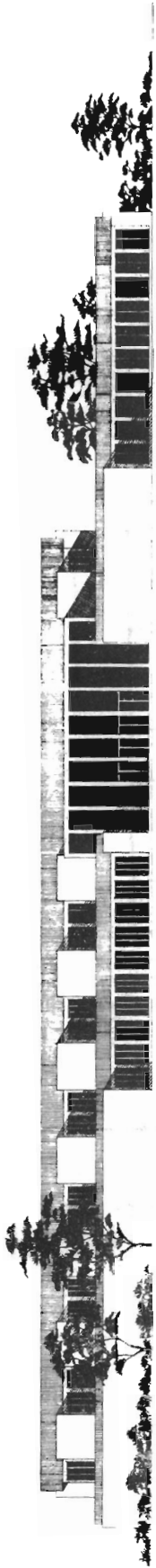
1. OUTLETS SHALL BE PROVIDED AT EACH LOCATION SHOWN ON INSTALLATION PLANS AND SHALL BE MOUNTED IN 2"-DEEP MINIMUM SURFACE ELECTRICAL BOXES.
2. PROVISION SHALL BE INCORPORATED TO PREVENT 60 HZ VOLTAGE TO BE INADVERTENTLY CONNECTED INTO DISTRIBUTION SYSTEM OUTLET.
3. OUTLETS SHALL BE DESIGNED TO ACCOMMODATE VHF AND UHF FREQUENCIES.
4. MINIMUM ISOLATION BETWEEN ANY TWO RECEIVERS SHALL BE 24 DB.
5. MATCHING TRANSFORMER AND FREQUENCY SPLITTING CONNECTION FOR VHF AND UHF TV SET INPUTS MUST BE PROVIDED.

APPENDIX VII

ARCHITECTURAL ELEVATIONS

and

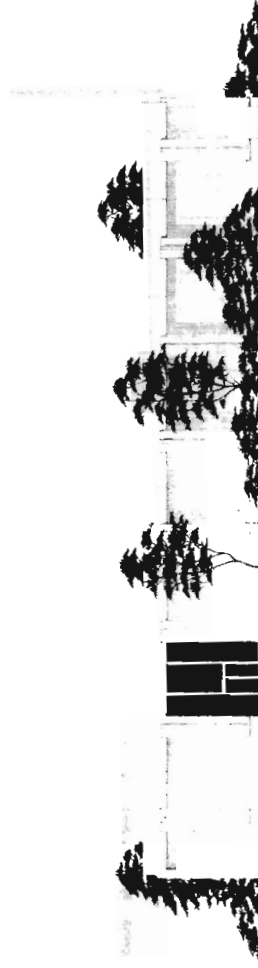
PLAN VIEWS



NEW BRUNSWICK

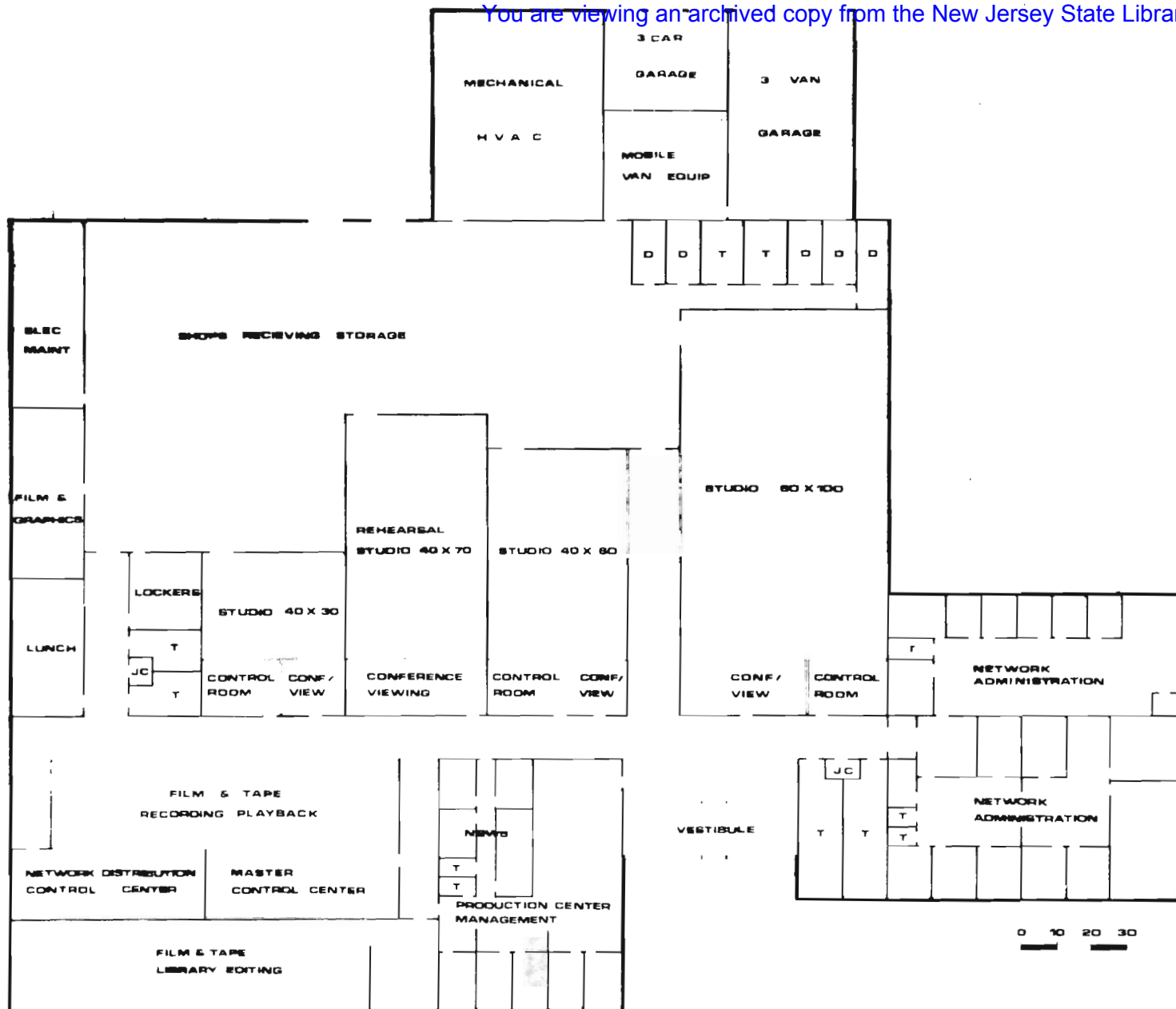


TRENTON



ATLANTIC CITY
GLEN RIDGE

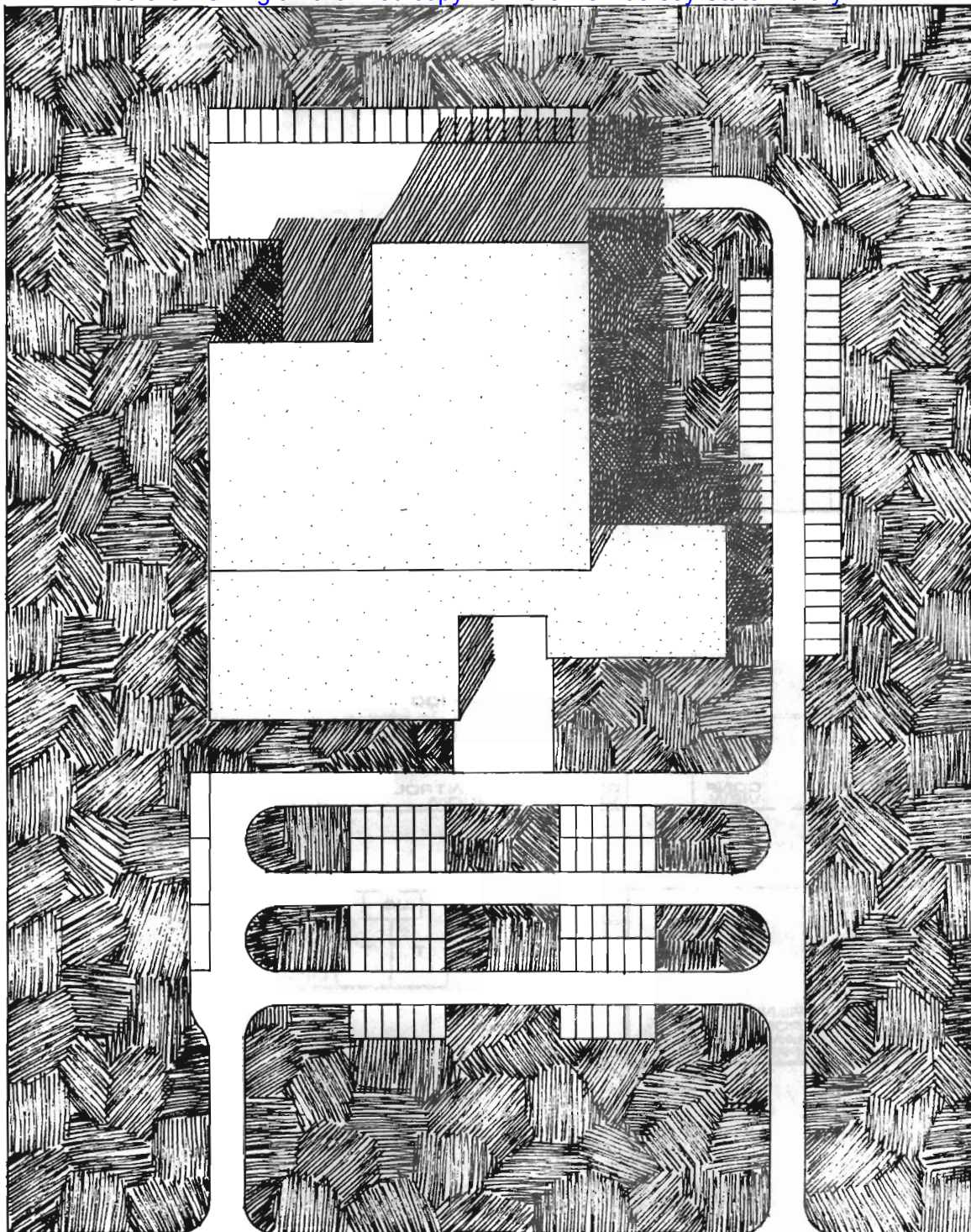
HG ROGER E.
GOODWIN



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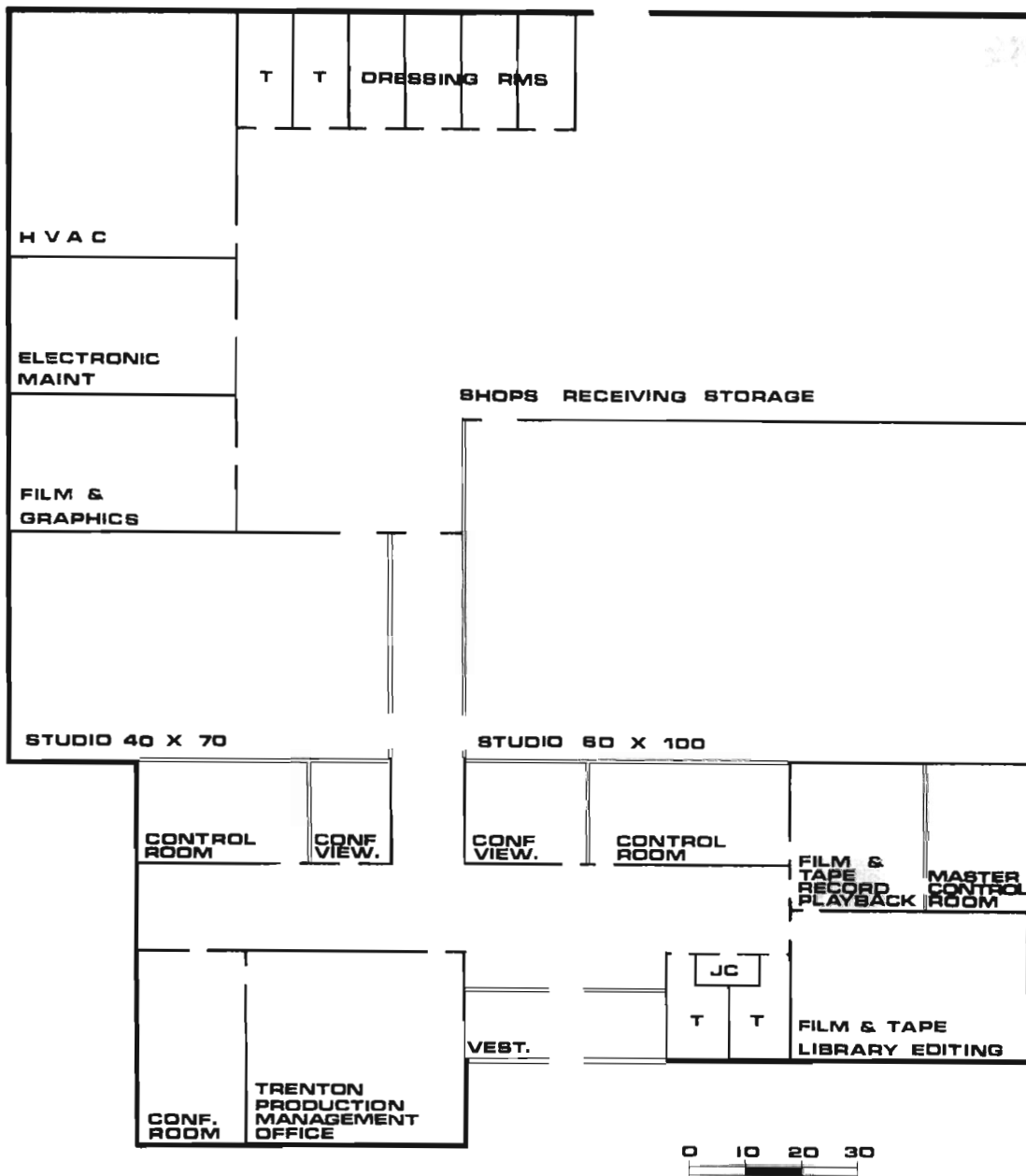
PRIMARY PRODUCTION CENTER · NEW BRUNSWICK





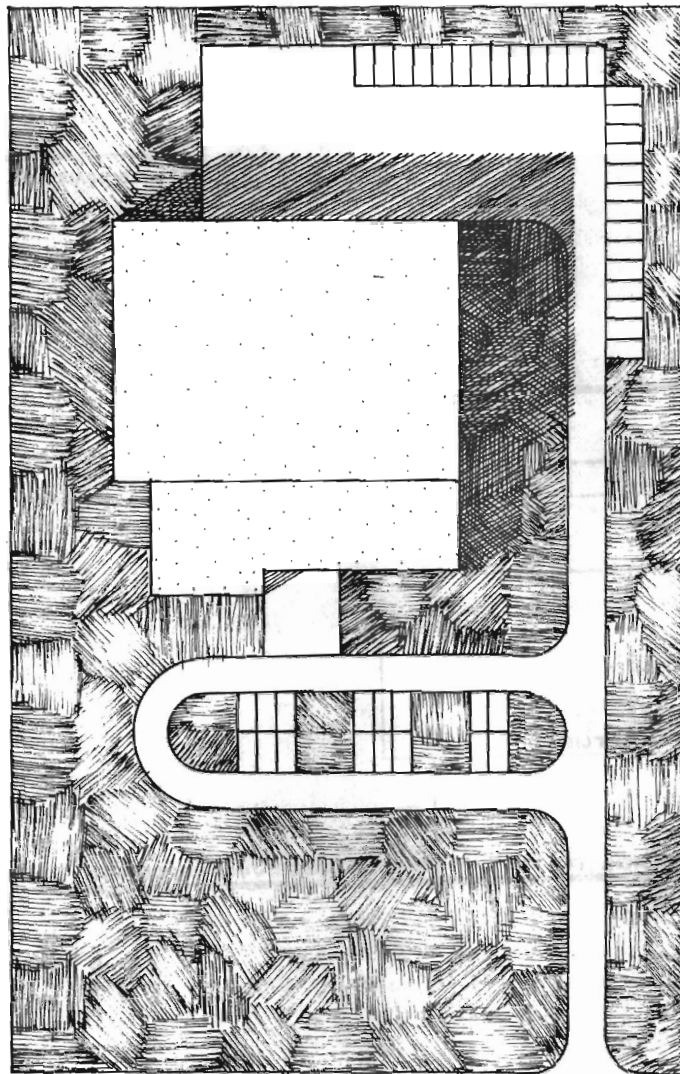
SITE PLAN





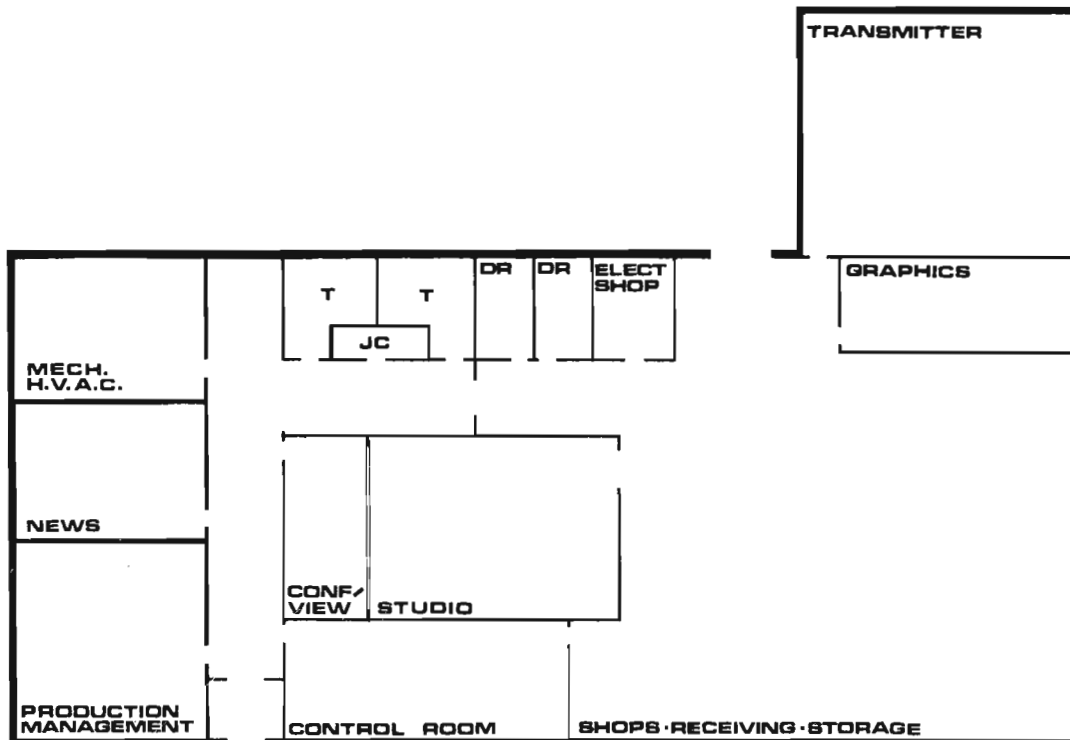
TRENTON PRODUCTION CENTER





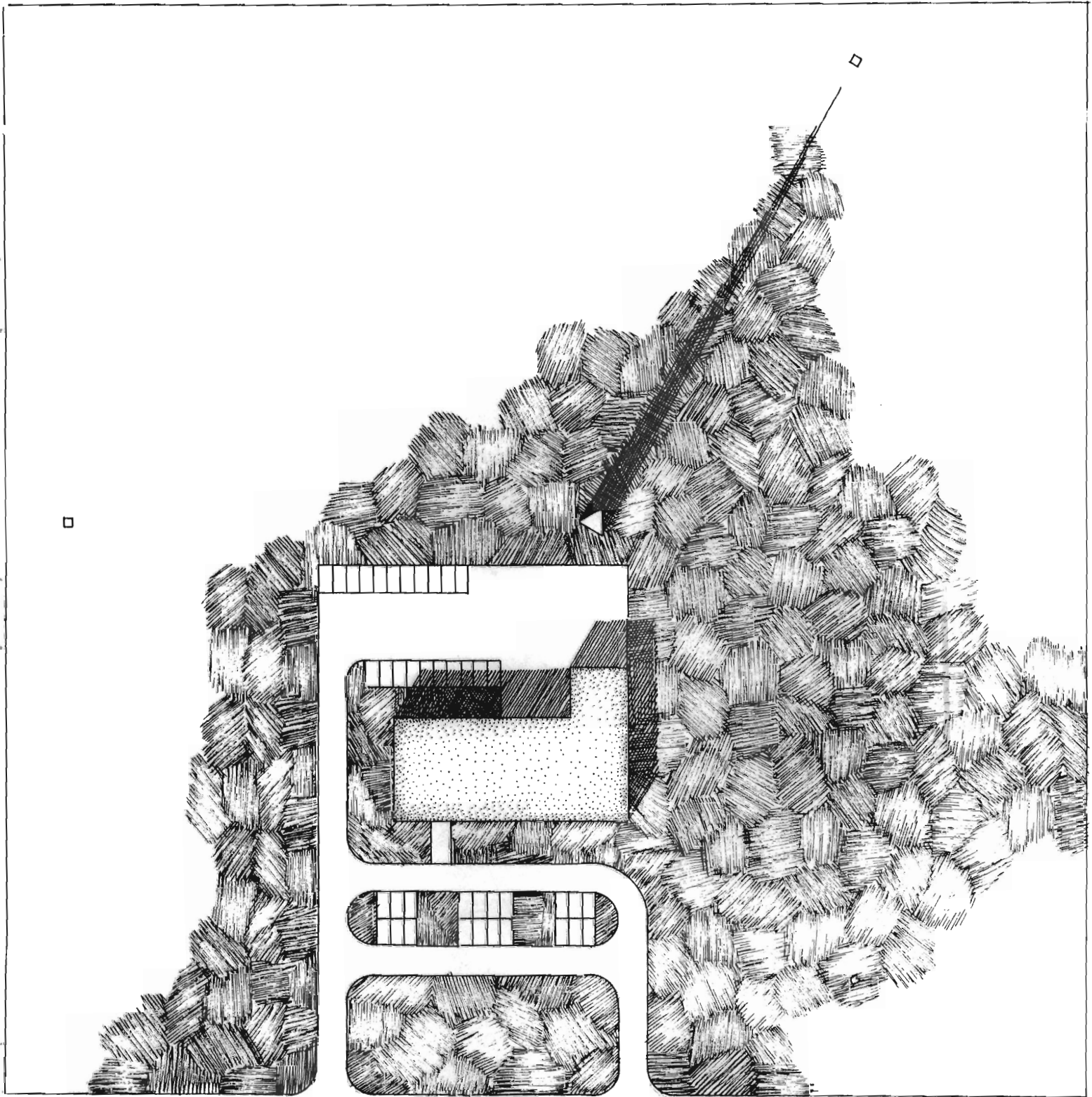
SITE PLAN





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ATLANTIC CITY PRODUCTION CENTER GLEN RIDGE PRODUCTION CENTER



SITE PLAN



APPENDIX VIII

FACT SHEETS REGARDING
NEW JERSEY PUBLIC SCHOOLS 1967-1968

NEW JERSEY ETV

ESTIMATED COSTS TO EQUIP BUILDINGS AND CLASSROOMS

APPROX. NUMBER OF SCHOOL BUILDINGS		2,300
APPROX. NUMBER OF CLASSROOMS		51,000
*AVERAGE NUMBER OF CLASSROOMS PER BUILDING		22
AVERAGE NUMBER OF CLASSROOMS PER BUILDING TO BE WIRED		22
*AVERAGE NUMBER OF CLASSROOMS PER BUILDING WITH TELEVISION SETS		14
<u>COST PER BUILDING</u>	<u>B/W</u>	<u>COLOR</u>
**DISTRIBUTION SYSTEM - 22 ROOMS @ \$80	\$1760	\$1760
BROADCAST RECEIVING ANTENNA	75	75
2500 MHZ RECEIVING AND DOWNCONVERTER	1500	1500
***28 RECEIVERS @ \$150 FOR B/W AND \$300 FOR COLOR	2100	4200
MAINTENANCE AND SPARE PARTS (10%)	543	753
AVERAGE COST PER BUILDING	\$5978	\$8288
AVERAGE COST PER CLASSROOM	271	377

APPROX. COST TO EQUIP 2300 BUILDINGS, OR \$13,751,400 \$19,062,400
 APPROX. COST TO EQUIP 51,000 CLASSROOMS 13,821,000 19,127,000

* ASSUMING SUFFICIENT TELEVISION RECEIVERS
 WERE PURCHASED TO EQUIP 2/3 OF CLASSROOMS
 IN ANY GIVEN BUILDING AT ANY GIVEN TIME.
 HOWEVER, ALL CLASSROOMS WOULD BE WIRED.

** DISTRIBUTION COST PER ROOM, BASED ON INFORMATION IN ITFS MANUAL, PUBLISHED BY NEA.

*** ASSUMING TWO TELEVISION RECEIVERS ASSIGNED TO EACH ROOM UTILIZING TELEVISION.

ESTIMATED COSTS TO ESTABLISH 2500 MHZ, 4-CHANNEL SYSTEM,
 TO REACH 90% OF SCHOOL BUILDINGS

TRANSMISSION

IT IS ESTIMATED THAT 8 TRANSMITTER SITES
 WOULD BE REQUIRED
 8 SITES (4 CHANNELS PER SITE) @ \$65,000 \$520,000
 (4 SITES WOULD BE TV TRANSMITTER LOCATIONS)

RECEPTION

IT IS ESTIMATED THAT THERE ARE SOMEWHAT MORE
 THAN 2300 SCHOOL BUILDINGS IN NEW JERSEY.
 A RECEIVING ANTENNA AND DOWNCONVERTER
 WOULD BE REQUIRED AT EACH RECEIVING
 LOCATION @ \$1500 EACH
 ****2300 x \$1500 \$3,450,000
 MAINTENANCE AND SPARE PARTS (10%) 397,000
 TOTAL ESTIMATED COST FOR 2500 MHZ,
 FOUR-CHANNEL SYSTEM \$4,367,000

**** THIS \$1500 FIGURE IS ALSO INCLUDED IN THE
 FIGURES LISTED UNDER "ESTIMATED COSTS TO
 EQUIP BUILDINGS AND CLASSROOMS" ABOVE.

FACT SHEET

REGARDING

NEW JERSEY PUBLIC SCHOOLS, 1967-68

NUMBER OF BOARDS OF EDUCATION	594
NUMBER OF SCHOOLBOARD MEMBERS	4,622
NUMBER OF SCHOOL DISTRICTS	594
NUMBER OF PUBLIC SCHOOLS	2,236
NUMBER OF CLASSROOMS	51,665
NUMBER OF DAY SCHOOL STUDENTS	1,333,563
NUMBER OF ELEMENTARY SCHOOL STUDENTS	879,838
NUMBER OF SECONDARY SCHOOL STUDENTS (JUNIOR HIGH SCHOOL, SENIOR HIGH SCHOOL, VOCATIONAL SCHOOL)	650,187
NUMBER OF SPECIAL INTEREST STUDENTS (HANDICAPPED, SUMMER ENROLLMENT, EVENING SCHOOL)	135,623

AVERAGE SCHOOL CONSTRUCTION COSTS (1965-66)
(EXCLUDES COST OF SITE, SITE DEVELOPMENT,
EQUIPMENT, AND FEES)

ELEMENTARY SCHOOLS:

COST PER PUPIL	\$1,196.00
COST PER SQUARE FOOT	18.10

SECONDARY SCHOOLS:

COST PER PUPIL	\$1,944.00
COST PER SQUARE FOOT	18.03

APPENDIX IX

VIDEO TAPE RECORDING CONSIDERATIONS

A. Quadruplex Video Tape Standards

1. Technical Requirements
2. Operational Procedures
3. Tape Tips
4. Video Tape Handling

B. Video Tape Dubbing Practice

C. Rationale for Use of the Helical Scan Television Tape Recorder

Quadruplex Video Tape Recording Standards

The attached Video Tape Standards have been basically derived from the WNDT Engineering Department, and are reprinted with their permission. Certain changes have been introduced in the light of current (1968) technological developments in the state of the art.

The attached Ampex Bulletin, "Tape Tips and Standards," is reproduced with the permission of the Ampex Corporation.

The NET Video Tape Handling specifications are to be considered "standard practice."

It is essential to the over-all operation of video tape exchange to refer to a standard alignment procedure as outlined in the attached requirements so that we maintain free inter-changeability of video tape programs.

PART I - TECHNICAL REQUIREMENTS

All operating and recording engineers are requested to become thoroughly familiar with the information contained within the Technical Requirements in order that we maintain the highest standards of technical performance and insure interchangeability.

I. VIDEO

The video input signal to the VTR shall be in accordance with E.I.A. specifications (Standard No. TR-135).

(a) Video Frequency Response: Uniform within ± 0.5 db from 20 cps to 3.6 mc and down no more than 1 db at 4.2 mc. The horizontal or vertical tilt as measured with a standard window signal should be less than 2%.

(b) Signal to Noise Ratio: Performance better than 40 db, peak to peak video to R.M.S. wideband noise. (Noise measurement includes unweighted noise components from 100 KC to more than 4.2 mc.)

(c) Related Video Requirements

1. Transient response: less than 0.2 u sec. rise time (10% to 90% measured with a 15 KC square wave having a rise time of no less than 0.02 u sec) Overshoot less than 7%.

2. Differential gain: no more than 5% at peak white or black levels, at normal video signal levels, and with input duty cycle of either 10% or 90%, no more than 5% in intermediate range. Measurement by I.R.E. Standard Step Signal Method.

(d) Vertical Line Displacement: Horizontal displacement (quadrature) of vertical picture elements should not exceed 0.05 u sec. (1/64 inch on 21 inch screen).

II. AUDIO

(a) Frequency Response: Equal to or better than ± 1 db, 50 to 10,000 cycles/second.

(b) Signal to Noise Ratio: Equal to or better than 50 db measured over-all with reference to a recorded level corresponding to 3% total R.M.S. distortion at 400 cycles/second.

(c) Flutter and Wow: Shall be less than 0.15% R.M.S. measuring all components from 0 to 200 cycles/second.

(d) Distortion' Equal to or less than 1% R.M.S. at 40 cycles measured at normal operating level (Normal operation level is 8 db below 3% R.M.S. distortion level, or peak recording level).

III. HEADS

(a) The four heads on the VTR shall be matched for a minimum of banding effects. This should be accomplished in accordance with differences among heads in noise level, resolution, horizontal displacement, and transient response. The recording current level to each head should be selected for optimum noise level and uniformly low transient response among all four heads. It is essential that optimum recording current level be selected. The resulting effects due to improper head current optimization cannot be rectified in the reproduction or duplication process. Programs with obvious banding effects will be considered unsuitable for duplication.

(b) Quadrature alignment of the head used for recording should be such that it is able to play back the standard alignment tapes with minimum horizontal displacement of vertical lines in adjacent bands. This requirement should be met for all of the four possible tracking positions. Deviations in excess of 0.05 u sec shall be considered unacceptable.

It is essential that the standard alignment tape be used for reference adjustments to maintain interchangeability.

IV. VACUUM GUIDE ADJUSTMENTS

(a) Horizontal Alignment: Vacuum guide pressure setting should be adjusted for minimum skewing when playing back the standard alignment tapes. The correct vacuum guide pressure setting is achieved by adjusting for minimum skewing, venetian blind effect or uniform vertical lines. Deviations in excess of 0.05 u sec shall be considered unacceptable.

(b) Vertical Alignment: Vacuum guide height should be determined for minimum scalloping (curvature of vertical lines within each level) when playing back the standard alignment tapes. deviations in excess of 0.05 u sec shall be considered unacceptable.

(c) SMPTE RP-11: As explained in the attached Ampex Publication shall be considered a further standard for vacuum guide positioning.

V. VIDEO SIGNAL ADJUSTMENTS

- (a) Frequency Modulation (Monochrome) Low Band: Blanking level shall correspond to a modulated FM carrier frequency of 5 mc. Carrier deviation will be adjusted to the proposed S.M.P.T.E. Recommended Practices of 2.5 mc with sync tips at 4.30 and peak whites at 6.8 mc.
- (b) High Bank Monochrome/Color Pre-Emphasis: Blanking level shall correspond to FM carrier frequency of 7.9 mc.; at peak whites. (SMPTE RP-6)
- (c) Head Servo adjustments are to be checked prior to recordings to assure freedom from any horizontal instabilities of the playback picture. Recording should be made with the head servo control chassis locked to the incoming video signal.
- (d) Tape Transport and Head Assembly must be properly cleaned prior to recording. It is necessary that the video head assembly be checked and demagnetized to insure optimum picture quality.

VI. VIDEO TAPE

- (a) Tape surface must be free from scratches, abrasions, indentations, pre-recording splices or other imperfections.
- (b) Frequency of video dropouts should not exceed more than 15/minute.
- (c) Determine condition of recorder to be used for evaluation by checking with an accepted operational tape.
- (d) New video tape stock should be burnished with at least two passes in the record mode using sync and at least 20% of setup, without video, using 2.5 mils of tip penetration.
- (e) Entire tape should be played back, if time permits, so that an evaluation of dropout activity can be determined. If time does not permit entire playback, spot check at least five sections throughout entire reel.
- (f) Splice Check: It is poor practice to re-record on spliced tape. If a spliced tape is to be utilized, all splices should be checked by recording and playing back over the spliced area. Observe if splice playback is free from scratches, abrasions, wrinkles and dropouts. Splice should also be checked for

control track or audio playback level changes at splice transition.

VII. RECOMMENDED PRACTICE FOR SPLICING VIDEO TAPE

(a) Location of Splice: The proposed S.M.P.T.E. recommended practice is shown in Figure 1.

(b) Splicing Tape shall be: 3M #391 - 1/2 - 66 (0.5" wide, .00025" thick) 3M #390 - 66 (0.25" wide, .0005" thick).

(c) Proper location of the cut is shown in the center of the field or edit pulse, which is determined as the center of the guard band, between two adjacent video tracks.

(d) Care should be taken in order that the separation between the two cut edges after splicing shall not exceed 0.001 inch at any point along the cut.

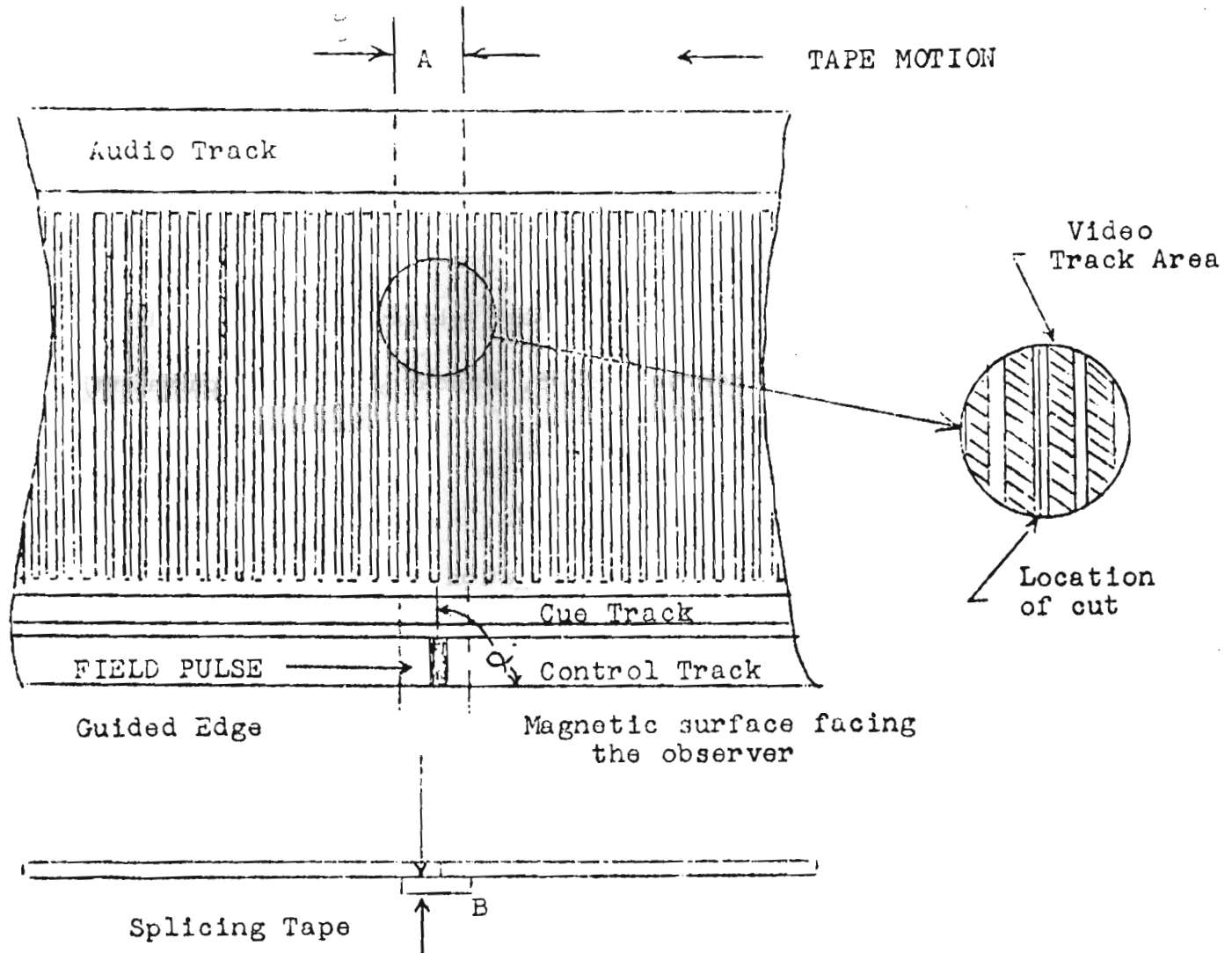
(e) The longitudinal distance between corresponding points on the record transverse video tracks immediately preceding and following the splice shall not separate from the average distance between successive tracks by more than \pm 0.0005 inch of a recorded tape.

(f) The splicing tape on a finished splice shall not exceed beyond the edges of the tape.

(g) The guiding edge of the magnetic tape on either side of a splice shall lie on a common straight line when the tape surface is constrained to lie in a plane.

(h) Taped material shall contain no post-recording splices except those made with the correct blanking intervals of the joined sections and in which the splice follows the vertical sync pulse in time. The splices shall be made in a workmanlike manner, equaling or exceeding the strength of the original material and capable of withstanding the stresses encountered in normal starting, stopping, playing and high speed winding operation on the recorder.

RECOMMENDED PRACTICE FOR PATCH SPLICES IN MAGNETIC VIDEO RECORDING TAPE



SYMBOL	DIMENSIONS
A - Width of Splicing Tape	0.25 inches, Nominal
B - Thickness of Splicing Tape	0.0007 Maximum Inches
	90° 33 Min \pm 3 Min

Figure 1

PART II - OPERATIONAL PROCEDURES

Procedures, as follows, must be adhered to in order to obtain complete interchangeability for video tape network operations, provide consistently uniform audio and video recording quality, and provide technically acceptable programming for broadcasting to all stations. The following information should be recorded immediately before recording the production:

A. Identification (Ink)

On the first two feet of video tape (glossy side), using a flomaster felt tip pen No. CP-05, standard (black or equivalent), there should be shown:

- (a) Series title
- (b) Call letters of originating station with their identification number
- (c) Date of recording
- (d) Studio of origination
- (e) Length of recording

NOTE: DO NOT permit inked section of video tape to extend into video test section, since the ink has been known to foul the guide shoe, causing "s" distortion.

B. Video/Audio Test Signals

The head end of each tape must contain the following video and audio test signals. Assuming correct signal injections into the tape recorder, it is appropriate to define subsequent studio signal degradation or tape equipment malfunction as a result of

said "head-end recording."

(a) 60 seconds of staircase (400 cycle tone at program level to accompany this)

(b) 30 seconds of window signal (400 cycle tone at program level to accompany this)

(c) 10 Seconds of silent "slate identification" inclusive of the following detail - see Figure 1:

(1) Program title - series of the Program

(2) Identification number as prescribed by intended recipient of product and studio identifying number

(3) Date of recording

(4) Specified program length in minutes and seconds

(5) Recording studio name or call letters

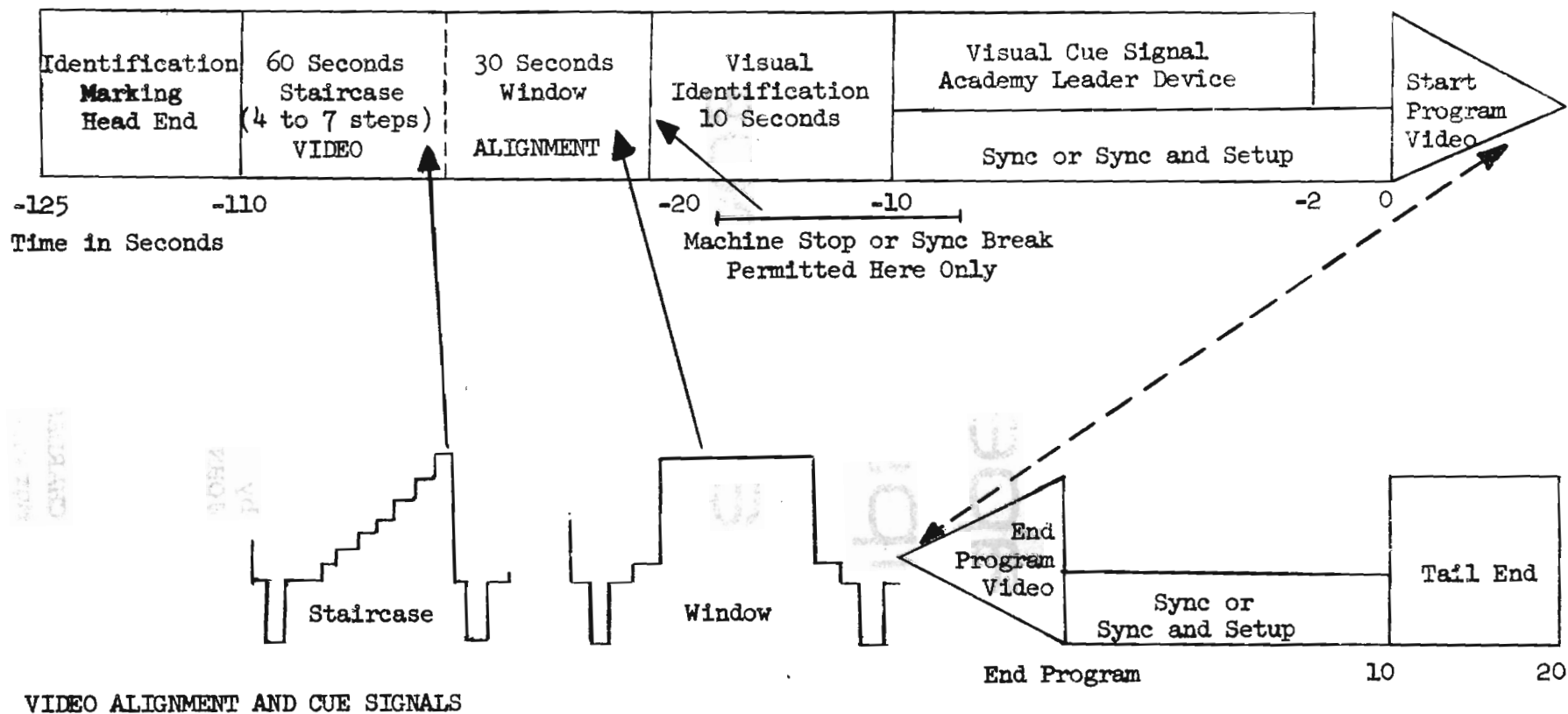
C. Audio Operational Cue Signals

The audio cue signals shall consist of 400 cycle tone injected as 1/5 second beeps, occurring at 9, 8, 7, 6, 5, 4, 3, and 2 seconds ahead of the program. Between beeps the 400 cycle signal shall be present but reduced in level by 20db. A two second interval of no sound must be maintained before the start of the program material. The level of the beeps shall be representative of normal 100% recording level.

D. Video Operational Cue Signals

(a) Simultaneously with the audio countdown signals, a digital display or an academy film leader (via film chain) should be used.

- (b) Sync only shall be recorded during the 2-second interval prior to program commencement. (This may be altered to encompass sync and setup.)
- (c) The syn signal applied to the video tape leader should be from the same source as that to be used with the program, in a continuous recording. Test signals and tape leaders shall be spliced or edited into the tape.
- (d) A minimum of 10 seconds of sync only shall conclude each separate video tape recording. There should be sufficient black to preclude any noise from getting on the air because of slow switching.
- (e) A minimum of 10 seconds of tape, to insure tape wrap-around the take-up reel after conclusion of the sync only, shall be provided. See Figure 1.



VIDEO ALIGNMENT AND CUE SIGNALS

AUDIO ALIGNMENT AND CUE SIGNALS

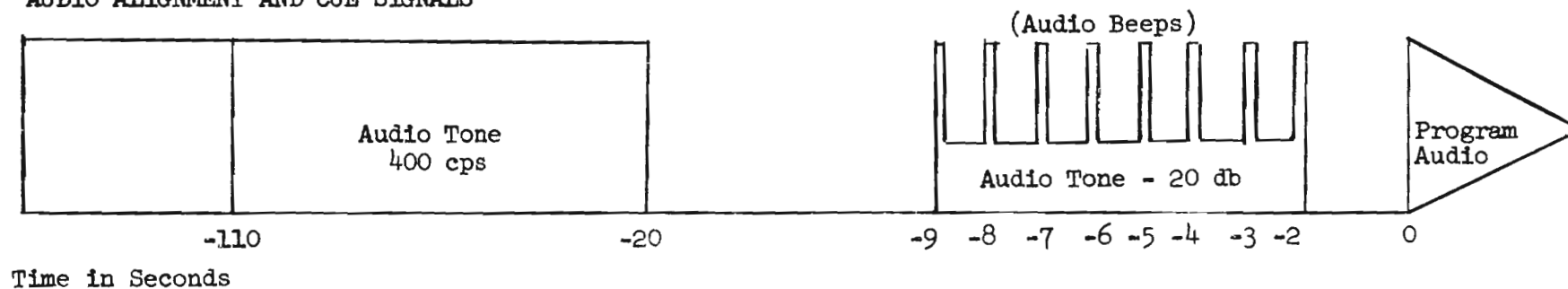


Figure 1. Video Tape Leader Signals

Bulletin From **VIDEO** Engineering

Issue 100
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Tape Tips And Standards

STAFF NOTE:
JANUARY
-15-

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INTRODUCTION

The SMPTE has created SMPTE Recommended Practice RP-11 titled Tape Vacuum Guide Radius and Position for Recording Standard Video Records on 2-Inch Magnetic Tape. This bulletin has been prepared to further the understanding of the recommended practice and to explain the terminology associated with video head operation.

DEFINITIONS

Drum Diameter: The design of the Ampex Television Recorder video head drum is based upon a nominal diameter of 2.06405". All measurements are referenced to this diameter. Because of machining tolerances, individual drums may differ slightly from the reference diameter.

Tip Projection: The tips of the four video heads on each drum assembly extend out from the drum a maximum of 3.3 mils (.0033") past the reference diameter. This yields a maximum tip-to-tip diameter of $2.06405" + .0066"$ or $2.07065"$. The common method of using a dial indicator to measure projection of the tips is valid as a standard measurement under two conditions only:

1. If the diameter of the drum is exactly equal to the reference diameter, or
2. If the dial indicator reading is corrected by the amount the drum is above or below the reference diameter.

As an example, suppose that a drum is measured and found to have a diameter 0.2 mil under the reference diameter. Suppose further that the measured tip projections with an indicator are tabulated as follows:

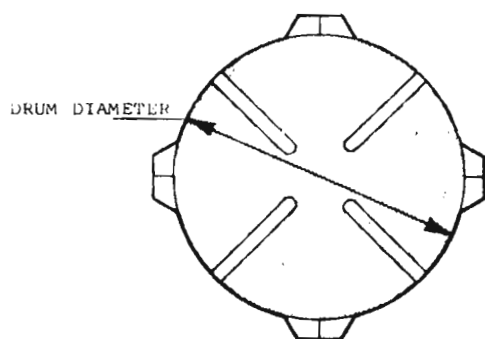


Figure 1

HEAD	MEASURED PROJECTION	CORRECTED PROJECTION
#1	3.2 mils	3.2 mils
#2	3.3 mils	3.2 mils
#3	3.1 mils	3.0 mils
#4	3.1 mils	3.0 mils

Figure 2

To find the corrected or actual projection, half the excess diameter or .1 mil must be subtracted from the measured projection.

Tip Engagement: To assure tight contact between the video heads and the tape, there is negative clearance between the head tips and the tape in the guide. The tape guide is relieved in line with the tips so the tape may stretch as the tip travels across it. The negative clearance is the tip engagement.

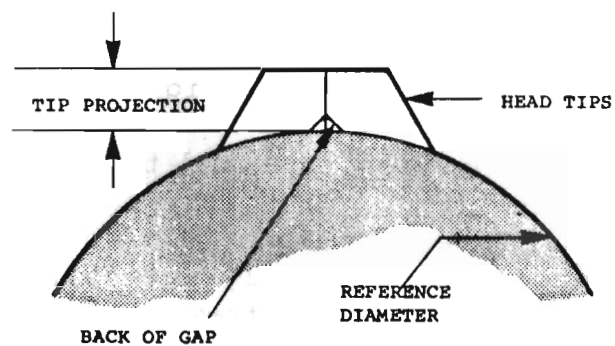


Figure 3

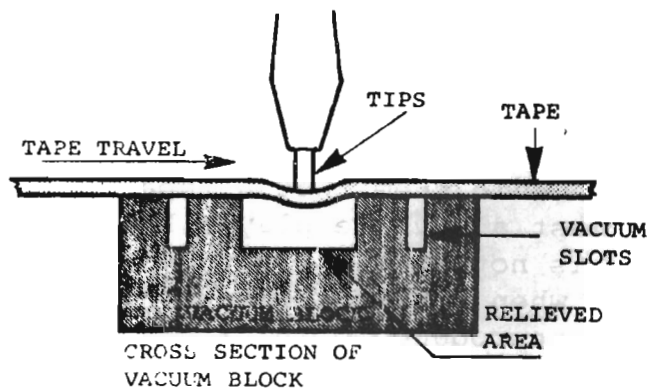


Figure 4

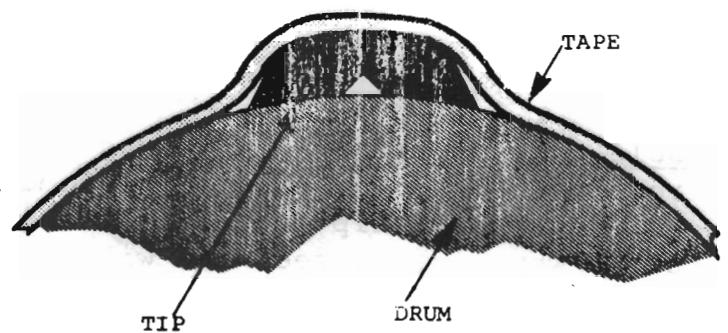


Figure 5

Departure Point: As negative clearance is decreased by moving the guide away from the head drum, signal output will remain relatively unchanged until only a small amount of negative clearance (engagement) is left, and intimate contact between head and tape starts to be lost. At this point output will start to fall and finally reach zero. Because horizontal movement of the guide away from the drum destroys concentricity between the two, intimate contact will be lost first at the mid-point of the head's travel across the tape, and a dip will be introduced at the center of the RF envelope of the head's output, as viewed on an oscilloscope (Fig. 6).

Complete loss of contact between tape and tip is indicated when the envelope dips to zero (Fig. 7). This point in the guide's movement is called the "Departure Point". To adjust approximately for a desired tip engagement it is only necessary to locate the "departure point" and move the guide towards the drum the distance equal to the desired engagement.

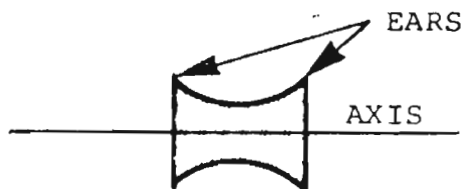


Figure 6



Figure 7

Self-compensation: At first glance it would seem that a tape recorded with a given tip engagement must always be played back using the same tip engagement. This is not true. To understand why, let us see what will happen when a tape recorded with a head having 3 mils tip projection is reproduced using a head which has only 2 mils tip projection. We will assume that the recording was made with 3 mils tip engagement. When the tape is played back by the 2 mil head, we find that the tip engagement (when the guide is adjusted to remove skewing) is now only 2 mils! The explanation is this: since the angular velocity is held the

same during record and reproduce, it follows that the tip velocity must have been greater during the record process due to the larger tip radius; if correct timing is to be maintained, the length of tape traversed by the shorter reproduce tips must be less or, in other words, less tape stretch is required. By a happy coincidence, the reduction in tape stretch due to decreased tip penetration is complementary to the reduced velocity due to decreased tip radius.

The significance of this self-compensation principle can be appreciated by performing this simple experiment. Record a tape with a head which has a tip projection of 3.0 mils, and use 3 mils of tip engagement, and now we simply grind one of the four tips down to 1 mil tip projection. If you now reproduce the tape which was recorded when all the tips were equal, you will see no visible defect in the picture! The reduced velocity of the short tip has been exactly compensated by the reduction in stretch due to reduced tip penetration.

One important idea to be kept in mind is that the stretching will be a localized affair. The effect of stretching is shown in the exaggerated figures that follow. The position of equally spaced recorded pulses on the tape is indicated by black bars on the cross section of the tape.

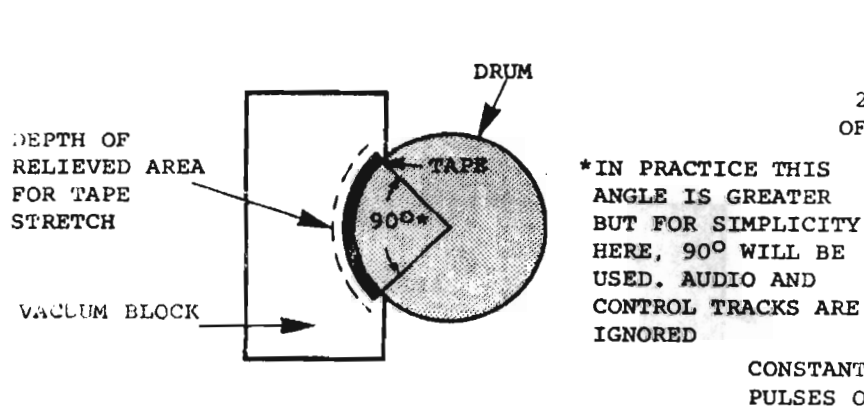


Figure 8

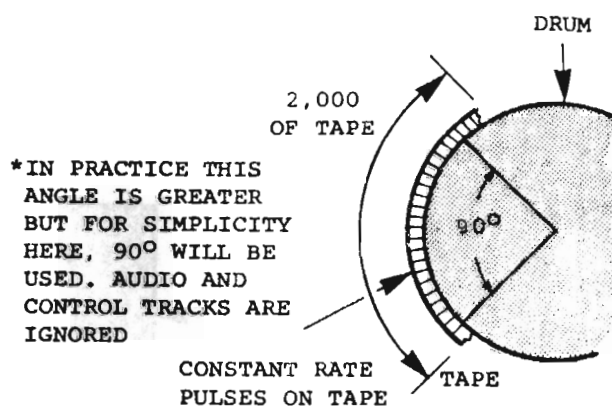


Figure 9

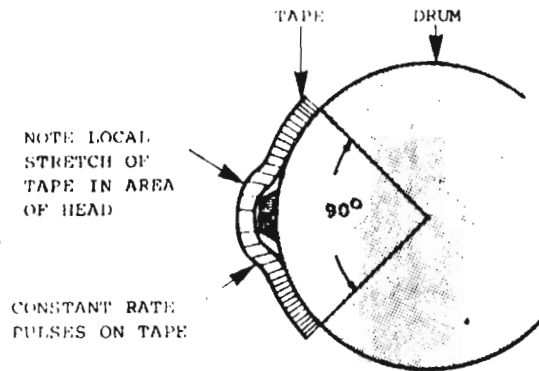


Figure 10

Facts to Note:

1. The head will sweep the same angle in the same time regardless of amount of tip projection.
2. The peripheral speed of the tip is greater with more projection, but the local stretch of the tape balances out the increased speed by increasing the separation of the pulses on tape.
3. The horizontal position of the guide relative to the chrome surface of the drum remains constant throughout the life of a head, and tip engagement decreases as the tips wear down.

Guide Radius and Position: The vacuum guide radius of curvature is specified in RP-11 as ranging from 1.0329 to 1.0334 inches; Mark Ten heads are held to a much closer range of values.

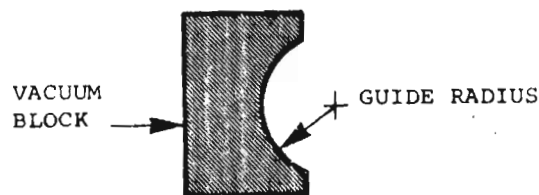


Figure 11

To a first approximation the variations in guide radius can be accommodated by varying guide position slightly so that the same length of track is always recorded or reproduced regardless of guide radius. Only when the guide radius is 1.0334 are the center of curvature of the guide and the axis of rotation of the drum coincident; for all other values a slight eccentricity exists.

Because guide radius is controlled by the manufacturer, the only variable under the control of the recorder operator is the guide position which determines eccentricity. In practice there are two ways for an operator to set up the proper eccentricity. The most accurate method is to play back a standard tape designed for the purpose and adjust guide position both horizontally and vertically for minimum geometric errors in the reproduced picture. A less accurate method which can be used if a standard tape is not available is the one described previously in the subsection entitled 'Departure Point'.

Guide Height: RP-11 states that the eccentricity shall be such that the extension of a line joining the center of curvature of the vacuum guide and the axis of rotation of the heads intersects the tape at the midpoint of its width. This statement defines what most of us know as guide height, and this positioning of the guide is also under the control of the operator. Mark IV and Mark Ten heads have a convenient control for adjusting this position.

The best way for the operator to set guide height is to use the same standard tape used for setting eccentricity, and as in the former case guide height should be adjusted for minimum geometric distortions in the reproduced test pattern.

If a standard tape is not available there are two other less accurate ways available for setting guide height which can be used in an emergency. The simplest way is to make a short recording and then observe the RF output of the switcher during playback while moving the guide away from the head. The RF pattern from the heads will dip as in Figure 6, and if the guide height is correct the ears at both ends of the RF burst will remain equal in height as the guide is backed away. The process of recording and playing back must be repeated several times to zero-in the correct setting.

A second method is to make a recording with the control track signal also recorded on the Audio I track and then play the tape back up-side-down. The guide height should be adjusted to remove half of the geometric error observed. The record-playback process should be repeated several times to zero-in the correct guide setting. A certain amount of experimentation with control track level will be necessary to obtain proper playback levels.

HEAD LIFE

Exact head life is impossible to predict because it is dependent upon so many variables, but it can be prolonged by operating the recorder in as clean an environment as possible. Dirty, dusty conditions are guaranteed to shorten head life.

The wear rate on new heads with tips at or near the maximum projection will be relatively high but will decrease as the heads wear. The curve has the following general shape.

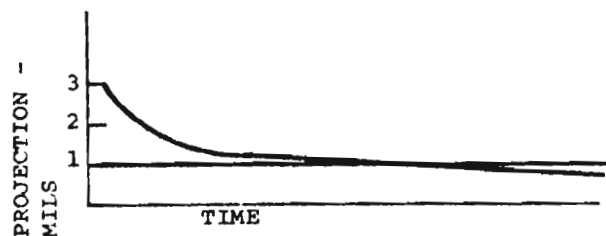


Figure 12

The point at which the head is retired is primarily determined by the drop out count which rises rapidly at about 1 mil of tip engagement; therefore, heads are generally retired when only 1 mil of tip remains.

SUMMARY

If tapes are to be interchangeable and interspliceable the vacuum guide position must be carefully controlled during the recording process, and the most practical way to do this is to make liberal use of a standard tape. Head life can be extended by keeping the operating environment as clean as possible. If these simple rules are followed a large step will have been taken towards standardization and improved operating efficiency and performance.

VIDEO TAPE HANDLING

1. REWIND

To insure a tight wind always thread tape through tape transport, past all heads and guide posts. Do Not rewind directly reel to reel omitting the normal tape guides.

2. TAPE END TIE DOWN

All tapes must be tagged down with a small piece of masking tape to prevent unravel. Do not use masking tape to fasten tape to reel hub!

3. STOPPING

When winding either fast forward or rewind, do not go to the stop position until you have reversed the wind and the tape is at the slowest speed. At this point depress the stop position. This procedure for stopping the tape travel from a fast mode may prevent fold over and possible tape stretching conditions.

4. PACKING

Always replace tape reel in the dust proof polyethylene bag before placing reel into its original container. It is essential that the reel and tape be kept clean. The accumulation of foreign matter, dust, etc., may seriously damage the video tape material and contribute to head clogging in playback.

5. MAGNETIC DAMAGE

Be certain that no element on your tape transport is magnetized. One magnetized head can degrade the picture for other stations in line for use of the same recording. Degauss VTR equipment when in doubt.

Your cooperation in these five rules will assure the best air quality and video tape for all affiliated stations.

VIDEO TAPE DUBBING PRACTICE

In order to produce satisfactory copies of tape recorded programs, it is essential that the tape used to copy from (master) must be of as high a quality as the state of the science/art permits. This implies use of professional broadcast, quadruplex video tape recording facilities meeting all requirements and stipulations as outlined in the brochure titled, "Quadruplex Video Tape Recording Standards." Dubbing should only be performed under strict controlled conditions and then only if the master tape meets all technical specifications.

At the present status of the art no helical master should be provided for quadruplex dubbing. Said operation can be accomplished but would be wasteful of valuable facilities. Only under emergency conditions can such practice be considered justifiable.

Based upon the above criteria, dubbing can be performed on the following basis:

- (a) Master Quadruplex 15/7-1/2 ips, high band to Quadruplex 15/7-1/2 high band
- (b) Master Quadruplex 15/7-1/2 ips, high band to Quadruplex 15/7-1/2 low band
- (c) Master Quadruplex 15/7-1/2 ips, low band to Quadruplex 15/7-1/2 low band
- (d) Master Quadruplex 15/7-1/2 ips, low/high band to Ampex 660B, 5000, 6000, or 7000 series recorders or International Video Corporation 800 series which represents high quality, low cost color-monochrome recorders.

It is considered satisfactory practice to work downward from master to copy, recognizing that added generation or lesser performing facilities results in a degraded product.

For professional copying (Quadruplex to Quadruplex) it is important to note that any dubbed insert on a composite master will be at least second generation on the master and third generation on subsequent copies. Therefore, high quality dubbing precludes such second generation inserts on the master.

A RATIONALE FOR
THE USE OF
THE HELICAL SCAN TELEVISION TAPE RECORDER

The basic rationale for justifying the use of the helical scan television tape recorder lies in its lower cost and lighter weight. Since the helical scan recorder is simpler in design and construction, requiring less sophisticated electronic circuitry and mechanical features, the result is a cheaper and lighter machine. However, one precaution should be borne in mind. While it is true that in many instances a simpler system may result in enhanced quality, such is not the case with the helical scan recorder. It can only be stated that the drop in quality of the end product (a moving picture) is commensurate with the reduction in cost.

Nonetheless, the advantages of a low cost video recorder and playback system are numerous. To list a few:

1. Permits recording when the program material is available and for playback when time for viewing is available.
2. Permits storage of visual and aural presentations for archive purposes.
3. Permits recording of an event and then sending it to others, if original recording equipment is compatible with the remote playback equipment.

In terms of cost, a broadcast quality video tape recorder

requires an expenditure of somewhere between \$50,000 and \$100,000.*

Such recorders permit recording and playback quality at the peak of performance, either in color or black and white. This type of system also provides for complete interchangeability with respect to tape useage.

The cost of a helical scan recorder varies between \$600 and \$16,500, and since the helical scan system is less complicated, the resulting types of recorders take on a wide variety of styles and configurations. This situation has made it most difficult to answer the question, "Which is the best television recording system for our needs?" The question can only be answered in terms of the following four considerations:

1. Quality of reproduction as viewed by the user.
2. Compatability of tapes used within the system (local, statewide, and national).
3. Reliability and operational cost of the facility.
4. User capital expenditure, based on the degree of utility anticipated for the hardware.

The area of greatest concern is that of compatability. It is apparent, from current industry-wide efforts (as recently discussed in November, 1967 at NAEB in Denver), that nationwide standards for helical scan video tape recorders may be some years away. The number of manufacturers engaged in research and production in this area seems to be growing daily. This results, of course, in an increase in the number of machines available and in reducing the cost of the recorders, but makes

* For a machine known as a quadruplex system.

the matter of standardization the more confusing. Attached, as Appendix I, is a listing of slant-track (helical scan) recorders, as prepared by the SMPTE and dated 2/1/67. Some eight manufacturers are listed, producing some twenty-seven different types and models of recorders. It will also be noted from this list that such items as tape width, tape speed, video head speed, head drum diameter, number of video heads, number of sync heads, video track width, and many other critical parameters are not compatible. This not only applies to variations between manufacturers, but, in many cases, applies to products manufactured by one organization.

Even with the above seemingly impossible conditions, some very important guidelines can be considered, relating to compatability, reliability, and end-product quality.

There will be cases where available funds will point to a choice of equipment, generally on the low end of the pricing schedule, with accompanying sacrifices in one or more of the above-mentioned vital areas. Some persons feel that savings in this area will permit purchase of other less costly items in other areas. Overwhelming evidence suggests strongly that this approach may well be false economy. As a general statement, it is strongly urged, in planning for television equipment purchase, that equipment be acquired which meets the actual needs for present utilization, with provision for future expansion which would permit integration of present equipment with future acquisitions.

Compatability, reliability, and quality regarding the helical scan video tape recorder are expanded upon below:

Compatability:

Although a plethora of types and species exist, some definite trends are developing in terms of the Ampex one inch format in video tape recorders. Ampex enjoys the position of having more recorders in ETV use than any other manufacturer. It is known to the writer that some eleven states have adopted the one inch Ampex format, among whom is New York State's ETV system. They have standardized on this product.

There has recently been developed and marketed a new recorder, with still different specifications, by the International Video Corporation. Inspection of this machine in terms of color reproduction and other desirable features shows much promise to those interested in going to color immediately. Cost for this equipment is at a median level.

There have been no new models or major innovations regarding the two-inch recorders by any manufacturer for the last year, and it is reported that Ampex is phasing out of production their 2" helical scan recorder (Model 660).

It is to be noted that Ampex provides compatability for the largest number of recorders from the \$995.00, VR-5000 model, to the \$16,500 VR-7800 model. The International Video Corporation model 800 costs \$4,200 for color. The International Video Corporation group is producing other models for which they claim compatibility between models.

Reliability and Maintenance:

The factor of reliability is very important, since, regardless of how much money is spent on a video recorder (or any other equipment), if the equipment is inoperative, it is no longer a tool, it is only a liability. The new video tape recorders are smaller, simpler, and generally quite easy to operate. However, every effort must be exercised to assure that "stability engineering" has been incorporated in the design. Maintenance must be of the highest quality because the equipment is advanced in design, and "know-how" is vital. Further, it must be recognized that "modular" service techniques require spare parts of this nature in order that the facilities may be effectively maintained.

Quality:

The quality of a product in the VTR field is almost proportional to the price paid. Equipment on the low end of the price scale should not be expected to have the features found in higher priced machines, such as electronic editors, slow motion, remote start, or broadcast quality.

Since quality is of prime importance, the following areas should be considered:

- a. Resolution Capability - Resolution, or picture quality, will generally be lower in the lower priced VTRs. Resolution is defined as the manner in which the reproduced picture demonstrates fine-line detail. Standard reference may be made through the use of the E.I.A. test pattern.

b. Noise Control - Small and large noise-signal components should be looked for in terms of the appearance of snow or grey scale shift throughout the picture. Measurement techniques should be employed for accurate evaluation.

c. Color Performance - If equipment purchased is expected to be color capable, color operating parameters must be determined by skilled measurement techniques.

Note: See Appendix II for further detail relative to helical scan products.

APPENDIX I

TECHNICAL DATA	AMPEX VR-1500 VR-660	AMPEX VR-7800 VR-7500 VR-7110 VR-7050 VR-7000	AMPEX VR-6175 VR-6075 VR-6050 VR-6000 VR-5000	DAGE DV-200	DAGE DV-300	NORELCO EL-3401	WESTEL WRC 150 WTR 100	LOEWE OPTACORD 500	LOEWE OPTACORD 600
TAPE WIDTH	2"	1"	1"	1"	1"	1"	1"	2"	1"
TAPE SPEED - IPS	3.7	9.62	5.91	5.91	5.91	9.0	10.0	6 3/4	5.1
VIDEO HEAD TO TAPE SPEED	640.3 IPS	1000 IPS	617.9 IPS	617.9 IPS	617.9 IPS	1086 IPS		1180 IPS	892 IPS
HEAD DRUM DIAMETER	6.756"	5.3"	6.495"	6.495"	6.495"	5.91"		6 1/4"	4.8"
NUMBER OF VIDEO HEADS	2	1	2	2	2	1	1		1
NUMBER OF VERTICAL SYNC HEADS	0	0	0	0	0	1	0		1
VIDEO TRACK ANGLE	9° STATIC 8° 56.9' DYNAMIC	3° 7.78'	4.45°	4.45°	4.45°	2.8°			3.8°
VIDEO TRACK WIDTH	7.5 MIL	6 MILS	5.91 MIL	5.91 MIL	5.91 MIL	6.0 MILS		0.01"	0.051"
CENTER TO CENTER	9.6 MIL	8.67 MILS		7.68 MIL	7.68 MIL	7.0 MILS		0.0114"	0.057"
VIDEO GUARD BAND WIDTH	2.1 MIL	2.67 MILS	1.77 MIL	1.77 MIL	1.77 MIL	1.0 MIL			
CONTROL TRACK SIGNAL	30 CPS PULSE	60 CYCLE	30 CPS PULSE	30 CYCLE	30 CYCLE	60 CYCLE		60 c/s	60 CPS
CONTROL TRACK WIDTH	50 MIL	20 MILS	43.3 MIL	43.3 MIL	43.3 MIL	40 MILS		0.059"	0.4"
AUDIO #1 TRACK WIDTH	43 MIL	43 MIL	43.3 MIL	43.3 MIL	43.3 MIL	40 MILS		0.059"	0.4"
AUDIO #2 TRACK WIDTH	43 MIL	10 MIL	NONE	NONE	NONE	NONE			-----X
MAXIMUM REEL DIAMETER	12.5"	9 3/4"	7"	7"	7"	9"	14"	10 1/2"	8"
REEL TYPE	C98.5 SMPTE NAB	NAB	SPECIAL	SPECIAL	SPECIAL	NAB	NAB		NARTB
SYNC TIP	*3.4 MC	3.5 MC	2.0 MC	3.0 MC	3.0 MC	3.0 MC		4 MC	3.5 MC
PEAK WHITE	*4.7 MC	5.5 MC	3.9 MC	4.85 MC	4.85 MC	4.3 MC		5 MC	4.5 MC
VIDEO PRE-EMPHASIS	YES	YES	YES	YES	YES	YES		ADJ. 2..3DB	ADJUSTABLE
VIDEO POST-EMPHASIS	YES	YES	YES	YES	YES	YES		ADJ. 2..3DB	ADJUSTABLE
JE TRACK WIDTH		NONE	NONE	NONE	NONE	NONE			-----X
TAPE WRAP		349°-352°		200°	200°	355°			
TYPE OF RECORDING		FM	FM	FM	FM	FM			
SPECIAL REMARKS		DROPOUT LASTS FROM 6-8 TV LINES. AUDIO EQUALIZATION IS PER NERT-B 15 MC CURVE.							

APPENDIX I

BLACK LEVEL 53.7 MC - 3.7 MC; WHITE LEVEL 54.7 MC
BEAT OR MIXED WITH 50 MC FOR PRE-RECORDING

TECHNICAL DATA	PRECISION INSTRUMENT 7100	SONY PV 100	SONY PV 120A	SONY PV 120U	SONY EV 200	SONY SV 300	SONY 2010 2020	3M WOLLENSAK VTR 150
TAPE WIDTH	1"	2"	2"	2"	1"	.5"	.5"	.5"
TAPE SPEED	7.5 & 8.46	5.75		107.914 MM	198.881 MM	7.5	7.5	7.5
VIDEO HEAD TO TAPE SPEED	631.5 IPS			740 IPS	590 IPS			180 IPS
HEAD DRUM DIAMETER	6.630			100 MM	160 MM			1"
NUMBER OF VIDEO HEADS	2			1	2		2	1
NUMBER OF VERTICAL SYNC HEADS	0			1	0			0
VIDEO TRACK ANGLE	4.25°			7°14'14"	3°58'			9°56'
VIDEO TRACK WIDTH	8 MIL			.17 MM	.150 MM			15 MILS
ENTER TO CENTER	10 MIL			.228 MM	.23 MM			20 MILS
VIDEO GUARD BAND WIDTH	2 MIL			.058 MM	.08 MM			5 MILS
CONTROL TRACK SIGNAL	30 CPS PULSE			60 CYCLE	30 CYCLE			60 CPS PULSE
CONTROL TRACK WIDTH	20 MIL			2.6078 MM	1.2 MM			10 MILS
AUDIO #1 TRACK WIDTH	40 MIL			4.4614 MM	2 MM			10 MILS
AUDIO #2 TRACK WIDTH	40 MIL			2.5079 MM	.8 MM			--
MAXIMUM REEL DIAMETER	10.5"			7"	8"			8"
REEL TYPE	NAB			SPECIAL	SPECIAL			AUDIO TYPE 1/2" HOLE
SYNC TIP	3.5 MC			3 MC	2.5 MC			
PEAK WHITE	5 MC			5 MC	4.8 MC			
VIDEO PRE-EMPHASIS	YES			YES	YES			
VIDEO POST-EMPHASIS	YES			YES	YES			
VIDEO TRACK WIDTH	20 MIL			NONE	NONE			
TAPE WRAP	180°							360°
TYPE OF RECORDING	FM							DIRECT WITH EQUALIZATION
SPECIAL REMARKS		NO LONGER IN PRODUCTION	NO LONGER IN PRODUCTION			SKIP FIELD RECORD- ING	SKIP FIELD RECORD- ING	7 MC BIAS

SLANT-TRACK RECORDING SUB-COMMITTEE

SMPTE

JUNE 14, 1966
(REVISED 2/1/67)

(REPRINTED WITH PERMISSION)

MAKE	WEIGHT LBS.	TAPE WIDTH	VIDEO HEADS	VIDEO HEAD REPLACEMENT COST	HEAD WARRANTY	CONVERT TO COLOR	ELECTRONIC EDITOR AVAILABLE	REMOTE CONTROL AVAILABLE	SLOW MOTION	MAXIMUM RECORDING TIME/REEL	INTERNAL SPEAKER	
AMPEX VR660B	100	2"	2	\$96.00	250 HRS.	NO	BUILT IN	YES	YES	5 HOURS	NO	
SONY PV 120U	150	2"	2	\$135.00	500 HRS. OR 1 YR.	YES COST?	YES COST?	YES \$95.00	YES	1½ HOURS	NO	
AMPEX VR7800	100	1"	1	\$175.00	500 HRS.	YES	YES	YES	YES	1 HOUR	YES	
AMPEX VR6000	79	1"	1	\$60.00	250 HRS. OR 90 D.	YES \$1000	NO	YES \$75.00	NO	1 HOUR	YES	
AMPEX VR7000	100	1"	1	\$60.00	500 HRS.	YES \$500	NO	YES \$75.00	NO	1 HOUR	YES	
AMPEX VR5000	65	1"	1	\$60.00	500 HRS.	NO	NO	?	?	1 HOUR	YES	
AMPEX VR7500 VR7500C	100 100	1" 1"	1 1	\$175.00	500 HRS. 500 HRS.	YES BUILT	NO NO	YES \$75.00	YES	1 HOUR	YES	
SONY EV 200	88	½"	2	\$75.00 EACH	500 HRS. OR 1 YR.	YES COST?	YES \$95.00	?	YES	63 MIN.	NO	
SONY V 300	45	½"	2	\$89.50	500 HRS.	?	NO	NO	NO	1 HOUR	YES	
SONY CV 2010	60?	½"	2	\$60.00	500 HRS.	NO	NO	NO	NO	1 HOUR	YES	
COLLENSAK TR 150	50	½"	1	\$100.00	1 YEAR	YES COST?	NO	NO	NO	1 HOUR	NO	
CONCORD TR 600	52	½"	2	\$90.00	500 HRS.	NO	NO	NO	YES	1 HOUR	NO	
VR 65	85	1"	?	\$420.00	?	?	?	YES \$114.00	?	96 MIN.	NO	

APPENDIX 11

MAKE	STABLE STOP MOTION	MEETS EIA SPECS RS-170	USE FOR ON-AIR BROADCAST	COMPATIBLE WITH THESE OTHER VTRs	COMPATIBLE WITH MAJORITY OF EDUCATIONAL INSTITUTIONS VTR EQUIPMENT	CURRENT PRICE
AMPEX VR660B	YES	YES	YES	VR1500 VR1560	YES	\$8,000.00
SONY PV 120U	YES	PV 120U NO BV 120 YES	PV 120U NO BV 120 YES	SONY BV 120	<u>NO</u>	PV 120U \$8,900.00 BV 120 \$11,400.00
AMPEX VR7800	YES	YES	YES	AMPEX VR5000, VR6000, VR6050, VR7000, VR7100, VR7500, VR7500C, VR7800	YES	\$8,000.00 TO \$16,000.00
AMPEX VR6000	YES	NO	NO	SAME AS COLUMN ABOVE	YES	\$1,595.00
AMPEX VR7000	YES	NO	NO	SAME AS COLUMN ABOVE	YES	\$3,450.00
AMPEX VR5000	YES	NO	NO	SAME AS COLUMN ABOVE	YES	\$995.00
AMPEX VR7500 VR7500C	YES YES	NO NO	NO NO	SAME AS COLUMN ABOVE	YES YES	\$3,995.00 \$5,000.00
SONY EV 200	YES	NO	NO	OTHER VTRs OF THE SAME MODEL	<u>NO</u>	\$3,500.00
SONY SV 300	NO	NO	NO	SONY CVC-2000 SONY CVC-2010	<u>NO</u>	\$980.00
SONY TCV 2010	YES	NO	NO	OTHER VTRs OF THE SAME MODEL	<u>NO</u>	\$995.00
WOLLENSAK VTR 150	NO	NO	NO	OTHER VTRs OF THE SAME MODEL	<u>NO</u>	\$1,495.00
CONCORD VTR 600	YES	NO	NO	OTHER VTRs OF THE SAME MODEL	<u>NO</u>	\$1,150.00
MVR 65	?	YES	YES	OTHER VTRs OF THE SAME MODEL	<u>NO</u>	\$11,350.00

CHANNEL

STUDIOS—UNIVERSITY OF WASHINGTON

PHONE 543-2000



TRANSMITTER—EDISON TECHNICAL SCHOOL

SEATTLE, WASHINGTON 98105

November 8, 1967

Mr. William H. King, Director
Audio-Visual Education
Department of Education
State of New Jersey
P. O. Box 2019
Trenton, New Jersey 08625

Dear Mr. King:

Thank you so much for your letter of November 3.

The concerns you expressed are certainly similar to those of our local Superintendents, and I would be happy to share with you information on the course of action that has been taken here. I wish I could tell you we have found an ideal solution. I am not at all sure that we have, but we are going ahead with a plan which was developed and it seems, as of this writing, to be reasonably successful.

In October 1965, the collective Superintendents of Schools in King County through their television committee decided they needed some advice on technical matters related to television. Accordingly, they formed a technical subcommittee of which I was chairman, and gave the subcommittee the assignment of preparing a report on what kinds of equipment would serve the schools and some information about it. Basically, this consisted of a list of various kinds of gear origination equipment, wide area transmission systems, building distribution systems, in-room distribution systems, and read-out devices. Under each of these headings the subcommittee set out definitions, capabilities, limitations, logistics, capital and operating costs. In October of 1965, the subcommittee was directed to prepare an additional report recommending equipment parameters and operating practices for television as it is used in the Seattle and King County School Districts. This report was completed in January 1967, and because it bears on your problem, I have taken the liberty of enclosing a copy.

Most of the report was fairly easy to prepare, but when it came to video tape recorders we, of course, had the same problem as everybody else - what to buy? The initial decision of the technical subcommittee was that compatibility was vital. Since the schools could obviously not afford to get into quadruplex VTR and since none of the helical scan VTR manufactures could interchange except within their own shop, this was tantamount about to selecting a particular manufacturer. The technical subcommittee looked over the recorders that were available and ultimately made a choice of the Ampex 6000/7000 series.

Mr. William H. King
November 8, 1967
Page 2

Several factors lead to this choice:

1. There is a commonality of equipment specifications over a group of models, offering a fairly wide range of performance and price without sacrifices of compatibility between units.
2. At least two models will meet requirements for open circuit broadcasting on KCTS-TV and future 2500 mc. installations.
3. Study of the design indicates that the range of prices and capability can be expanded within the 6000/7000 series "family" of recorders.
4. At any given point in the price range, model for model, the performance of the Ampex 6000/7000 series was superior to other units tested.
5. The Sub-Committee was informed that several national library services intend to make their materials available for use on the 6000/7000 series.
6. The provisions of the Warranty provided by Ampex meet the needs of the districts who have not yet had the opportunity to develop their own service capability.
7. Ampex operates a training center to which school personnel can be sent for training.
8. Ampex recorders are produced in the United States. This suggests the potential of better parts availability and circumvents the possibility (however remote) of encountering future difficulty with "Buy American" clauses in grants.
9. Multiple dealerships and multiple service facilities are available in the King County area.
10. The experience of KCTS-TV since 1960 with other Ampex equipment in use at the station has been very satisfactory and the company has shown itself to be reliable and a leader in the recording field.

You will note that in the enclosed report, the technical subcommittee did not specifically mention Ampex by name, but rather stated that the tapes would have to play in all districts involved in the interchange program and with KCTS-TV. Since the station purchased Ampex Helical Scan equipment, this made it possible for the districts to do likewise and still meet all of the requirements placed upon them.

I might tell you that this decision brought down on our heads a considerable amount of acrimony from those whose machines would not meet the specification of compatibility, but it is obvious that no matter whose machine we picked we would have had to face the same problem. Because of the relatively low technical literacy within each of the districts in this area, and the underdeveloped service capability at this writing, we are advising schools not to acquire tape recorders in large numbers.

Mr. William H. King

November 8, 1967

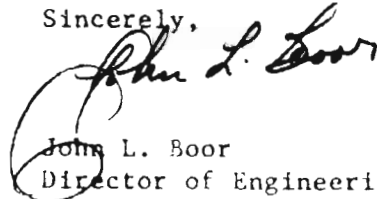
Page 3

Rather, we are suggesting that each district get only one or two and begin in a small way to train people in the techniques of using the device. We are specifically recommending that they start by using the machine to record programs broadcast by Channel 9 so that they may be played at times convenient to them. After they have acquired this kind of experience, move off into some limited form of production. We can point to several districts who failed to follow this advice, purchased a considerable amount of equipment, and had so much difficulty learning how to use it that the results have not justified the investment. On the other side of that coin, however, those districts who have gone into this in an orderly fashion seem to be getting everything they expected.

Since you are in a much better position to evaluate your situation than I am, please know that this letter is not intended as advice on how to proceed, but rather a statement of what has happened to us. We feel fortunate that we now have a number of districts using machines (6000/7000/7500) and thus far had no problem with interchange. Like all tape recorders, these machines are not entirely trustworthy, tho in fairness to Ampex we have to admit that most of our difficulties stem from "pilot error," not machine design. We are pleased to note that this week Ampex confirmed our estimate that the family could be expanded by bringing out a model 5000 and 8000 which extends the price range from about \$1000 to about \$10,000 according to the number of "bells and whistles" one wishes to include. The serious complaint we have at the present time is parts availability, and even this picture appears to be improving.

Good luck with your new endeavor.

Sincerely,

A handwritten signature in dark ink, appearing to read "John L. Boor". The signature is fluid and cursive, with a large initial "J" and "B".

John L. Boor
Director of Engineering

JLB:ms

APPENDIX X

DETAILED COST ESTIMATES OF THE NEW JERSEY PUBLIC BROADCASTING SYSTEM

A. Capital Expenditures

B. Operating Costs

A. CAPITAL EXPENDITURES

A. INITIAL TOTAL CAPITAL EXPENDITURES FOR NEW JERSEY
PUBLIC BROADCASTING SYSTEM

1. Transmission Facilities

Four (4) transmitters, terminal/input equipment complete with video/tape film facility	\$ 2,080,490
Four (4) antenna and towers complete with transmission lines and gasing equipment	735,580
Eight (8) 2500 MegaHertz ITFS trans- mitters, antennas with associated relay towers and equipment	720,000

2. Television Production and Administrative Facilities

<u>Primary Production Center:</u>	Building	\$ 2,613,240
	Electronics	2,333,709

3 studios - color cameras and associated
equipment

Support facilities

Recording and playback equipment

<u>Trenton Area Production Center:</u>	Building	1,370,680
	Electronics	1,500,769

2 studios - color cameras and associated
equipment

Support facilities

Recording and playback equipment

<u>Glen Ridge Area Production Center:</u>	Building	671,400
	Electronics	349,989

1 studio - monochrome cameras and associated
equipment

Support facilities

Recording and playback equipment

<u>Atlantic City Area Production Center:</u>	Building	671,400
	Electronics	349,989

1 studio - monochrome cameras and associated
equipment

Support facilities

Recording and playback equipment

3. New Jersey Network Electronic and Interconnection Facilities: \$874,000

4* - Interconnection circuits from transmitter
to Control Center

5* - Interconnection circuits from Control
Center to five locations

2* - Towers for interconnection relay
sites

Electronic switching facilities for
control of distribution-center
program integration to five locations

* Above expenditure does not include
maintenance costs. As an alternative,
the cost of leasing these facilities
would be \$194,000 annually.

4. Auxiliary Technical Equipment Facilities
(e.g. generators, cameras, distribution equipment) \$ 834,418

Four color camera systems with switching and associated equipment	\$ 426,718
Power generator for auxiliary facilities	7,500
Lighting equipment	7,000
Two sets of four monochrome (black and white) camera systems with switching and associated gear	354,000
Lighting equipment	3,200
Three complements of news facilities	36,000

701

5. Radio -- News/Public Affairs Production Center	\$ 75,000
6. Specially Manufactured Vans for Mobile Control Units	354,000
One (1) color van	\$ 118,000
Two (2) black and white vans	236,000
7. Service Vehicles (e.g. repair trucks, staff vehicles)	24,000
8. Furnishings and Office Equipment	70,000
9. Shop and Maintenance Equipment	50,000
10. Land Acquisition	140,000
	<hr/>
CAPITAL EXPENSES	
GRAND TOTAL	<u>\$ 15,743,844</u>

B. OPERATING EXPENSES

OPERATING EXPENSES

(Personnel Staffing)

Glen Ridge: Technical, Production, News,
Transmitter, and Support staffing

Technical-Production

- 1 Technical supervisor
- 1 Switcher
- 1 Video operator
- 1 Audio operator
- 2 Camera men
- 1 Utility man
- 1 Floor manager
- 1 Electrician stage hand
- 1 General stage hand
- 1 Producer/director
- 1 Assistant director
- 1 Announcer
- 1 Film and tape operator

SUB-TOTAL: Technical-Production \$ 108,000

News

- 1 News director
- 1 Commentator/ announcer
- 1 News writer
- 1 Film camera man
- 1 Assistant film camera man
- 1 Editor

SUB-TOTAL: News \$ 57,000

Transmitter

- 1 Transmitter engineering supervisor
- 6 Transmitter operators

SUB-TOTAL: Transmitter \$ 58,000

OPERATING EXPENSES

(Personnel Staffing)

Glen Ridge (Cont.)

Support

2 Graphic artists
2 Scenic artists
2 Writers
2 Film service editors
1 Set construction

SUB-TOTAL: Support \$ 63,000

Administrative

1 Operations director
1 Payroll/personnel clerk
3 Secretaries

SUB-TOTAL: Administrative \$ 35,000

TOTAL: Glen Ridge \$ 321,000

Hours of studio usage = 40 hours

Ratio: Use to program hours (8) = 5 hours program

OPERATING EXPENSES

(Personnel Staffing)

Atlantic City: Technical, Production, News
Transmitter, and Support staffing

Technical-Production

- 1 Technical supervisor
- 1 Switcher
- 1 Video operator
- 1 Audio operator
- 2 Camera men
- 1 Utility man
- 1 Floor manager
- 1 Electrician stage hand
- 1 General stage hand
- 1 Producer/director
- 1 Assistant director
- 1 Announcer
- 1 Film and tape operator

SUB-TOTAL: Technical-Production \$ 108,000

News

- 1 News director
- 1 Commentator/announcer
- 1 News writer
- 1 Film camera man
- 1 Assistant film camera man
- 1 Editor

SUB-TOTAL: News \$ 57,000

Transmitter

- 1 Transmitter engineering supervisor
- 6 Transmitter operators

SUB-TOTAL: Transmitter \$ 58,000

OPERATING EXPENSES

(Personnel Staffing)

Atlantic City (Cont.)

Support

2 Graphic artists
2 Scenic artists
2 Writers
2 Film service editors
1 Set construction

SUB-TOTAL: Support \$ 63,000

Administrative

1 Operations director
1 Payroll/personnel clerk
3 Secretaries

SUB-TOTAL: Administrative \$ 35,000

TOTAL: Atlantic City \$ 321,000

Hours of studio usage = 40 hours

Ratio: Use to program hours (8) = 5 hour program

OPERATING EXPENSES

(Personnel Staffing)

Trenton: Technical, Production, News,
Transmitter, and Support staffing

Technical-Production

1 Switcher
1 Video operator/light control
1 Audio operator
3 Camera men
1 Utility man
1 Floor manager
1 Electrician stage hand
1 General stage hand
1 Producer/director
1 Assistant director
1 Announcer

SUB-TOTAL: Technical-Production \$ 98,000

Studio "E" - Same as Studio "D" above \$ 98,000

Transmitter

1 Transmitter engineering supervisor
6 Transmitter operators

SUB-TOTAL: Transmitter \$ 58,000

Support

1 Graphic artist supervisor
1 Graphic artist
2 Scenic artists
1 Lighting director
3 Technical maintenance engineers
1 Stock room controller
1 Shipping/receiving clerk
1 Utility stock shipping
2 Set constructors
2 Video operators for film and
line cameras
1 Operations traffic scheduler

SUB-TOTAL: Administrative \$ 42,000

TOTAL: Trenton \$ 418,000

Hours of studio usage = 80 hours

Ratio: Use to program hours (10) = 8 hour program

OPERATING EXPENSES

(Personnel Staffing)

Mobile Unit #1 (Color): Technical and Production

Technical-Production

1 Technical supervisor/lighting director
1 Switcher/driver
1 Video operator
1 Audio operator
3 Camera men
3 Utility men
1 Producer/director
1 Announcer

SUB-TOTAL: Technical-Production \$ 98,000

Mobile Unit #2: Technical and Production

Same as Unit #1 above \$ 98,000

Mobile Unit #3: Technical and Production

Same as Unit #1 above \$ 98,000

TOTAL: Mobile Units \$ 294,000

Hours use, Mobile Van #1 = 40
#2 = 40
#3 = 40
120

Ratio: Use to program hours (4) = 30 hours program

OPERATING EXPENSES

(Personnel Staffing)

Primary Production Center: Technical, Production, News,
Transmitter, and Support staffing

Technical-Production

Studio "A" (8-hour operation - 5 days)

- 1 Switcher
- 1 Video operator
- 1 Audio operator
- 4 Camera men
- 1 Utility man
- 1 Floor manager
- 1 Electrician stage hand
- 1 General stage hand
- 1 Producer/director
- 1 Announcer

SUB-TOTAL: Technical-Production \$ 99,000

Studio "B" (8-hour operation - 5 days)

- 1 Switcher
- 1 Video operator
- 1 Audio operator
- 3 Camera men
- 1 Utility man
- 1 Floor manager
- 1 Electrician stage hand
- 1 General stage hand
- 1 Producer/director
- 1 Announcer

SUB-TOTAL: Technical-Production \$ 91,000
Studio "B"

Studio "B" (Second shift - 8 hours - 5 days)
(Same as first 8-hour period) \$ 91,000

Studio "C" (8-hour operation - 5 days)
(Same as first 8-hour period,
Studio "B") \$ 91,000

Transmitter

- 1 Transmitter engineering supervisor
- 6 Transmitter operators

SUB-TOTAL: Transmitter \$ 58,000

OPERATING EXPENSES

(Personnel Staffing)

Primary Production Center (Cont.)

News (Joint operation: New Brunswick-Trenton)

- 1 News director
- 1 News writer
- 1 Commentator/announcer
- 1 Film camera man
- 1 Assistant film camera man
- 1 Editor

SUB-TOTAL: News \$ 57,000

Support

- 1 Graphic arts supervisor
- 2 Graphic/photo artists
- 3 Scenic artists
- 1 Lighting director
- 3 Technical maintenance engineers
- 1 Stock room controller
- 1 Shipping/receiving clerk
- 1 Utility stock shipping
- 3 Set constructors
- 4 Video operators
(1 per 3-line cameras - 3 studios,
plus 1 per 3-line cameras due 2nd
shift in Studio "B")
- 1 Photo lab technician

SUB-TOTAL: Support \$ 160,500

Administrative

- 1 Operations director
- 1 Personnel director
- 1 Payroll clerk
- 6 Secretaries

SUB-TOTAL: Administrative \$ 58,000

TOTAL: Primary Production Center \$ 705,500

Hours studio usage: A = 40
B = 80
C = 40
160

Based on 8/1 ratio = 20 hours program/week

OPERATING EXPENSES

(Personnel Staffing)

NET Distribution/PPC Master Control

Technical

3 Technical supervisors
6 Technical operators
 (Switching and engineering)
4 Audio operators
3 Coordinators
6 Projectionists
6 Video tape operators
3 Audio operators/film
6 Video operators/film

SUB-TOTAL: Technical \$ 314,000

Administrative

1 Operations director
1 Clerk secretary

SUB-TOTAL: Administrative \$ 17,000

TOTAL: Distribution/
 PPC Master Control \$ 331,000

OPERATING EXPENSES

(Personnel Staffing)

Administration

1 General Manager
1 Personnel Director and
Assistant to the Manager
1 Director of Programming
1 Director of Engineering
1 Assistant Engineering Manager
1 Director of Production and Operations
1 Traffic Coordinator
2 Utility clerks
1 Director of Business Affairs
2 Secretaries (Pool)
4 Payroll clerks
1 Director of Public Affairs
and Publicity
11 Secretaries
4 Clerk typists
1 Manager - Special projects
1 Manager - School services
1 Manager - Public broadcast
1 Manager - News services

TOTAL: Administration \$ 368,000

OPERATING EXPENSES FOR RADIO

NEWS/PUBLIC AFFAIRS PRODUCTION CENTER

Staff

News Director (Executive Producer of Unit)	\$ 20,000
3 News Editors (responsible for assigning stories and writing)	
1 Senior Editor @ \$15,000	
2 Editors @ \$10,000	35,000
3 Reporters/Broadcasters @ \$10,000	30,000
4 Technicians/Tape Editors @ \$10,000	40,000
3 Secretaries/clerical @ \$6,000	18,000

Internship Program

6 newsroom assistants @ \$1,200 (These would be college students, chosen from New Jersey institutions of higher education)	7,800
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News Services

AP, UPI (educational rates)	4,000
Newspaper "stringers"(major dailies to supply additional news capability, via phone, land-line, and/or written form)	10,000
Maintenance	7,500
Operating supplies	<u>5,000</u>

Total Annual Operating Budget:	\$177,300
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OPERATING EXPENSES

(Business and Other Operating Costs)

Publications

Heat, Power, and Light

Legal, Accounting, and Insurance

Postage

Business Telephone Facilities

Teletype Service

Fringe Benefits for Staff

Maintenance - Buildings and Electronic

Travel

Janatorial Services

Supplies

Office

Vehicle

Cleaning

Kinescope Equipment Supplies

Video Recording Tape

Duplication, etc.

TOTAL: <u>Business and Other</u>	\$ 3,237,600
<u>Operating Costs</u>	

GRAND TOTAL: <u>Operating Expenses</u>	\$ 6,173,400
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APPENDIX XI

COSTS OF THE NEW JERSEY PUBLIC BROADCASTING SYSTEM TO USERS

COSTS OF THE NEW JERSEY PUBLIC BROADCASTING SYSTEM TO USERS

The Commission is aware that users of the New Jersey Public Broadcasting System -- citizens, schools or institutions -- must bear certain financial costs in order to receive programming from the New Jersey Public Broadcasting System. In particular:

Financial Costs to the Home Viewer: If a home viewer has a pre-1964 television set equipped only for VHF reception, he must incur additional costs in order to receive the New Jersey Public Broadcasting System UHF signals; namely, (a). a rooftop UHF antenna (with separate leadin), the cost of which, with installation at commercial rates -- is between \$50.00 and \$75.00; and (b). a converter which costs between \$25.00 and \$35.00.

If the home viewer has a television set manufactured since 1964 with built in facilities for UHF reception,* a rooftop antenna may have to be purchased, the cost of which is \$50.00 to \$75.00. It is reported that of the total 2,500,000 television sets New Jersey claims, approximately half are UHF equipped.

Financial Costs to the Schools: The cost of equipment required to furnish a school or institution to receive the New Jersey Public Broadcasting System varies according to the extent of the system already installed. The cost of equipping a 22 classroom building, for example, to receive the New Jersey Public Broadcasting System is as follows:

* By Federal Communications Commission mandate issued in 1964, all television receivers must be capable of receiving VHF and UHF signals.

<u>Cost per Building</u>	<u>Black and White</u>	<u>Color</u>
Distribution system, 22 rooms @ \$80 *	\$ 1,760	1,760
Receiving antenna systems	75	75
Closed-circuit 2500 MegaHertz receiving and converting facilities	1,500	1,500
Television Receivers (28) ** B/W @ \$150 and color @ \$300	2,100	4,200
Maintenance and spare parts (10% total)	<u>543</u>	<u>753</u>
Total cost per building	\$ 5,978	\$ 8,288
Average cost per classroom	\$ 271	\$ 377

For greater detail, see Appendix VIII

A brochure describing requirements for school television distribution systems may be found in Appendix VI. Costs pertinent to the New Jersey school systems may be found in Appendix VIII.

Regarding Community Antenna Television: Television signals can also be supplied to users over a cable similar to a telephone line direct to the user's home, school, office or other. This kind of signal distribution is known as Community Antenna Television, or CATV, and is usually offered to the public by a private corporation. The cost to the subscriber for this service is \$15.00 to \$20.00 installation cost and \$4.00 to \$5.00 monthly service charge. The advantage of this type of service over direct pick up via the users own antenna is significant only if the user is in a poor location for receiving a good television signal. Tele-

* Distribution cost per room based on information in ITFS manual, published by the National Education Association.

** It is to be noted that 28 receivers will equip 14 classrooms at any one time. The sets can be moved to other rooms as required.

vision signals are broadcast at very high or ultra high radio frequencies, and therefore are susceptible to mashing or distortion from such obstructions as mountains, buildings, trees, etc., which may interfere with line of sight between the user antenna and the point of transmission. A CATV organization selects a site for its receiving antennae at a place and at a height that will provide the best signal for said location. This better quality signal is then distributed via cable to the users location. It must be noted that the above described CATV system will not provide for ITFS reception unless special engineering case-by-case designs are effected.

