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ABSTRACT

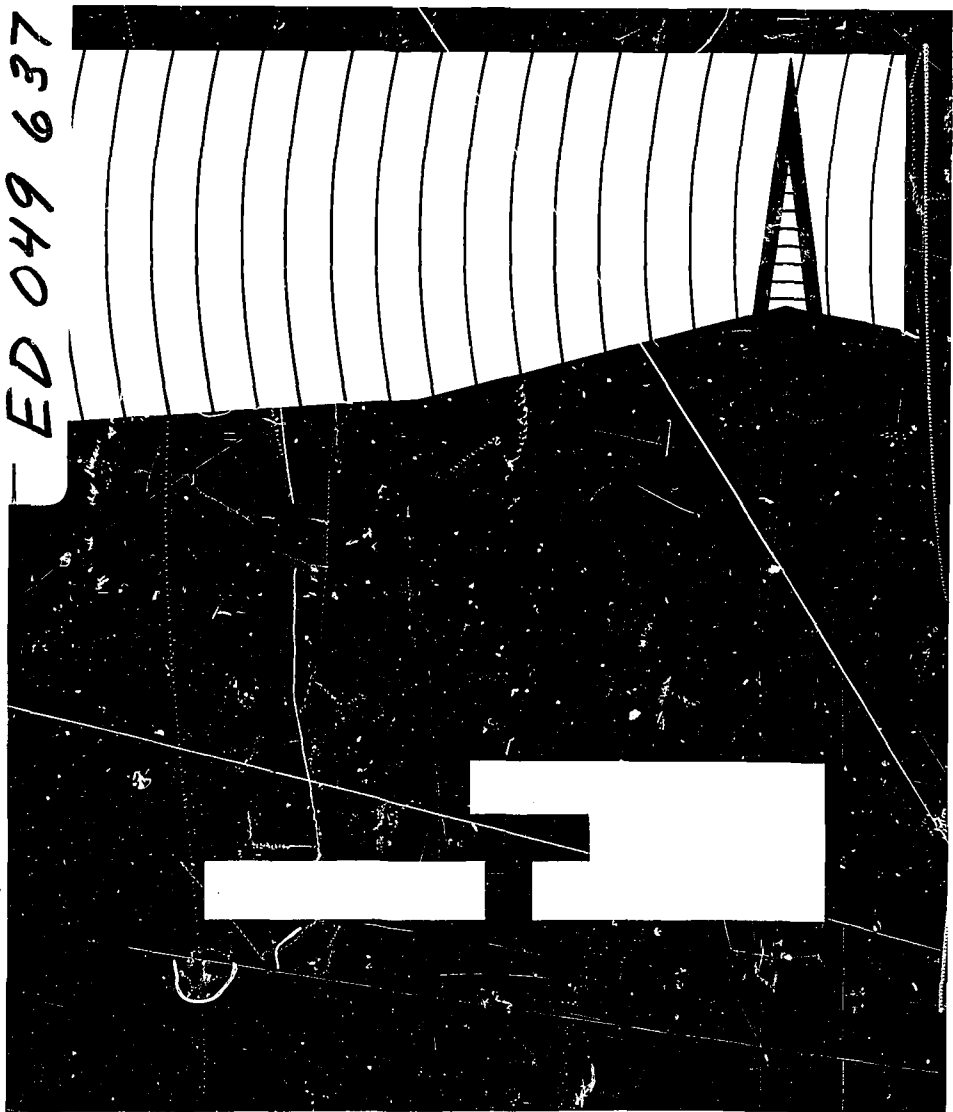
The papers gathered here are designed to provide a foundation of background information for those charged with the responsibility of formulating school district goals regarding cable television (CATV) and of obtaining the necessary cooperation from the local CATV franchise operators to reach these goals. The position of the National Education Association, which seeks to have 20 percent of all CATV channels reserved for educational purposes, is presented. Cable television is described both from a historical and technical viewpoint. Suggestions for obtaining CATV channels for school use include ideas for working both with city governments and with franchise operators. The cost of various CATV services is estimated, and the future of cable communications is projected, emphasizing the potential of its unique technical features for solving educational problems. A case study describes the efforts of a New York community group to obtain educational provisions in a CATV franchise. A list of requirements formulates the necessary franchise stipulations which will protect the interests of public education. Sample contracts, a glossary, and a bibliography are included as supplementary information. (JY)

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SCHOOLS and cable television

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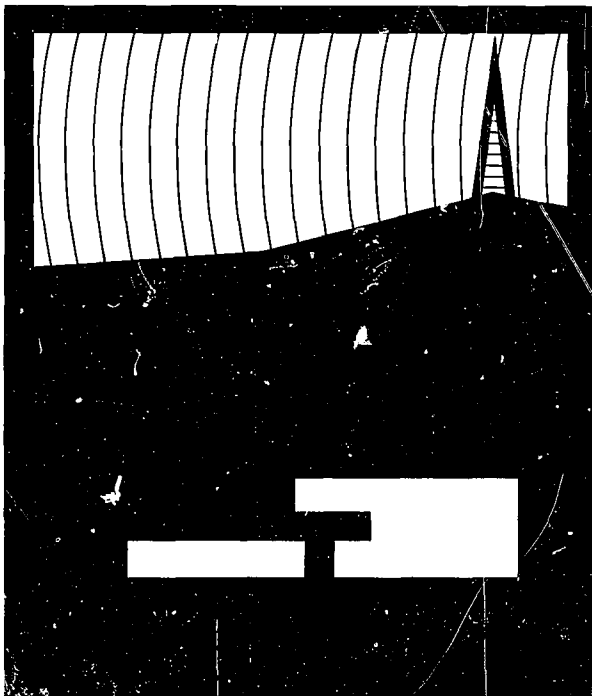


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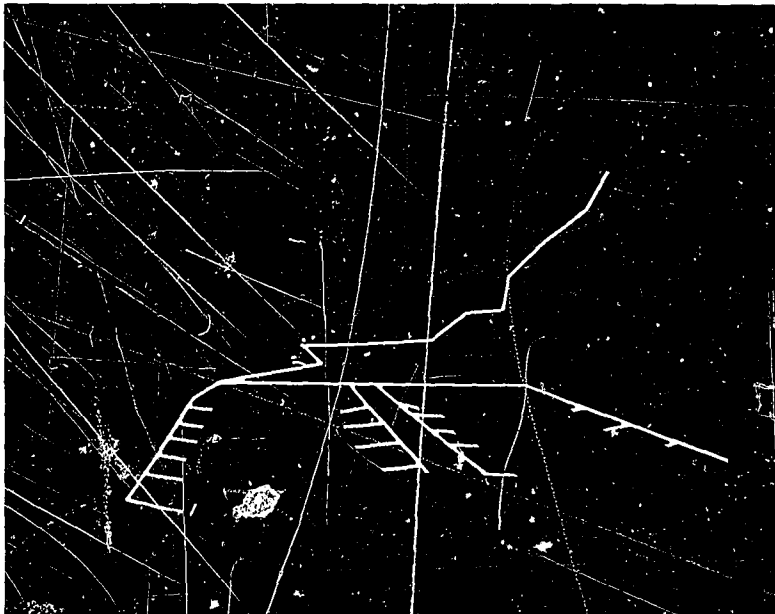
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Preface

In more than a thousand communities across the United States, municipal officials are facing decisions on applications for cable television (CATV) franchises. Much is at stake *now* in the granting of these franchises not only for CATV operators but also for schools, cities, and, in fact, the entire nation.

Gradually emerging is not only the redesign of tomorrow's television but also an entirely new telecommunications system to serve our cities and our nation. In an occasional paper from the Alfred P. Sloan Foundation, *Issues for Study in Cable Communications*, Arthur L. Singer, Jr., vice-president of the Foundation, makes this forecast of the future of cable television:

Predictions are hazardous wherever a growing technology is concerned. But it is almost surely safe to say that by 1975 a minimum of 25 per cent of all American homes will be wired with 20 or more channels, and that some few years after 1975 that number will rise to at least 60 per cent; if anything, both predictions are likely to be on the low side, and perhaps widely so. (p. 4.)

He continues:

Sometime in the moderately near future, in other words, most residents of the United States will be in possession of a communications facility vastly in excess of anything that has previously been known. It is unarguable that such a development will carry with it social, political and economic implications of unparalleled significance, dwarfing the changes that were brought about by such earlier developments as the development of television itself or by the creation of the present highway network. (pp. 4-5.)

With the rapid growth of this industry, it is important that the educational community understand the impact that cable TV will unquestionably make on American life and that it realize the potential of this new communications development for teaching and learning in the 1970's. The coaxial cable's enormous capacity for carrying information—about 10,000 times greater than a household telephone line—will unquestionably open up new dimensions in communication for both schools and homes. The coaxial cable, in fact, might well become an electronic highway between the home, the school, and other community resources, leading to greater involvement and participation of the community in the work of the schools. Once this wire is in the home, in the school, in libraries, and in museums, new and

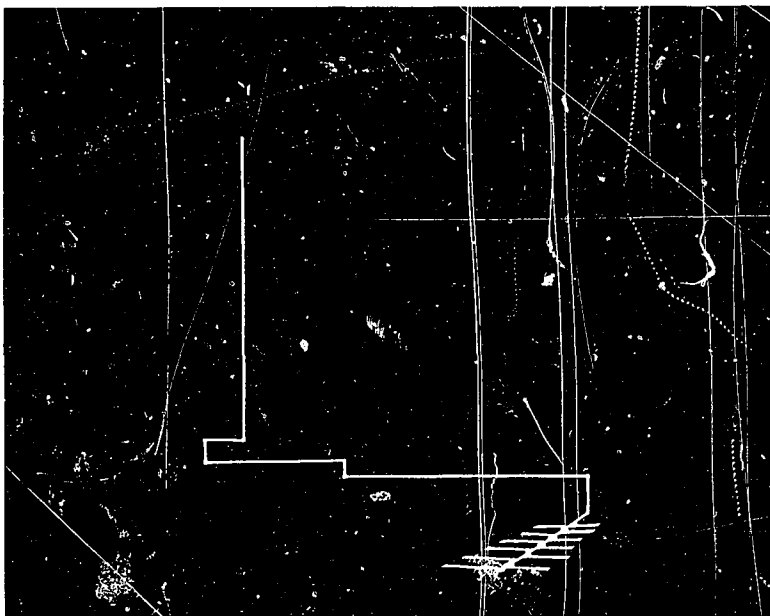
before impossible opportunities open up for experiments in two-way communications, in data transmission, in information exchange and retrieval.

Local education association leaders and school administrators should be alert to the status of cable TV in their community and should act at the strategic moment to request channels. Otherwise it may be too late to harness this valuable community resource to serve the school district.

Herein lies the reason for this publication—to alert the teaching profession to the opportunities and options available in the development of cable television and to offer guidelines for the sound development of this new communications system in the public interest in the years ahead.

Helen P. Bain
President, National Education Association

The NEA thanks the National Cable Television Association for allowing the use of these photographs.



1

The NEA's Position on Cable Television

Harold E. Wigren, Associate Director
Division of Educational Technology
National Education Association

At its 1970 annual meeting held in San Francisco, the 7,500-member Representative Assembly of the National Education Association, acting for 1.22 million members, passed the following resolution on Community Antenna Television (CATV)¹:

The National Education Association believes that the use of Community Antenna Television (CATV) channels for education is essential to preserve the public interest, to afford an opportunity for educational innovation, and to encompass the learning needs of a diverse society.

The Association directs its officers and staff to seek the reservation of at least 20 percent of all CATV channels for educational purposes. (Current Resolution 70-25)

In furtherance of this resolution, the NEA submitted the following comments, reply comments, and oral recommendations to the Federal Communications Commission's proposed rulemaking on community antenna television systems (Docket No. 18397-A):

1. *"That 20 percent of any CATV system's capacity should be reserved for educational, instructional, civic and cultural applications" and that "this principle be applied to old as well as new CATV systems in order that uniformity of such services can be made possible."*

¹ "Community antenna television" (CATV) was the initial service performed by cable television. Now, with the addition of new nonbroadcast programs and services, the broader and more accurate term "cable television" is rapidly supplanting the older "CATV." The terms "community antenna television" and "cable television" are used interchangeably.

In the 1940's, public policy dictated that 20 percent of FM radio frequencies be set aside for educational and other noncommercial uses. In the early 1950's, when new broadcast television channels were established, approximately 20 percent were likewise reserved for educational use. At the threshold of the 1970's, the NEA recommends that the same 20 percent principle be applied in the development of CATV for educational and public uses. This would allow educational uses of CATV to grow along with the industry and would guarantee access to a minimum percentage of available channel capacity for noncommercial education and public service use.

2. That under the present state of technological development of CATV the Commission "require CATV systems in the top 100 markets to have a minimum capacity of 20 to 24 channels and that the Commission compel all systems to stay abreast of the state of the art as regards both channel and systems capacity."

At the present time, most CATV systems being installed have a capacity of 20 channels, but the future clearly points to systems of much greater capacity. Forty to 60 channels are being predicted in some quarters. One engineer, Nathaniel E. Feldman, in a paper delivered at the Institute for Electrical and Electronic Engineers International Convention in 1970, goes even further:

If four of the present cables were installed in a single duct in one operation, one could have a 48-channel TV distribution system tomorrow. Due to some economies of scale and some learning effects, the cost per mile of the operation is likely to be only 2 to 2.5 times as much as the cost of a single cable for the cheapest system, and much less than this factor for the most expensive systems, e.g., systems where the costs of trenching are high. In 10 to 20 years, a four-cable system could provide 400 channels of television.

This staggers the imagination. One might ask, "How might one use so many channels? How could one pay for the costs of programming?" This booklet points to many possible uses of cable television by schools and colleges. Feldman, in commenting on these questions, offers his version of the need for additional channels by the public and the schools:

One of the first uses for additional channels would be to repeat existing programming so that the viewer can see a given program when he wants to see it. Since some areas of the United States now receive 13 channels of television, mere repetition of this material on other days and at other hours could consume 30 to 100 channels. TV watching, like moviegoing, could become more discriminating; one could consult reviewers and friends about a program before committing time to it. Note that such extensive repetition of commercial TV would involve no additional costs for programming preparation.

The 100 most popular lecture classes on the university campuses each hour could be made available to a larger audience if a large number of channels were available; students who preferred could listen to the lectures at home, as some now do in dormitories. Lectures also could be repeated at several hours of the day to make them more readily available and to help those who want to hear the material a second or third time. Colleges and universities could become primarily places for small discussion groups, section meetings, and laboratory work. This approach might help alleviate the inexorable rise in costs per student for education, compounded by the increasing number of students applying for admission each year.¹

3. That the Commission require two-way capability (audio and video in both directions) in all CATV systems.

The NEA feels this is especially important in planning for *instructional* uses of cable systems. Because education is an interactive process between teacher and learner, this requirement would enable cable TV to become a learner-oriented instructional mode as well as a teacher-oriented one. Up to this time, television has been a passive medium, eliciting little or no involvement on the part of the learner. The wide experience that our Association has had with schools in the field of closed-circuit television underlines the great need for feedback and interaction with the television medium. Broadcasting by its very nature is one way. Cable possesses the necessary copper electronic pathway to be two way.

Again, the state of the art already makes two-way communications possible. Several manufacturers are now delivering two-way equipment with wire carrying messages in both directions. In *Public Television*, the Carnegie Commission's report on educational television, J. C. R. Licklider, writing on the future of television usage, referred to interactive and selective television. He also referred to intercommunicational television:

It is a collection of rich and attractive images that form part of a concept that is developing in the minds of a growing number of people. Closed-circuit television is an important part of the concept, but by no means the essence of it. The essence is a comprehensive, flexible, interactive, multipurpose information network that includes large collections of information and advanced facilities for storing, processing, transmitting, and displaying it.²

Intercommunicational television has already been applied in Boston at Logan International Airport, which is connected to Massachusetts General

¹ Feldman, Nathaniel E. "A Scenario for the Future of Cable Television Distribution." *Proceedings of the IEEE International Convention Digest*, March 23-26, 1970. New York: Institute for Electrical and Electronic Engineers, 1970. pp. 74-75.

² Licklider, J. C. R. "Televistas: Looking Ahead Through Side Windows." *Public Television: A Program for Action*. The Report and Recommendations of the Carnegie Commission on Educational Television. New York: Harper & Row, 1967. p. 222.

Hospital in an interactive mode in a system known as Tele-Diagnosis.¹ Physicians in the hospital can diagnose the condition of a patient at the airport and prescribe emergency treatment if necessary. This situation would seem to suggest similar experiments in the field of education.

4. *"That the principle of the proposed public dividend plan—wherein CATV systems in the top 100 markets importing any distant stations would pay 5 percent of their subscription revenues quarterly in the public interest—be adopted and that the public dividend money be reinvested in public cable facilities and programming rather than be allocated to public broadcasting."*

At present no federal legislation exists that can be tapped by school districts for monies for CATV facilities and programing. While the Public Broadcasting Act of 1967 (P.L. 90-129) makes funds available for public broadcasting facilities, no provision is made for facilities for cable TV.

5. That, *"in an effort to guarantee the public a fair share in public cable communications, the Commission should encourage experimentation in selected local communities with the development of public cable corporations dedicated to fostering a richly beneficial system serving the public interest."* Schools might well take the leadership in local communities in mobilizing public institutions to form such public cable corporations which themselves could operate the local franchise in a given community. Such cable corporations should include not only the public broadcasting stations but also public schools and other public education organizations and institutions. In some communities a public nonprofit cable authority (similar to a port or power authority) may be a more appropriate licensee of the noncommercial CATV franchise in that community than the public broadcasting station. An independent public cable corporation would offer still another voice and another alternative in the noncommercial broadcast field.

In making these recommendations to the Federal Communications Commission, the NEA also pointed out that—

- The NEA has a long-standing and well-documented record of support for the full development of educational and instructional television. The NEA was a founding member of the Joint Committee on Educational Television and was in the vanguard of those who, in the early 1950's, urged the Federal Communications Commission to reserve broadcast channels and make possible the creation of educational television.

¹ Bird, Kenneth T. "Tele-Diagnosis: A New Community Health Resource." *Educational/Instructional Broadcasting* 2: 18-21; February 1969.

- Having worked for 20 years in the development of ETV, the NEA applauds the efforts now being undertaken nationally to expand the availability of CATV service in American communities.
- The Association believes it appropriate for the FCC to play a much greater role than it has played to date in shaping CATV's future capacity to serve the public interest and encourages the Commission to assert jurisdiction in the area of cable telecommunications.
- The NEA has consistently encouraged school districts and its local professional associations to explore the possibilities of using CATV channels to extend the work of the schools by both in-school and out-of-school instructional programs via cable.

The National Cable Television Association is on record as having a position similar to, and supportive of, that of the NEA. In its April 1969 position paper are the following statements: "NCTA and the CATV industry endorse a policy of supporting the efforts of the National Education Association, the Joint Council on Educational Telecommunications (JCET), and other organizations concerned with future planning for the nation's school systems. . . . it is the intention of NCTA and the CATV industry to support a plan in principle whereby CATV systems allot one or more standard and non-standard channels of proposed and existing cable systems to school districts or other educational bodies to accomplish the goals of television instruction; and generally to provide whatever assistance necessary to help alleviate overcrowded classroom conditions, provide in-home instructional assistance, and to serve in other ways for the greater efficiency and effectiveness of public education."

2

The What and Why of Cable TV for Schools

Martha Gable
Editor, *The School Administrator*
American Association of School Administrators

What Is Cable Television?

Cable television (CATV, originally *community antenna television*) is a transmission system that carries television signals over wires, underground, or on utility poles from specially built high antennas and head-end control centers to those homes, offices, schools, or other receiving locations that are linked to the cable system. Following the same principle used by master antennas serving hotels, apartments, and offices, CATV provides, via cable, high-quality signals to the television sets of an entire town or even a large city.

Unlike VHF and UHF transmission which goes through the air and can be received by TV sets within the reception range of station transmitters, cable TV is a wired system for which a monthly fee is paid for the connection of TV sets to the cable network. (It differs from pay TV for which fees are paid to receive certain programs, usually through a device which "unscrambles" the signal.) Once individual homes or schools are wired into a cable system, the potential exists for the delivery of a wide variety of electronic communications to the home or school.

Background and Development

Although CATV started mainly in rural towns, it moved gradually into larger and larger towns until now systems are being constructed in virtually

all large urban centers. Originally CATV was operated as small business, but today big corporations are being attracted by the potential magnitude of the profits. Through merger, acquisition, and/or establishment of new franchises, some of America's corporate giants are acquiring interests in CATV.

The rapid growth of CATV can be attributed to several enormous advantages it has over broadcast TV. Chief among these is CATV's multi-channel capability, which makes possible a wide diversity of program or communications offerings. TV stations from outside a community's reception range can be imported to cable subscribers, thereby increasing their program options. Also, because cable TV does not consume "on air" channels of the crowded Very High Frequency (VHF) and Ultra High Frequency (UHF) spectrum, a locality can have up to 40 or more channels for a wide variety of services.

Second, cable provides a unique opportunity for two-way communications (referred to in Chapter 1). This aspect is especially important in education, particularly if it includes audio and video in both directions.

A third feature, one advocated by the cable industry, is that the viewer is able to receive a universally good, clear, usually ghost-free, TV picture with a minimum of interference, especially for color. Cable has the ability to receive UHF channels which are susceptible to obstruction, shadowing, or interference and which generally have a more limited geographic range because of their relative position in the spectrum. Most public noncommercial television stations are on UHF and are underpowered; cable transmission should greatly enhance the quality of reception of such stations.

As broadcasters realized that cable TV operators not only can extend and improve signals of existing local stations but also can provide station programs from other areas to compete for the local audience and advertising dollars, they petitioned the Federal Communications Commission (FCC) for protection. The broadcasters protested the transmission by cable operators of costly TV programs, without the payment of fees or royalties to them, yet for which the cable TV operators collect a connection fee from subscribers. As a result, the FCC has severely restricted the importation of distant signals in the top 100 TV markets.

The battle has been raging between the broadcasters, represented by the National Association of Broadcasters, and the cable TV owners and operators, now represented by the strong National Cable Television Association.

The proposed copyright law has also been the focus of heated debate. Broadcasters and producers of programs demand protection; cable TV operators hope for few or no copyright restrictions. The FCC recently ruled that cable TV operators are required to originate programs in areas where there are 3,500 or more subscribers. (It is currently studying an appeal

from CATV operators in small communities who are requesting that this minimum requirement for origination be raised to 10,000 subscribers.) The Commission has also ruled that advertising may be sold. These rulings will greatly enhance the commercial value of cable TV.

Regardless of final pronouncements, the rapid development of cable TV seems imminent. The implications for education and public services are enormous.

Obtaining the Facility

At the present time, CATV systems, unlike broadcast television and radio stations, are not licensed by the FCC, but operate under a franchise granted by the city fathers. In any given case, whether or not the CATV service is provided to the schools is likely to depend on the interest and initiative of the educational community.

Teachers associations especially have an important role in alerting their school superintendents and local boards of education to the possibilities of obtaining some of these channels free for school use. In turn, school administrators and executives of teachers associations should be in immediate touch with their city's board of aldermen or city council to request, when franchises are to be awarded to a CATV operator in their community, that these franchises contain a clause that provides that 20 percent of all channels be set aside by the CATV operator exclusively for school use free of charge. In some communities where CATV already exists,¹ the CATV operator has cooperated by providing, in addition to free channels and free cable connections to each school distribution system, assistance in building, equipping, and staffing a studio production facility for the use of the schools.

The school superintendent and the teachers association, however, have certain obligations when they ask the mayor or city manager for CATV channels to service the schools. They should develop a plan for using the channels productively for instruction and communications within the district. The following are factors for consideration:

1. Adequate professional leadership for the program is necessary if it is to proceed on a sound basis.
2. Supporting staff (teachers, studio personnel, TV teachers, graphic artists) are important to ensure quality production.
3. In-service workshops for teachers should be conducted so that teachers are involved in planning and understand the objectives of the various TV services.

¹ For example, Suffolk County, Stony Brook, Long Island, N.Y.; Whitewater, Wisc.; Pasadena, Calif.; Los Angeles County, Calif.

4. Receiving equipment for classrooms and distribution systems within each school are important for successful use of the materials transmitted. Wiring of the classrooms within a building that will receive TV signals from the school antenna (to which the cable is connected) costs about \$135 per room.
5. If no TV studio is available from a local ETV station or within the school district, one should be designed and equipped for origination of programs. It may be that the franchisee, who must, in some areas, originate programming, will share a studio with the school or will share the costs of building one.
6. A curriculum planning committee could be helpful to envision and create innovative uses of the TV facility.

In situations where ETV services are already used, cable TV channels will permit additional transmission of a greater variety of services, and at more times, to schools for in-school programming and to community locations (i.e., homes, industries, hospitals, agencies) for adult education. It is important for the superintendent to realize the possibilities inherent in the combination of cable TV with closed-circuit TV, open-circuit TV, and 2500 megahertz installations. If they are planning expenditures for ITFS, it might be useful to see if those needs could better be met by CATV, or a combination of both. These distribution systems can be meshed so that origination points serve (a) the entire city from an open-circuit ETV station, (b) the schools plus whatever agencies are connected to the cable TV system, and (c) homes and schools in segments of the city where certain TV channels may be used at various times to reach certain neighborhoods for specialized programs in health, basic skills, safety, job training, and so forth. A competent engineer should be consulted to ensure the most appropriate and effective combination of these various distribution systems into an optimally workable system.

The school administrator should understand that, in requesting cable TV, he still has the same responsibility of providing studio facilities, distribution systems in the schools, and TV receivers that he has with the use of other types of TV transmission. Cable TV simply offers additional channels at less cost.

Uses of the Facility for Education

Since cable TV provides a multichannel facility, videotaped programs may be distributed simultaneously to schools, learning centers, institutions of higher education, and homes.

Distribution systems to the classrooms in each school are necessary; the school antenna is then linked to the cable system. This type of installation represents an expansion of existing services in the form of an open-circuit ETV station and/or an ITFS installation. Examples of services made possible by CATV alone, or in combination with open-circuit television or ITFS, follow:

1. The redistribution of open-circuit ITV programs over additional channels at a variety of times provides much needed flexibility for school use. Teachers and learners thereby have access to instructional television programs without the limitations imposed by a prearranged schedule.
2. Films from a central film library may be sent over a channel, as desired, for teachers to preview before requesting them for class showing.
3. Cable TV permits the use of channels to segmentize the audience to serve unique needs. For instance, informational programs may be offered in a second language for pupils (and their families) who do not speak English. Programs may also be provided to help these pupils improve their understanding and use of English.

NOTE: In large communities several cable TV franchises may be granted to different operators, each to cover a specific geographical area of the city. Educators may take advantage of this design of distribution to serve certain neighborhoods with programs that pupils, parents, and community groups help to plan and produce to meet local needs. When it is necessary to reach the entire city over such a segmentized facility, a "single head" origination point linking all segments is possible.

4. The extra channels make it possible to distribute teacher education to all schools at various times. If a local university is linked to the system, "feeds" to schools from the college of education for teacher education are possible. Using a channel in the opposite direction permits student teachers in training to observe classroom procedures in the schools.

5. Clusters of schools may be linked by the cable, with origination points "patched in" so that pupils can exchange live productions, such as particularly relevant dramatic performances.

6. Without interfering with ITV, which continues on other channels, an extra channel may be used for teacher conferences, within segments of the city or throughout the entire city, with demonstrations, films, discussions.

7. Cable distribution may be used for computerized information and dial access of data, videotapes, films, and other information as the engineering becomes more sophisticated. This can eventually lead to instant access and retrieval of data stored in a central "bank," typically on microfilm, with the possibility of the establishment of an information network or a nationwide library system.

8. The multichannel cable capacity would make possible many adult education uses heretofore limited and restricted on one-channel open broadcast systems. This would open up new dimensions for adults in such areas as the following:

(a) High school equivalency. Half of the American population over 25 years of age lacks a high school diploma as do many younger dropouts. Cable television could offer a wide diversity of high-quality instruction through television and radio courses as a means of preparation for those seeking high school equivalency diplomas.

(b) College-level equivalency instruction. Cable television could become the cornerstone of a non-formal system of instructional preparation and examination that would eventually lead to a college equivalency degree. In his inaugural address as Commissioner of Education of the State of New York, Ewald B. Nyquist supported the idea of the college equivalency degree to be offered by the Regents.¹

(c) Vocational training for the unemployed as well as training for job advancement and mobility for those already employed. While labor shortages exist in certain skilled occupations (i.e., electrical work, plumbing, sales), there is on the other hand underemployment as well as unemployment, and people need to be trained for jobs other than those that they have been holding.

(d) On-the-job training and retraining for industrial workers.

The CATV services suggested above do not preempt distribution of regular ongoing programming.

The potential for cable TV has not begun to be fully realized. One or two channels may be designated for "special" uses. Eventually, special audio connections will make possible two-way communications from the origination point to viewers and also among viewers. High-quality individualization of instruction, another major prospect, will require the tapping of resources from far and near. The distribution of these resources will require the specialized transmission capabilities of cable TV.

Unquestionably, cablecasting, rather than broadcasting, indicates the trend in the transmission of instruction and information in the schools of the 1970's. In the 1980's will likely come direct satellite-to-school transmission. When it is combined with ground cable systems, videotape cassettes/cartridges, facsimile, and eventually lasers, a multipurpose informational network will have been achieved.

The procession will continue until instantaneous communications interconnecting schools with resources nationwide and worldwide through

¹ "The Idea of the University of the State of New York," inaugural address of Ewald B. Nyquist.

electronic information networks become a reality. Hopefully, education will join with the electronics industry in shaping these new developments for the benefit of education.

3

Obtaining CATV Channels for School Use

Frank W. Norwood
Executive Secretary
Joint Council on Educational Telecommunications

There has been growing recognition by the CATV industry and the school community that cable television and education share areas of mutual interest and that well-planned cooperation can be beneficial to all parties. Now, the Federal Communications Commission, in action recently taken and other proposals still under study, appears to be performing an important catalytic role which will encourage both wider and stronger ties between education and cable communications in the future.

The first evidences of "mutual attraction" between CATV and education appeared at the local level. From the earliest days of CATV, many cable operators, mindful of their responsibilities to the community and the need to maintain good public relations, voluntarily agreed to provide free CATV service to each of the schools that the cable system passed. Such "drops" often provided the school system new and improved reception of the ETV station serving the area. Imaginative schoolmen were quick to see that the commercial CATV system, spreading through the community, might also provide the local school system with its own closed-circuit television interconnection.

In the educational community, the National Education Association and the Joint Council on Educational Telecommunications have directed the attention of educators to the possibilities of CATV. Articles about the use of CATV systems by schools have appeared in *Audiovisual Instruction* and the American Association of School Administrators' *Hot Line*. At the same time, parallel articles have appeared in the trade magazines of the

CATV industry. The national trade association of CATV, the National Cable Television Association, issued a "Statement of Position" in which it announced that "it is the intention of NCTA and the CATV industry to support a plan in principle whereby CATV systems allot one or more standard and non-standard channels of proposed and existing cable systems to school districts or other educational bodies to accomplish the goals of televised instruction."

At the Federal Communications Commission, the Joint Council on Educational Telecommunications (of which the National Education Association is a founding member) has long urged that federal regulations should be formulated to ensure that a minimum of 20 percent of the capacity of each CATV system be made available "for education, information, culture and public use." While such federal regulations have not been finalized, the FCC "has now accepted the principle that it must make an effort to insure the development of sufficient channel availability" for public interest functions. While that principle awaits translation into regulatory policy, the Commission has already announced that, as of April 1971, all CATV systems serving 3,500 or more subscribers will be required to engage in "cablecasting," the presentation of original programming on the cable. That action, in itself, has important implications for education.

Before we examine those implications it may be well to look at the facts, past and present. With very rare exception, CATV systems are locally franchised, and the services they are required to provide vary in accordance with the terms of the local franchising agent. A municipal ordinance usually sets forth the general ground rules under which any CATV system within the township limits will be required to operate and establishes the minimum standards which any such system must meet. Further, a local ordinance describes the process by which prospective CATV operators may apply for a franchise to enter the CATV business within the township's jurisdiction.

In any given case, the services provided for education are likely to be the result of three factors: (1) the degree of sophistication possessed by the city fathers who draw up the ordinance and grant the franchise; (2) the concern of the CATV applicant for educational and community needs; and (3) the interest in CATV exhibited by the educational community—particularly before the municipal ordinance is passed and before the franchise is granted by the city fathers.

To cite some examples: in New York City, Mayor John Lindsay appointed a special task force on CATV. It studied the complex issues for more than a year and made recommendations regarding what terms should be included in any CATV franchise granted by the city. Some, although not all, of the Task Force's recommendations were reflected in New York's recent grant of long-term franchises in Manhattan and Riverdale.

The CATV applicant, particularly when he is a "multiple system operator" who has gained experience in CATV in other locations, will sometimes himself suggest making one or more CATV channels available for program origination by the schools and/or local higher education institutions.

Finally, there is a growing, although by no means universal, interest in CATV by the educational community. The activities of SCOPE (the Suffolk County Organization for the Promotion of Education) in alerting Long Island township councils to the need to incorporate free channels for education as the condition of any franchise are described in detail elsewhere in this booklet. At least one school system in the Midwest is going yet a step further and is itself seeking the franchise for CATV operation in its community.

At the other end of the scale, of course, there are countless cases in which the CATV franchise has been let without consideration of education's needs by any party: the city fathers, the cable operator, or the educators themselves. When should the educator act? The obvious answer is "right now!"

The first thing to do is to determine the status of CATV in your community. If a system already exists, what are the terms of the franchise under which it operates and how long does that franchise run? Who is the manager of the local CATV system? Is this system owned by a corporation which operates CATV in a number of other communities (a "multiple system owner")? What is the company's track record in other localities in which it owns CATV?

If there is no CATV in your town, what are the prospects for the future? Has the city council been approached by prospective operators? Has it drawn up and issued an ordinance under which CATV franchises are to be granted? Have the city fathers given any study at all to the matter of CATV?

If no franchise has been granted, there are several possibilities. Perhaps the CATV industry has expressed no interest in your community. If so, the local educational community itself might seek to become the CATV operator. The financial, legal, and policy questions of such a move are far too complex to discuss here. Like any other businessman, the educator would need to examine costs, potential revenues, and the like before engaging in such a venture. It is important to emphasize that a nonprofit CATV system that reinvests its revenue from subscriber fees in new services rather than in distribution to its stockholders is neither impossible nor impractical. Indeed, interest in the concept of "public cable" is growing substantially.

If the CATV franchise has been granted or will be granted to a commercial cable operator, what can the educator realistically and reasonably expect?

1. The carriage of your local ETV station. FCC policy requires that CATV systems carry *all* local stations, so this requirement may be assumed. If there is no ETV station in your community, the CATV operator may willingly agree to bring in the signal of one or more noncommercial stations from other communities. Before you request or support such a service, however, you should check with the ETV stations themselves. Neither you nor the manager of a distant ETV station will want to undercut the possibility that your own community or one nearby might support an ETV station of its own.

2. Free connections to the CATV system for local educational institutions. This practice is widespread in the industry. As the CATV trunk lines are constructed, the operator installs "drops" to each school the trunk passes. Please note that such interconnection typically provides only for those schools that are near the trunk line. If some of the schools in the system are beyond the area that the CATV system proposes to serve, some additional arrangements will need to be made.

Typically, the CATV operator will agree to provide a free connection to each school within his service area. If a school has no internal distribution system of its own, the CATV operator may be willing to install one for the cost of parts and labor.

You would be wise to make sure that all parties understand that you are requesting free interconnection for the schools for as many sets as each school may use via its own internal building distribution system. The CATV operator makes one connection, from a telephone pole or an underground cable to the school; you want to reserve the right to add additional television sets without having to pay the "second set charges" that may be levied against other subscribers.

3. One or more channels on the CATV system for educational use. The Joint Council on Educational Telecommunications, and the National Education Association and other JCET members have long urged that such provision be required by the FCC. As noted above, the National Cable Television Association has endorsed the principle of one or more channels for educational use. Until federal regulation is enacted or until such channels are required by a local CATV ordinance, it would be both ungracious and unwise to approach the city fathers or the CATV franchise applicant or holder with a list of "unnegotiable demands."

Back to the implications of cablecasting for education: whether or not your local CATV system reaches, or will ever reach, 3,500 subscribers, the FCC's encouragement of program origination on the cable is likely to

stimulate the development of cable-only program services on many CATV systems. The school system ready to produce local instructional television programming and the cable operator interested in developing local cablecasting services clearly have before them opportunities for close cooperation. Where the school system or local college already owns TV production facilities, the CATV system about to begin local cablecasting may be a ready tenant or lessee of production services. In other cases the cable operator may have already constructed a studio facility for program origination on the cable, and it will be the school system that is interested in developing local programs for its own use. Here, the educator may find that making use of the CATV system's studio facilities is a far more rational approach to school television than the construction of new TV studios exclusively for educational use.

The greatest mutual benefits may well occur when the CATV operator and educators approach the problems of local program origination on the cable and instructional television for the schools as parts of a whole. In Grand Junction, Colorado, for example, the television studio was constructed at the expense of the cable operator, but the school district purchased \$30,000 worth of origination equipment under a joint-use contract. The cable operator and the educators alike realized that a considerable investment was required to buy adequate hardware for the production of good television programming. Each party agreed that it would be more reasonable to cooperate in the use of one relatively sophisticated studio facility rather than to squander limited resources on separate, inadequate efforts. In this particular case the partnership goes still further. A typical locally produced TV program is likely to originate in the studio built by the cable operator, use cameras and other electronic equipment purchased by the public schools, and—at least in part—be staffed by students in the TV production course offered by the local community college. Not only are production costs kept to an acceptable level, but the college students get a chance to supplement their textbook knowledge of TV with invaluable “on-the-air” production experience. From such cooperation by a commercial CATV operator and the local educational authorities will come not merely one, but *four*, channels of local educational and public service television: one channel devoted to programming for the general audience, two of instructional TV for the schools, and a fourth channel available only to those whose sets are equipped with a special converter for in-service instruction, orientation, and other school administrative programming.

Some educators, despite their best intentions and willingness to cooperate, will find that their interest in CATV apparently comes too late. If they are in one of those rural markets where CATV first made its appearance more than 10 years ago, they may well find that both the local franchise and

the system operating under it are somewhat old-fashioned. Many of the early CATV systems, particularly those in smaller communities, still use cables and amplifiers that carry only Channels 2, 3, 4, 5, and 6; in many cases only three of those five channels are actually available for use. The educator who finds himself in such a situation could explore several alternatives with the local cable operator:

1. Many older "low-band" CATV systems are scheduled for rebuilding with modern equipment. For example, in Moab, Utah, the school and cable operator jointly rebuilt the part of the trunk system that reached the schools. The town council paid for the cable, and the CATV operator donated the installation. The result was that the CATV operator had the beginnings of a citywide modern 12-channel system and the schools had access to new channels.

2. Some low-band systems use only alternate channels (2, 4, and 6 or sometimes 2, 4, and 5); such systems *may* be able to add signals on the two unused channels if new electronic equipment, including filters to minimize interference from adjacent channels, is added.

3. Low-band systems that transmit signals on all five channels (2-6) would appear to be "full up." In such a case you will want to investigate some modern cable techniques of which the cable operator himself may not be aware—the use of "nonstandard" channels. With new electronic equipment in the cable system and with special converters at the schools or other receiving points, it is technically possible to transmit and receive additional television channels whose frequencies are immediately below Channel 2 or immediately above Channel 6, in the "spectrum gap" between conventional Channels 6 and 7, or above Channel 13.

Such channels cannot be used by broadcast television because those frequencies are assigned for other purposes, but they can be used on the cable. Some CATV systems are now providing as many as 21 channels over a single cable by using nonstandard channels. While CATV operators who offer 21 channels of service do so by issuing special converters to all of their customers, thus allowing them to tune channels that conventional TV sets with "click" tuners simply skip over, there is no reason why such converters have to be on an all or nothing basis. With the addition of new head end equipment to feed the new channels down the line and converters at each school, university building, or other special location, it is technically possible to create new channels that are essentially private.

For in-school use, or for special audiences such as doctors interested in continuing medical education or teachers engaged in in-service education, nonstandard channels may be as good or better than standard channels that lack privacy. In Grand Junction, Colorado, the schools and the CATV system are exploring the possibility of using Channel "I" between Channels

6 and 7 [nonstandard channels are given letter designations] for instruction, teacher orientation, and in-service use. For the cable operator, providing the educator with nonstandard channels means that the new service will not require the displacement of existing services to the general public.

Most promising of all is the hope that the use of such nonstandard channels can open educational possibilities even on older, low-band systems. While the older systems may not be able to transmit Channels 7-13, a minimum investment in new equipment may make nonstandard channels below Channel 2 or immediately above Channel 6 a viable possibility.

In all of the cases where making new channels available will require investing in new electronic equipment, the cable operator can be expected to suggest that the educator defray part or all of the cost involved. If common interests and mutual advantages can be identified (as in Moab, Utah, or Grand Junction, Colorado), both the educator and the cable operator can reasonably expect to benefit from a policy of cooperation.

The educator needs to remember that ETV provides another alternative for delivering instructional television to the home or classroom. CATV may provide new means for providing instructional television to smaller institutions and communities that could not likely afford to build their own distribution systems from scratch, and a new outlet for larger institutions to expand and broaden their services. Under the best of circumstances the educator will still, and quite properly, have to concern himself with matters of program acquisition and production, and the proper utilization of program materials once they reach their intended audience. He will still need to budget funds for equipment and personnel, and, particularly where the local CATV system is already a going concern, at least a portion of the cost of implementing new educational services over the existing system. To remind the educator of those points is not to minimize the importance of CATV but only to stress two things: first, that for the present (although not for the future) CATV is essentially a one-way device much like broadcast television, ITFS, and closed-circuit TV. Second, and of equal importance, while the educator may find a friendly and valuable ally in the CATV operator, he cannot absolve himself of the responsibility for providing the most useful and most valid educational and instructional programing, nor can he leave to others or to chance the effective utilization and integration of the program materials provided.

4

Some Cost Considerations in Planning for CATV

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In planning for CATV, certain considerations must be kept in mind in order to determine the most practical and suitable relationship between the school district and/or university, on the one hand, and the local CATV system, on the other. These considerations cover the purposes and objectives of the system, the types of uses that are anticipated, whether programs will be used off the cable only or whether local origination of programs for the cable system is also planned, and whether a single channel or multiple channels will be required. The answers to such basic considerations as these will not only determine the most appropriate use of the CATV system to meet particular needs but will also determine the costs involved.

Special Services

Because a CATV system can reach homes and community centers such as public libraries, museums, and hospitals, it offers schools and universities a valuable opportunity to serve students, teachers, and parents. CATV thus enables the school to become a more active and integral part of the local community.

In addition to reaching the community with educational programming, police and fire departments may also be served in ways to save money over the long term. Community fire alarms can be directly connected to the fire stations through the CATV system, and police can maintain constant sur-

veillance of dangerous intersections or other areas. The CATV system may even realize a small profit, which may be returned in services to the community.

Whether a community owns its own CATV system or whether the system is privately owned, schools will *usually* be offered free use of at least one standard channel. There are many reasons for granting channels to the schools. The CATV operator creates a valuable public service image and encourages parents and other potential viewers to subscribe to the company's services. Most cable systems are unable to fill all their channels, and the addition of school programming (compared to what is available on local broadcast TV) may be the decisive factor in the mind of the potential subscriber. In most situations, this addition may be easily obtained.

The schools may institute local program origination, utilizing the cable system as a delivery system to the schools and homes. At this point, some financial commitment on the part of school officials may be required. It may be necessary to wire a master in-building distribution system to connect several classrooms to the single CATV terminal. The cost for wiring a school for cable transmission is approximately \$135 per classroom, depending of course on the size and arrangement of the school. There is also a cost for connecting the school antenna to the main cable trunk line. Hopefully, the CATV operator would underwrite the cost of linking the school building to the main cable. The school district, however, must bear the expense of instituting and maintaining the internal master distribution system. A small helical scan videotape recorder (VTR) (compatible with that used by the CATV operator) and some dubbing and recording equipment, the minimum necessary for program redistribution, would cost approximately \$6,000.

Films, slides, and filmstrips can be distributed, in conjunction with the school district's media center or learning resources center, without physical transport to classrooms. It is possible to begin program production with two cameras, a switcher, and VTR. Costs of these depend on the size and type of equipment used.

Before making a really substantial investment, school officials should ask several basic questions about instructional television (ITV) in general, and CATV in particular, to help determine an appropriate level for CATV utilization. Try these questions in your situation:

1. Does the school district intend to use ITV in any other form in the near future? Are teachers favorable to the idea?
2. Does the district presently operate an ITV system that includes a production facility?
 - a. Would use of CATV expand present services or duplicate them?

- b. Are internal building distribution systems (master antenna TV systems, MATV) presently installed in schools for broadcast TV reception?
3. Is your school district interested in reaching students, parents, and teachers at home through the cable system?
4. Is the school population capable of supporting CATV-ITV on a per-pupil cost basis?
5. Since local origination may be required of CATV operators, is the school district interested in a joint venture on production facilities and technical staff?
6. Does the CATV system reach *all* schools, libraries, and other learning and meeting places in the school district?
7. Is the reservation of channels for educational use formalized in a written agreement?
8. Is the CATV company providing schools with *free* use of channels?
9. Will the cable company provide free interconnection between the school's production facility and the CATV central distribution point?
10. Is the CATV system simplex or duplex (i.e., does it have a one-way or a two-way communications capability)?
11. Does the CATV franchise reserve additional channels for education as the need arises?

These questions apply in most instances, but they by no means cover all possible decision-making criteria, particularly those posed by local budget conditions, existing school priorities, and the compensatory effects of media systems already in operation in the school district. However, they are helpful in determining additional factors to be evaluated in the local decision to use CATV-ITV. Let us examine each of the above questions.

1. Does the school district intend to use ITV in any form in the near future? Are teachers favorable to the idea?

Existing plans to develop a broadcast, ITFS, or closed-circuit system are usually affected by the advent of a CATV system in the community. The potential use of CATV may not preclude the use of other transmission systems. CATV may be considered as a supplementary distribution system to compensate for limitations in whatever other system has been planned or implemented. For example, the broadcast system for most communities is limited by the FCC to one channel, and programming to meet FCC technical requirements may be expensive and hard to justify if the intended audience for particular programs is small. A cable system may well serve as a valuable low-budget supplement or substitute. The CATV system may add to the system's flexibility by providing distribution of ITFS or school closed-circuit cable systems to the homes of teachers, parents, and students. If

adequate channels are available from the cable system, cable TV may provide a more economical distribution system than the more expensive open-circuit and 2500 megahertz installations.

When a school district is contemplating the use of ITV, it should use standard survey procedures to assess teachers' attitudes toward the use of ITV to ensure their cooperation and support. ITV is more likely to be successful when teachers and administrators see a purpose for it and are involved in planning for it. The classroom teacher's cooperation is particularly crucial since he must make a positive effort to use ITV. In some cases, a teacher can even reduce, instead of enhance, the effectiveness of a learning tool. The classroom teacher must take the time and effort to schedule class time to fit the ITV transmission schedule and to develop pre-telecast and follow-up activities. The teacher must be willing to work with ITV, and no external pressure can compensate for a lack of such willingness. Some school districts have discovered this the hard way, after pouring thousands of dollars into a particular series, only to have less than 5 percent of the teachers utilize it. In such a case, the cost per pupil may be excessive.

2. Does the school district presently operate an ITV system that includes a production facility?

The facilities for origination of instructional programing cost from a few thousand to several hundred thousand dollars. Additional operational and staff costs can make the decision to develop local programing even more difficult. If facilities are not already available in the school media center or elsewhere in the district, the following production costs should be considered.

The basic system. A camera and videotape recorder with a supply of tape are necessary to originate programing. These are the basic components of all systems, with accessories added to provide better technical quality and greater flexibility. Black-and-white Vidicon cameras cost from \$700 to \$15,000; videotape recorders range from \$500 for a small half-inch portable of limited quality to \$14,000 for a one-inch videotape recorder and to \$100,000 or more for a broadcast-quality quadruplex videotape recorder with color-recording capability. Videotape for the one-inch recorder averages around \$60 per hour reel. Therefore, the basic system costs from \$1,500 to about \$30,000.

Although a small \$1,500 system may be useful for microteaching or demonstration purposes, it has little value for broadcast-quality instructional television to be distributed over a coaxial cable system. The basic system should take advantage of the cable system's potential. Equipment approaching Electronic Industry Association Standards should be used.

The school district or the university should employ a consulting engineer

to design the system needed for your particular situation. A cost estimate for an adequate basic system with equipment of high enough quality to give a satisfactory picture would approximate \$22,000. This basic system would include the following equipment:

- 2 Vidicon cameras with viewfinders
- 1 portable camera
- 1 video switcher or fader
- 1 zoom lens
- 1 fixed focal length lens
- 2 microphones
- 1 \$8,000-\$12,000 VTR
- 1 \$2,500-\$8,000 portable VTR (compatible with other VTR)
- 3 video monitors
- 1 studio monitor
- 1 audio mixer
- 1 intercom between studio and control room
- 1 wave form monitor
- 1 sync generator
- 2 camera tripods
- 1 set of miscellaneous relay racks
- 1 patching board
- 1 audio recorder
- 1 phono turntable arm and cartridge
- 1 basic quartz lighting system
- 1 TV receiver monitor

If a school district already owns any of this equipment, it would not of course be necessary to buy the item again. Television production equipment is fully compatible with present-day cable technology.

In addition, a film-slide chain is necessary for distribution of films, slides, and other audiovisual materials to viewing areas or for mixing slides and film materials with on-camera shots. This chain would include one 16mm film projector, one 35mm slide projector, and one video monitor; there would be a yearly maintenance expense of 7 percent of the capital investment. All of this would add \$5,000 to \$6,000 to the previous total. Further, one other major expense would be one-inch videotape stock at \$60 per hour. The amount of tape purchased depends on the extent of program production and the quantity of programing to be preserved for later use. Would-be purchasers should be alert to changes in existing equipment and the development of new equipment. For instance, half-inch videotape recorders are improving rapidly in quality and may be used in place of one-inch videotape recorders at a considerable savings. The cost of half-inch videotape is approximately \$40 per hour.

Because an average of 60 percent of all school programing for use on CATV would normally be rented from outside sources, this of course would reduce the need for local production. For this reason it is advisable for the school district and university to undertake cooperative construction and/or use of television production facilities with the CATV operator (see item 5, p. 30).

Production costs vary so much across the nation that a competent consultant should be employed to estimate personnel requirements.

Staffing. Although production facilities may seem relatively expensive to many school districts, providing competent staff for operating the origination system costs comparatively more, since salaries are annual operation expenses and facilities are capital expenditures which may be sufficient for up to 10 years of continuous use. The staff should include a producer-director, a technician, and a media specialist to coordinate production and distribution of materials. The media specialist, the producer-director, and the technician should work full-time, while a graphic artist, a photographer, and a film producer may be shared with the school district's media center when work loads are not extensive. If programing totaling 3 hours of actual air time is produced per week, a full-time artist and a full-time photographer should be employed. Part-time student assistants paid on an hourly basis can work as cameramen, floor directors, and set men.

Information resources. The school district should definitely employ an ITV consultant before making staff and facility decisions. No general discussion of ITV decision making can compensate for the specialized advice a consultant can provide on distribution systems, facilities, and personnel. His recommendations will improve the chances of settling upon a successful design and will prevent the headaches that have plagued some administrators. There are, of course, good publications available that offer a more detailed analysis of facility costs and selection than that possible in this booklet. Although they should be studied, reading them cannot take the place of the services of an ITV consultant. However, the following are good, as are the other listings in the bibliography (see p. 63):

Instructional Television Facilities—A Planning Guide

John P. Witherspoon and William J. Kessler. 73 pp. No. FS 5.234:34043 (write to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402—Price \$1).

Design for ETV—Planning for Schools with Television

A report from the Educational Facilities Laboratories. 96 pp. (477 Madison Avenue, New York, N.Y. 10022).

"Helical Scan Video Tape Recorders," *Educational Product Report*, December 1969-January 1970, Volume 3, Numbers 3 and 4, 36 pp.

(Educational Products Information Exchange Institute, 386 Park Avenue South, New York, N.Y. 10016—Price \$5 for nonmembers).

2a. Would use of CATV expand present services or duplicate them?

As pointed out earlier, a cable system can effectively duplicate services already provided by another transmission system or expand program services. It also effectively redistributes programs for broadcast operators. Duplicating existing program services helps ITFS facilities by cutting the cost of reception equipment and expensive antenna systems and their maintenance. One ITFS converter and antenna placed at the CATV head end, or central distribution point, can save a school district thousands of dollars by making it unnecessary to build costly receiving converters and antenna systems. The CATV system may also extend the service range of an ITFS facility just as for a broadcast system, because the range of an ITFS facility may be reduced by rugged terrain, tall buildings, or even a large tree in the path of the transmitted signal. The cable system can compensate for impaired reception by carrying ITFS signals on the cable. In a few instances, a school district has shared the cost of extending a cable system's trunk or main line to reach out-of-the-way schools. In these cases, it has been less expensive to pay to extend the cable line than to overcome physical barriers or transmission distance limitations by other means.

2b. Are internal building distribution systems (master antenna TV systems, MATV) presently installed in schools for broadcast TV reception?

School systems can reduce initiation costs for a cable system if the schools are already wired for TV reception in classrooms and other viewing areas. Costs can be reduced if wiring is installed in new buildings during their construction. The cost of the in-building distribution system is always a major expense; it is usually taken into account by schools before deciding on the use of any ITV system, not just CATV.

3. Is your school district interested in reaching students, parents, and teachers at home through the cable system?

In the age of "Sesame Street," outstanding pre- and post-school programming will be produced nationally for distribution through public broadcast stations. If no broadcast facility carries these programs, the cable system can. Locally produced instructional units for home viewers may also have some impact on the community. Vocational instruction, hobbies and crafts, and the multitude of other adult continuing education subjects taught in evening sessions at schools can be supplemented or substituted with cable-carried instruction.

The CATV system can also provide a valuable public relations service by

distributing information about school board actions, club activities, PTA meetings, and athletic events, and can announce school closings or other special administrative bulletins.

In-service education for teachers, home study for students unable to come to school, and evening supplemental instruction such as films or videotapes related to in-school lessons are additional possibilities for CATV programs.

4. Is your school district capable of supporting CATV-ITV on a per-pupil cost basis?

Per-pupil cost is a standardized assessment of a school project or program. Although such a relative measure does not perfectly indicate the success of instruction or the true cost-benefit relationship that schools are asked for as part of their accountability reckoning, the principle can and should be applied to television. An estimate of the total cost per year of the proposed ITV system should definitely be made. It would include a percentage of capital costs based on the number of years of equipment service, including both origination and reception equipment, and operating costs, including salaries, office expenses, and system maintenance charges. With some interpolation and control of variables such as the amount of programming per student per year, it is possible to make a close comparison of costs of various electronic distribution systems. A good basis for comparing costs of various systems was prepared in 1969 by General Learning Corporation and is reported in a paper from the ERIC Clearinghouse at Stanford University, "Costs of Educational Media Systems" by Michael Sovereign. The paper sets up models of systems and compares costs for local, city, metropolitan, state, and regional levels for 10 different types of distribution systems.

Based on the General Learning Corporation's model, the school district with 15,000 or fewer pupils should weigh carefully the cost of an ITV system, because it is a major investment when utilized to the extent chosen by the General Learning Corporation. The cost of a citywide system would be reasonable for many school systems whether CATV or other distribution systems were employed. A city school system should weigh carefully not only the cost per pupil but also the kinds of programming service desired. For example, ITFS transmission cannot be received in the homes, as can that carried by a leased coaxial cable system. The broadcast facility can program to homes as well as schools, but programming for small audiences is expensive.

5. Since local origination may be required of CATV operators, is the school district interested in a joint venture on production facilities and technical staff?

Both schools and CATV companies will be producing programming for the cable system. In several communities the CATV company has approached

the schools or university to lease the schools' ITV facility. Where the school system or a local college already has TV production facilities, the CATV system about to begin local cablecasting may be a ready tenant or lessee of production services. By the same token, school systems that want to engage in TV production for their own use, whether on the cable or over their own CCTV, and have no studio facilities may be able to use the CATV's production facilities.

6. Does the CATV system reach *all* schools, libraries, and other learning and meeting places in the school district?

If not, the school district may need to use other means of providing complete ITV coverage for all its schools. Point-to-point microwave transmission, ITFS, or a leased cable system are other possible solutions. Another means is videotaping materials and carrying them to the schools for playback, although additional equipment, videotape stock, and staff time would be required.

If an ITFS transmission system were employed, costs would include approximately \$18,000 for transmission equipment per channel and \$1,800 per school for a receiving antenna, a down-converter, and a power supply unit. In some cases where one university wants to connect with another university, a point-to-point system is most economical. A point-to-point microwave system (not to be confused with ITFS) will cost approximately \$11,000 for transmission equipment per channel and \$7,250 for reception. The microwave system is limited to transmission from one location to another location, and additional transmitters and receivers would be required for each school. The ITFS transmitter, however, can be received at several locations at one time, as it is not a point-to-point system. A leased cable system from a telephone company will cost approximately \$1,500 per cable mile per year, or \$1.50 per 100 feet per month.

Another alternative is to share the cost of extending the cable system's trunk line to reach additional schools. In Moab, Utah, this cost the school district \$12,000. If the cable were leased from the telephone company, leasing charges would exceed the cost of the alternative CATV trunk line extension after about five years. It may, therefore, be reasonable to pay for the extension of the trunk line, if distances are not extensive and there are not too many schools beyond the reach of the present CATV cable. If distance or the number of schools or other factors prohibits the extension of the CATV cable, ITFS might be considered an alternative.

7. Is the reservation of channels for educational use formalized in a written agreement?

This point has been repeatedly emphasized in this booklet, as schools

must be sure of having channels before investing in expensive television equipment.

8. Is the CATV company providing schools with *free* use of channels?

If a cable system is not required by its franchise to provide schools free use of channels, it may levy charges for the use of channels at its own discretion. In a few cases, the charges have been too high for the school district.

9. Will the cable company provide free interconnection in your community between the school's production facility and the CATV central distribution point?

Some cable systems are designed so that interconnecting the school origination center with the CATV head end involves little expense for either the schools or the cable company. In other, more expensive cases, alternatives should be examined. FCC regulations do not permit the use of ITFS for this purpose alone. If ITFS were to be used, its primary purpose must be to transmit directly to schools rather than indirectly to the cable system head end and then to the schools via cable. If a cable system does not reach all schools in a district, the ITFS transmission system can be employed to reach these schools and at the same time provide a link to the CATV system. Since the interconnection of the school origination center and the cable head end involves transmission from only one location to one other location, point-to-point microwave may be worth considering.

10. Is the CATV system simplex or duplex (i.e., does it have a one-way or a two-way communications capability)?

Most cable systems are of the simplex design, providing from 12 to 20 channels of programming on the cable. A duplex system employs one or two cables and allows two-way communications. In time most systems will have this capability. Educators will be able to get feedback from studio teachers and others viewing a program. It will be easy to discuss the instructional materials and ask about them. The two-way system may be useful for such kinds of data transmission among schools as computer linkage, surveys, and test processing. The cable system then becomes, in effect, an information distribution system capable of handling all forms of information in a two-way network.

11. Does the CATV franchise reserve additional channels for educators as the need arises?

Many schools are now encouraging city officials to reserve as much as 20 percent of a CATV system's channel capacity for educational use. Because it was not possible to allocate on broadcast frequencies all the channels

education could potentially utilize, supplementary services such as ITFS were established. However, ITFS cannot serve the homes of a community and is not a reasonable investment for single smaller school districts. A cable system can serve an entire community and is capable of excellent local informational and educational services.

If the FCC does not require the reservation of multiple channels for these services, the city officials should specify, *in writing*, in the franchise or city ordinance that applies to the CATV system that at least 20 percent of all channels be allocated for such purposes. For any school district, one or possibly two channels for ITV will not be sufficient for a very long time. Educators in cities using broadcast channels have found that they can utilize as many channels as are made available to them; the 20-percent clause helps guarantee that education's use of CATV can grow along with the industry.

5

The Future of Cable Communications

Frank W. Norwood, Executive Secretary
Joint Council on Educational Telecommunications

Twenty years ago the pioneers in the development of community antenna television did not have the slightest inkling that they were setting forth the groundwork of a new and substantially different communications system. In the hill-locked towns of Oregon and Pennsylvania the men who installed the first cables were interested only in extending the signals of television broadcast stations to those citizens who were deprived of television because of accidents of geography. Such early systems were crude and simple, and were based upon the expansion in rural areas of a technology that was originally developed to bring television from rooftop antennas into apartments and hotels. Regardless of the naive way in which its pioneers may have viewed CATV, the fact remains that television-by-cable can be and, in time, will be something substantially different from over-the-air broadcast TV.

The first unique potential of cable television is that it offers the possibility of change from television's present "economy of scarcity" to an "economy of abundance." For technical reasons, no city in the United States can be served by more than seven local VHF television stations. Other factors reduce the number still further near New York and Los Angeles. Along the congested East Coast, Philadelphia, the fourth-largest television market in the United States, has only three VHF channels assigned to it. Unless carefully allocated, TV channels in Philadelphia interfere with stations in New

York, and Baltimore channel allocations affect Wilmington, Philadelphia, and Washington. On the cable, on the other hand, the TV spectrum is "contained," with the result that a theoretically limitless number of channels may someday be delivered to any city without restricting in the least the number of channels delivered to a neighboring town. Then the possibility of a wide variety of voices, delivering special programs to special audiences, will be limited only by imagination and economics, not by the technology. Just as the printing press makes possible a wide variety of magazines and books for different ages, tastes, and interests, so the cable may make possible a far wider variety of programs and channels than anything we have known in the past.

The second potential of cable television lies in the fact that, in any given geographical area, the cable, or the channels on it, can be confined within specific geographical areas; counties, cities, and even neighborhoods can be served by one or more channels limited to their own confines. In broadcast television, a New York City politician seeking reelection must purchase, at great expense, television coverage of a three-state area where most viewers could not vote for him even if they wanted to. Cable television systems can be divided to provide service to an ethnic area, a school district, or a political precinct. In this way, cable holds the possibility of removing the "mass" from mass communications.

While cable offers the possibility of programing for smaller audiences within the geographic confines of a specific community, it also can reach smaller audiences that are geographically dispersed. By the use of special channels and converters, it would be equally possible to reach all doctors, say, in the New York metropolitan area. Given a large number of channels on the system and even the possibility of restricting the delivery of such channels to certain persons or groups, the concept of specialized services for doctors, teachers, opera lovers, soccer fans, and other minority audiences could be economically as well as technically viable.

Cable communications offer the opportunity of an abundance of channels, targeted audiences within specific geographical limitations, targeted audiences based on common interests across wide geographical areas, and, still more important, the development of television and other communications as interactive rather than one-way systems. (FCC Commissioner Nicholas Johnson titled his recent book *How To Talk Back to Your Television Set.*) Advances in cable technology make that an actual rather than a figurative possibility. The secret lies in the fact that, appropriately equipped, the cable is capable of carrying signals in both directions. The FCC now has under study the possibility of requiring all CATV systems in major cities to include for future use the capacity to transmit signals *from* the home as well as *to* it. One of the nation's largest multiple-system operators is already

installing two-way capacity in a new system being built in the San Francisco Bay area.

The way you "talk back to your television set" may be very sophisticated indeed. By combining cable communications technology with that of the computer, it is possible to reduce the size of an "intended audience" to a single household. Despite the fact that a cable system is, essentially, a giant "party line" to which all receivers are simultaneously connected, the use of a return channel on a cable system permits information to be exchanged between a central source and an individual household without the possibility of "other nosy neighbors" "listening in."

Such a system would require, in addition to the conventional television set, a terminal device. Such terminal devices are already under development, and field testing is expected to take place early in 1971. By utilizing data communications over the cable such a terminal would be able to receive information intended for it alone and to respond with information and instructions of its own. More elaborate and sophisticated versions of such a terminal device would include interconnection with the television set itself and the ability to store and display still pictures, including printed texts and diagrams, and to produce permanent "hard copy" from some type of facsimile printer.

All the necessary components of such a system already exist. What remains to be done is to combine them and to demonstrate their application and effectiveness in widespread use. Given the economies that mass production could provide, homeowners might be able to afford such terminal gear.

In such a system, which may be demonstrated before mid-1972, each receiving terminal would have its own "address"—a string of digital pulses that would be its unique identification. While a computer may send out a constant stream of information, the home terminal would fail to respond to anything not preceded by its own unique address. Recognition of its own address would cause the terminal to "open its gate" and respond to whatever query the computer may address to it, or, via the home terminal, to another device with which it is associated.

The computer may ask such questions as,

"How are things? Have the fire or burglar alarms or other emergency sensors at your house been tripped in the last 30 seconds?"

"What are the current readings on your water, gas, and electric meters?"

"What is your answer to the question just posed on Instructional Channel 22?"

"Turn on your hard copy printer; I am going to print out a bibliography on the subject you requested."

The terminal can then respond, preceding the response with its unique digital identification, and transmit the required information as fed to it by

one of its associated devices: the burglar alarm, the water meter, or the human being who owns and controls it. By using time-sharing techniques already developed for remote computer use, 10,000 such conversations with 10,000 different terminals could take place in less than 1 second.

The possibility that cable offers of changing television from a passive into an active device has enormous implications which can escape no educator. The future of CATV clearly holds in it a great deal more than the delivery of ghost-free TV signals from educational and commercial stations, local and distant. As to what the future may have in store, there is no better way to summarize than by quoting the Federal Communications Commission's own words in its current inquiry in Docket No. 18397:

It has been suggested that the expanding multi-channel capacity of cable systems could be utilized to provide a variety of new communications services to homes and businesses within a community, in addition to services now commonly offered such as time, weather, news, stock exchange ticker, etc. While we shall not attempt an all-inclusive listing, some of the predicted services include: facsimile reproduction of newspapers, magazines, documents, etc.; electronic mail delivery; merchandising; business concern links to branch offices, primary customers or suppliers; access to computers, e.g., man to computer communications in the nature of inquiry and response (credit checks, airlines reservations, branch banking, etc.), information retrieval (library and other reference material, etc.), and computer to computer communications; the furtherance of various governmental programs on a Federal, State and municipal level, e.g., employment services and manpower utilization, special communications systems to reach particular neighborhoods or ethnic groups within a community, and for municipal surveillance of public areas for protection against crime, fire detection, control of air pollution and traffic; various educational and training programs, e.g., job and literacy training, pre-school programs in the nature of "Project Headstart," and to enable professional groups such as doctors to keep abreast of developments in their fields; and the provision of a low cost outlet for political candidates, advertisers, amateur expression (e.g., community or university drama groups) and for other moderately funded organizations or persons desiring access to the community or a particular segment of the community.

Appendix A

Glossary of Terms

Community Antenna Television (CATV)—A community antenna television system is usually composed of three basic parts:

1. A master antenna usually located on high ground where reception of “off-the-air” television signals is good
2. A “head end” where the signals are filtered, translated, and amplified for retransmission to the coaxial cable distribution system
3. A coaxial cable distribution system which may be capable of carrying 5, 12, 20, or even more video channels to the television receivers of individual subscribers.

The concept was conceived of and first implemented 20 years ago merely as a community antenna transmission service to furnish viewers in rural areas with clear, multichannel reception, but through the years has come to be known as cable television, encompassing a wide range of telecommunications services that can be carried by coaxial cable.

Cable Television—An overall term denoting the transmission of TV and other information through a broad-band network of coaxial cables to the homes of individual viewers. Cable television is commonly referred to, along with community antenna television, as CATV. The inclusion of such nonbroadcast services as original TV programming makes “cable TV” a more accurate term than community antenna television. In its earliest form a cable television, or community antenna television, system had a latent capacity to deliver 12 broad-band channels into the home although these were not needed or required during the early state of the art. Arthur Singer points out: “Since the fifties, two technological advances have taken place. First, the basic channel capacity of the coaxial system moved up into the range of 20-25 channels, and then toward the range of 40 channels; the next move, not too far off, is likely to be toward a range of 80 to 100 channels. Second, synchronous communications satellites offered the promise of cheap and flexible interconnections among distinct cable systems.”¹

Closed-Circuit Television (CCTV)—Cable, within one or more buildings, owned by the educator or leased from the telephone company. This is not franchised as is CATV.

¹ Singer, Arthur L., Jr. *Issues for Study in Cable Communications: An Occasional Paper from the Alfred P. Sloan Foundation*. New York: Alfred P. Sloan Foundation, September 1970. pp. 3-4.

Coaxial Cable—The “magic wire,” about the thickness of a fountain pen, used for transporting the signals that make up television pictures.

Standard Channels—Those channels which can be tuned on a conventional TV set.

Nonstandard Channels—A 6-megacycle band of frequencies that fall below Channel 2, between Channels 6 and 7, or above Channel 13. Such channels cannot be used by broadcast television because those frequencies are assigned for other purposes, but they can be used on the cable.

“Drops”—Individual connections from the main feeder trunk cable line to the individual subscriber’s set.

“Head End”—The electronic control center of the CATV system where incoming TV signals are amplified, filtered, and converted to appropriate cable system channels.

Low-Band VHF—Frequencies up to Channel 6.

Pay TV—A programming service in which the subscriber pays for each program he selects. The CATV subscriber, on the other hand, pays a monthly service charge rather than for individual programs.

Instructional Television Fixed Service (ITFS)—The Federal Communications Commission recently opened 31 channels in the 2500-2690 megahertz frequency range for use by educational institutions and organizations primarily for the transmission of instructional and educational programs to schools and colleges. ITFS is a point-to-point service from a transmitter to one or more designated receiving locations. Although the signal is transmitted in much the same way as is the broadcast television signal, it requires a special receiving antenna and down converter unit and can be received only in those buildings so equipped. In short, ITFS is a private distribution system in which preselected receiving points are connected by radio signals instead of by cable.

Appendix B

Some Practical Considerations on Regional Planning for CATV¹

Questions to be considered in designing a CATV ordinance:

Do we want CATV for our community?

If so, what do we want it to offer in the way of services now? In the future? How do the plans for the development of our area affect planning in the communications field?

What is the most economical system to consider now? In the future? What is a reasonable compromise?

Should our community design a CATV plan for itself? What resources do we need to do this? Do we have them? Shall we create a study group?

Is there one already? Does it need a technical staff? How much money can we spend on creating a design?

Is there any advantage in a cooperative regional approach to planning a communications system?

If we should decide to franchise a CATV system, how do we want it to be operated? As a profit-making operation? As a nonprofit community service? Who will be in charge of the operations? What role shall the community play in decision making? How shall questions of policy, rate regulation, or use of the system be regulated?

How much will the system, as agreed on, cost? Shall we install parts of the system first, or do it all at once? Who will provide investment capital? Who will be responsible for marketing services? How shall profit be distributed?

In short—do we want CATV? If so, what kind of system is best for us? How shall it be paid for? What kind of franchise agreement can be arrived at to serve the best interests of the public?

When these questions—and others that you will want to raise—have been studied and resolved, you will have the satisfaction of knowing that the interests of the public will reflect this concern, and the people of your community will benefit from your foresight for decades to come.

¹ Dr. Huntington Harris, vice-chairman, Loudon (Virginia) County Board of Supervisors, and vice-president of the Northern Virginia Educational Television Association.

Appendix C Speech—Cable Television¹

It is more than a bit ironic that the cable, or community antenna television (CATV), which was unceremoniously developed as an improvised method of relaying television reception into rural regions, now portends to revolutionize the cities. In the next few years, we shall see television, radio, and even the telephone radically transformed by the phenomenon of a thick strand of tensiled copper wire encased in plastic.

With cable television, every home could have made available to it from 25 to 40 channels, and more. Cable not only provides new channels, it also greatly facilitates more diversified use of these channels. Potentially it offers the opportunity for television to become far more flexible, far more democratic, far more diversified in content, and far more responsive to the pressing needs in the nation's cities.

With cable's increased channels and greater amount of "air" time, it becomes possible for television to cater to the needs and interests of specialized communities and minorities.

The educational opportunities offered by a cable system are virtually unlimited. For instance, it would be possible to institute an Open University of the Air. A cable system would also provide channels for vocational training and high school equivalency as well as many more channels than now exist for in-school use.

For cities and towns, the most important contribution of CATV is the greatly increased capacity for local services. One channel can provide live coverage of city hall; another can carry local events.

Cable has the potential of a great many more services besides television and radio programming. A duplex, or two-way, system can be utilized to read meters, security and fire alarm systems, and to carry data communications. Cable services such as at-home banking and shopping are already in the planning stage.

The possibilities opened up by linking such a two-way feedback system to our schools, hospitals, libraries, and businesses are startling.

In short, *technologically* a new age of communications is not only coming, it is *here*. However, to say we have the technology for this is not to say that we are going to see it happen. To put it bluntly, we are once again

¹ Excerpted from a speech by John W. Macy, president of the Corporation for Public Broadcasting to the National League of Cities, December 10, 1970.

faced with a situation where technology has far outstripped our ability to use it.

We were at similar exciting junctures in communications technology when radio and then television were developing as media of mass communication. Everyone proclaimed their exciting public service and educational prospects. However, it is no secret what has happened. We have created a vast and, in many ways, wondrous system of communications, designed by the economics of the commercial broadcasting industry, to attract and hold the largest possible audience for the longest period of time. It is fine for entertainment or spectator sports or news spectacles, certainly, but not very effective in giving priority to public needs in programing.

And so the question before us today is how will we allow cable television to develop? Will we let it go the purely commercial route so that only programs of mass entertainment will be profitable? Or will we preserve this new technology as a medium that gives priority to public needs in programing?

The history of radio and TV has an obvious lesson for us: we must act *now*—not tomorrow, but today while there is still time—to ensure that the public benefits of cable TV are secured before we take up the prospect of commercial benefits.

There are positive steps that can be taken now to give us that insurance.

First, the current regulatory entanglement must be straightened out. The present regulatory powers over CATV are hopelessly mixed between the FCC and state and local governments. The most effective means of ensuring the full development of CATV throughout this nation is for the FCC to preempt the field and undertake all aspects of CATV licensing and regulation.

Second, regardless of who grants the franchise for a local system, it should be guaranteed by the builder that the system will have duplex capability and that it will offer the maximum number of channels. Most systems that have been built thus far have only a 12-channel, simplex capacity even though the technology has long existed for better systems.

Third, 50 percent of all channels on the cable should be reserved for public purposes. Obviously, the availability of these channels will not in itself provide public benefits. They must be programed in such a manner and with such excellence that they will be of effective use.

To help provide for this programing, 5 percent of the subscription revenues of cable systems should be assigned to a dedicated account for use in the planning of the noncommercial uses of cable systems and the production of programing for use on the cable channels reserved for public benefit.

Finally, the mayors of this nation should consider the possibility of constructing cable systems as municipal enterprises and leasing them to a nonprofit community organization for operation. Though in most cases a city might have to float public bonds to finance the construction of the system, it would be well worth the investment in terms of financial return and public benefit. By building the system as a public utility, it can be guaranteed that the public retains control of this communications enterprise, and also that all or a good part of the profits can be rechanneled into the system for educational and community programming.

One of the logical operators of such a system would be a local public broadcaster. There is in fact no better way to ensure that the public interest acquires a piece of the action and derives the maximum benefits of the cable system. Public broadcasting is capable, given the increased resources, of filling the greatly increased air time of the cable system with programming of quality and enlightenment. And perhaps it alone is capable of fulfilling the educational and community service potentials of this new technology.

With the coming of cable we are indeed in a new age of communications technology. And we are once again faced with the crucial questions: How will we preserve this tremendous new communications potential for public service and education? And what will we say over these many new channels?

Television has already had an untold effect on our society. In the future, when we have 40 channels instead of 4 or 7, its effect will be even greater. The question is whether its effect will be beneficial or harmful.

Will this increased communications capacity provide vastly expanded access to education and diversity of entertainment and enlightenment or to a greater selection of the same kind of programming that must always seek the largest audience—an electronic version of the Tower of Babel?

Will it be a public dividend or something less?

Appendix D

A Case Study of Obtaining Educational Provisos in Cable TV Franchises and Ordinances¹

This study focuses on the Cable TV (CATV) endeavors of SCOPE in Suffolk County, Long Island, New York. SCOPE is an acronym for the Suffolk County Organization for the Promotion of Education. SCOPE is a nonprofit corporation permanently chartered by the Board of Regents of the State of New York and is primarily funded by annual membership fees from 65 public school districts plus the parochial schools of the Diocese of Rockville Centre and Dowling College. In essence SCOPE functions as a consortium for the major elements of the educational community in Suffolk County, New York, and is governed by an elected Executive Committee of 10 school district superintendents.

Suffolk County, New York, occupies approximately the eastern two-thirds of Long Island. Its western half is a densely populated suburban area, the eastern end is still rural, and a population explosion "Frontier Zone" exists in the middle of the County. Geographically, the County is about 80 miles long and 20 miles wide, and is located east of New York City. Its present population is slightly over one million, of which about 340,000 are children of school age. The educational community has nearly 15,000 teachers and about 350 school buildings. Local civil governments consist of a county government plus 10 township governments and 27 incorporated villages. The town and village governments have the authority to grant CATV franchises.

SCOPE's sphere of endeavors ranges from the conduct of School Board Institutes to the sponsorship of Instructional Materials Exhibits. However, SCOPE is structurally organized to reflect its three main thrust areas, which are Teacher Inservice Education, Curriculum Development, and Educational Communications, Media and Technology (CMT). Since 1967 SCOPE has designated Cable TV as the major priority for its CMT Segment. The CATV endeavors, however, must be viewed within the context of a larger effort to establish a comprehensive countywide Educational and Instructional Television System.

In 1965 the SCOPE Executive Committee recognized the need for the creation of a countywide educational television plan to provide supportive

¹ Excerpted from a longer report prepared by Roger W. Hill, Jr., of SCOPE.

services to Suffolk school districts undertaking the utilization of television. Funds were requested for this endeavor in SCOPE's first ESEA Title III proposal. The proposal was approved by both the State Education Department and the U.S. Office of Education.

SCOPE has undertaken a program to formalize the relationship between educational and instructional television and the emerging Cable Television (CATV) industry. In essence SCOPE developed a series of educational provisos which in varying degrees have been incorporated into CATV franchises granted by the Towns of Smithtown, Islip, and Huntington. In the Town of Babylon a collaboration agreement exists between the franchised Cable Operator and SCOPE, and in the Towns of Brookhaven, Riverhead, Southold, Southampton, and Shelter Island informal working arrangements have been made. The CATV Ordinance for the Town of Huntington is SCOPE's most significant CATV accomplishment because it incorporated about 98 percent of SCOPE's provisos nearly verbatim and in effect reserves approximately 20 percent of the total CATV systems capacity in Huntington for educational and municipal use without charge.

SCOPE's CATV endeavors consist of simultaneous efforts in several directions, which include—

- A campaign to alert school administrators and teachers to the educational applications of CATV. Toward this end SCOPE has made formal presentations at meetings of the Suffolk Chief School Executives Association, the Suffolk Educational Communications Council, the New York State Educational Communications Association, the New York State School Boards Association, and the Annual Zone meeting of the PTA. In addition over 20 briefings have been presented to school faculty and administrative council meetings, teacher inservice educational workshops, etc. This phase of the program has also included the extensive dissemination of CATV publications, especially reprints of magazine articles.
- Meetings with local CATV operators to establish rapport on behalf of the educational community and to motivate a willingness to collaborate with the schools. This has led to SCOPE being accepted as an *associate* member of the New York State Cable Television Association.
- Meetings with local town and village government officials to alert them to the need for educational provisos in any franchise that may be granted. Activities of this nature have ranged from formal presentations at public hearings to briefings in closed sessions or merely consultations with the Town Supervisor, Village Mayor, or Town and Village Attorneys.
- The final phase of these endeavors has been to help others in the development of their CATV undertakings. In this regard SCOPE has assembled and disseminated over 500 packets of CATV material. This activity originally began in response to an ESEA Title III dissemination

requirement but has been perpetuated after the cessation of ESEA funds. Also, SCOPE designed a series of 20 overhead transparencies about CATV. Originally these transparencies were for in-house use; however, loan requests became so frequent that they were produced in quantity and offered for sale nationwide. To date, approximately 50 sets are in use primarily by schools and colleges that have a communications arts program. Recently, SCOPE developed an independent study kit about CATV intended primarily for use in high school industrial arts programs. The study kit consists of 3 hours of audio taped lectures used in conjunction with a visual manual and student response booklet. Also included are selected reprints of significant magazine articles and a CATV bibliography.

The end result of the preceding endeavors is intended to result in working relationships between the local cable operators and the schools, both on a district-level basis and an area or regional-level basis. To fully capitalize on this activity the schools must make significant investments in both personnel and equipment. Consequently, SCOPE has been unwilling to permit this relationship to be based upon the "shifting sands" of good will and gentlemen's agreements. Hence, much of SCOPE's energies have been expended in solidifying the relationship in Town and Village franchises and ordinances. In consort with the recommendation of the Joint Council on Educational Telecommunications (JCET), SCOPE requests that approximately 20 percent of a CATV system's capacity be allocated for educational, instructional, cultural, and civic applications. In essence, what SCOPE has done, however, is to specify in detail what 20 percent of systems capacity should be and to do so in terms of the current and projected needs of the Suffolk educational community. These educational provisos are couched in legal phraseology and are much too long to incorporate in this case study; however, copies may be obtained by writing to SCOPE-Suffolk Educational Center, Stony Brook, New York 11790. In essence the provisos cover five areas:

1. A requirement that the CATV operator must connect his cable to schools, colleges, and public libraries and provide service without charge.
2. The individual school districts must be allowed to preempt the use of one channel at any time for school-to-home programing.
3. At sometime between the fifth and tenth year of the franchise the cable operator must interconnect the school buildings of each district.
4. When Suffolk schools construct a regional 2500MHz (ITFS) System each cable operator must interface the ITFS System with his cable system.
5. Each cable operator must construct a TV studio which will be avail-

able for education, cultural, and civic applications for up to 50 percent of its operating time, but not less than 20 hours per week.

In varying degrees the preceding benefits have been incorporated into six franchises granted by Suffolk Town governments. Inducing Town officials to provide for the needs of the schools has been laborious and the procedure followed was dictated by circumstances, hence, different in each Town. As a result of these experiences some DO's and DON'T's seem to have evolved.

DO's

1. Make direct personal contact with the Town Supervisor, Village Mayor, and Town or Village Attorney. Discuss the matter individually with as many Town Board members as possible.
2. Make direct contact with the CATV operator who is or may be a franchise applicant. It is most desirable that you enter a CATV public hearing in substantial accord with the CATV franchise applicant.
3. Make sure that your school community presents a "united front" in any public hearings.
4. Solicit the support of influential individuals both in and outside the school community.
5. Ensure that your CATV franchise requests receive good local press coverage.
6. After your CATV requests have been granted, recognize the contribution of the Town Supervisor or Village Mayor by publicly awarding a plaque or certificate of appreciation.
7. Be as knowledgeable as possible about the "state of the art" in CATV and generously share your information with Town and Village officials.
8. Speak as frequently as possible about CATV before local civic groups such as the Lions Club, Rotary, etc.

DON'T's

1. Ask for a percentage of the franchise fee unless you are very certain that you can get it and that it is legal.
2. Make unreasonable demands on the CATV franchise applicant. His costs tend to be front ended—put a time delay into any request that will be costly to him.

3. Assume that all town officials will automatically espouse your cause—an intensive “selling job” is imperative.
4. Allow the CATV franchise applicant to view you as a parasite. This is a “quid pro quo” arrangement. Most cable operators need you as much as you need them; however, the cable operator must be made aware of the effort and expenses you will incur to implement your part of the program.
5. Be inflexible or arbitrary in your franchise requests. Politics is the “art of compromise.” There is likely to be much negotiation before you are finished.
6. “He who acts as his own attorney has a fool for counsel.” Franchises and ordinances are intricate legal matters—just one misplaced word can defeat the entire intent of a particular proviso. Get good legal guidance.
7. Brevity is sometimes said to be the soul of wit, but at other times it may well be the sign of a nitwit. Spell out the details of your provisos in good legal and engineering language. If your good rapport with the cable operator should ever deteriorate, the language of the franchise may be all that you have left to rely on.
8. Be easily discouraged. You are predestined for at least a few setbacks. Persistence is the “name of the game.”

GOOD LUCK

Appendix E

Public Education's Stake in the Proposed Community Antenna System Franchise¹

The requirements, outlined below, are based on documents which have been prepared as a result of months of study at the local, state, and national levels, and which have involved the National Education Association, the National Association of Educational Broadcasters, the Division of Educational Technology of the NEA, the Joint Council on Educational Telecommunications, many local educational groups, and the Federal Communications Commission's National Committee for Instructional Television.

Requirements

It is proposed that a primary condition for the awarding of a CATV franchise in Pasadena be the completion of a contract with the Pasadena Unified School District and other public educational institutions herein identified as "eligible agencies," to provide facilities and services set forth below:

1. *Channels To Be Dedicated to Education:* Twenty percent (20%) of the CATV cable channel capacity shall be reserved for educational and instructional purposes exclusively and shall be made available free of charge to the public schools and public colleges, and other eligible agencies, identified below, in whole or in part within the Pasadena city limits. However, not less than two channels shall be provided initially of which one shall be reserved for use by the Pasadena Unified School District.
2. *Eligible Agencies:* Agencies to whom this service shall be provided free of charge include the public schools and public colleges, all public libraries, fire department headquarters and stations, police headquarters, Pasadena Art Museum, the City Hall and city department headquarters, Civil Defense quarters, and the Huntington Memorial Hospital. These shall be indicated hereinafter as eligible agencies.
3. *Cable Connections and Terminal Equipment:* The company receiving the CATV franchise shall, without charge to the eligible agencies, connect them to the CATV cable, including the necessary terminal equipment to permit said eligible agencies to receive all programming on channels reserved for their educational use as described in para-

¹ Prepared by Alan Fink, Pasadena City Schools, Pasadena, California.

graph 1 above. Such terminal equipment shall be located as specified by each school and agency.

4. *Type of Signal Distribution:* Equipment provided shall be capable of feeding into the eligible agencies' normal radio frequency distribution systems.
5. *2500 MegaHertz Signal Reception and Retransmission:* The CATV system shall provide its own facilities for receiving and retransmitting the four 2500 MHz frequencies of Channel KQI-29 on channels allotted to the eligible agencies as specified in the contract.
6. *Distribution of Program Materials:* The CATV shall distribute free of charge throughout the cable system on the channels reserved for the eligible agencies all programs as required by the said eligible agencies within the hours of 7 a.m. and 10 p.m. daily.
7. *Exclusive Use:* The Pasadena Unified School District shall have available to it for its exclusive use a minimum of one channel initially, except that a minimum of two (2) channels or one half of all available channels for instructional use, whichever is greater, shall be provided the unified district at such time as the cable has a twenty-channel capability. Use of channels in excess of four by the unified district shall be negotiated with other eligible agencies.
8. *Quality of TV Signals:* Signal quality shall equal or exceed the standard commercial telecast signal specifications as required by the FCC. Signals delivered by the CATV system to the eligible agencies' headend facility shall meet or exceed specifications herein attached. The standards of quality described below shall also apply to all eligible agencies with respect to the signals and/or video tapes delivered to the CATV system. The specifications for quality control are as follows:
 - a. Video response
 - ± 1.5 db at 4.2 MHz
 - $\pm .5$ db 60 Hz to 3.6 MHz
 - Differential gain .5%
 - Differential phase $.5^\circ$
 - Signal to noise greater than 45 db PP signal to RMS noise
 - b. Audio response
 - $\pm .5$ db 30 to 15K
 - c. Total harmonic distortion not greater than 1% 50 Hz to 15 KHz.
 - Noise must be better than 60 db below 100% modulation.
 - 100% modulation shall be defined as ± 25 KHz deviation when employing standard FM modulation.
9. *Notification:* The CATV company shall notify in writing each of the above-named eligible agencies of the educational provisions of this

franchise and contract whenever a CATV cable is installed within 1,000 feet of the land upon which a building of an eligible agency is located. Thence, upon written request from an eligible agency, the company shall install CATV receiving terminal apparatus and cable connections as described above in paragraphs 3, 4, and 5.

10. *Transmitting Program Materials:* The CATV company shall receive via 2500 MHz transmissions from KQI-29 for instantaneous retransmission, video tapes of the two-inch quadrature format compatible with Ampex two-inch video tape machines, and video tapes of the one-inch format compatible with Ampex 7800 VT machines for cable distribution at the times specified by the respective eligible agencies.
11. *Collaboration:* Eligible agencies which shall elect to avail themselves of the benefits which ensue from this franchise in principle and in policy shall collaborate with the franchise company to the greatest extent possible consistent with law, ethics, and accepted principles of educational administration. Collaboration shall be for the purposes of video taping or live cablecasting of programs originating in the eligible agencies' facilities. For practical purposes of district management the franchise company will negotiate with the eligible agencies for a mutually acceptable working relationship.
12. *Additional Educational Facilities:* After the company has held this franchise for a period of ten (10) years, it shall, without charge, provide the Pasadena Unified School District, upon request by the district, a CATV channel which will interconnect the school district media center with the building level media centers of the same district.

After twelve (12) years, during which time the grantee has held this franchise, the company shall, without charge, provide a local production facility (TV studio) which shall be made available to the eligible agencies for up to fifty percent (50%) of its operating time which shall be construed to be at least twenty (20) hours per week. Prior to construction, the design of the studio shall be approved by a committee composed of one representative from each of the eligible agencies, and the studio shall consist of at least three color viewfinder cameras, switcher-fader controls, audio system, color film chain, two color video recorders, and multiplexing unit. All equipment shall be remotely controlled by a master control unit. The studio shall be physically located within the City of Pasadena. Technical operating and graphics personnel shall be provided by the company; the producer/director and talent shall be provided by the eligible agencies.
13. *Experimental Services to Long-Term Incapacitated Students via Educational Video Instruction:* In addition to channel requirements set forth above and immediately upon the granting of the franchise the

company shall undertake to devise and put into effect an experimental program with the Pasadena Unified School District so as to permit and enable students who are bedridden or confined to their homes because of a long-term incapacitating accident, injury, or illness to receive home instruction via video or "live" programs from the classroom or school studios to the student. This program, if successful, shall be made available to all such students. The company's obligation hereunder shall be limited to providing a cable connection and the use of its system to provide the hookup between the classroom and/or district studios and the incapacitated student's home, and shall not include or require the company to provide the necessary "hardware." The use of the channel space shall be given to the united district free of charge.

14. *Relationship Between the Educational Benefits and the Growth of the CATV System:* It is the express intent and purpose of the company to proceed immediately with the building of the CATV system and, while all installations and service contemplated hereunder shall be made by the company in accordance with the orderly progress and construction of its cable system, it is the express intent and desire of the company to proceed with all deliberate speed to accomplish the objectives set forth herein as soon as possible.
15. *Distribution of the Revenue from the CATV System:* Beginning with the sixth year of operation under the franchise the company shall return two and one-half percent (2½%) of the net receipts from the CATV cable operation to the eligible public school systems for support of and improvement of their TV instructional programs, reception and production facilities, and staffing requirements.

Appendix F
Sample Contracts¹

Whitewater, Wisconsin

PROPOSED
ORDINANCE NO.

AN ORDINANCE GRANTING A FRANCHISE TO

.....
Name of Company

ITS SUCCESSORS AND ASSIGNS, TO CONSTRUCT, OPERATE AND MAINTAIN A COMMUNITY ANTENNA TELEVISION SYSTEM IN THE CITY OF WHITEWATER, WISCONSIN; SETTING FORTH CONDITIONS ACCOMPANYING THE GRANT OF FRANCHISE; PROVIDING FOR CITY REGULATION AND USE OF THE COMMUNITY ANTENNA TELEVISION SYSTEM; AND PRESCRIBING PENALTIES FOR VIOLATION OF THE FRANCHISE PROVISIONS.

The Common Council of the City of Whitewater, Walworth and Jefferson Counties, Wisconsin, Does Ordain As Follows:

SECTION 1: *SHORT TITLE*. This Ordinance shall be known and may be cited as the "City of Whitewater Community Antenna Television System Franchise Ordinance."

¹ On June 10, 1968, the U.S. Supreme Court in the *U.S. vs. Southwestern Cable Corporation* upheld the view of the Federal Communications Commission that it had full jurisdiction over cable television activities as follows: "CATV is interstate commerce and the FCC has the authority under the Communications Act to regulate it." The FCC had argued that it had this jurisdiction under the Communications Act of 1934.

At the present time there are four dockets before the FCC. Two of these, FCC Docket No. 18397A and FCC Docket No. 18892, are concerned with, among other questions, the question of access to cable channels by local municipal, social service, and educational interests. It has been the position of many national educational organizations that free and unlimited access to at least 20 percent of all channels in all cable systems be allocated to educators and others on a no charge basis. It is impossible to forecast how the FCC will finally act in this matter.

If the FCC deems that educators and others have this free access, it should not be necessary to enter into such a contract with your local cable entrepreneur for the matter will have been decided by federal decree.

SECTION 2: *DEFINITIONS*. For the purposes of this Ordinance, the following terms, phrases, words, and their derivations shall have the meaning given herein. When not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular number, and words in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

- (1) "City" is the City of Whitewater, Wisconsin.
- (2) "Council" is the Common Council of the City of Whitewater.
- (3) "Community antenna television system," hereinafter referred to as "CATV System" or "System," means a system of coaxial cables or other electrical conductors and equipment used or to be used primarily to receive television and/or radio signals directly or indirectly off-the-air and transmit them to subscribers for a fee.
- (4) "Person" is any person, firm, partnership, association, corporation, company or organization of any kind.
- (5) "Grantee" is or anyone who succeeds in accordance with the provisions of this Franchise.

SECTION 3: *GRANT OF* *AUTHORITY*.

- (a) There is hereby granted by the City to the grantee the right and privilege to construct, erect, operate and maintain, in, upon, along, across, above, over and under the streets, alleys, public ways and public places now laid out or dedicated, and all extensions thereof, and additions thereto, in the City, poles, wires, cables, underground conduits, manholes, and other television conductors and fixtures necessary for the maintenance and operation in the City of a CATV system for the interception, sale and distribution of television and/or radio signals.
- (b) The right to use and occupy said streets, alleys, public ways and places for the purposes herein set forth shall exclusive (and the City reserves the right to grant a similar use of said streets, alleys, public ways and places, to any person at anytime during the period of this Franchise) (*to be added if non-exclusive franchise is granted*).

[Sections 4-12 and 14-40 have been omitted from this booklet. Section 13 follows because of the importance of ensuring that the schools be provided with channels free of charge.]

SECTION 13: *SERVICE TO SCHOOLS*. The grantee shall provide service to public school locations and teaching stations within the City for educational purposes upon request by the City and at no cost to it or to the public school system. The grantee may at its election provide

similar services without cost to private schools, including parochial or other religious schools.

Los Angeles County

[The following three letters and sample resolution provide background for the second sample contract and illustrate how concerned members of a school district may take action in the area of securing schools' rights in CATV. The letters are used with Mr. Vail's permission.]

December 16, 1970

Dr. Richard M. Clowes, Superintendent
Los Angeles County School District
155 West Washington Boulevard
Los Angeles, California 90015

Dear Mr. Clowes:

You will find enclosed a copy of a specimen letter that this district has sent to each of the eight communities it serves. In addition there is enclosed a copy of a resolution 70-41 passed by the ABC Board of Education at its regular meeting on December 14, 1970, and a copy of a rough draft of the agreement between a school district and a community antenna television system that your office had prepared. Also enclosed is a copy of a letter that this district addressed to Dr. Siegfried C. Ringwald, president of Cerritos College, which sets out the need for an umbrella organization to coordinate community antenna television systems as they are franchised in Southeastern Los Angeles County. When it is considered that the ABC Unified School District serves all of three cities and a part of five others, it will be seen why there is a need for this type of coordination. This letter is addressed to you in hopes that the county office would wish to play a role in the development of such an umbrella organization.

If your office has an interest in this matter, we would be pleased to hear from you.

Sincerely,
Edward O. Vail
Assistant Superintendent
Special Services
md
Enclosures

December 16, 1970
Dr. Siegfried C. Ringwald
President, Cerritos College
11110 East Alondra Boulevard
Norwalk, California 90650

Dear Dr. Ringwald:

You will find enclosed a specimen copy of a letter that the ABC Unified School District addressed to each of the eight cities it serves. Enclosed also are a resolution 70-41 and a rough draft of an agreement between a school district and a community antenna television corporation. I am writing to you as president of Cerritos College because it appears that there is need for the development of an umbrella organization to coordinate community antenna television operations in the several cities in Southeastern Los Angeles County. Because this area is fragmented into so many separate municipalities, it would appear to be impossible for a school district to coordinate any type of cable television programming without a master agreement covering all of the franchised companies. There appears to be some urgency in the development of this organization because currently two cities, Norwalk and Lakewood, are negotiating with community antenna television companies.

I should like to hear from you in relation to this matter.

Sincerely,
Edward O. Vail

December 16, 1970
City Council
City of Artesia
11729 East 183rd Street
Artesia, California 90701

SPECIMEN

Gentlemen:

At its regular meeting held on Monday, December 14, 1970, the ABC Unified School District's Board of Education passed a resolution which has as its subject matter Community Antenna Television Systems. A copy of that resolution (70-41) is enclosed for your study. The board has directed that a copy of this resolution be forwarded to each city council within the ABC Unified School District. In passing Resolution 70-41, the board intends that the special interests of the ABC Unified School District shall be protected in any negotiations any of the cities should conduct with any community antenna television company. This is to say that the district would wish to act as its own agent in any such negotiations.

You will also find enclosed a second document. This rough draft of a model agreement between a school district and a community antenna television corporation was prepared by the Office of the County Superintendent of Schools. In any exploratory discussions that might be held by a city and a community antenna television company, it should be explained to the company that this document contains only the minimum considerations that shall be granted to the schools.

May we request that in every case where your city enters into discussions or negotiations concerned with community antenna television systems that this office be notified in writing. Should you have any questions concerning these matters, please contact this office.

Sincerely,
Edward O. Va:l

RESOLUTION NO. 70-41

WHEREAS community antenna television organizations are making an increased effort to install and expand cable television systems in communities throughout Los Angeles County as well as the entire country; and

WHEREAS the potential of expanded cable systems can provide high quality multichannel signals beyond the current broadcast spectrum and may open the possibility of a new technology including complete home communications and study centers; and

WHEREAS local school systems recognize the urgency to share in the use of this public facility based on proven successes of instructional-educational television programing; and

WHEREAS the National Cable Television Association in its position paper, dated April 1969, endorsed the policy as follows: "To this end, NCTA and the CATV industry endorse a policy of supporting the efforts of the National Education Association, the Joint Council on Educational Telecommunications (JCET), and other organizations concerned with future planning for the nation's school systems." In implementing the same position paper the NCTA further stated: "Further, it is the intention of NCTA and the CATV industry to support a plan in principle whereby CATV systems allot one or more standard and non-standard channels of proposed and existing cable systems to school districts or other educational bodies to accomplish the goals of television instruction; and generally to provide whatever assistance necessary to help alleviate overcrowded classroom conditions, provide in-home instructional assistance, and to serve in other ways for the greater efficiency and effectiveness of public education"; and

WHEREAS the Office of the Los Angeles County Superintendent of Schools has recommended that local school districts work together to realize maximum benefits for students through the development of educational television: Therefore be it,

RESOLVED, that the Board of Education of the ABC Unified School District hereby states its intention to request permission to participate in negotiations with all community cable television companies that currently do have or may have in the future, an interest in establishing or expanding a franchise operation within the boundaries of the ABC Unified School District: Be it further

RESOLVED, that upon notice of intent by a cable company to negotiate or renegotiate a franchise, that immediate notice to this Board of Education and other school boards concerned be forwarded to acquire educational specifications to insure adequate service to schools: Be it further

RESOLVED, that each franchise considered must incorporate a percentage of cable system capability commensurate with educational needs and potential. This percentage established within the franchise will be based upon a traditionally established percentage of channels and/or facilities reserved especially for education: Be it further

RESOLVED, that, as a first step toward this objective, the ABC Unified School District urges the City Councils of Artesia, Cerritos, Hawaiian Gardens, Lakewood, La Mirada, Long Beach, Norwalk, and Santa Fe Springs to provide education an opportunity to participate in negotiations for franchise requests by community antenna television organizations (cable television) : Be it further

RESOLVED, that this resolution be forwarded to each City Council within the ABC Unified School District.

IN WITNESS of the adoption of the foregoing resolution by a vote in excess of two-thirds of all the members of this Board, we, the members of such Board present and voting thereof, have hereunto set our hands this 14th day of December, 1970.

BOARD OF EDUCATION
ABC UNIFIED SCHOOL DISTRICT OF
LOS ANGELES COUNTY

ROUGH DRAFT OF A SAMPLE AGREEMENT BETWEEN
A SCHOOL DISTRICT AND A COMMUNITY ANTENNA
TELEVISION CORPORATION

Agreement between School District and the
..... Corporation relative to terminal television
apparatus and television cable connections.

This is an agreement entered into effective,,,
between the School District, hereinafter referred to as the
District and the
Corporation, hereinafter referred to as the Corporation.

The parties hereto mutually agree as follows:

(a) *Educational Institution Reception.* The corporation shall, without charge, install into every public school building, private school building, college and public library within the, receiving terminal apparatus and cable connections sufficient to enable each said building to receive all programs transmitted and distributed over the corporation's CATV system. Such equipment shall be capable of feeding into the schools normal R.F. distribution systems, and the corporation shall install its receiving terminal apparatus in each building in such a location within each building as is designated by the appropriate school, college or library official as being the location of the building's R.F. distribution system's "head end."

The corporation shall notify, in writing, each school building principal, college and library official, of the educational provisions of this franchise and contract whenever a CATV cable is installed within 1000 feet of the land upon which a school building, college or public library is located. Thence, upon written request from the appropriate school, college or library official, the corporation will install a CATV receiving terminal apparatus and cable connection.

(b) *Educational Preemption.* The corporation shall allocate, without charge, for educational use, at least 20 percent of the available video-audio channels. The channels shall be primarily for the transmission of locally originated educational programming. Any school district lying wholly or partially within the may preempt the use of these channels for such periods of time as is required by such school district, provided such school district files with the corporation ten days in advance thereof a written notice of preemption. The word district when used in this section shall be construed to include

The corporation shall make available for school use a video tape recorder which shall be compatible with the Ampex one-inch format. The District

may provide the corporation with pre-recorded video tape programs in the Ampex one-inch format which the corporation shall then transmit, without charge, at the requested times and dates. The corporation shall accommodate preemption requests in the order received based on the date of post-mark until a coordination and utilization committee of the District assumes this function. Furthermore, in recognition of the fact that the educational provisos contained in this franchise establish a national precedent and significantly exceed all such other known provisos, the District, which shall elect to avail itself of the benefits which ensue from this franchise, thereby, in principle and in policy does agree to collaborate with the corporation to the greatest extent possible consistent with law, ethics and accepted principles of educational administration. Collaboration shall be for the purposes of sharing with the corporation video tapes owned, produced or acquired by the District and enabling the corporation access to school functions for the purpose of video taping or live cablecasting. For practical purposes of District management the corporation will negotiate with the District for a mutually acceptable working relationship.

ITFS TIE IN

(c) *ITFS Tie In.* If the District shall construct an Instructional Television Fixed Service System (2500 MHz system) intended to service schools lying wholly or partly within the _____, the corporation shall provide during the first five years of its franchise for the reception and transmission of one ITFS channel, during the second five years shall provide a second channel, and during the third five years shall provide a third channel. The ITFS channels shall be received and down converted by the corporation and transmitted on mid band channels. Mid band channels are defined as channels between Channel 6 and Channel 7 which are between 88MHz and 174MHz. ITFS programs relayed on mid band channels will be up or down converted to standard VHF and/or UHF channels at each school building. ITFS programing relayed on mid band channels will be up or down converted only in schools or public libraries unless prior authorization is granted. The corporation shall provide ITFS antennas and down converters upon each of its towers in the event that more than one CATV tower shall be constructed in the _____

(d) *EDUCATIONAL FACILITIES*

After the corporation has held this franchise for a period of ten (10) years, it shall, without charge, provide to the District lying wholly or partly in the _____, upon request by the District, a CATV channel which will interconnect:

(1) The school district media center with the building level media centers of the same district.

(2) The district media centers of each school district lying within the

(3) The Educational channel of the CATV system in the city with the Educational channel of CATV systems operating in adjacent towns.

(e) *EXPERIMENTAL SERVICES TO LONG TERM INCAPACITATED STUDENTS VIA EDUCATIONAL VIDEO INSTRUCTION.*

Immediately upon the granting of the franchise the corporation shall undertake to devise and put into effect an experimental program with the District in the city of so as to permit and enable elementary school students who are bedridden or confined to their homes because of a long term incapacitating accident, injury or illness, to receive home instruction via video or "live" programs from the classroom to the student. This program, if successful, shall be made available to all of the school buildings and school students within the city of with all deliberate speed, consistent with the orderly progress and construction of the grantee's cable system. The corporation's obligation hereunder shall be limited to providing a cable connection and the use of its system to provide the hookup between the classroom and the incapacitated student's home and shall not include or require the corporation to provide the necessary "hardware." The use of the channel space shall be given to the District free of charge.

(f) *RELATIONSHIP BETWEEN THE EDUCATIONAL BENEFITS AND THE GROWTH OF THE CATV SYSTEM.*

It is the express intent and purpose of the corporation to proceed immediately with the building of the CATV system and while all installation and service contemplated hereunder shall be made by the grantee in accordance with the orderly progress and construction of its cable system, it is the express intent and desire of the corporation to proceed with all deliberate speed to accomplish the objectives set forth herein as soon as possible.



Appendix G

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