APPLICATIONS OF DATA ON CABLE SYSTEMS

Leo J. Shane

GENERAL INSTRUMENT-JERROLD DIVISION

ABSTRACT

The use of coaxial cable for business and municipal communications is increasing at an extremely rapid rate. It has been estimated that by 1985, three-fourths of all businesses will use non-telco services for at least part of their communication needs.(1) Many will turn to CATV technology to provide this service. Municipalities also view cable as a means to provide reliable, cost effective communications for civic needs.

Applications using cable for business and municipal communications are in operation but little documentation exists on what has been done and the reasons for its implementation. This paper will review three actual applications where CATV technology is used in the applications of: 1) Videoconferencing earth station links; 2) Municipal medical information network; and 3) Business communications.

INTRODUCTION

During 1984 an estimated $2.2B will be spent by businesses and municipalities to communicate voice and digital information in the metropolitan area. Local telephone companies will accrue 98% of these revenues while less than two percent will go to operators of private microwave systems, earth stations, Digital Termination Service, and cable networks. It is projected that by 1988, expenditures for local business communication will reach $5.9B per year with approximately 85% of this revenue being spent on telco services. The four other competitors will split the balance of the revenue cable technology accounting for three percent or $177M per year.(2),(3)

There is an endless variety of applications for which CATV technology can be used. Generally, these applications are lumped into data, voice and video. Some examples are:

Data: Business transfer of Accounts Receivable, Accounts Payable, Inventories, New Orders and Scheduling. Credit card validation at retail stores. Bank account balance status. Data base access.

Voice: PBX voice communication and voice trunking.

Video: Business videoconferencing, live video educational programming, taped presentations and seminars.

Municipalities have needs similar to those of the business community. Data transfer, voice communication and video programming to benefit education and government are needs which are taken into account when franchises are granted or refranchising occurs.

VIDEO CONFERENCING

In Fairfax County, VA, there are almost 2,000 businesses employing approximately 90,000 people. Media General Corporation operates the cable franchise which covers approximately 400 square miles west and south of Washington, D.C. To service the communication needs of the area, Media General has instituted a service called Medianet.(4)

Medianet is a cable network separate from the entertainment cable network dedicated to service the needs of business, public offices, educational institutions, and health care facilities. Medianet has readily available bandwidth, features competitive pricing and offers the inherent advantages of using cable for high speed digital transmission. After evaluating the alternatives of telco and microwave, SBS (Satellite Business Systems) decided that Medianet was the most economical choice to link its earth station to the video-conferencing facility at its McLean, VA headquarters. The initial customer

utilizing this videoconferencing service was Aetna Life & Casualty Insurance Company of Hartford, Conn.

Video Conferencing System Figures 1A and 1B show the video conferencing system established by SBS and Media General Corporation for Aetna Life and Casualty Insurance Company. A video conferencing room has been built on the 9th floor of the SBS/RealCom Building in Mclean, VA.

This room can be used by Aetna executives and others in the Washington, D.C. area for conferences. In the room, video and audio signals from cameras and microphones are converted in a device called Codec (Coder Decoder) to a digital bit stream at 1.544 MBPS.

The earth station which will transmit data to the satellite transponder is located three miles away. Medianet was employed to make this link using T-1 (1.544 MBPS) broadband modems. Modems used include field trial units of Jerrold Metronet 1600 modems. All data is modulated (demodulated) to RF by the modem located in the conference room and demodulated (modulated) by the modem at the earth station. From there, the video conferencing data stream is transmitted to the satellite 23,000 miles above the earth and retransmitted to an earth station on the roof of the Aetna headquarters building in Hartford, Conn. A direct link to the Codec in the teleconferencing room is made and the digital information is reconverted to analog for audio and visual communication.(5) The entire voyage of the data is 46,000 miles and takes less than 1/4 second to complete.

Video Conferencing Benefits The video conferencing link solved a problem for Aetna in that it now can accomplish timely, cost effective business conferences between executives in two cities. The "right people" can now attend meetings and much less "wear and tear" is experienced by executives shuttling between cities.

Recent advances in satellite and communication technology have made videoconferencing an affordable and reliability means of conducting meetings. However, all this technology is of little use unless it can be distributed to the specific building where the videoconferencing room is built. Of the three alternatives available to provide this local link, 1) Dedicated telephone lines for T-1 service would not be available for 11-12 months; 2) Microwave transmission was too costly since direct line of sight could not be gained; and 3) Only Medianet was available, at competitive prices and used proven technology.

MUNICIPAL NETWORK

The cable system in Kansas City, MO and its suburbs is operated by American Cablevision a Division of ATC. The franchise area includes Jackson, Clay, and Platte counties in Missouri and parts of Johnson County in Kansas. As part of its franchise committment, American Cablevision of Kansas City (ACKC) built a 72 mile institutional network throughout the franchise costing $700,000. The Distribution System is a 330 MHz network and features Jerrold SJ Amplifiers and Passives. Four channels upstream and four channels downstream are dedicated for municipal use. The balance of the network is available for commercial applications.

The Institutional Network provides municipal communication services to four groups; hospitals, libraries, educational institutions and police. Each was allotted one TV channel on the network. When fully completed, the municipal network will service over 50 institutions including:

15 - Hospitals/Medical Centers

13 - Colleges

12 - Libraries

11 - Police Facilities

Medical Network The Kansas City Area Hospital Association (KCAHA) has 44 member organizations in the Kansas City area on both sides of the Missouri/Kansas border. The KCAHA is responsible for managing the programming of the medical channel. The KCAHA uses this channel to reduce the cost of education to member hospitals and increase the amount of health care related programming in the area.

Figure 2 shows the 14 health care facilities (3 medical centers and 11 hospitals) currently interconnected on the "1" Net. The three hub sites, linked by microwave, are also shown.

The medical network at Kansas City provides a variety of services related to health care for hospital staffs (medical and administrative) and patients.(6) These services include:

1.) National satellite video teleconferencing of health related topics.
2.) Teleconferences among the 14 health care facilities.
3.) Broadcast of prerecorded programs on health care issues.
4.) Distribution of cable health network to hospital patients and their families.

Medical Network Benefits The medical network at Kansas City has given the community health care facilities a medium over which to share information for education and training purposes. It also provides a means to demonstrate medical techniques on a consistent and more frequent basis. This medium was not previously available and the cost would have been prohibitive without a system shared by other municipal and business institutions. The availability of this network has resulted in a noticeable increase in staff participation in education. This is attributed to its convenience, broad range of programming and quality.

In the future, the medical network at Kansas City has planned to have expanded services such as data transmission, electronic mail service, credit and non-credit courses for hospital employees, uplinking of programming from Kansas City to other regional medical networks and potentially distributing live or taped health care programming to the subscriber network in Kansas City.

BUSINESS COMMUNICATION

Many cable operators are reacting positively to the need for cost effective business communications. Some are building vast institutional networks and promoting their use through active selling and marketing. For those operators outside the largest metropolitan areas, another strategy can be taken to serve the business community without the huge initial capital outlay.

Currently a cable operator in the northeast is following the strategy of first building individual systems for major businesses in its area. Later, these systems will be expanded to serve smaller businesses. As the systems grow, availability to all businesses will be achieved and an integrated institutional network will be developed. The network currently being developed will eventually serve the 9,000 businesses and 200,000 employees in the franchise area.

In one particular system developed by this cable operator, a major customer with 24 buildings is using CATV technology for a business communication system. It includes electronic mail, word processing and access to information located in the company's computer and communication center (inventory, Receivables, schedules, etc.).

Business Communication Network The architecture of the system is shown in Figure 3. The front end processor is located in the computer and communications center. This computer center is

linked to the main headquarters building and a second administrative office building via cable. This link is made using broadband data modems which are predecessors of the Jerrold Metronet 1000. The modems operate at 9600 BPS and yield an RS-232 output.

At both the headquarters building and the administrative office, this RS-232 is split into four (4) separate RS-232 outputs by a device called an MSD (Modem Splitting Device). This device has four IBM #3274 controllers connected to it and 32 individual work station terminals can be connected to each controller. This means that with one 9600 BPS point-to-point connection, 128 terminals can be supported by the processor. With a total of eight such point-to-point communication paths, the system capacity is presently 1,024 user terminals.

Currently three buildings and approximately 700 users are linked to the business communication system. Future plans include a link to all 24 buildings.

Business Communication Benefits The system described is used for electronic mail, data access and word processing. This system has led to higher productivity through more efficient communication. Moreover, the system offers flexibility since any terminal in any building can be used to access information in the network, including an individual's own list of messages.

Originally the business communication system was implemented using telephone lines. The major problem with the telephone system was reliability. The user had experienced 2000-3000 errors per hour on telco lines but has experienced almost no errors with the cable system.

The user also considered cost in choosing CATV technology for its business communication system. Microwave transmission was evaluated along with telco and cable. Of the three alternatives (microwave, telco, cable), it was found that cable provided the least costly system to build and operate.

CONCLUSION

The three applications discussed in this paper are actual installations currently operating in good order. In each application, the cable system plays a key role in providing communication services to each of the users. Also, in each application cable has proven to be the most cost effective, reliable, and available alternative.

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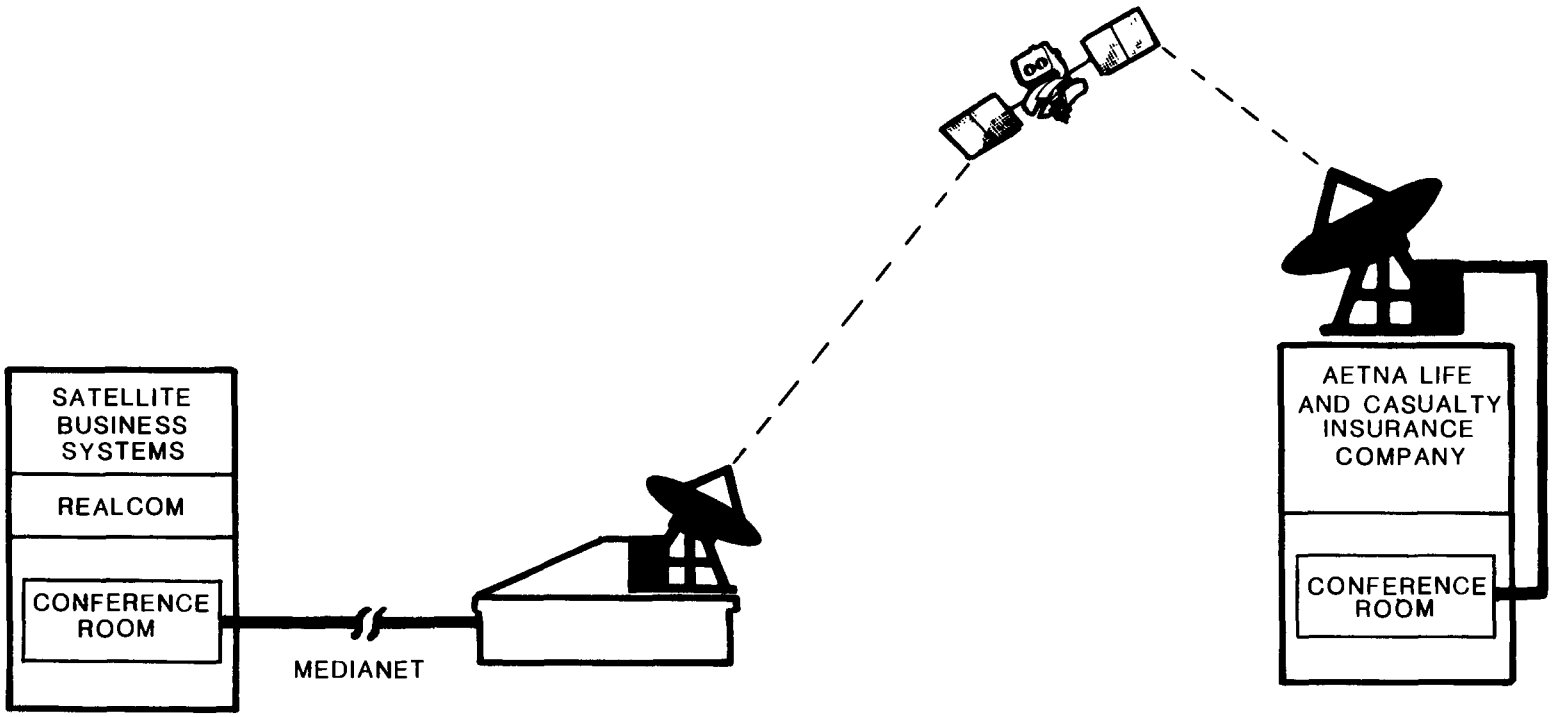

FIGURE 1A - VIDEOCONFERENCING SYSTEM

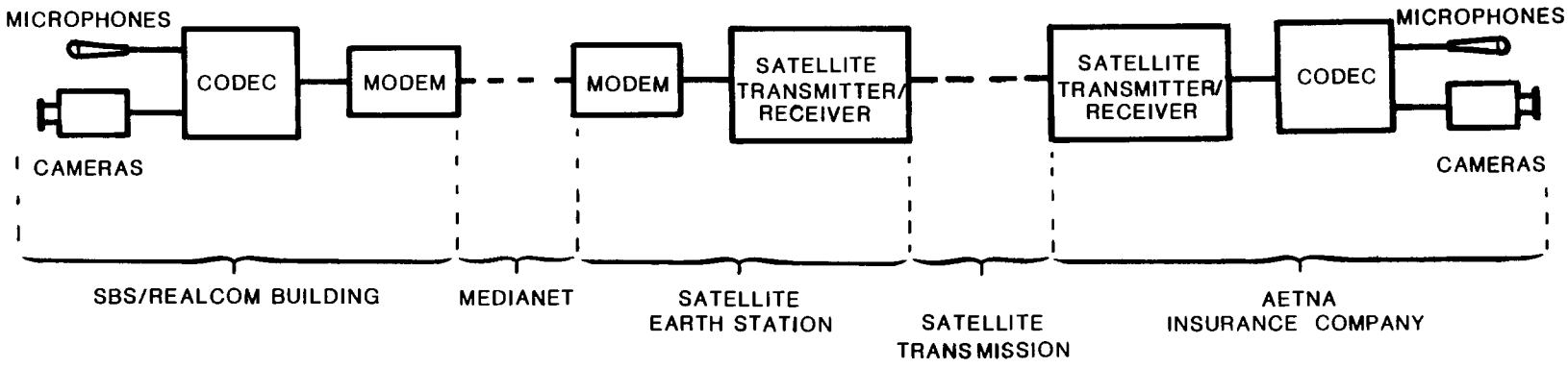

FIGURE 1B – BLOCK DIAGRAM – VIDEOCONFERENCING SYSTEM

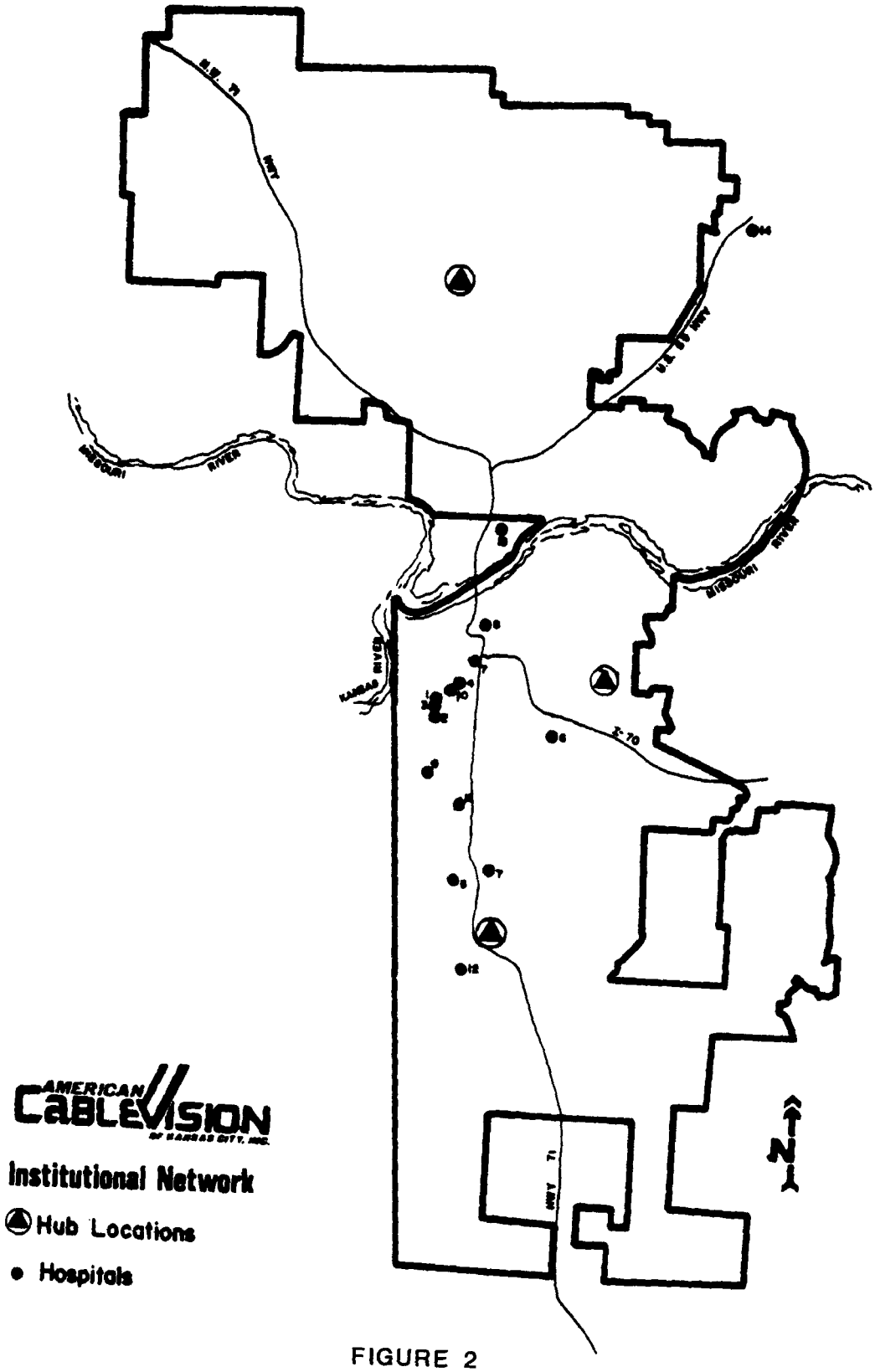
AMERICAN CABLEVISION
Institutional Network
Hub Locations
Hospitals
I-70
MISSOURI RIVER
KANSAS RIVER
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FIGURE 2

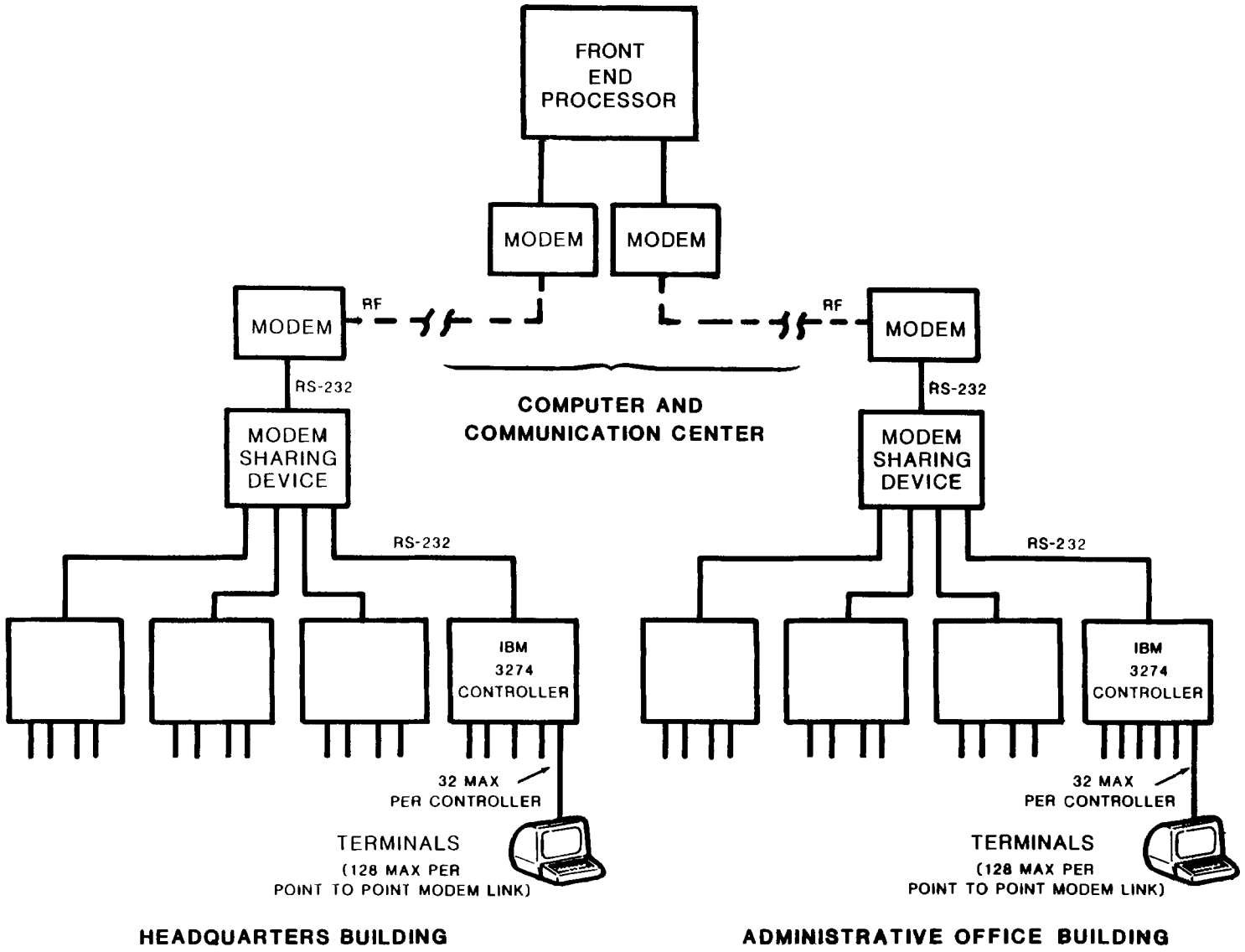

FIGURE 3 - BUSINESS COMMUNICATION NETWORK ARCHITECTURE