DOC PS/WP4-

3. ATV SYSTEM ARCHITECTURE

3.1. Generic ATV System Block Diagram

The North American ATV system (Figure 3.1) can be subdivided in three main modules [Ref.2]: production/studio environment, emission environment including feeder and distribution systems, and consumer equipment including TV receiver, VCR, CDV etc. Each module is interconnected via the following reference points.

* Ultimate Single Worldwide HDTV Production Signal: HDP-W (Reference Point "A")
* North American HDTV Production Signal: HDP-NA (Reference Point "B")
* North American HDTV Emission Signal: HDE-NA (Reference Point "C")
* ATV Feeder Signals (Reference Point "D")
* ATV Distribution Signals (Reference Point "E")
* ATV Receiver Multiports (Ports "E.1", "E.2" ..... "E.n"):

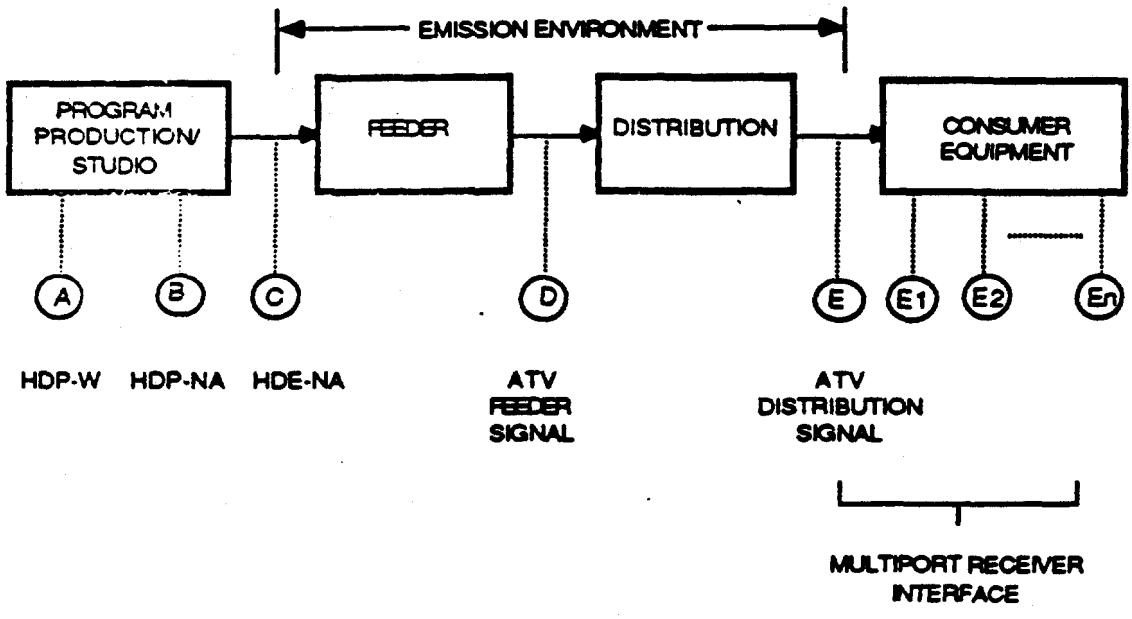
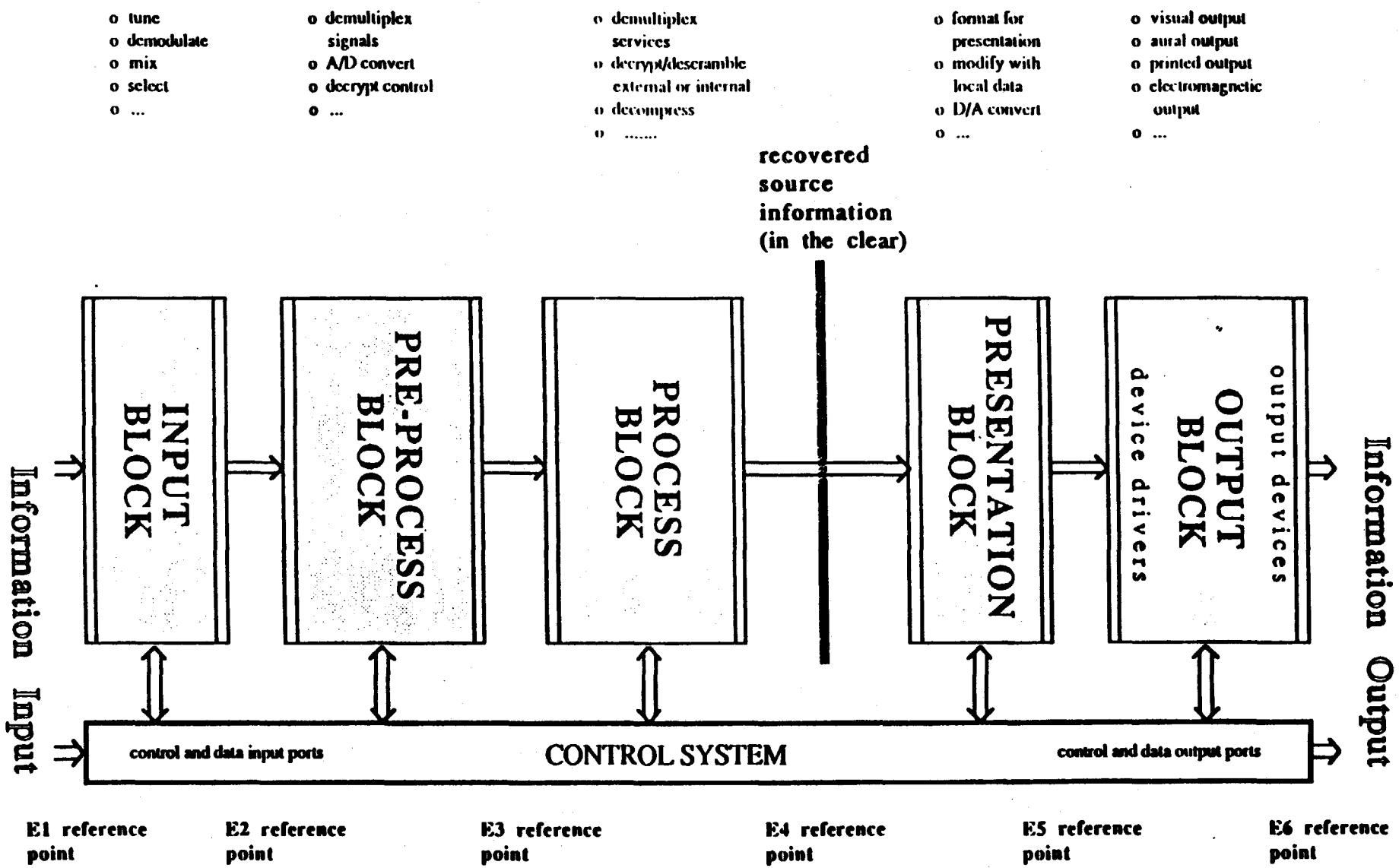


Figure 3.1: Generic ATV System Block Diagram

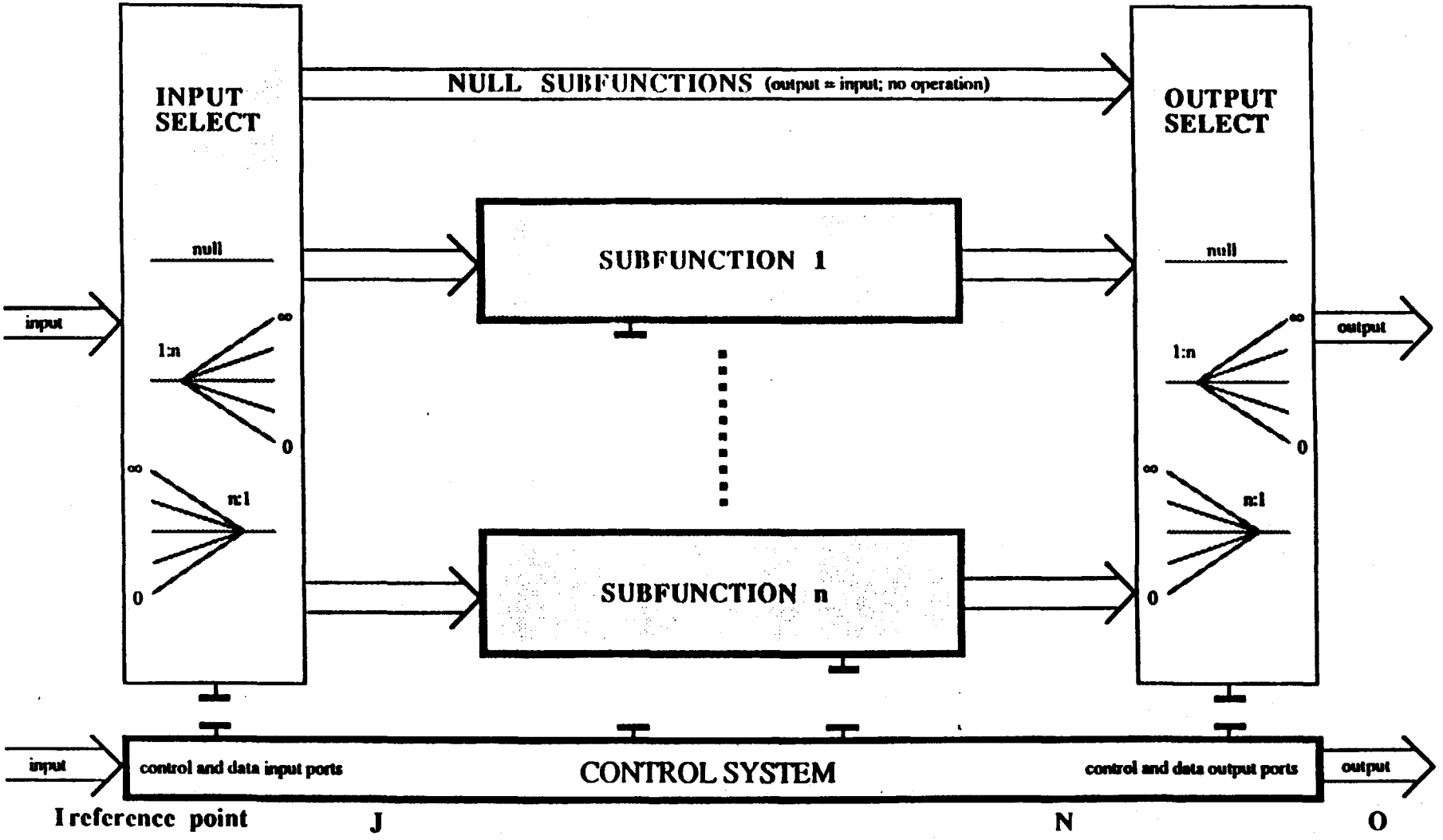


(Note: Physical input and output ports are at reference points E1 and E6 respectively. Information to and from other reference points may be projected to E1 or E6 as required.)

tv_if_ref_pts.10 E. Lubchenko 890510

FIGURE 4.1: GENERIC ADVANCED TELEVISION RECEIVING SYSTEM INTERFACE REFERENCE POINTS

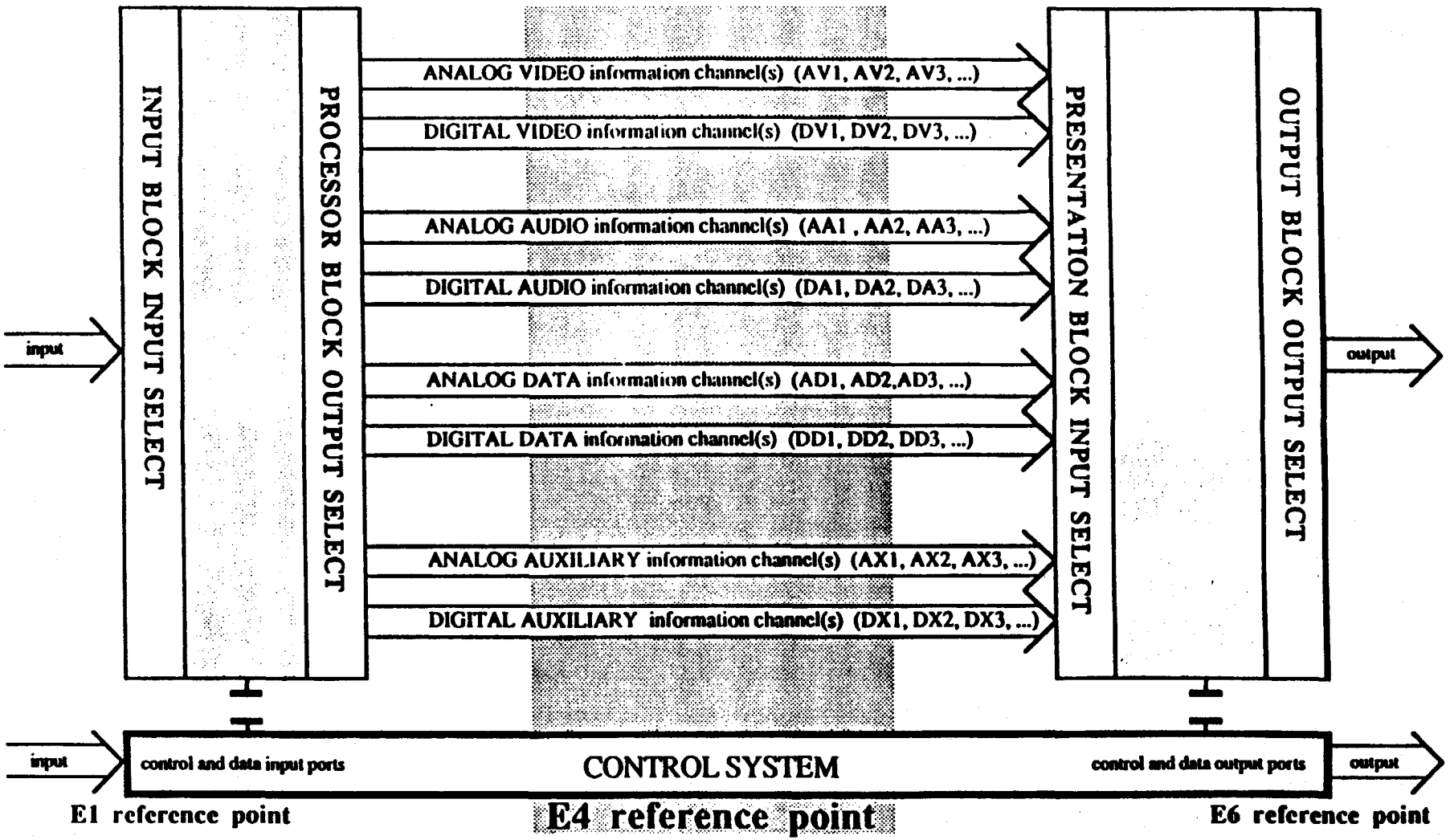
Notes:
1. For feedback functions, use mirror image, i.e. input information on the right, output information on the left.
2. Pass-through information paths (strictly passive) are via null input select, null subfunction, and null output select options.
3. INPUT SELECT allows function input information to be mapped onto subfunction inputs one to one, one to many, or many to one.
4. OUTPUT SELECT allows subfunction outputs to be mapped onto function outputs one to one, one to many, or many to one.
5. Passive terminations, zero or infinity (no load) reference levels may be provided by INPUT SELECT and OUTPUT SELECT operations.



gen_io_model.02 E. Lubchenko 890510

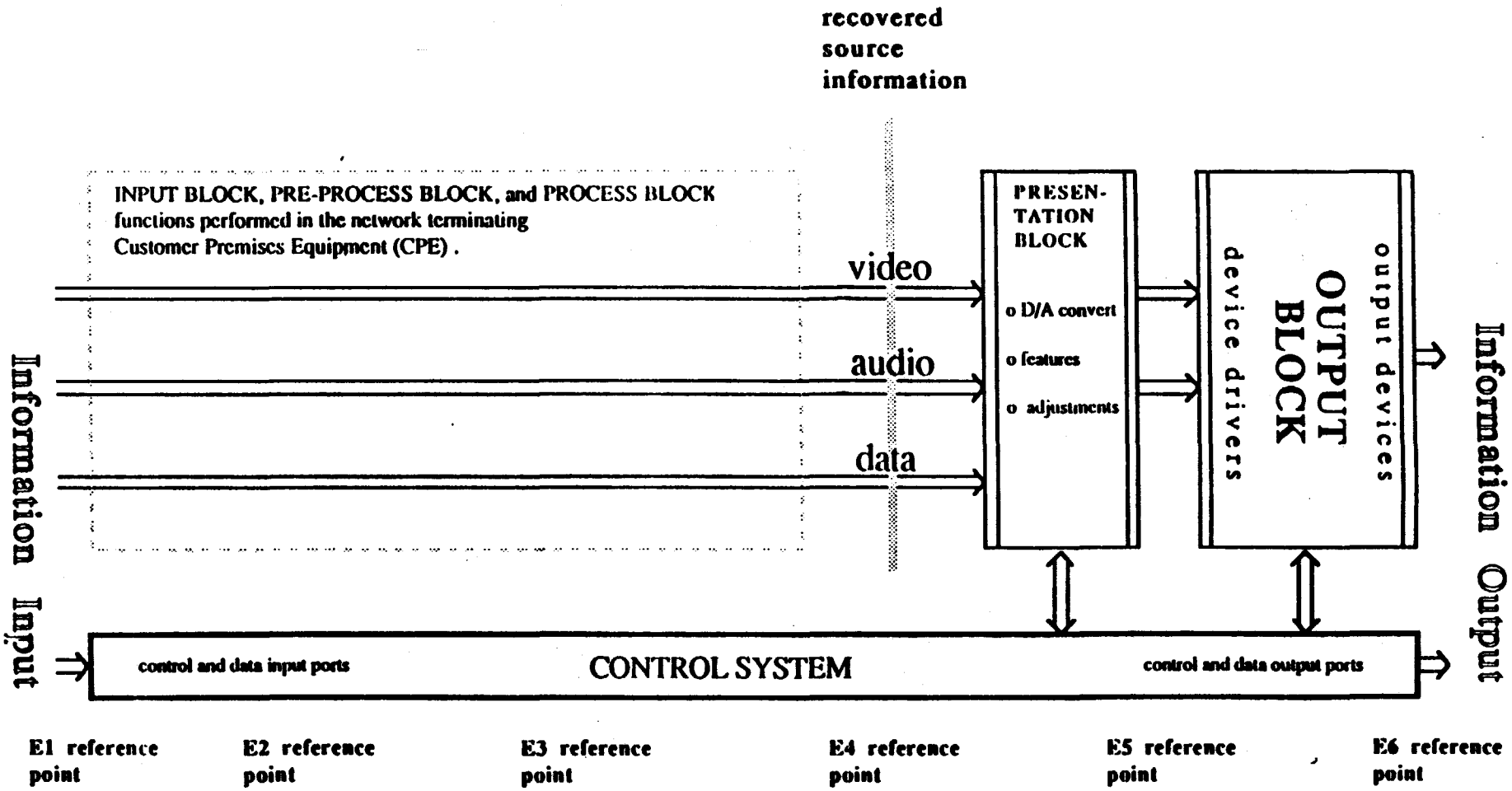
FIGURE 4.2: GENERAL FUNCTION REFERENCE POINTS

Notes:
1. Each set of information channels at reference point E4 below may consist of zero or more defined information channels.
2. Definition of any given information channel does not infer its presence in any system.
3. Internal system interfaces (not available externally) need not comply with reference point E4 definitions.
4. External system interfaces, not adhering to reference point E4 definitions, are outside the scope of this model.
5. Various combinations of information channels may be present in an application depending on the services being provided.



c4_ref_point.00 E. Lubchenko 890510

FIGIRE 4.5: ATV RECEIVER E4 REFERENCE POINT EXPANSION

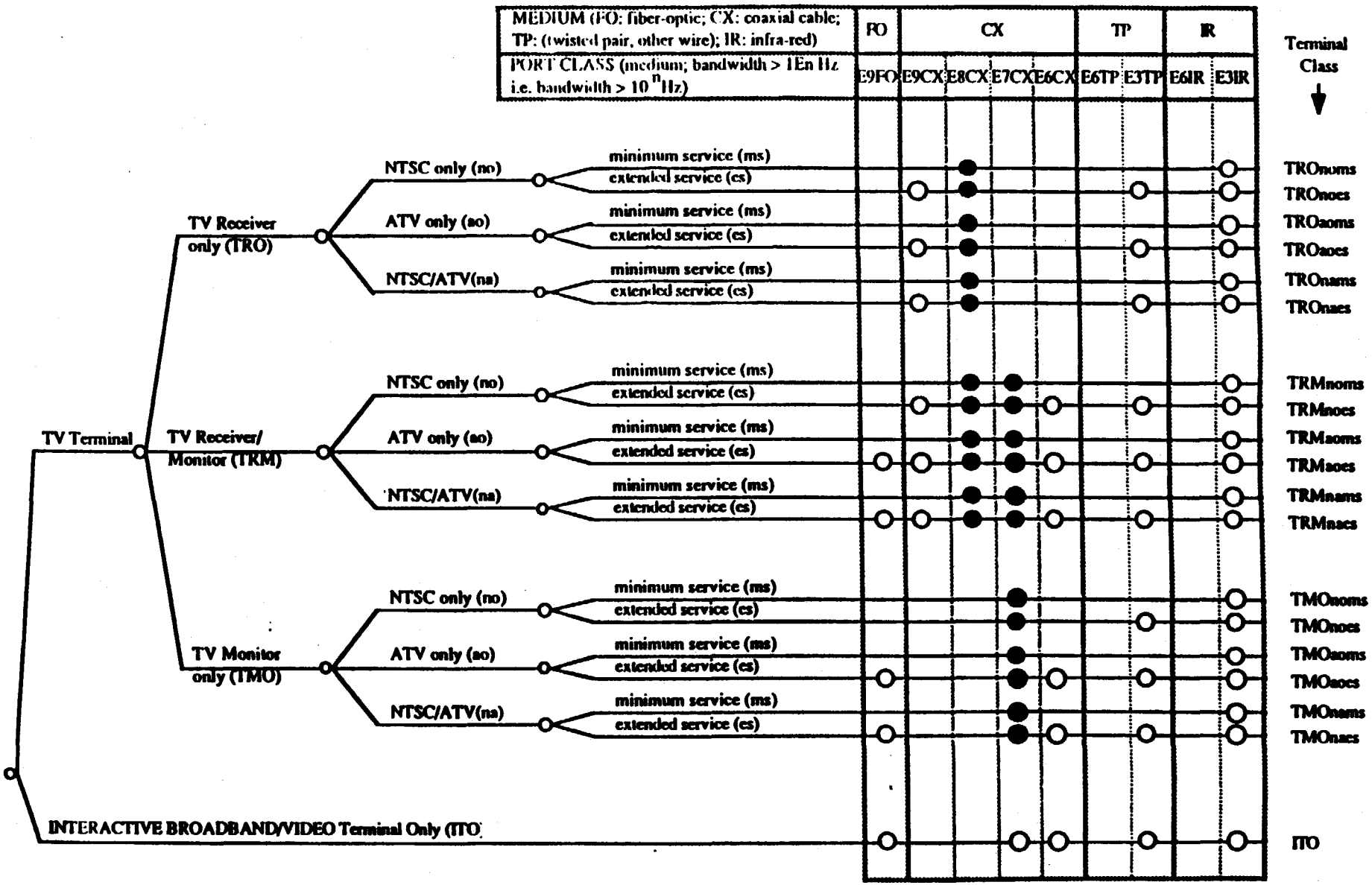


(Note: Physical input and output ports are at reference points E1 and E6 respectively. Information to and from other reference points may be projected to E1 or E6 as required.)

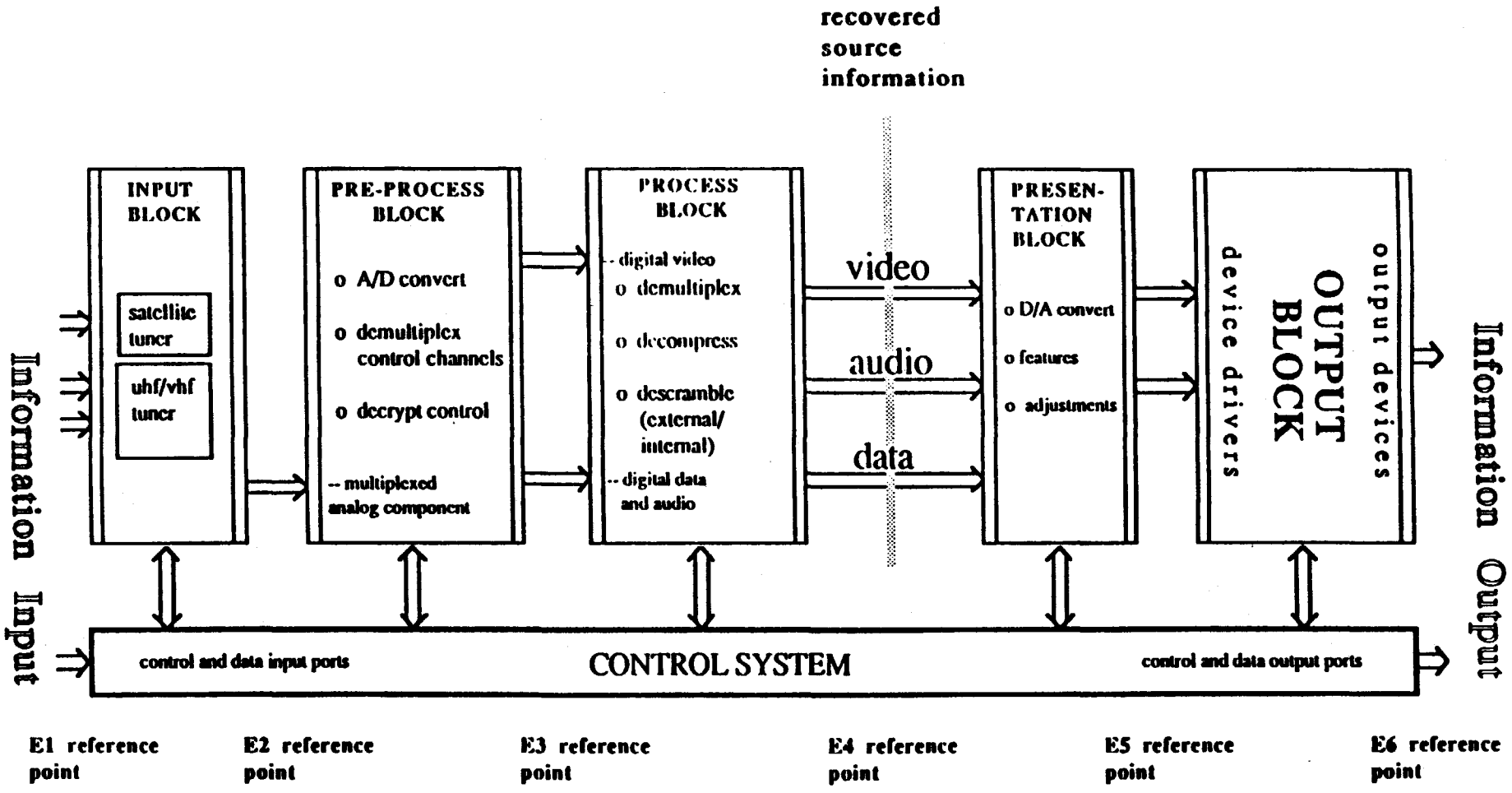
fiber_mon.00 E. Lubchenko 890510

FIGURE 4.4: DIGITAL FIBER DISTRIBUTION SERVICE GENERIC ATV RECEIVING SYSTEM EXAMPLE

FIGURE 4.6: CLASSIFICATION OF NTSC/ATV RECEIVING SYSTEMS AND INTERACTIVE VIDEO TERMINALS



terminal_class.00 E. Lubchenko 890809



(Note: Physical input and output ports are at reference points E1 and E6 respectively. Information to and from other reference points may be projected to E1 or E6 as required.)

sbc_rcvr.00 E. Lubchenko 890510

FIGURE 4.3: BROADCAST, CABLE, SATELLITE GENERIC ATV RECEIVING SYSTEM EXAMPLE

Advanced TV

Advisory Committee on Advanced Television (ATV) Service

Advisory Committee on
Advanced Television Service

Doc. No. PS/WP4-0056
Date 10/4/89

Planning Subcommittee

Working Party 4 -- Alternative Media Technology and Broadcast Interface

==========

Minutes of Meeting, August 23, 1989

1. PS/WP-4, Alternative Media Technology and Broadcast Interface, met on August 23, 1989, at the Viacom Conference Center in New York. The meeting was called to order by the chairman, Ed Horowitz at 10:08 A.M. The agenda was accepted as proposed.

2. The first item was a review and evaluation of past FCC Advisory Committee activities affecting alternative media. V. Conanan reported that PS/WP-4 attempted to get information from various ATV proponents during the marathon meetings held by SS/WP-1 on the week of May 8th, by means of a questionnaire and verbal inquiries. He said the proponents did not provide definite responses; hence, PS/WP-4 was not able to gather sufficient information to evaluate a proposed ATV systems' performance with alternative media. It was suggested that perhaps the proponents had too many things to worry about, concentrated only on terrestrial broadcasting and alternative media was placed lower on their priority lists.

3. B. Lechner said that despite the lack of response by proponents, alternative media and broadcast interface issues are still deemed important, and that in fact, other organizations such as ATTC, Cable Labs, NCTA, EIA, AEA, ATSC, SS/WP-4(standards), and maybe others are studying these issues. He further reported other related events: on May 31, FCC ATS Systems Subcommittee considered seven ATV models; Cable Labs agreed to fund ATTC for ATV testing on cable systems; the EIA under Sid Topol created a committee to study the ATV multiport; and, ATSC has formed T3/S2, chaired by Lechner, to study similar issues.

4. Ed Horowitz recognized the various ongoing work by said organizations. He stated that the working party's past contributions have been proved significant and it is time to reassess PS/WP-4's role. There was agreement that PS/WP-4's original approach had worked well, and should be continued; e.g., the Alternative Media Test Plan, and the ATV Multiport strawman documents provided good "starting points" for others who wished to continue the work, and it is now generally recognized that a form of baseband interface is desirable. PS/WP-4 will continue

planning, coordinating and continue serving as the focal point for all FCC activities.

5. B. Lechner then gave an update on the charter and workplan of ATSC Specialist Group on Interoperability and Consumer Product Interface -- T3/S2, which he chairs. In their meeting, they determined that alternative media are likely to wait for an FCC recommendation for a terrestrial ATV transmission standard. It could be disruptive if alternative media adopts an ATV standard before the FCC does, and this scenario is being discouraged. When the FCC process is complete and if the chosen standard offers significant improvements, then alternative media will likely carry the same. If no improvement is offered, then alternative media may do something else. They intend to study receiver interfacing issues, but will not duplicate work being done by the EIA or other groups. They will concentrate on those than can be done productively, discuss the concerns, document them, and then pass the information to relevant working groups. Other topics to be considered are certain uses of the vertical interval and methods of scrambling that allow economic integrity.

6. Yozo Ono expressed concern that various groups might be doing redundant work, and that PS/WP-4 should avoid going into such situation. A discussion followed on how best to monitor the activities of other organizations. One difficulty encountered in gathering information is due to the private nature of associations like ATSC and the EIA, wherein ongoing discussions are often limited to members; whereas, the FCC Advisory Committee proceedings is a public forum and ongoing discussions are available to the general public, without limitations.

7. B. Dickens suggested that PS/WP-4 should solicit contributions instead of waiting for input from other parties. J. Inis also added that PS/WP-4 should take an active role on how other FCC parties should handle alternative media. P. Resch agreed and said it is reasonable to expect that PS/WP-4 will be asked to develop a position paper later. Along these lines, A. Toth suggested to conduct a one day session for PS/WP-4 to ask all remaining ATV proponents of their alternative media plans. B. Lechner mentioned that Cable Labs has plans to conduct an "mini marathon week," which might be an opportunity to ask questions. The chairman volunteered to call Dick Green to determine Cable Labs'intentions, and then plan action items.

8. An update on EIA multiport committee activities was given by A. Toth. He described an output document "ATV System Architecture" PS/WP4-0055, (attached) which includes a generic ATV reference point, E4. Referring to the document, E4 is the lowest level interface while E1 is the highest level. The model is a result of phase I of their activities, which manufacturers can use to match practical applications. Phase 2 report will be issued next year, with some specific design examples.

9. The chairman thanked Mr. Toth for his update and asked him to keep PS/WP-4 abreast of the ATV multiport subcommittee developments.

10. The definition of "ATV Receiver," and "ATV Receiver Interface" was discussed.

A. Toth noted that the EIA continues to study such definitions as part of their ongoing work, which will include conditional access, and the impact of digital video transmission such as Broadband-Integrated Services Digital Network. B. Dickens suggested to use a different terminology for the so-called "ATV Receiver" to accurately reflect a "consumer equipment." Special attention should be given to minimum features to be included in the receiver, and to make sure that PS/WP-4 flags those that affect alternative media. J. Kraus mentioned that the FCC Implementation Subcommittee, Policy and Regulation specialist Group is looking at the "All Channel Rule," and in particular whether or not manufacturers can sell NTSC-only or ATV-only TV sets; and if so, based on which timetable? Another question: should ATV be sold only as displays, without tuners?

11. The impact of ATV Implementation in Multi-Media Environment was briefly discussed, yielding no specific recommendation from PS/WP-4. The chairman believes this issue will be discussed in more than one forum, which the working party should know about and subsequently discuss.

12. No new business was introduced. The chairman will soon announce the next meeting location, date and time. The meeting adjourned at about 1:OO p.m.

* * * * * * * * * * * * * * *

PS/WP-4 Attendance Sign-up Sheet

PS/WP4-0057

Aug. 23, 1989

name	Company	Telephone	Fax.
Leonard Golding	Hughes Net. Sys.	(301) 428-7066	(301) 428-1635
Seymour Yusem	Hughes TV Network 260 Madison Ave NY NY 10016	212-684-7900 [redacted]	
John Berry	Group W Satellite Comm. (Westinghouse B'Castings)	203-965-6339	203-965-631
BERNARD L. DICKENS	CBS	(212) 975-2003	(212) 975-17
Scott A. Esty	CORNING	607-974-4588	607-974-75
YOZO ONO	NHK/NY	212-489-9550	212-974-3
JEFF SKINNER	HOECHST CELANESE	201-522-7944	201-522-391
Krzysztof G. Toth	Philips Labs.	914-945-6418	
GARY HARTWICK	BELLCORE	201+758-4155	201+758-0
JULES A. BELLISIO	BELLCORE	201-758-2959	-0
Chris Bowick	Scientific Atlanta	404 925-5100	-5
Paul Resch	The Disney Channel	818-569-7948	

NAME	COMPANY	PHONE	FA
JEFF KRAUSS	GENERAL INSTRUMENT CORP	301-258-8164	301-97 6330
RONALD J. GNIDZIEJKO	NBC	212 664-3153	212 581-6
[illegible] H JABLONSKI	NBC	212-664-4440	[illegible] 3650
BERNARD J. LECHNER	[illegible]	609-924-7545	609-924-75
James G. Ennis	Fletcher, Heald + Hildreth (on behalf of various clients)	(202) 828-5700	(202) 828 5786
Eb Tingley	EIA/CEG Consultant	(202) 457-4975	(202) 835-89
Ed [illegible]	Viacom Int.	(212) 713 7549	(212) 713 70
VIRGIL CONANAN	HBO	212-512-5309	212-512-559
GIL DOBBIN	DOC/CRC/CABSC	613-998-2045	613-990-79
Sang Lee	Bellcore	201-829-4464	
Keiichi KUBOTA	NHK	81-3-465-1111	81-3-468-54

ZENITH

ZENITH ELECTRONICS CORPORATION ☐ 1000 MILWAUKEE AVENUE ☐ GLENVIEW, ILLINOIS 60025-2493

WAYNE C. LUPLOW
EXECUTIVE DIRECTOR
ELECTRONIC SYSTEMS R&D
AND ENGINEERING SERVICES
(312) 391-7873
TELEX: 25-4366

May 12, 1989

Virgil Comm

PS/WP4-0058

Mr. Edward Horowitz
Senior Vice President
Viacom International, Inc.
1211 Avenue of the Americas
New York, New York 10036

Dear Ed,

In response to your April 6th request to Birney Dayton, Chairman of SS/WP-1, Zenith presented (with a hand-out) responses to the questions submitted by PS/WP-4 at the second so-called "Marathon Week" on May 10th. We assume that PS/WP-4 had appropriate representation at that meeting.

For your information, enclosed is a copy of the hand-out provided which pertains to our responses to the questions contained in your April 6th correspondence. Numbering is consistent with that of the questions.

If deemed desirable or necessary, Zenith people could meet with your committee, either during a committee meeting or at Zenith, to clarify or answer any additional concerns.

Sincerely,

Wayne Luplow

WCL/e

Enclosure

cc: V. Brugliera
B. Dayton
C. Eilers

RECEIVED

MAY 16 1989

E. HOROWITZ

ALTERNATIVE MEDIA TEST PLAN

SC-HDTV Completely Compatible with all other Media

Alternative Media Test Plan is Acceptable

Zenith
5/10/89

INTERFACE WITH OTHER TRANSMISSION STANDARDS

- In U.S., only other Transmission Standard is NTSC.
- Downconversion from SC-HDTV to NTSC is Straightforward.

Zenith
5/10/89

CONSUMER FRIENDLY

- o Component Approach Provides Easy Interference Between
  - SC-HDTV Receiver
  - SC-HDTV VCR
  - Addressable Converter
  - Decrypter
- o Multiport or Open Architecture Receiver
  - Premature to Consider
  - Market Place Will Determine

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5/10/89

CASCADED DEFECTS

- Always possible, depending on equipment design
- Proper allocation of tolerances (e.g. filter functions) will satisfy overall considerations

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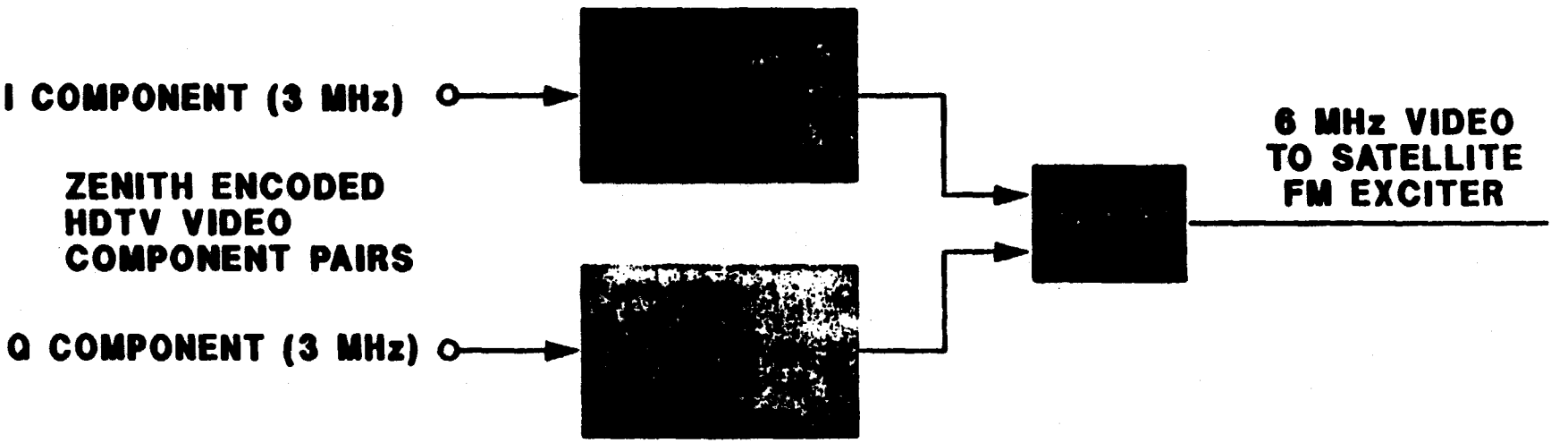
5/10/89

CONVERSION BETWEEN MEDIA (2)

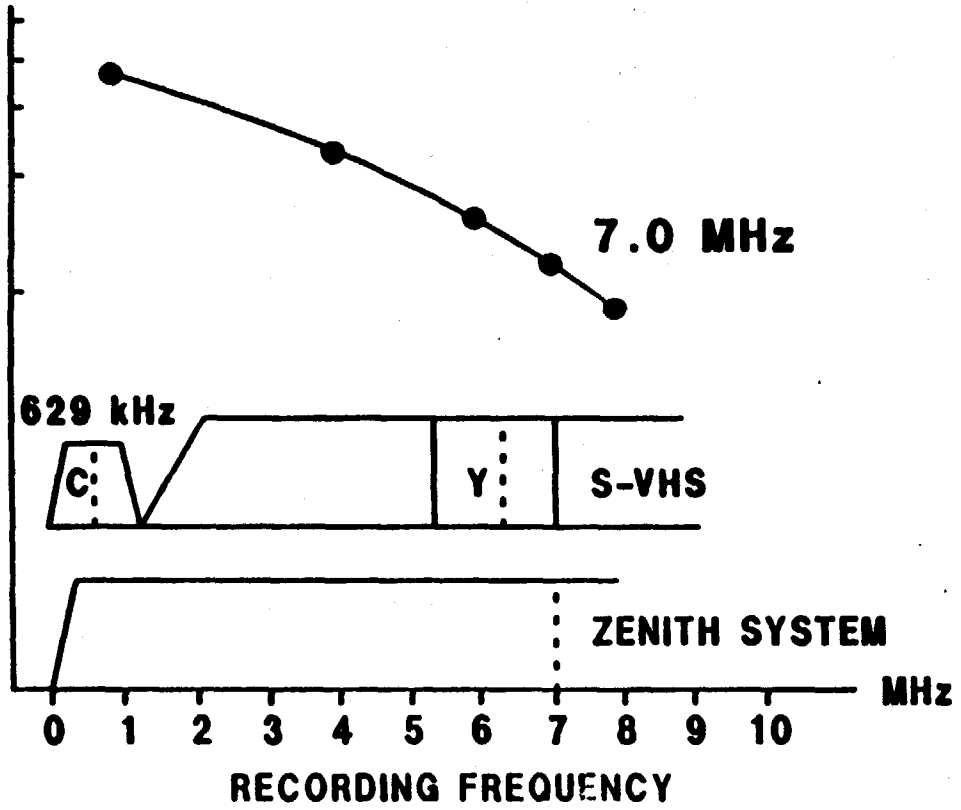
- **No Change in Level of Security**
- **For Local Access Control, the digital stream is deciphered and re-enciphered as desired before modulating for the new medium.**

Zenith
5/10/89

COMPONENT PAIR TO FM FORMAT CONVERSION



COMPARISON OF RECORDING ZENITH SYSTEM AND S-VHS



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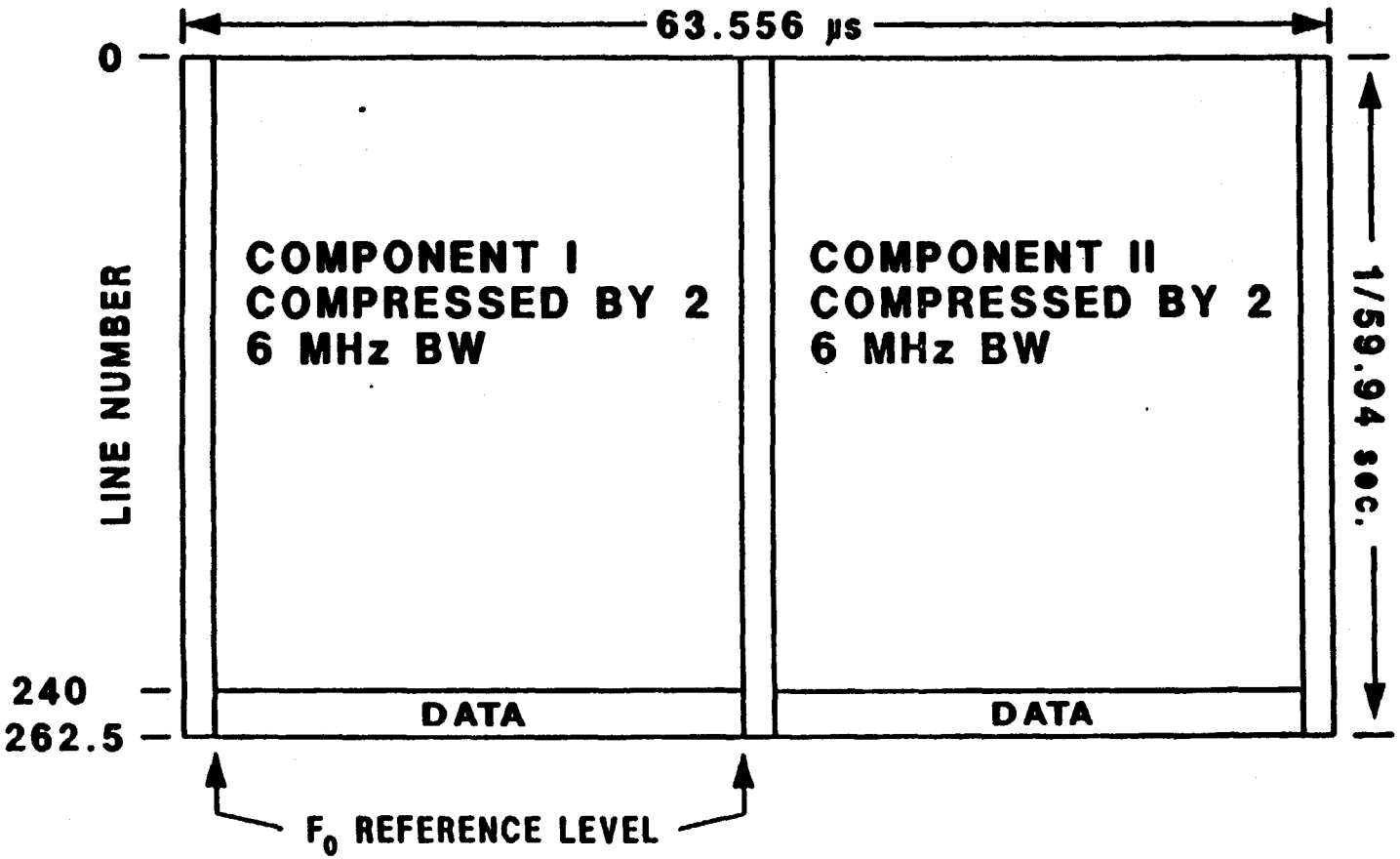
5/10/89

FM FORMAT OF HDTV SIGNAL



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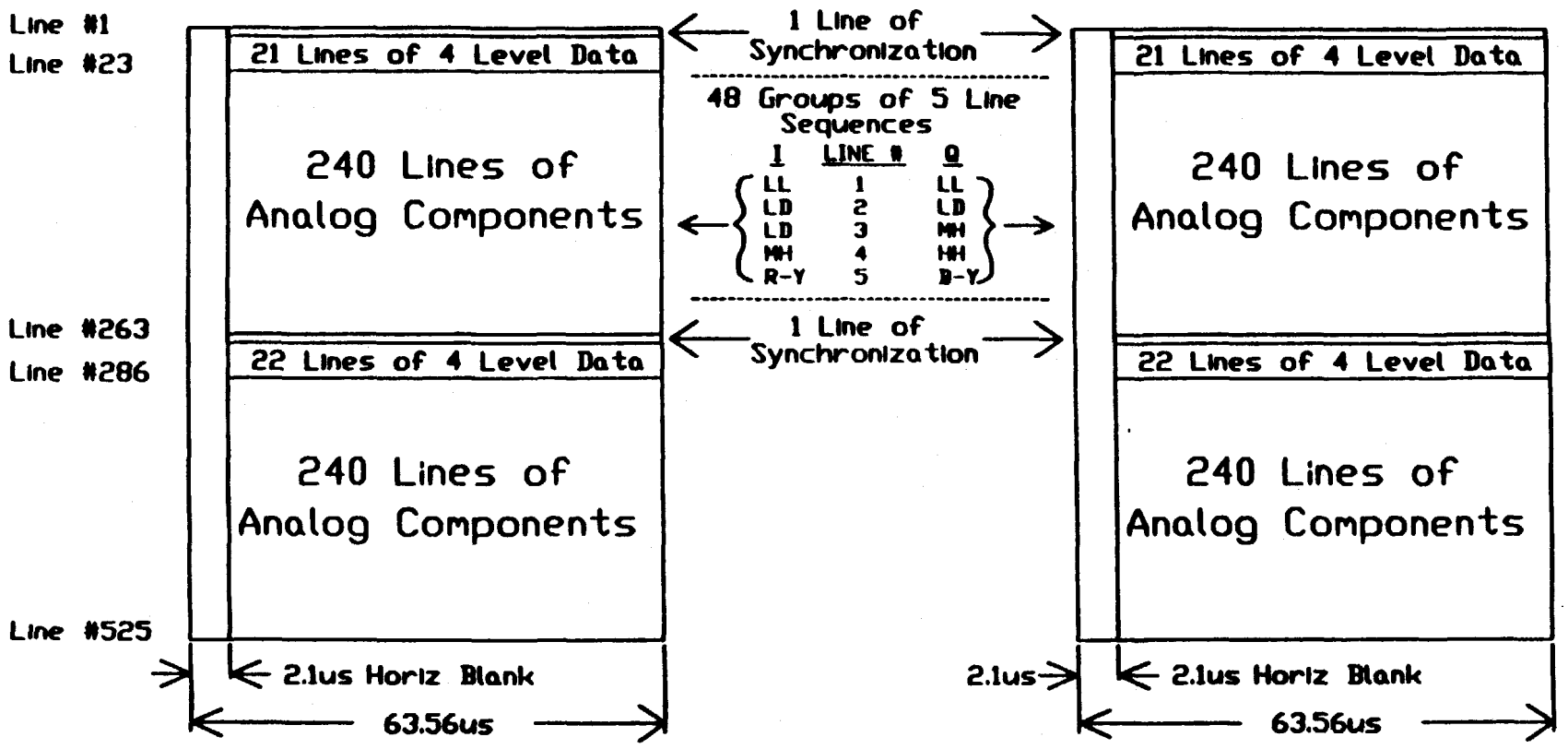

Modulation on In-Phase and Quadrature Channels

MULTIMEDIA USE

FOR ECONOMIC VIABILITY OF HDTV, MUST BE ABLE TO DELIVER OPTIMAL PERFORMANCE IN ALL FOUR MEDIA:

- **Terrestrial Broadcast**
- **Cable and Fiber**
- **Satellite**
- **Home VCR**

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5/10/89

OPTIMAL TRANSMISSION MEDIA

Terrestrial Broadcasting: VHF; UHF

Cable Transmission: AM; FM

Satellite Transmission: C-Band; Ku-Band; DBS

Terrestrial Microwave: AML; FML

Pre-recorded Media, Directly Displayable to Consumer Device: Tape; Disc

Zenith
5/10/89

EXECUTIVE SUMMARY

ZENITH'S
SPECTRUM COMPATIBLE HIGH DEFINITION TELEVISION SYSTEM

BACKGROUND

High definition television has generally been described as a new consumer-oriented television service having the properties of (1) improved picture definition, normally double in both horizontal and vertical resolution to that achievable by the existing NTSC system, and (2) improved audio, usually defined as compact disc (CD) quality. It is generally agreed that (3) improved noise performance is also required, and some believe that (4) wider aspect ratios are necessary. Although (5) larger screen sizes would probably best exhibit the improved resolution pictures, the marketplace will be the deciding factor.

The "ideal" HDTV signal would undoubtedly provide, as a minimum, properties (1) and (2) in conjunction with the existing NTSC signal, constrained to the current spectrum bandwidth of 6 MHz, such that viewers with a new, more expensive HDTV television receiver could receive HDTV video and sound while all 160 million existing NTSC receivers would receive their accustomed NTSC performance without any perceptible impairments. Such HDTV service is often called "compatible," "NTSC-compatible," or "receiver-compatible," analogous to the terminology used when compatible (with monochrome reception) color telecasts and receivers were first introduced in the late 1950's.

Such "compatible" HDTV systems have been proposed, but none are known to simultaneously satisfy the key criteria: double resolution; no impairments to NTSC reception within present NTSC service areas; utilization of only 6 MHz of bandwidth; and robustness to be transmitted and received through the 6 MHz terrestrial air-ways without deterioration resulting from noise, multipath (ghosts, airplane-flutter) and interfering spectrum emissions.