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Date: October 6, 1997

From: Neal L. McNeil
Office of Engineering and Technology

To: Office of the Secretary

Subject: ET Docket No. 97-206, FCC 97-340; Technical Requirements to Enable
Blocking of Video Programming based on Program Ratings

Please place the attached documents in ET Docket No. 97-206.

ET 97-204

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Pages 7-32 and 41-124
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SUBJECT: Standards Proposal No. 3688, Proposed Revision of EIA-608 "Recommended Practice for Line 21 Data Service" (if approved, to be published as EIA-608-A)

BACKGROUND: The attached material was prepared by the EIA R-4.3 Subcommittee on Television Data Systems, and was approved by the chairman of the committee. SP-3688 is herewith submitted to EIA membership and others concerned as a step toward standardization.

NOTE: Please use the following format for comments:

- Company Name - Comment No.
- Type of Comment - Technical or Editorial
- Reference - Page No., Clause No., Line
- Suggested Change - Change From:... To:... Add:, Delete:
- Rationale for Technical Change

COMMENT PERIOD EXPIRES: MAY 28, 1996

Prior to this date, you are urged to submit your comments with the form on page two in accordance with the established EIA Standardization Procedures. Following the expiration of the comment period, this Proposal will be submitted to the EIA Engineering Department Executive Committee (EDEC) for final approval as to acceptance or rejection of this Standards Proposal.

(PLEASE SEE PAGE TWO FOR BALLOT)

Eng # 54105

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Published by

OELECTRONIC INDUSTRIES ASSOCIATION 1996
Engineering Department
2500 Wilson Boulevard
Arlington, VA 22201

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PRICE: \$119.00

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FOR LINE 21 DATA SERVICE
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Revision History

Current revision level - Revision 2

Original release no revisions - 4/15/93

Prior to final release added information to sections 2,6,7. Moved original section 9 to section 4. Added section 9 and annex C. - 4/28/93

Prior to final release corrected content, spelling, punctuation and grammar errors throughout document.

Added Text management to annex A. - 5/31/93

Added complete Glossary. - 8/15/93

Added Content Advisory code and replaced EDS with XDS - 12/21/95

RECOMMENDED PRACTICE

FOR LINE 21 DATA SERVICES

PART ONE - INTRODUCTION

1.1 INTRODUCTION TO PART ONE

This section describes the scope and purpose of this entire document. It includes background information useful to the reader and important definitions of the various services carried on line 21.

1.2 SCOPE

The purpose of this document is to be a technical guide for those who wish to provide encoding equipment and/or decoding equipment to produce material with encoded data embedded in line 21 of the vertical blanking interval of the NTSC video signal. It is also a usage guide for those who will produce material using such equipment.

Where recommendations are made for service providers, they apply to anyone who creates, transmits, or modifies data, i.e., someone other than an equipment manufacturer. For example, a "caption service provider" could be the agency which creates the captions for a program, the network which carries the captions on line 21, or the local affiliate which uses its own data encoder to insert Text Mode or Extended Data Services between the captions.

The document is divided into sections which concentrate on technical issues and those which deal with different aspects of usage.

It is recommended that regardless of the function to be performed, the reader should become familiar at least with all the introductions to sections of this document to avoid unintentionally degrading other services, and then concentrate on the sections which are appropriate to the activity being undertaken.

This document represents the best advice of the Electronic Industries Association, as compiled by its Television Data Systems Subcommittee, made up of representatives from the television receiver manufacturing and captioning industries. While there is no legal requirement to abide by the advice herein, it is strongly recommended that this advice be followed by line 21 data service providers and manufacturers of equipment used to transmit and receive these data services. Failure to follow these practices will result in a degraded and inferior service and a non-uniform, unpredictable display of captions, text, or operation of Extended Data Service features on the consumer's receiver.

1.3 BACKGROUND

The data signal on line 21 consists of independent data on field 1 and field 2. Each data channel may contain specific types of data packets as shown in Table 1.

Field 1 Packets	Field 2 Packets
CC1 (Primary Synchronous Caption Service)	CC3 (Secondary Synchronous Caption Service)
CC2 (Special Non-synchronous Use Captions)	CC4 (Special Non-synchronous Use Captions)
T1 (First Text service)	T3 (Third Text service)
T2 (Second Text service)	T4 (Fourth Text service)
	XDS (Extended Data Services)

Table 1

The Primary Synchronous Caption Service (CC1) is primary language captioning data that must be in sync with the sound, preferably to a specific frame. The Secondary Synchronous Caption Service (CC3) is an alternate captioning data channel usually used for second language captions.

The Special Non-synchronous channel (CC2, CC4) carries data that is intended to augment information carried in the program and need not be in sync with the sound. Delays of several seconds within the program are to be expected and would not affect the integrity of the data.

Due to bandwidth used by XDS in field 2, Text Services should use channels T1 and/or T2 (field 1) if possible; T3 and T4 should be used only if T1 and T2 are not sufficient.

In the interest of efficient bandwidth utilization, data shall not be duplicated in more than one data channel or field.

Text and XDS have equal priority after captioning. In order to maintain this balance and the integrity of field 2 text data through downstream encoders, Text providers should consider the downstream line 21 environment and restrict Text bandwidth usage as discussed in section 10.7.2.

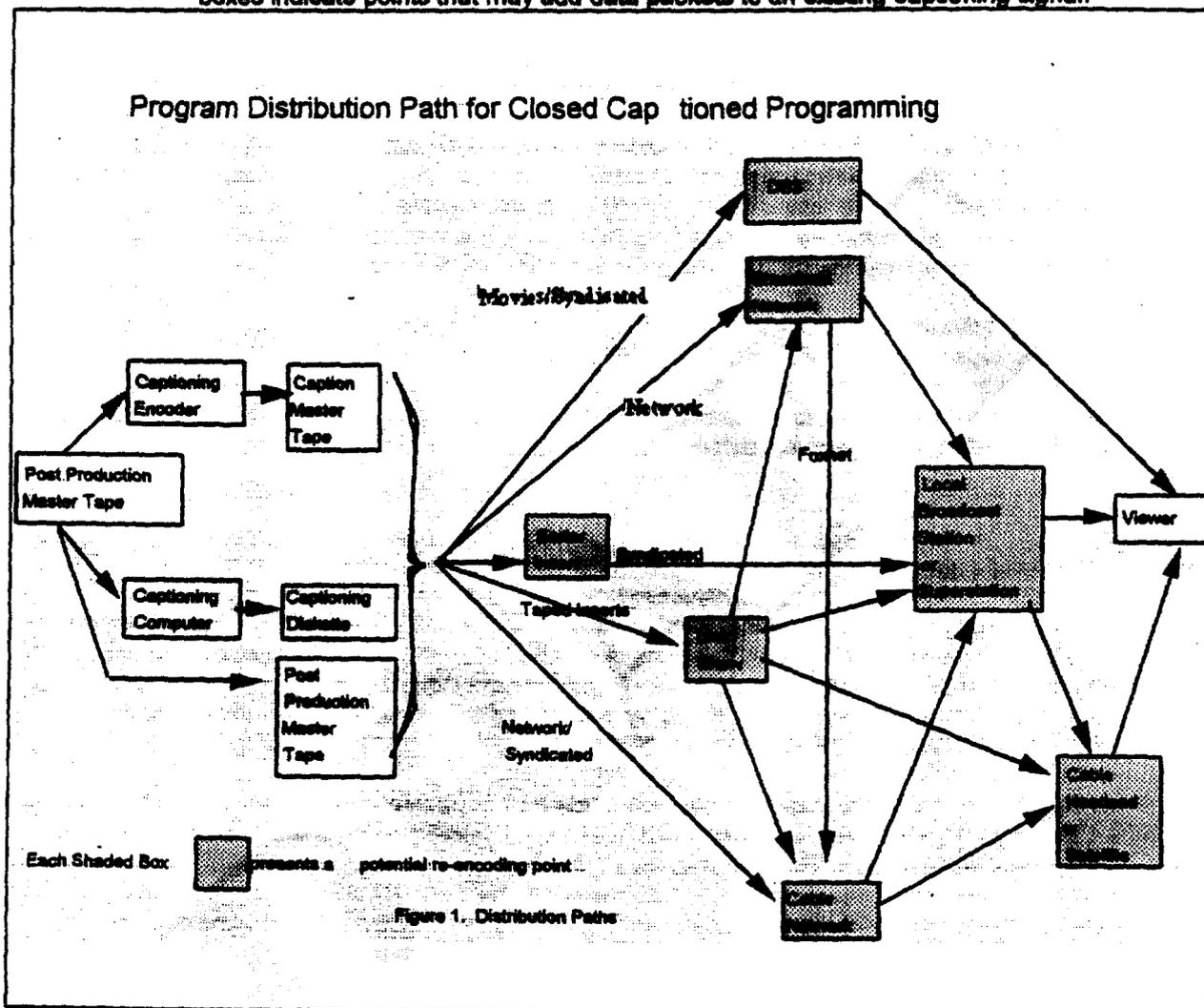
The XDS packets break down into several packet types (Current program information, Future Program Information, etc.) and some packet types of multiple fields (Program Length, Title, Etc.). Part 6 describes the packet definitions in detail.

This mixture of several data types requires a guideline for processing to assure the integrity of the data are maintained through numerous distribution stages and channels.

This document recommends a default mode of operating and does not preclude overriding default settings or the addition of features beyond those mentioned here.

1.3.1. Program Distribution Paths

Figure 1 describes the possible distribution paths for a captioned program. The shaded boxes indicate points that may add data packets to an existing captioning signal.



1.4 CAPTIONS

Captions are program-related data which may be transmitted using either field of line 21. Captions are a visual depiction of the soundtrack of a video program, and as such are timed to correspond to the soundtrack. For this reason, caption data are given absolute priority over other data which may be carried on line 21. Caption data may not be delayed in order to insert other data on line 21, except as may be technically necessary to control the throughput of all data.

Captioning services differ from other line 21 services in four important ways. First, they are the only services which are always program related. Second, captioning is the only data service given regulatory protection. Third, only captions command precise screen placement and display style. Fourth, captions alone are restricted as to size (in terms of the number of rows of text displayed simultaneously) so as not to obscure too great a portion of the video image.

This document describes the specifications for creation, transmission, reception, and display of caption data, plus the relationship of Caption Mode data to other line 21 data. Of greatest importance to caption service providers, it includes a comparison of decoders meeting FCC rules to all decoders designed prior to the drafting of those rules, and a timetable for the implementation of features which are unique to the different generations of decoders.

1.5 TEXT

Text Mode is a data service, generally not program related, which may be transmitted using either field of line 21. Text Mode data are always displayed as soon as they are received and are intended to be displayed in a manner which isolates them from the video program used to transmit the data. Once the display window is filled these data are always scrolled upward through the display window provided by the decoder. The Text Mode service provider has limited control of the timing and screen placement of the display, except to transmit data in discrete rows and to affect the placement of characters within their given row.

Discussions of Text Mode in this document are made by explicit reference or by spelling the word "Text" using an upper-case T. The word "text" with a lower-case t refers to a character or string of characters transmitted for display in any service mode.

This document describes the specifications for creation, transmission, reception, and display of Text Mode data, plus the relationship of that data to other line 21 data.

1.6 EXTENDED DATA SERVICES

Extended Data Services (XDS) mode is a third data service on field 2 intended to supply program related and other information to the viewer.

As an adjunct to program identification, XDS provides the transport mechanism to identify advisories about mature program content, intended to help consumers make appropriate viewing choices.

When fully implemented, the XDS data can be displayed on a decoder-equipped television to inform the viewer of such information as current program title, length of show, type of show, time in show (or time left) and several other pieces of program-related information. This information

may be particularly valuable during commercials so that the channel-grazing viewer can identify XDS encoded programs without the aid of a guide.

During specially prepared promos, the Impulse Capture function can be used to program decoder-equipped VCRs automatically.

Future program and weather alert information may also be displayed.

A competitive advantage may be gained via increased consumer interest in XDS services. Program ID's transmitted during commercials can be used to capture viewers who do not know what program is scheduled for that channel.

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RECOMMENDED PRACTICE

FOR LINE 21 DATA SERVICES

PART SIX - EXTENDED DATA SERVICE PACKETS

6.1 INTRODUCTION TO PART SIX

This section defines and identifies kinds of packets to be used for the Extended Data Services of line 21, field 2.

- 6.1.1 All the services defined by the packets within the context of this section are optional. Many packets can serve as a stand-alone service. While there is no requirement to support any or all of the modes and features described herein, this standard is meant to encourage widespread use of the new services.

The encoder operation for extended data services is described in section 6.6.

- 6.1.2 This specification has been deliberately designed to allow as much free market choice as possible, so each signal supplier can decide the level of implementation he feels best serves his unique market.

- 6.1.3 Information provided by one packet should not be added into any other packets. This avoids sending redundant or conflicting data. (eg., A movie rating should not be included as part of a program name packet.)

6.2 GENERAL USE

- 6.2.1 Each packet can have different refresh or repetition rates. General recommendations and guidelines for packet repetition rates are given in Section 10.7.3 and annex C of this document.

- 6.2.2 While many packets are currently defined with fewer than 32 Informational characters, functions may be added at a future point that could extend the definition and length of each packet. Such extensions will be added after the existing Informational characters (up to a maximum of 32) and can be ignored by products designed prior to definition.

- 6.2.3 A receiver should continue to receive and verify packets that may be longer than initially defined.

- 6.2.4 There is no provision (or need) to "erase" or delete data sent previously. Updated or new information simply replaces or supersedes old information. Changes in certain packets can clear several packets.

- 6.2.5 A packet is first begun by sending a Start/Type character pair. This pair would then be followed by Informational/Informational character pairs until all the informational characters in the packet have been sent, or until the packet is interrupted by captioning, Text or another packet.

6.2.6 To resume sending a previously started packet, the Continue/Type character pair would be sent.

6.2.6.1 When resuming a packet, the Type code used with the Continue code must be identical to the Type code used with the Start code.

6.2.7 To end a packet, the End/Checksum pair is used. There is only one code for end, it is used to end all packets and therefore always pertains to the currently active packet.

6.2.8 If a packet is interrupted before the End/Checksum pair is sent, the packet must be resumed by sending the Continue/Type pair.

6.2.9 While some packets have a variable length, the formatting of the XDS packets requires that there always be an even number of informational characters. If the contents of the information require an odd number of characters, a standard null character (00h) should be added after the last character to achieve an even number.

6.3 EXTENDED DATA PACKET CONTROL CODES

6.3.1 Six classes of packets are defined. Current, Future, Channel Information, Miscellaneous, Public Service and Reserved. In addition, an Undefined Class has been included.

6.3.2 Each packet within the class may exist independently.

6.3.3 The following table lists the use of the assigned control codes:

CONTROL CODE	FUNCTION	CLASS
01 _h 02 _h	Start Continue	Current Current
03 _h 04 _h	Start Continue	Future Future
05 _h 06 _h	Start Continue	Channel Channel
07 _h 08 _h	Start Continue	Miscellaneous Miscellaneous
09 _h 0A _h	Start Continue	Public Service Public Service
0B _h 0C _h	Start Continue	Reserved Reserved
0D _h 0E _h	Start Continue	Undefined Undefined
0F _h	End	ALL

6.4 CLASS DEFINITIONS:

- 6.4.1 The Current class is used to describe a program currently being transmitted.
- 6.4.2 The Future class is used to describe a program to be transmitted later.
- 6.4.3 The Channel Information class is used to describe non-program specific information about the transmitting channel.
- 6.4.4 The Miscellaneous class is used to describe other information.
- 6.4.5 The Public Service class is used to transmit data or messages of a public service nature such as the National Weather Service Warnings and messages.
- 6.4.6 The Reserved Class is reserved for future definition.
- 6.4.7 The Undefined Class is for use in any closed loop system for whatever that system wishes. It will not be defined by this standard now or in the future.
- 6.4.8 For each Class, there will be two groups of similar packet types. Bit 6 is used as an indicator of these two groups. When bit 6 of the Type character is set to 0 the packet will only describe information relating to the channel that carries the signal. This is known as an In-Band packet. When bit 6 of the Type character is set to 1, the packet will only contain information for another channel. This is known as an Out-of-Band packet.

6.5 TYPE DEFINITIONS:

6.5.1 Current Class

01h Program Identification Number

(Scheduled Start Time). This packet contains four characters that define the program start time and date relative to Coordinated Universal Time (U.T.C.). This is Non-ASCII data so bit #6 is always set to one. The format of the characters is as follows:

Character	b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	b ₀
Minute	1	m5	m4	m3	m2	m1	m0	
Hour	1	D	h4	h3	h2	h1	h0	
Date	1	L	d4	d3	d2	d1	d0	
Month	1	Z	T	m3	m2	m1	m0	

The minute field has a valid range of 0 to 59, the hour field from 0 to 23, the date field from 1 to 31, the month field from 1 to 12. The "T" bit is used to indicate a program that is routinely tape delayed (for mountain and pacific time zones). The D, L, & Z bits are ignored by the decoder when processing this packet. (The same format utilizes these bits for time setting.) The T bit is used to determine if an offset is necessary because of local station tape delays. A separate packet of the Channel Information Class will indicate the amount of tape delay used for a given time zone. When all characters of this packet contain all Ones, it indicates the end of the current program.

A change in received Current Class Program Identification Number is interpreted by XDS receivers as the start of a new current program. All previously received current program information will normally be discarded in this case.

02h Length / Time-in-Show

This packet is composed of 2, 4 or 6 non-ASCII informational characters. It is used to indicate the scheduled length of the program as well as the elapsed time for the program. The first two informational characters are used to indicate the programs length in hours and minutes. The second two informational characters show the current time elapsed by the program in hours and minutes. The final two informational characters extend the elapsed time count with seconds.

The informational characters are encoded as described in the following table:

Character	b ₇	b ₆	b ₅	b ₄	b ₃	b ₂	b ₁	b ₀
Length - (m)	1	m5	m4	m3	m2	m1	m0	
Length - (h)	1	h5	h4	h3	h2	h1	h0	
ET - (m)	1	m5	m4	m3	m2	m1	m0	
ET - (h)	1	h5	h4	h3	h2	h1	h0	
ET - (s)	1	s5	s4	s3	s2	s1	s0	
Null	0	0	0	0	0	0	0	

The minute second fields have a valid range of 0 to 59, and the hour fields from 0 to 63. The sixth character is a standard null.

03h Program Name (Title)

This packet contains a variable number, 2 to 32, of Informational characters that define the program title. Each character is an ASCII character in the range of 20h to 7Fh. The variable size of this packet allows for efficient transmission of titles of any length. A change in received Current Class Program name is interpreted by XDS receivers as the start of a new current program. All previously received current program information will normally be discarded in this case.

04h Program Type

This packet contains a variable number, 2 to 32, of informational characters that define keywords describing the type or category of program. These characters are ASCII symbols that have been coded to keywords as shown in the following table:

HEX Code	DESCRIPTIVE KEYWORD	HEX Code	DESCRIPTIVE KEYWORD	HEX Code	DESCRIPTIVE KEYWORD
20	Education	40	Fantasy	60	Music
21	Entertainment	41	Farm	61	Mystery
22	Movie	42	Fashion	62	National
23	News	43	Fiction	63	Nature
24	Religious	44	Food	64	Police
25	Sports	45	Football	65	Politics
26	OTHER	46	Foreign	66	Premiere
27	Action	47	Fund Raiser	67	Prerecorded
28	Advertisement	48	Game/Quiz	68	Product
29	Animated	49	Garden	69	Professional
2A	Anthology	4A	Golf	6A	Public
2B	Automobile	4B	Government	6B	Racing
2C	Awards	4C	Health	6C	Reading
2D	Baseball	4D	High School	6D	Repair
2E	Basketball	4E	History	6E	Repeat
2F	Bulletin	4F	Hobby	6F	Review
30	Business	50	Hockey	70	Romance
31	Classical	51	Home	71	Science
32	College	52	Horror	72	Series
33	Combat	53	Information	73	Service
34	Comedy	54	Instruction	74	Shopping
35	Commentary	55	International	75	Soap Opera
36	Concert	56	Interview	76	Special
37	Consumer	57	Language	77	Suspense
38	Contemporary	58	Legal	78	Talk
39	Crime	59	Live	79	Technical
3A	Dance	5A	Local	7A	Tennis
3B	Documentary	5B	Math	7B	Travel
3C	Drama	5C	Medical	7C	Variety
3D	Elementary	5D	Meeting	7D	Video
3E	Erotica	5E	Military	7E	Weather
3F	Exercise	5F	Miniseries	7F	Western

The service provider or program producer should specify all keywords which apply to the program and should order them according to his opinion of their importance. A single ASCII character code is used to represent each entire keyword. This allows multiple keywords to be transmitted very efficiently.

The list of keywords is broken down into two groups. The first group consists of the codes 20h to 2Fh and is called the "BASIC" group. The second group contains the codes 30h to 3Fh and is called the "DETAIL" group.

The Basic group is used to define the program at the highest level. All programs that use this packet must specify one or more of these codes to define the general category of the program. Programs which may fit more than one Basic category are free to specify several of these keywords. The keyword "OTHER" is used when the program doesn't really fit into the other Basic categories. These keywords must always be specified before any of the keywords from the Detail group.

The Detail group is used to add more specific information if appropriate. These keywords are all optional and must follow the Basic keywords. Programs that may fit more than one Detail are free to specify several of these keywords. Only keywords which actually apply should be specified. If the program can not be accurately described with any of these keywords, then none of them should be sent. In this case, the keywords from the Basic group are all that are needed.

05h Program Rating

This packet includes two characters that contain information about the program's MPAA rating and mature-content advisories. The characters are non-ASCII, so b6 must always be set high (b6=1). The following chart indicates the contents of the characters:

Character	b6	b5	b4	b3	b2	b1	b0
Rating	1	-	-	a0	r2	r1	r0
Advisory	1	v1	v0	s1	s0	m1	m0

The bit a0 is used to indicate whether or not the content advisory character is used or applies to the program. A value of "1" indicates that the advisory character does apply and a value of "0" indicates that the content advisory character does not apply.

Three bits r0 - r2 are used to encode the motion picture rating if used.

r2	r1	r0	Rating
0	0	0	N/A
0	0	1	"G"
0	1	0	"PG"
0	1	1	"PG-13"
1	0	0	"R"
1	0	1	"NC-17"
1	1	0	"X"
1	1	1	Not Rated

A distinction is made between N/A and Not Rated. When all zeros are specified (N/A) it means that motion picture ratings are not applicable to this program, (e.g., made for TV movies). When all ones are used (Not Rated) it indicates a motion picture that did not receive a rating for a variety of possible reasons.

Bits b5 - b0 in the second character are used to indicate a program's mature-content advisories. This character provides for three categories of mature content, each with four levels. The degree of content increases as the advisory level number increases in any given category. Bits v1 - v0 are used to convey information about any violent content in the program, s1 - s0 are used to provide information regarding any sexual content in the program, and the bits m1 - m0 are used to provide information about any mature content in the program.

v1	v0	Advisory level	s1	s0	Advisory level	m1	m0	Advisory level
0	0	No violent content	0	0	No sexual content	0	0	No mature content
0	1	V1	0	1	S1	0	1	M1
1	0	V2	1	0	S2	1	0	M2
1	1	V3	1	1	S3	1	1	M3

All program content analysis is the function of parties involved in program production or distribution. No precise criteria for establishing content ratings or advisories are given or implied in this section. The characters are provided for the convenience of consumers in the implementation of a parental viewing control system.

The data within this packet should be cleared or updated upon a change of the information contained in the Current Class Program Identification Number and/or Program Name packets.

06h Audio Services

This packet contains two characters that define the contents of the main and second audio programs. This is non-ASCII data so b6 is always set high (b6=1). The format is as follows:

Character	b6	b5	b4	b3	b2	b1	b0
Main	1	L2	L1	L0	T2	T1	T0
SAP	1	L2	L1	L0	T2	T1	T0

Each of these two characters contains two fields: language and type. The language fields of both characters are encoded using the same format:

L2	L1	L0	Language
0	0	0	Unknown
0	0	1	English
0	1	0	Spanish
0	1	1	French
1	0	0	German
1	0	1	Italian
1	1	0	Other

1 1 1 None

The type fields of each character are encoded using the following different formats:

Main Audio Program

Second Audio Program

T2	T1	T0	Type	T2	T1	T0	Type
0	0	0	Unknown	0	0	0	Unknown
0	0	1	Mono	0	0	1	Mono
0	1	0	Simulated Stereo	0	1	0	Video Descriptions
0	1	1	True Stereo	0	1	1	Non-program Audio
1	0	0	Stereo Surround	1	0	0	Special Effects
1	0	1	Data Service	1	0	1	Data Service
1	1	0	Other	1	1	0	Other
1	1	1	None	1	1	1	None

07h Caption Services

This packet contains a variable number, 2 to 8 characters that define the available forms of caption encoded data. One character is needed to specify each available service. This is non-ASCII data so bit #6 is always set. Each of the characters follows the same format:

Character	b6	b5	b4	b3	b2	b1	b0
Service Code	1	L2	L1	L0	F	C	T

The language bits are encoded using the same format as for the audio services packet.

F	C	T	Caption Service
0	0	0	field one, channel C1, captioning
0	0	1	field one, channel C1, Text
0	1	0	field one, channel C2, captioning
0	1	1	field one, channel C2, Text
1	0	0	field two, channel C1, captioning
1	0	1	field two, channel C1, Text
1	1	0	field two, channel C2, captioning
1	1	1	field two, channel C2, Text

09h Aspect Ratio Information

This packet is used to describe programs with various aspect ratios. Two or four non-ASCII informational characters are used in the following manner:

Character	b6	b5	b4	b3	b2	b1	b0
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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

30 DAY PUBLIC REVIEW NOTICE

May 10, 1996

SUBJECT: Standards Proposal No. 3688-1-A, Proposed Revision of EIA-608 "Recommended Practice for Line 21 Data Service" (if approved, to be published as EIA-608-A)

BACKGROUND: SP-3688-1-A was prepared by the R-4.3 Subcommittee on Television Data Systems. The proposed revision of the amendment deletes the specific rating system format throughout the document (see pages 38, 39, 50, 51 and 78 attached). Hence, the chairman for the formulating committee deemed it necessary to issue a 30 Day Public Review Notice. SP-3688-1-A is herewith submitted to EIA membership and others concerned as a step toward standardization.

NOTE: Please use the following format for comments:

- Company Name - Comment No.
- Type of Comment - Technical or Editorial
- Reference - Page No., Clause No., Line
- Suggested Change - Change From:... To:... Add:, Delete:
- Rationale for Technical Change

COMMENT PERIOD EXPIRES:

JUNE 10, 1996

Prior to this date, you are urged to submit your comments with the form on page two in accordance with the established EIA Standardization Procedures. Following the expiration of the comment period, this Proposal will be submitted to the EIA Engineering Department Executive Committee (EDEC) for final approval as to acceptance or rejection of this Standards Proposal.

(PLEASE SEE PAGE TWO FOR BALLOT)

Eng # 54399