



## Private Line Video Services

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# BELLSOUTH PRIVATE LINE VIDEO SERVICES

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## BELLSOUTH PRIVATE LINE VIDEO SERVICES

### 1. INTRODUCTION

#### 1.1 General

This document describes Private Line Video Services that are offered by BellSouth to Interexchange Carriers (ICs) and End Users (EUs) for either LATA access or for point-to-point or point-to-multipoint service within a LATA. For both the ICs and EUs, BellSouth will provide the facilities from the EU's Network Interface (NI) within the LATA to the IC's point of termination (POT) or between end-user's (NI) within the LATA for point-to-point service or point-to-multipoint service.

The application of this service is for all video services that do not require the higher performance characteristics of Broadcast Quality (TV1) service.

This BellSouth Technical Reference supplements Bellcore Technical Reference TR-NPL-000338, Issue 1, December 1986.

#### 1.2 Purpose

The purpose of this document is to describe the interface and performance specifications for Private Line Video Services offered by BellSouth. The objective is to allow compatible operation of video terminals and video service extensions within the BellSouth network.

This is a technical requirements document and is not intended to be used as an ordering guide, however the customer may consult this document for Access Codes. **The BellSouth tariffs should be consulted for ordering information.**

The reason for reissue of this document is to include technological enhancements and new network channel interface codes that are the result of improved technologies and are within the scope of this service.

#### 1.3 Applicability of Technical Specifications

The technical interface and performance specifications listed in this reference were developed based on Industry Standards and will comply with those standards where appropriate. The primary source documents for Performance Parameters are the American National Standard – System M–NTSC Television Signals – Network Interface Specifications and Performance Parameters (ANSI T1.502–1988), EIA Standard – Electrical Performance Standard for Television Relay Facilities (EIA/TIA–250–C), and Bellcore Technical Reference TR–NPL–000338. When new standards are developed for video applications within the quality range specified in this document, this reference will be revised to incorporate relevant aspects.

### 2. SERVICE DESCRIPTION

Private Line Video Services are full-time channels used exclusively for transmission of standard format video and associated audio signals within a LATA. The services accommodate either single or multiple standard 525-line/60-field National Television Systems Committee (NTSC)–System M video signals including one, two or three associated audio signal(s) per video signal. Transport may be via analog and/or digital techniques over a mix of basic facilities. These services may be provided between an End User (EU) and an Interexchange Carrier (IC), or between two End Users (EU) within the same LATA. These services are one-way only. Two-way service requires subscription to two one-way video channels. These services will be designated as **TV3 for Commercial Quality and TV4 for Business Quality.**

## 2.1 Features/Functions/Options

- (a) Point-to-point or point-to-multipoint.
- (b) This service will accommodate one-way video communications.
- (c) This service will also accommodate multiple one-way video communications combined over a single path as shown in **figure 1**.
- (d) None or one (3 kHz or 7 kHz) audio channel on the business quality video.
- (e) Includes two (7 kHz or 12 kHz) separate audio channels on each video channel on the commercial quality video service.
- (f) Or includes two 15 kHz separate audio channels on each commercial quality video channel with an option for one additional 15 kHz audio channel on the same video channel.
- (g) 75 ohm unbalanced electrical interface for baseband analog video signal.
- (h) 600 ohm balanced electrical interface for baseband analog audio signal.

## 2.2 Service Types

BellSouth will design and provide a network solution using appropriate technology to meet the customer's needs according to one of the following qualities of service:

- (1) Quality #2 – Commercial Quality – TV3
- (2) Quality #3 – Business Quality – TV4

### 2.2.1 Commercial Quality Transport Service (TV3)

This service is designated as TV3 and provides a full motion, high quality video performance channel and one or two audio signals with an option for one additional audio signal. This service is visually comparable to broadcast quality transport service (TV1), however the technical parameters are less stringent than those required for broadcast. Examples of this service are transport for entertainment and educational television.

### 2.2.2 Business Quality Transport Service (TV4)

This service is designated as TV4 and provides a near full motion, very good quality video performance channel with possible slight impairments in motion. The service is provided with or without an audio channel and is suitable for point-to-point or point to multipoint video arrangements. Examples of this service are transport for closed circuit video, surveillance, and video teleconferencing. The technical parameters supported for this service are less stringent than commercial quality service.

## 2.3 Network Interface (At The Customer Premises)

A baseband-to-baseband analog signal will be the network interface component.

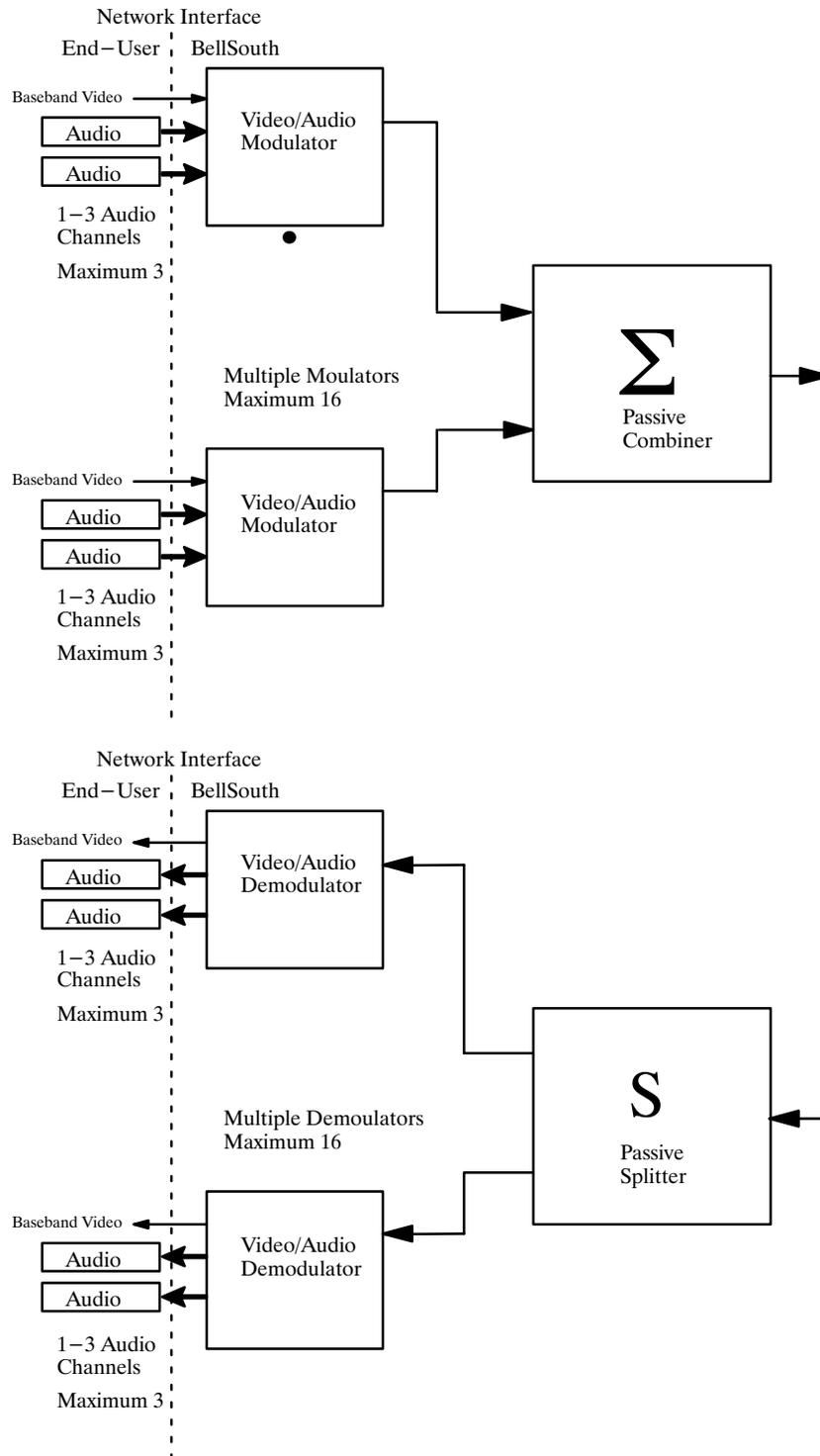


Figure 1 – MULTIPLE VIDEO CHANNELS

### 3. ELECTRICAL INTERFACE SPECIFICATIONS

#### 3.1 Video

3.1.1 Definition: The video signal is usually described in waveform terminology as shown in Figure 3 and measured in accordance with Figure 2.

### 3.1.2 Impedance:

- (a) Source impedance – The impedance presented to the input terminals of a transmission service channel.
- (b) Input impedance – The impedance presented by the input terminals of a transmission service.
- (c) Output impedance – The impedance presented by the output terminals of a transmission service channel.
- (d) Load impedance – The impedance presented by the input terminals of a device that will terminate the transmission service channel.

The standard value for these four impedances shall be 75 ohms, unbalanced-to-ground, with a return loss of at least 30dB over the frequency range of 0.5MHz to 4.2MHz.

### 3.1.3 Video Signal Level

- (a) Input Signal Level of a transmission service channel is the difference in voltage between sync tip (–40IRE units) and reference white (+100IRE units) of a composite picture signal presented to the video baseband input terminals and usually expressed in volts. The values shall be a nominal 1 volt peak-to-peak difference between sync tip and reference white (140IRE units). (See Figures 2 and 3)
- (b) Output Signal Level of a transmission service channel is that level presented by the transmission service channel output terminals. The output signal shall be a faithful reproduction of the input signal, subject to parametric variations permitted by the performance characteristics set forth in this practice.

## 3.2 Audio

**3.2.1** Definition: Audio signals are waveforms comprised of periodic and/or nonperiodic components confined to the frequency range from 50 Hz to 20,000 Hz usually measured in volume units (VU).

### 3.2.2 Impedance:

- (a) Source impedance – The impedance presented to the input terminals of a transmission service channel.
- (b) Input impedance – The impedance presented by the input terminals of a transmission service channel.
- (c) Output impedance – The impedance presented by the output terminals of a transmission service channel.
- (d) Load impedance – The impedance presented by the input terminals of the device that will terminate the audio output of a transmission service channel.

The standard value for these four impedances shall be 600 ohms, balanced to ground.

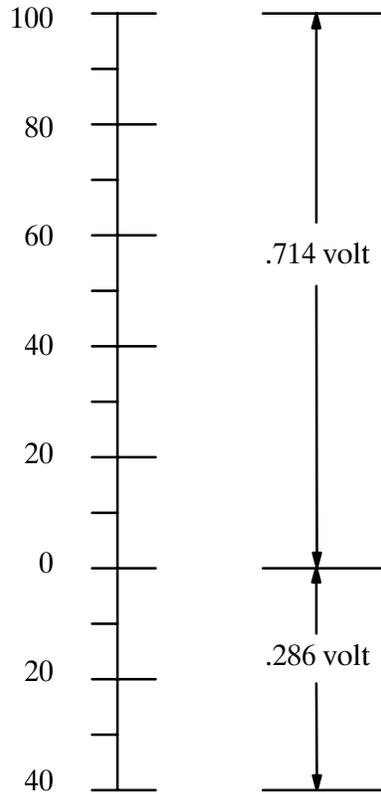


Figure 2 – THE IRE SCALE UNITS (FOR A 1V P-P COMPOSITE SIGNAL)

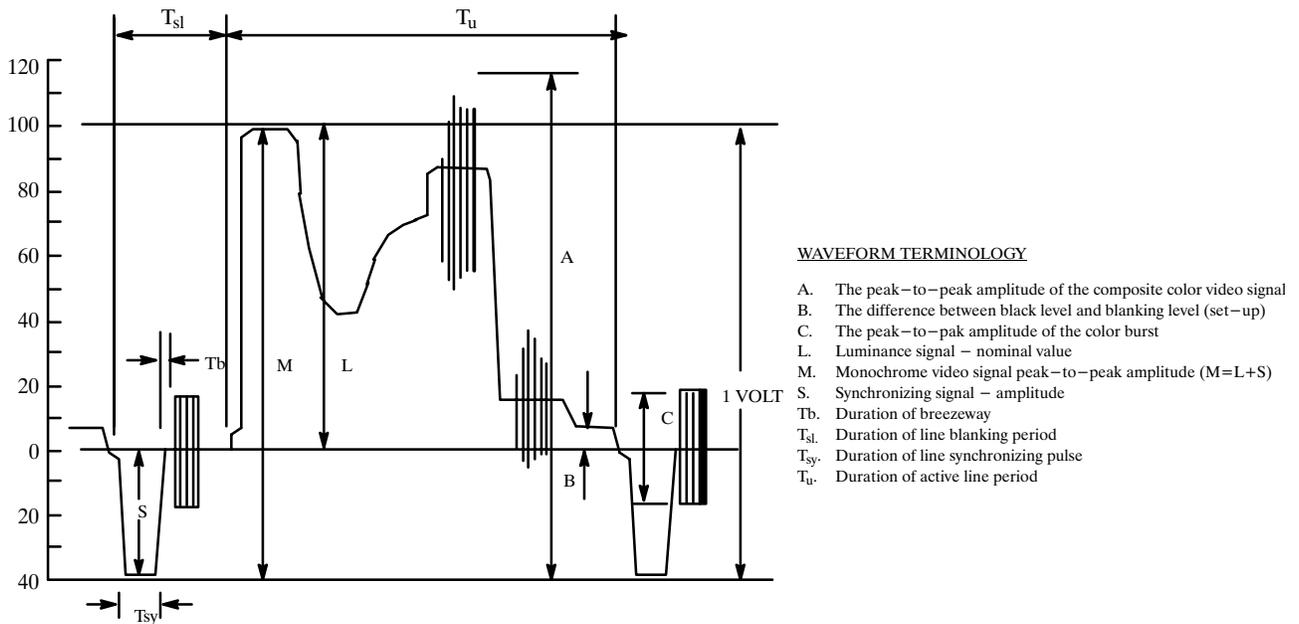


Figure 3 – THE STANDARD COMPOSITE COLOR VIDEO SIGNAL

### 3.2.3 Audio Signal Level

The input signal level to a transmission service channel is the signal level across the transmission service channel input impedance. When the signal is sinusoidal the input signal is expressed in dBm.

(a) **Commercial Quality**

The peak operating level of the input signal of the audio transmission channel across the standard impedance is equal to the peaks of a sine-wave whose RMS power is +14 dBm.

**NOTE 1: The maximum test tone power, averaged over 1 second, that can be applied to the transmission service channel input terminals at a nominal frequency of 400 Hz is +18 dBm with a maximum 4 second duration limit.**

**NOTE 2: The maximum continuous sinusoidal test signal amplitude that can be applied at the input terminals of a transmission service channel is as follows:**

<p>+ 8 dBm for 50 Hz to 404 Hz (0 dBm for 404 Hz to 15 kHz)</p>
---

(b) **Business Quality**

The peak operating level of the input signal of the audio transmission channel across the standard impedance is equal to the peaks of a sine-wave whose RMS power is +10 dBm.

**NOTE 1: The maximum test tone power, averaged over 1 second, that can be applied to the transmission service channel input terminals at a nominal frequency of 400 Hz is +10 dBm with a maximum 4 second duration limit.**

**NOTE 2: The maximum continuous sinusoidal test signal amplitude that can be applied at the input terminals of a transmission service channel is 0 dBm.**

(c) The output signal level of a transmission service channel is the signal level across the transmission service channel output impedance and is generally expressed in dBm. The output signal shall be a faithful reproduction of the input signal subject to the parametric variations permitted by the performance specifications in this practice.

### 3.2.4 Non-Useful DC Component

The Non-Useful DC Component of the audio channel is any dc component which is unrelated to the signal and is present when the audio signal is removed. When the audio signal is removed, direct current flow shall be equal to or less than 0.2 mA through a zero ohm termination across the audio channel input or output terminals. Direct current flow shall be equal to or less than 0.2 mA when the terminals are shorted together and measured through a zero impedance to ground.

#### 4. VIDEO PERFORMANCE PARAMETERS

The objective quality of video transport services is specified by limits on allowed perturbations to the video signal which may arise as it passes through the transport facility. These perturbations are described in terms of a number of performance parameters important to video broadcasters. Parameters for which limits are specified for commercial quality and business quality video are described here.

**Insertion Gain Variation** – Insertion gain is defined as the difference of a signal's output level compared to its input level. Insertion gain variation is the change of insertion gain with time. Measurement of this parameter is done in units of IRE over periods of one second and hourly.

**Frequency Response** – This parameter is typically referred to as the Amplitude versus Frequency characteristic which is an expression of amplitude variation as a function of baseband frequency of sine-wave voltage. This is when it is applied to the transmitting terminal baseband input and measured at the receiving terminal baseband output. The amplitude may be expressed either in dB or IRE. This measurement is typically measured at 6 points in the frequency range of 0.5 MHz to 4.2 MHz.

**Chrominance/Luminance** – This parameter is basically a measurement of relationships between the chrominance signal and the luminance signal. There are three relationships that are measured and they are gain, delay, and intermodulation.

**Gain Inequality** is a measure of the chroma level with respect to the luminance level and affects saturation and will produce colors which are paler or more vivid than normal.

**Delay Inequality** is the difference in transmission time between the luminance signal (below 600 kHz) and the chrominance signal (3 to 3 MHz) and affects the color displacement in the horizontal from the luminance value.

**Intermodulation** is the variation in luminance amplitude resulting from the presence of a chrominance signal of specified amplitudes.

The units of measurement for Gain and intermodulation are typically in IRE, however the delay is typically in seconds.

**Chrominance Non-Linear Gain** – This parameter is the departure from proportionality between the amplitude of the chrominance subcarrier (at the input) to the circuit, and the corresponding amplitude (at the output) as the amplitude of the subcarrier is varied from a specified minimum to a maximum value, at a given luminance level and average picture level (APL). This parameter affects the trueness of the colors. This parameter is typically measured in units of IRE.

**Chrominance Non-Linear Phase** – This parameter is the variation of the phase of the chrominance subcarrier (at the output) as the amplitude to the subcarrier (at the input) is varied from a specified minimum to a maximum value, at a given luminance level and average picture level (APL). This parameter is measured in units of degrees and affects the reproduction of the highly saturated colors.

**Luminance Non-Linearity (Peak-to-Peak)** – This parameter is the distortion of the luminance signal from proportionality between the amplitude of the small unit step function, as the level of the step is shifted from blanking to white level. This parameter is measured in units of IRE.

**Differential Gain** – This parameter is the difference in gain of the transmission channel (or network) as measured by a low-amplitude, high frequency (chrominance) signal at any two levels of a low-frequency (luminance signal) on which it is superimposed. It is expressed as a percentage of the maximum gain in IRE units or percent. This affects the color picture saturation as the brightness (luminance) changes.

**Differential Phase** – This parameter is the difference in phase shift through the transmission channel or network exhibited by a low-amplitude, high-frequency (chrominance) signal at any two levels of a low-frequency (luminance) signal on which it is superimposed. Differential phase is expressed as the maximum phase change between any two levels and shown in units of degrees.

**Waveform Distortion** – This parameter is the measurement of linear distortion at different time sequences on the video waveform. This parameter is divided into four test and they are field-time, line-time, short-time and long-time. The particular time sequence on the waveform for each parameter are as follows:

Field-Time	64 microseconds to 16 milliseconds
Line-Time	1 microsecond to 64 microseconds
Short-Time	0.125 microseconds to 1.0 microseconds
Long-Time	16 milliseconds to tens of seconds (long time)

**Field-Time** affects the quality of the shading from top to bottom of the screen. This parameter is measured in units of IRE.

**Line-Time** affects the ability to reduce the streaking and smearing of the picture. This parameter is measured in units of IRE.

**Short-Time** affects the ability of reproduce the small picture details faithfully. It also affects the capability to reduce blurring, smearing, overshoots and ringing. This parameter is measured in units of either IRE or percent.

**Long-Time** is better known as the “bounce-test” and affects the ability to reduce the settling time. This parameter also is the damped low-frequency transient resulting from a change in average picture level (APL) that affects the signal DC component. This parameter is measured in units of IRE for 3 seconds of settling time.

**Signal-to-Noise Ratio** – This parameter is probably the most quoted parameter of all the above. It is the ratio of the signal power to the noise power at a given point in a given system (usually expressed in decibels). Generally, the measurement method gives a ratio which is signal + noise to noise. This parameter is measured in units of decibels (dB).

5. PERFORMANCE SPECIFICATIONS

5.1 This section provides the performance limits to which Commercial Quality and Business Quality Video Services are provisioned and pertinent limits for video are provided in Table 5-1. Limits for associated audio channels are provided in Table 5-2.

PERFORMANCE SPECIFICATIONS FOR PRIVATE LINE – VIDEO		
Parameter	Recommended Limits	
	TV3	TV4
Insertion Gain Variation		
– One Second	+ 1.7 To – 1.7 IRE	± 4 IRE
– Hourly	+ 3.5 To – 3.3 IRE	± 5 IRE
(*) Amplitude Response vs. Frequency (0.5 MHz – 4.1 MHz)	± 3 IRE	± 10 IRE
Chrominance/Luminance		
– Gain Inequality	± 4 IRE	± 5 IRE
(*) – Delay Inequality	± 33 ns	± 70 ns
(*) – Intermodulation	2 IRE	4 IRE
Chrominance Non-Linear Gain	± 2 IRE	± 8 IRE
(*) Chrominance Non-Linear Phase	2°	8°
Luminance Non-Linearity (Peak-Peak)	4 IRE	8 IRE
(*) Differential Gain	5 %	7 %
(*) Differential Phase	1.3°	6°
(*) Field-Time Distortion	3 IRE	3 IRE
(*) Line-Time Distortion	1 IRE	3 IRE
(*) Short-Time Distortion (K <sub>2T</sub> )	2 IRE	2 IRE
Long-Time Waveform Distortion (3-second settling time)	8 IRE	10 IRE
(*) Signal-to-Noise Ratio Random (10 KHz – 5 MHz)	≥ 60 dB	≥ 50 dB
NOTE: (*) Measurement Required for Tariff The method of measurement for these parameters is based on ANSI Standard T1.502–1988.		

Table 5-1

AUDIO PERFORMANCE PARAMETERS		
Performance Parameter	Recommended Limits	
	TV3	TV4
Input/Output Test Tone Levels Maximum Permitted Test Tone Level (+ 8 dBm @ 404 Hz)	+ 8.0 dBm + 18.0 dBm	0 dBm + 10 dBm
Insertion Gain @ 404 Hz	0 dB $\pm$ 0.5 dB	0 dB $\pm$ 0.5 dB
(*) Amplitude Response vs. Frequency (1 kHz Ref @ 0 dBm)	50 – 10 kHz $\pm$ 0.5 dB 10 kHz – 15 kHz + 0.5 to – 1.5 dB 50 Hz – 7 kHz $\pm$ 1 dB	50 – 3 kHz $\pm$ 3 dB 50 – 7 kHz $\pm$ 1.5 dB
(*) Total Harmonic Distortion + Noise (+ 18 dBm @ 404 Hz for 4 Sec)	0.5 %	3.5 %
(*) Signal-to-Noise Ratio Weighting	65 dB 15 kHz Flat	44 dB C Message for 50–3 kHz 15 kHz Flat for 50–7 kHz
Gain Difference Between Dual Channels Crosstalk + Noise Degradation (50 – 15 kHz) Crosstalk shall not degrade the measured signed/noise ratio by more than	$\leq$ 1.0 dB  0.5 dB	NA  1.0 dB
Audio-to-Video Time Differential Range	25 ms lead to 40 ms lag	NA NA
NOTE: (*) Measurement Required for Tariff The method of measurement for these parameters is based on ANSI Standard T1.502–1988.		

Table 5–2

## 6. ACCESS SERVICE CHANNEL AND INTERFACE CODES

### 6.1 General

Access Services are specified for ordering purposes through the use of Network Channel (NC) and Network Channel Interface (NCI) codes. These codes provide a shorthand notation of the interface and performance characteristics described earlier in this document. **This document may be referenced in specifying NC and NCI codes when ordering video services from the BellSouth Access tariff.** The interface codes are described in this section.

**NOTE: Network Channel Codes (NC) and Network Channel Interface Codes (NCI) are currently not used to describe non-access services. Development of (NC) and (NCI) codes to describe non-access services is currently under study.**

### 6.2 Part One – Network Channel Interface Code Definitions (NCI) – EU/IC

The electrical interface with the BellSouth Network is described by a Network Channel Interface (NCI) code for each Point of Termination (POT). The NCI code identifies four elements at the Point of Termination (POT). The elements are: (1) the number of wires, (2) the protocol code, (3) the nominal reference impedance code, and (4) any applicable protocol options. The interface codes for the service desired must be specified by the customer. Example: The code 4TV6–7 contains the following components:

- (1) 4 – the number of wires

Table 6–1 defines the allowable entries for this component. Note that this is a two-digit code throughout this document and the zero for the initial digit is generally omitted for simplicity.

- (2) TV – the protocol code.

In this example it is a television interface protocol. There are no other options. Table 6–2 provides a glossary of protocol codes that apply to the private line commercial video services.

- (3) 6 – the nominal reference impedance.

In this example it is 75 ohms. Table 6–3 defines the allowable entries for this component.

- (4) 7 – the protocol option.

In this example it assumes that one (2-wire) 7kHz audio signal is provided at the end-user's interface. The protocol option codes are defined in Table 6–2.

6.2.1 Network Channel Interface Code (NCI) Tables

**Total Number of Conductors**

Code	Number of Physical Conductors
02	2 (video with no audio)
04	4 (video & 1 channel audio)
06	6 (video & 2 channels audio)
08	8 (video & 3 channels audio)

**Table 6-1**

**Protocol Codes and Selected Options**

Code	Option	Definition
TV		Television Interface
	0	Video signal only, no audio
	12	Video plus one or two (2-wire) 12 kHz audio signals
	15	Video plus one or two (2-wire) 15 kHz audio signals
	15A	Video plus three or four (2-wire) 15 kHz audio signals
	3	Video plus one or two (2-wire) 3 kHz audio signals
	7	Video plus one or two (2-wire) 7 kHz audio signals

**Table 6-2**

**Impedance**

Code	Value (ohms)
6 (Coaxial Cable)	75

**Table 6-3**

### 6.3 Part Two – Network Channel Code Definitions (NC)

Private Line Video Services within the network are described by a Network Channel (NC) code. Included in this code set are customer options associated with individual channel services. The elements in the code set are: (1) the service code, (2) service quality, (3) central office options. **The NC code set and options must be specified by the customer.** Example: The code “TZBB” contains the following components.

- (1) The first two characters – “TZ” – the channel service code.

Table 6–4 defines the allowable entries for this component. Note that this is a two character code. This component identifies the LATA service as access.

- (2) The third character – “B” – service quality

In this example, Commercial Quality is the specified quality of service. Table 6–5 defines the allowable entries for this component.

- (3) The fourth character – “B” – central office option

In this example, central office bridging is specified. Table 6–6 defines the available options that can be specified for a network channel.

#### 6.3.1 Network Channel Code (NC) Tables for Access Circuits:

**Service Codes**

Service Code	LATA Service	Description
TZ	Access	Single or multichannel television grade access circuit used to provide video and audio signals for non-broadcast television and similar image services

**Table 6–4**

**Service Quality**

Position	Character	Description
3	B	Commercial Quality
3	C	Business Quality

**Table 6–5**

**Central Office Option**

Position	Character	Description
4	–	None
	B	C. O. Bridged
	C	Multichannel Service
	Q	B + S
	S	C. O. Switched

**Table 6–6**

**Central Office Option**

Service Code	NC Code	End-User Interface	Interexchange Carrier Interface
TV3	TZB	4TV6–12	4TV6–12
		4TV6–15	4TV6–15
		4TV6–7	4TV6–7
		6TV6–12	6TV6–12
		6TV6–15	6TV6–15
		6TV6–7	6TV6–7
		8TV6–15A	8TV6–15A
TV4	TZC	2TV6–0	2TV6–0
		4TV6–3	4TV6–3
		4TV6–7	4TV6–7

**Table 6–7**

## 7. INTERFACE ILLUSTRATIONS

This section illustrates each interface used to provide different options of the BellSouth Private Line Commercial Quality or Business Quality Video Service.

### Interface Type 2TV6-0

*Application:* Provides a one-way transmission of a video signal

*Operating mode:* Full or part-time video signal

*Physical description:* Coaxial cable for video only

*Service:* TV4

### Electrical Features

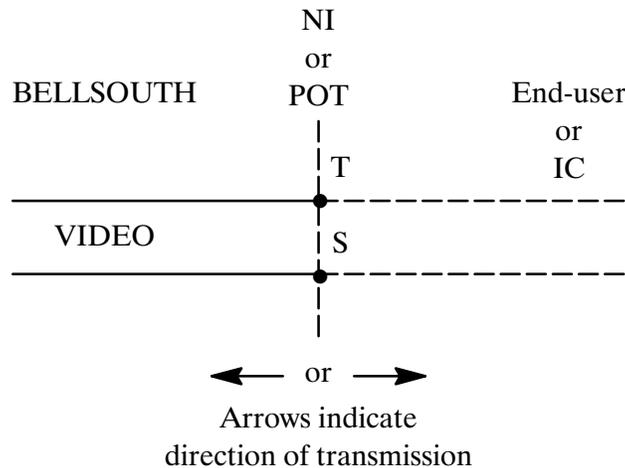
#### Video

*Impedance:* 75 ohms unbalanced

*Operating Levels (nominal):* 1 V peak-to-peak  
(Sync tip to reference white)

*Frequency range:* .5 MHz to 4.2 MHz

*Illustration:*





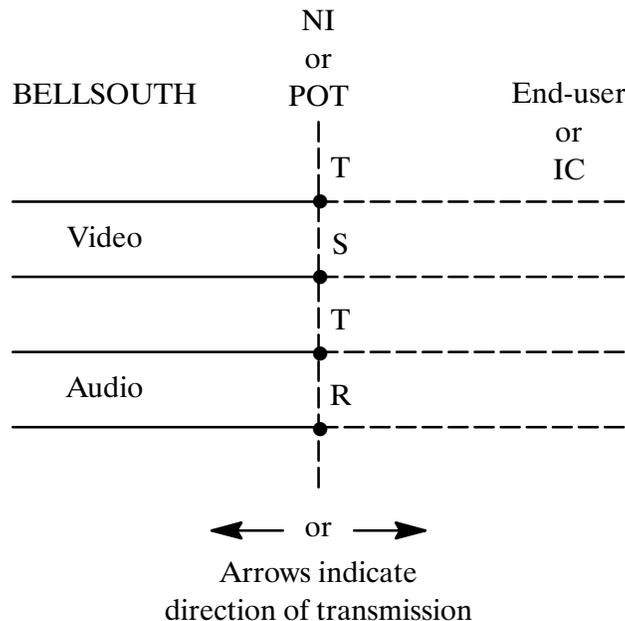
**Interface Type 4TV6-7**

<i>Application:</i>	Provides a one-way transmission of standard 525-line/60-field NTSC video signal, and one associated 7 kHz audio signal.
<i>Operating mode:</i>	Full or part-time video and associated audio signal
<i>Physical description:</i>	Coaxial cable for video and two-wire (T,R) for audio
<i>Service:</i>	TV3 or TV4

**Electrical Features**

	<b>Video</b>	<b>Audio</b>
<i>Impedance:</i>	75 ohms unbalanced	600 ohms balanced
<i>Overload point:</i>	1.2V p-p	+10 dBm <sup>1</sup> at 400 Hz
<i>Operating Levels (nominal):</i>	1 V peak-to-peak (Sync tip to reference white)	0 VU (max) program level
<i>Max. Steady-State Levels: (Averaged over one second)</i>	N/A	0 dBm 50 Hz ≤ f ≤ 404 Hz 0 dBm 404 Hz < f < 7 kHz
<i>Frequency range:</i>	.5 MHz to 4.2 MHz	50 Hz to 7 kHz

*Illustration:*



1. This level cannot be continuously applied to audio channels.

**Interface Type 4TV6-12**

*Application:* Provides a one-way transmission of standard 525-line/60-field NTSC video signal, and one associated 12 kHz audio signal.

*Operating mode:* Full or part-time video and associated audio signal

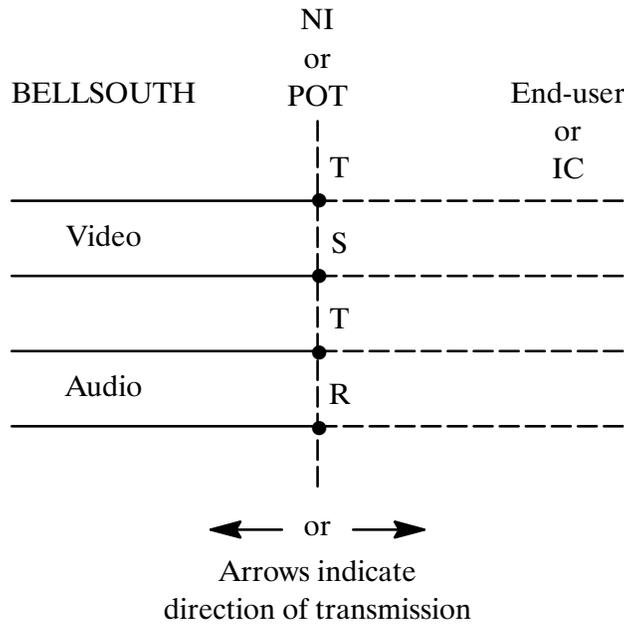
*Physical description:* Coaxial cable for video and two-wire (T,R) for audio

*Service:* TV3

**Electrical Features**

	<b>Video</b>	<b>Audio</b>
<i>Impedance:</i>	75 ohms unbalanced	600 ohms balanced
<i>Overload point:</i>	1.4V p-p	+18 dBm <sup>1</sup> at 400 Hz
<i>Operating Levels (nominal):</i>	1 V peak-to-peak (Sync tip to reference white)	+8 VU (max) program level +8 VU = +8dBm
<i>Max. Steady-State Levels:</i>	N/A	+8 dBm 50 Hz ≤ f ≤ 404 Hz
<i>(Averaged over one second)</i>		0 dBm 404 Hz < f ≤ 12 kHz
<i>Frequency range:</i>	0.5 MHz to 4.2 MHz	50 Hz to 12 kHz

*Illustration:*



1. This level cannot be continuously applied to audio channels.

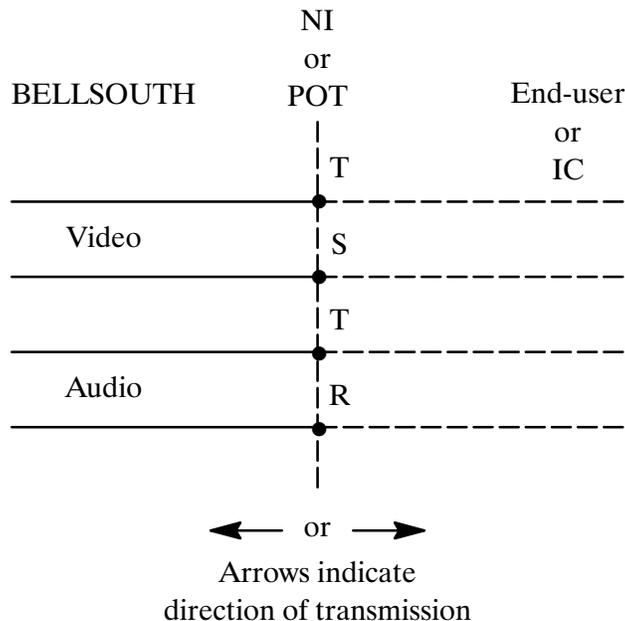
**Interface Type 4TV6-15**

<i>Application:</i>	Provides a one-way transmission of standard 525-line/60-field NTSC video signal, and one associated 15 kHz audio signals.
<i>Operating mode:</i>	Full or part-time video and associated audio signals
<i>Physical description:</i>	Coaxial cable for video and two-wire (T,R) for audio
<i>Service:</i>	TV3

**Electrical Features**

	<b>Video</b>	<b>Audio</b>
<i>Impedance:</i>	75 ohms unbalanced	600 ohms balanced
<i>Overload point:</i>	1.4V p-p	+18 dBm <sup>1</sup> at 400 Hz
<i>Operating Levels (nominal):</i>	1 V peak-to-peak (Sync tip to reference white)	+8 VU (max) program level +8 VU = +8dBm
<i>Max. Steady-State Levels: (Averaged over one second)</i>	N/A	+8 dBm 50 Hz ≤ f ≤ 404 Hz 0 dBm 404 Hz < f ≤ 15 kHz
<i>Frequency range:</i>	0.5 MHz to 4.2 MHz	50 Hz to 15 kHz

*Illustration:*



1. This level cannot be continuously applied to audio channels.

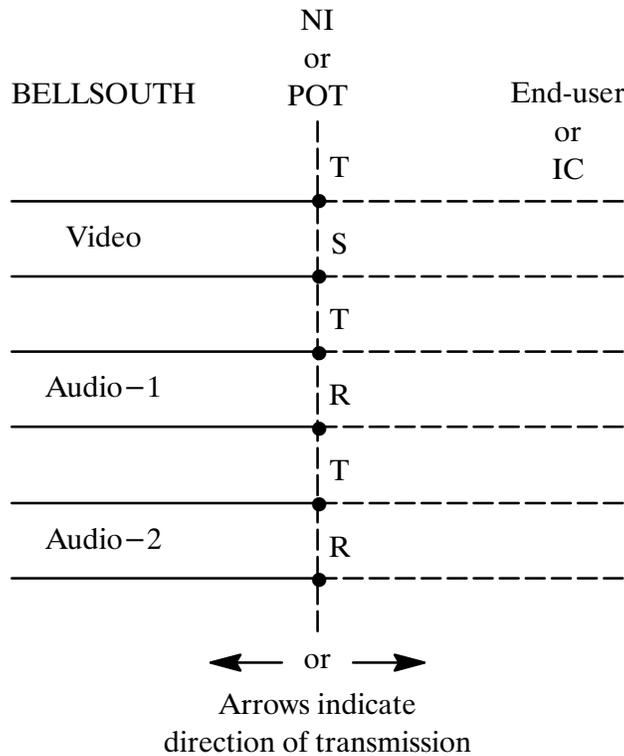
**Interface Type 6TV6-7**

<i>Application:</i>	Provides a one-way transmission of standard 525-line/60-field NTSC video signal, and two associated 7 kHz audio signals.
<i>Operating mode:</i>	Full or part-time video and associated audio signals
<i>Physical description:</i>	Coaxial cable for video and two-wire (T,R) for audio
<i>Service:</i>	TV3

**Electrical Features**

	<b>Video</b>	<b>Audio</b>
<i>Impedance:</i>	75 ohms unbalanced	600 ohms balanced
<i>Overload point:</i>	1.2V p-p	+18 dBm <sup>1</sup> at 400 Hz
<i>Operating Levels (nominal):</i>	1 V peak-to-peak (Sync tip to reference white)	+8 VU (max) program level +8 VU = +8dBm
<i>Max. Steady-State Levels:</i> <i>(Averaged over one second)</i>	N/A	+8 dBm 50 Hz ≤ f ≤ 404 Hz 0 dBm 404 Hz < f < 7 kHz
<i>Frequency range:</i>	0.5 MHz to 4.2 MHz	50 Hz to 7 kHz

*Illustration:*



1. This level cannot be continuously applied to audio channels.

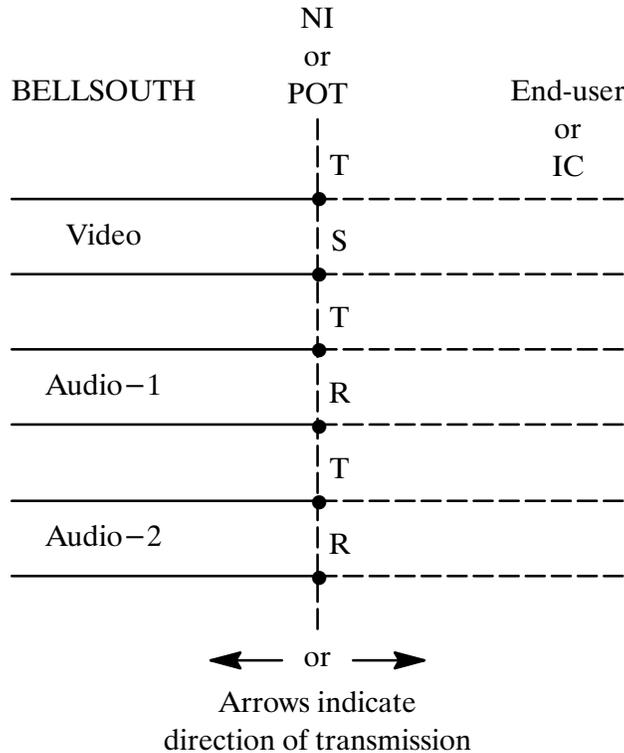
**Interface Type 6TV6-12**

<i>Application:</i>	Provides a one-way transmission of standard 525-line/60-field NTSC video signal, and two associated 12 kHz audio signals.
<i>Operating mode:</i>	Full or part-time video and associated audio signals
<i>Physical description:</i>	Coaxial cable for video and two-wire (T,R) for audio
<i>Service:</i>	TV3

**Electrical Features**

	<b>Video</b>	<b>Audio</b>
<i>Impedance:</i>	75 ohms unbalanced	600 ohms balanced
<i>Overload point:</i>	1.2V p-p	+18 dBm <sup>1</sup> at 400 Hz
<i>Operating Levels (nominal):</i>	1 V peak-to-peak (Sync tip to reference white)	+8 VU (max) program level +8 VU = +8dBm
<i>Max. Steady-State Levels: (Averaged over one second)</i>	N/A	+8 dBm 50 Hz ≤ f ≤ 404 Hz 0 dBm 404 Hz < f ≤ 12 kHz
<i>Frequency range:</i>	0.5 MHz to 4.2 MHz	50 Hz to 12 kHz

*Illustration:*



1. This level cannot be continuously applied to audio channels.

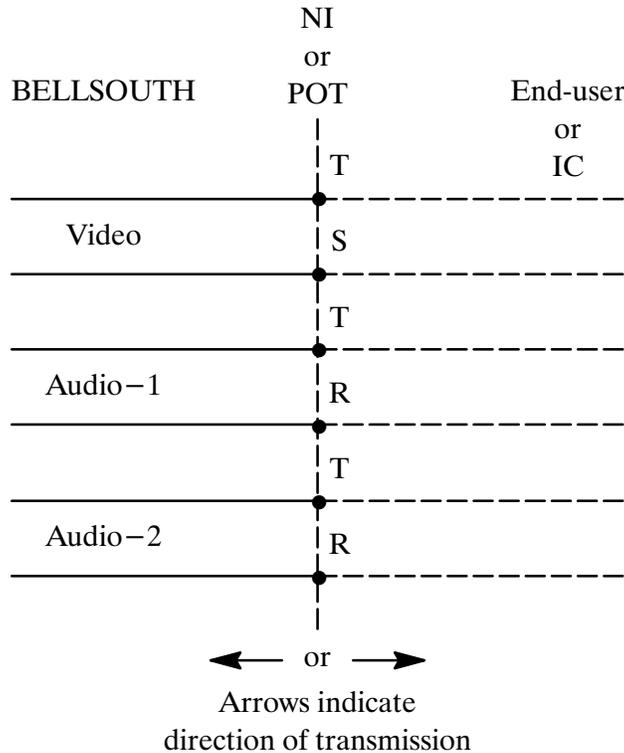
**Interface Type 6TV6-15**

<i>Application:</i>	Provides a one-way transmission of standard 525-line/60-field NTSC video signal, and two associated 15 kHz audio signals.
<i>Operating mode:</i>	Full or part-time video and associated audio signals
<i>Physical description:</i>	Coaxial cable for video and two-wire (T,R) for each audio
<i>Service:</i>	TV3

**Electrical Features**

	<b>Video</b>	<b>Audio</b>
<i>Impedance:</i>	75 ohms unbalanced	600 ohms balanced
<i>Overload point:</i>	1.2V p-p	+18 dBm <sup>1</sup> at 400 Hz
<i>Operating Levels (nominal):</i>	1 V peak-to-peak (Sync tip to reference white)	+8 VU (max) program level +8 VU = +8dBm
<i>Max. Steady-State Levels: (Averaged over one second)</i>	N/A	+8 dBm $50 \text{ Hz} \leq f \leq 404 \text{ Hz}$ 0 dBm $404 \text{ Hz} < f \leq 15 \text{ kHz}$
<i>Frequency range:</i>	0.5 MHz to 4.2 MHz	50 Hz to 15 kHz

*Illustration:*



1. This level cannot be continuously applied to audio channels.



## 8. GLOSSARY

### CENTRAL OFFICE (CO)

A local switching system (or portion thereof) and its associated equipment located at a wire center

### CHANNEL

An electrical or photonic, in the case of fiber optic based transmission systems, communications path between two or more points of termination.

### CUSTOMER PREMISES

Denotes a building or portion(s) of a building occupied by a single customer or End-User (EU) either as a place of business or residence. Adjacent buildings and the buildings on the same continuous property occupied by the customer not separated by a public thoroughfare, are also considered the customer's premises.

### END-USER (EU)

Any individual, partnership, association, corporation, governmental agency or any other entity that (a) obtains a common line or uses a pay telephone in the operating territory of the serving Telephone Company, or (b) subscribes to services provided by an IC or uses the services of an IC when the IC provides service(s) for its own use.

### FACILITIES

Any cable, poles, conduit, microwave, or carrier equipment, wire center distributing frames, central office switching equipment, computers (both hardware and software), business machines, etc., utilized to provide (1) the services offered by the Telephone Company, or (2) the services provided by an IC for its own use or for an IC end-user's use.

### INTEREXCHANGE CARRIER (IC) OR INTEREXCHANGE COMMON CARRIER

Any individual, partnership, association, joint-stock company, trust, governmental entity or corporation engaged for hire in interstate or foreign communication by fiber, wire or radio, between two or more exchanges.

### LOCAL ACCESS AND TRANSPORT AREA (LATA)

A geographic area established by the FCC for the provision and administration of local communications service. It encompasses designated exchanges that are grouped to serve common social, economic and other purposes.

### MULTIPLEX

A technique to use a single transmission channel to provide several transmission channels, such as by sharing the time of the channel (time-division multiplexing) or superimposing many frequencies at the same time (frequency-division multiplexing) in order that many signal sources may communicate during a given time period.

### NTSC (NATIONAL TELEVISION SYSTEMS COMMITTEE) SIGNAL

This is the standard television transmission channel intended for the transmission of 525 line/60 field video and associated audio signals. The specified performance objectives of a transmission service channel for broadcast quality video service are stated in ANSI T1.502–1988

### NETWORK CHANNEL (NC) CODE

The Network Channel (NC) code is used to identify both switched and special channel services. Included in this code set are customer options associated with individual channel services.

### NETWORK CHANNEL INTERFACE (NCI) CODE

The NCI code identifies 4 interface elements located at the Point of Termination (POT). The interface elements are: physical conductors, protocol, impedance, and protocol options.

### POINT OF TERMINATION

The demarcation point between a telephone Company and the customer. This point establishes the technical interface, the test point(s) of the division of operational responsibility. It is located at the point of presence.

### PROTOCOL CODE

A component of an interface code that is readily associated with the basic electrical function of the interface.

### SERVICE CODE

Two character code set (alpha only) that identifies a particular type of Special Service Circuit.

## 9. REFERENCES

### International Standards

CCITT Recommendation G.712, Performance characteristics of PCM channels between 4-wire interface at voice frequencies

CCITT Recommendation G.722, 7 kHz Audio-Coding within 64 Kbit/s

CCITT Recommendation G.728, 3 kHz Audio at 16 Kbit/s

### American National Standards Institute

ANSI T1.306–1990, Digital Processing of Audio Signals – Algorithm and Line Format for Transmission of 7–kHz Audio Signals at 64/56 kbit/s

ANSI T1.502–1988, System M–NTSC Television Signals – Network Interface Specifications and Performance Parameters

ANSI T1.505–1989, Advanced Digital Program Audio Services – Analog Interface and Performance Specifications

### Bellcore Publications (For ordering Bellcore publications call 1-800-521-CORE)

TR–NPL–000337 Issue 1 July 1987, Program Audio Special Access and Local channel Services

TR–NPL–000338 Issue 1 Dec 1986, Television Special Access and Local Channel Services