

视听研究所

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BTSC BASIC:

Multi-channel television sound (MTS), better known as BTSC encoding—developed by Zenith—was adopted by the U.S. Federal Communications Commission (FCC) in 1984 as the method for encoding three additional audio channels onto National Television Systems Committee (NTSC) format video signals. Early NTSC video already included a monophonic audio signal (equivalent to $L + R$, stereo-sum), so BTSC added the stereo difference signal ($L - R$), which is combined with the sum signal to decode stereo audio. In addition, a second channel, known as second audio program (SAP), is available to provide a second language, an audio description service for the visually impaired, or radio service. A third—professional (PRO)—channel may be used by the broadcasting station for audio or data exchange.

Frequency plots of NTSC composite video and BTSC composite audio spectra are shown in Figures 1 and 2, respectively. Note that the BTSC spectrum incorporates a pilot signal at 15.734 kHz, which is the same frequency as the NTSC video horizontal sync, $1H = f_{H \text{ sync}}$. This pilot signal is used by the receiver to recover the double-sideband suppressed-carrier (DSBSC) modulated stereo-difference ($L - R$) audio channel at $2H$, and the SAP and PRO channels at $5H$ and $6.5H$. It is important to note that DSBSC modulation requires coherent demodulation, so phase and frequency must be identical at both transmit and receive points to avoid severe distortion.

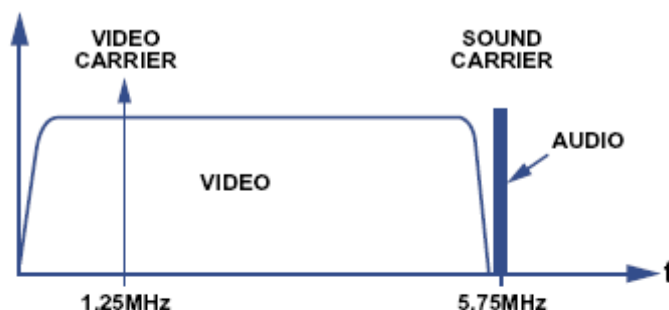


Figure 1. NTSC spectrum for a television channel.

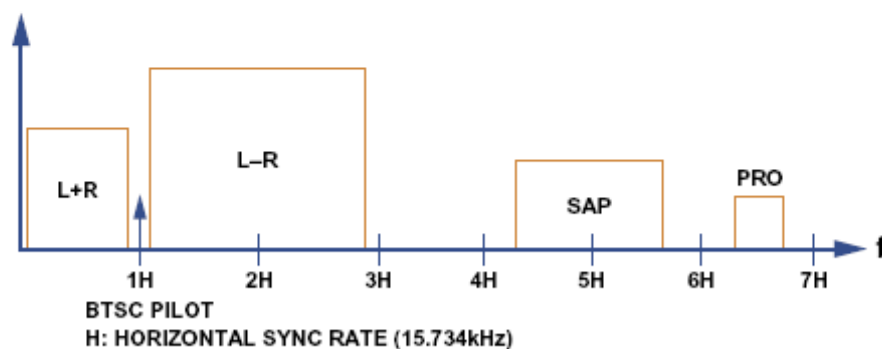


Figure 2. Audio spectrum defined by BTSC.

Applications for BTSC sound:

.1 The BTSC typical has three modes for terminal user:

.a STEREO

.b AUTO SAP

.c MONO

a.c belongs to MTS audio, and b is SAP.

User can use the key to select among stereo, mono and the secondary audio program (SAP).

Mono plays the sound in mono only.

Use this setting when receiving broadcasts with weak stereo signals;

Stereo split the incoming stereo audio signal into left and right channels; and *Enhanced* for simulated surround sound. Most TV programs and recorded materials have stereo audio. The word *Stereo* appears on the TV when you tune to a program that is broadcast in stereo.

SAP (*Second Audio Program*) plays the program's audio in a second language, if one is available. The TV displays the word SAP when you tune to a program that is broadcast with SAP information. SAP audio is broadcast in mono. SAP is also used to broadcast a program's audio with descriptions of the video for the visually impaired. Press OK to turn *SAP* on or off.

By Makin