

NTSC is the analog television system in use in the United States and in many other countries, including most of the Americas and some parts of East Asia. It is named for the National Television System(s) Committee, the industry-wide standardization body that created it.

History

The National Television Systems Committee was established in 1940 by the Quick Facts about: **Federal Communications Commission**

An independent government agency that regulates interstate and international communications by radio and television and wire and cable and satellite Federal Communications Commission to resolve the conflicts which had arisen between companies over the introduction of a nationwide analog television system in the U.S. The committee in March 1941 issued a technical standard for Quick Facts about: **black and white**

A black-and-white photograph or slide black and white television. In January 1950 the committee was reconstituted, this time to decide about color television, and in March 1953 it unanimously approved what is now called simply the *NTSC* color television standard. The updated standard retained full backwards compatibility with older black and white television sets.

The standard has since been adopted by many other countries, for example most of Quick Facts about: **the Americas**

North and South America the Americas and Quick Facts about: **Japan**

A constitutional monarchy occupying the Japanese Archipelago; a world leader in electronics and automobile manufacture and ship building Japan.

Technical details

Refresh rate

The NTSC format—or more correctly the **M** format; see Quick Facts about:

broadcast television system

Quick Summary not found for this subject broadcast television systems—consists of 29.97 Quick Facts about: **interlace**

Quick Summary not found for this subject interlaced frames of Quick Facts about: **video**

The visible part of a television transmission video a Quick Facts about: **second** 1/60 of a minute; the basic unit of time adopted under the Systeme International d'Unites second, each consisting of 480 lines of vertical resolution out of a total of 525 (the rest are used for sync, vertical retrace, and other data such as captioning). The NTSC system interlaces its scanlines, drawing odd-numbered scanlines in odd-numbered fields and even-numbered scanlines in even-numbered fields, yielding a nearly flicker-free image at its approximately 59.94

Quick Facts about: **hertz**

The unit of frequency; one Hertz has a periodic interval of one second hertz (nominally 60 Hz / 1.001) refresh Quick Facts about: **frequency**

The number of occurrences within a given time period (usually 1 second)frequency. This compares favorably to the 50 Hz Quick Facts about: **refresh rate**

Quick Summary not found for this subjectrefresh rate of the 625-line Quick Facts about: **PAL**

A close friend who accompanies his buddies in their activitiesPAL and Quick Facts about: **SECAM**

Quick Summary not found for this subjectSECAM video formats used in Quick Facts about: **Europe**

The 2nd smallest continent (actually a vast peninsula of Eurasia); the British use 'Europe' to refer to all of the continent except the British IslesEurope, where 50 Hz Quick Facts about: **alternating current**

An electric current that reverses direction sinusoidallyalternating current is the standard; the European standards have noticeably more flicker than NTSC.

Interlacing the picture does complicate editing video, but this is true of all interlaced video formats, including PAL and SECAM.

The NTSC refresh frequency was originally an even 60 Hz in the black and white system, chosen because it matched the nominal 60 Hz frequency of alternating current power used in the United States. It was preferable to match the screen refresh rate to the power source to avoid wave interference that would produce rolling bars on the screen. Quick Facts about: **Synchronization**

Coordinating by causing to indicate the same timeSynchronization of the refresh rate to the power cycle also helped Quick Facts about: **kinescope**

A cathode-ray tube in a television receiver; translates the received signal into a picture on a luminescent screenkinescope cameras record early live television broadcasts, as it was very simple to synchronize a Quick Facts about: **film**

Photographic material consisting of a base of celluloid covered with a photographic emulsion; used to make negatives or transparenciesfilm camera to capture one frame of video on each film cell by using the alternating current frequency as a shutter trigger. In the color system the refresh frequency was shifted slightly downward to 59.94 Hz.

The mismatch in Quick Facts about: **frame rate**

Quick Summary not found for this subjectframe rate between NTSC and the other two video formats, PAL and SECAM, is the most difficult part of television video format conversion. Because the NTSC frame rate is higher, it is necessary for video conversion equipment converting to NTSC to interpolate the contents of adjacent Quick Facts about: **frames**

One of a series of still transparent photographs on a strip of film used in making moviesframes in order to produce new intermediate frames; this introduces Quick Facts about: **artifacts**

A man-made object taken as a wholeartifacts, and a trained eye can quickly spot video that has been converted between formats. (See also stutter frame.)

Color encoding

For backward compatibility with black and white television, NTSC—in this area the terminology **NTSC** is technically correct—uses a Quick Facts about:

luminance

The quality of being luminous; emitting or reflecting light luminance-Quick Facts about: **chrominance**

Quick Summary not found for this subject chrominance encoding system invented in 1938 by Quick Facts about: **Georges Valensi**

Quick Summary not found for this subject Georges Valensi. Luminance is essentially the original monochrome signal, while chrominance carries color information. This allows black and white receivers to display NTSC signals simply by ignoring the chrominance information. In NTSC, chrominance is encoded as two quadrature signals: *I* (in-phase) and *Q* (quadrature). The resulting system is called Quick Facts about: **YIQ**

Quick Summary not found for this subject YIQ.

To implement this system, NTSC includes a chrominance Quick Facts about:

subcarrier

Quick Summary not found for this subject subcarrier at a frequency of 3.579545 (exactly 315/88) MHz. This subcarrier is maintained by transmitting for each

scanline a sinusoidal reference signal known as Quick Facts about: **colorburst**

Quick Summary not found for this subject colorburst, located on the Quick Facts about: **front porch**

A porch for the front door front porch, an otherwise unused period after the horizontal sync pulse and before the line of video starts. The colorburst consists of eight to ten cycles of the unmodulated subcarrier at 180° phase. Additional subcarrier is then added to the video signal in any portion of the scanline displaying color, with the subcarrier's amplitude determining color saturation and its phase in relation to the colorburst's phase determining Quick Facts about: **hue**

The quality of a color as determined by its dominant wavelength hue.

The addition of this subcarrier was what necessitated the slight downward adjustment in the refresh rate. When NTSC is modulated over a VHF or UHF carrier it has a sound signal transmitted on a carrier 4.5 MHz higher. If the signal is affected by non-linear distortion, which can happen in many receivers, the 3.58 MHz colour carrier will beat with the sound carrier to produce a stationary dot pattern on the screen. When the frame rate is adjusted the dot pattern is no longer stationary and becomes much less noticeable to the viewer.

Transmission modulation scheme

An NTSC television channel as transmitted occupies a total bandwidth of 6 MHz.

A guard band, which does not carry any signals, occupies the lowest 250 kHz of the channel to avoid Quick Facts about: **interference**

The act of hindering or obstructing or impeding interference between the video signal of one channel and the audio signals of the next channel down. The actual video signal, which is Quick Facts about: **amplitude-modulated**

Quick Summary not found for this subject amplitude-modulated, is transmitted between 500 kHz and 5.45 MHz above the lower bound of the channel. The video Quick Facts about: **carrier**

A rack attached to a vehicle; for carrying luggage or skis or the like carrier is 1.25 MHz above the lower bound of the channel. Like any modulated signal, the video carrier generates two Quick Facts about: **sideband**

Quick Summary not found for this subject sidebands, one above the carrier and one below. The sidebands are each 4.2 MHz wide. The entire upper sideband is transmitted, but only 750 kHz of the lower sideband, known as a vestigial sideband, is transmitted. The color subcarrier, as noted above, is 3.579545 MHz above the video carrier, and is Quick Facts about: **quadrature-amplitude-modulated**

Quick Summary not found for this subject quadrature-amplitude-modulated. The highest 250 kHz of each channel contains the audio signal, which is Quick Facts about: **frequency-modulated**

Quick Summary not found for this subject frequency-modulated, making it compatible with the audio signals broadcast by FM radio stations in the 88-108 MHz band. The main audio carrier is 4.5 MHz above the video carrier.

Sometimes a channel may contain an Quick Facts about: **MTS**

Quick Summary not found for this subject MTS signal, which is simply more than one audio signal. This is normally the case when Quick Facts about: **stereo audio**

Quick Summary not found for this subject stereo audio and/or Quick Facts about: **second audio program**

Quick Summary not found for this subject second audio program signals are used.

Quality problems

Video professionals and television engineers do not hold NTSC video in high regard, joking that the abbreviation stands for "Never The Same Color", "Never Twice the Same Color", or "Never Tested Since Christ." Cabling problems tend to degrade an NTSC picture (by changing the Quick Facts about: **phase**

Any distinct time period in a sequence of events phase of the color signal), so the picture often loses its color balance by the time the viewer receives it. This necessitates the inclusion of a Quick Facts about: **tint control**

Quick Summary not found for this subject tint control on NTSC sets, which is not necessary on Quick Facts about: **PAL**

A close friend who accompanies his buddies in their activities PAL or Quick Facts about: **SECAM**

Quick Summary not found for this subject SECAM systems. Some complain that the 525 line resolution of NTSC results in a lower quality image than the hardware is capable of.

There is no question the NTSC system reflects the limitations and technology of a bygone era; indeed, its compatibility with even the crudest equipment since the dawn of television has been the key to its longevity and ubiquity over five decades. The coming of Quick Facts about: **digital television**

Quick Summary not found for this subject digital television and high definition television may indeed spell its doom. There is, however, no way to predict just

how many more years its characteristic notched trace may continue to flicker across television station Quick Facts about: **waveform monitor**

Quick Summary not found for this subject waveform monitors and its basic but effective scheme continue to beam into living rooms over much of the globe.

Variants of NTSC

Unlike PAL, with its many and varied underlying Quick Facts about: **broadcast television system**

Quick Summary not found for this subject broadcast television systems in use throughout the world, NTSC color encoding is invariably used with broadcast system **M**, giving NTSC-M. Quick Facts about: **Britain**

A monarchy in northwestern Europe occupying most of the British Isles; divided into England and Scotland and Wales and Northern Ireland Britain once contemplated introducing a 405-line NTSC-A system on top of its old black-and-white television system, but the proposal was eventually scrapped in favor of the incompatible PAL-I. Only Quick Facts about: **Japan**

Japan's variant "NTSC-J" is very slightly different: in Japan, black level and blanking level of the signal are identical, as they are in PAL, while in American NTSC, black level is slightly higher than blanking level. Since the difference is quite small, a slight turn of the brightness knob is all that is required to enjoy the "other" variant of NTSC on any set as it is supposed to be; most watchers might not even notice the difference in the first place. However, some areas of Japan use 50 Hz Quick Facts about: **alternating current**

An electric current that reverses direction sinusoidally alternating current, while others use 60 Hz. Consequently, the two variants of NTSC are only mutually compatible in parts of Japan that use 60 Hz as their Quick Facts about:

alternating current

An electric current that reverses direction sinusoidally alternating current frequency, which is the same AC frequency used in North America.

Countries and territories that use NTSC

Antigua and Barbuda
Aruba
AntillesArubaQuick
Barbados
Belize
Bermuda
British Virgin Islands
Canada
Cayman Islands
Costa Rica
Cuba
Dominica
Dominican Republic
El Salvador

Guatemala
Grenada
Haiti
Honduras
Leeward Islands
Montserrat
Netherlands Antilles
Nicaragua
Mexico
Panama
St. Kitts and Nevis
St. Lucia
St. Vincent
Trinidad and Tobago
United States
U.S. Virgin Islands
Bolivia
Chile
Colombia
Ecuador
Guyana
Jamaica
Peru
Suriname
Venezuela
Japan
Myanmar
Philippines
South Korea
Taiwan
Vietnam
American Samoa
Diego Garcia
Fiji
Guam
Marshall Islands
Micronesia
Midway Atoll
Palau
Samoa
Samoa