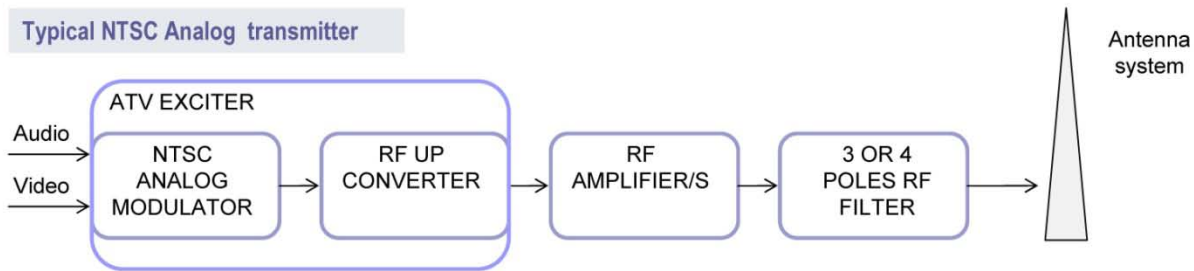


***This month:***

## Analog and Digital Television

**The Analog Broadcast Television system (ATV)** is the television technology that uses analog signals to transmit audio and video. The audio/video signal, generated from the studio/production is modulated and amplified. This signal is converted with an IF section and a LO (local oscillator) to the frequency that must be radiated. This frequency is amplified and filtered so that it fits into the desired channel. The signal is applied to the antenna system which then broadcasts it.

Typical NTSC Analog transmitter



**The Digital Broadcast Television system (DTV)** is the transmission of audio and video by digitally processed and multiplexed signal, in contrast to the totally analog and channel separated signals used by analog television.

When the first analog color television broadcast began, different systems were utilized in different countries (**PAL** system mainly in Europe, **NTSC** mainly in the US and the Americas, **SECAM** mainly in France and USSR). In the same way, different systems were created and adopted by different countries for digital television. Therefore, in Europe, **DVB-T** is the main system; the US and Mexico have **ATSC**, Japan uses **ISDB-T**, and Central and South America use a slight variation of the Japanese system which is **ISDB-Tb**.

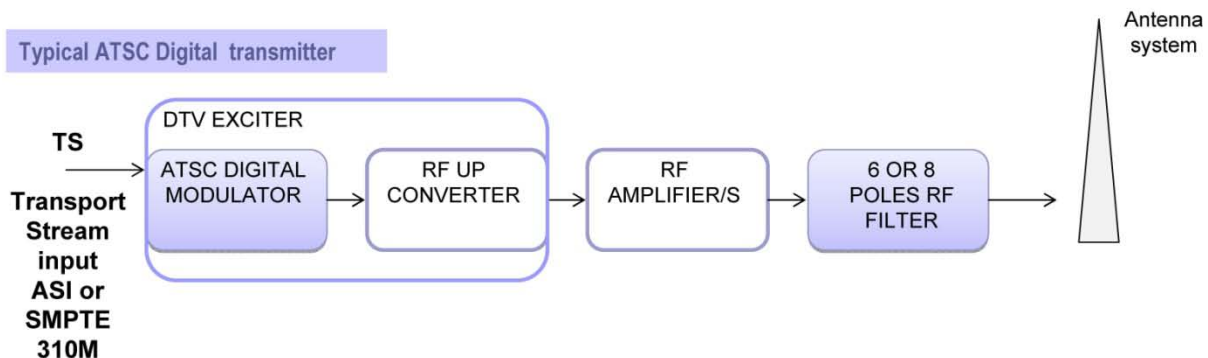
Every system has different characteristics:

**DVB-T** uses coded orthogonal frequency-division multiplexing (**OFDM**) modulation and supports hierarchical transmission.

Advanced Television System Committee (**ATSC**) uses eight-level vestigial sideband (**8VSB**) for terrestrial broadcasting.

**ISDB-T** (integrated Services Digital Broadcasting) utilizes **OFDM** and two-dimensional interleaving. It supports hierarchical transmission of up to three layers and uses **MPEG-2 video** and **Advanced Audio Coding**.

Typical ATSC Digital transmitter



## DIGITAL POWER & COVERAGE ISSUES

In the traditional Analog Broadcast System the power is measured and indicated in **Watt/Peak**; In the Digital Broadcast System the power is measured in **Watt/RMS**.

This difference between the measurement systems is due to the different kind of signal/modulation that is radiated.

**The DIGITAL STANDARDS guarantee good reception and decoding at a lower RF receiving level than the analog ones.**

Therefore, with the same radiated power, the digital transmitter will cover a bigger area than the analog one. In other words, the Digital Transmitter needs less power than an Analog one to cover the same area.



For example: An analog NTSC transmitter, switched to Digital ATSC standard, can typically give an average power in **Watt/RMS** of about 40/50 % of its original power in **Watt/Peak**.

If we broadcast with the ISDB-Tb system (Central and South America) the power in **Watt/RMS** will be of about 30/35% of its original power in **Watt/Peak**.

The difference in the two systems is due to the fact that **ATSC channel** occupies only **6 Mhz** while **ISDB-Tb** like almost all the other systems, occupies **8 Mhz**.

## ANTENNA ISSUES WITH DIGITAL TRANSMISSION ?

Because the channels and the frequencies are the same, if the antenna system was well dimensioned for analog transmission, there should not be any problems with the digital broadcasting. However, if the system has been in place for many years, it would be advisable to replace cables and connectors which are the most delicate part of the system. Another thing to consider is that, if you increase your power, your current system may not be able to handle it. Therefore, it would be a good idea to check what power your antenna system is rated for.



## SOURCE CODING FOR DIGITAL TRANSMITTER

Digital transmission requires a TS (**Transport Stream**) as input.

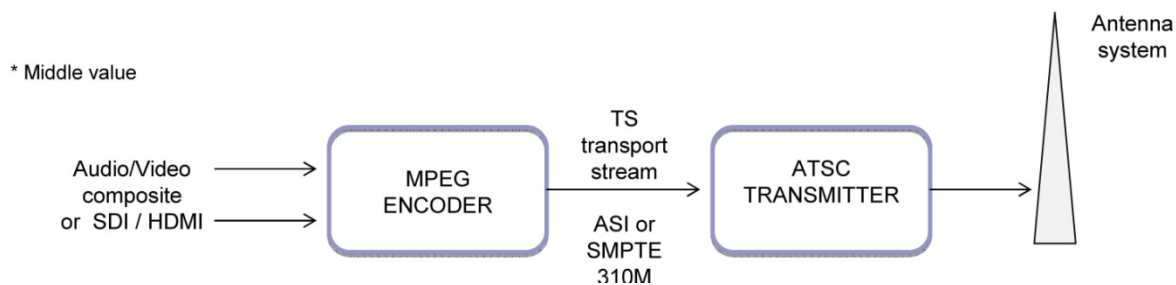
This stream can be generated from an Encoder, whose function is to compress the A/V or SDI signal without deteriorating the source quality.

Today's compression technology includes:

**MPEG-2** usually utilized in standard definition (SD) (as in HD it will take much space) – SDTV at 3-6 Mbit/s \*

**MPEG-4 / H.264** working either in SD or High definition (HD) – SDTV at 1-3 Mbit/s\* - HDTV at 7 – 10 Mbit/s \*

\*Average values



Example of single program in a Digital Channel

# MULTIPLEXING

The **Transport Stream (TS)** can be composed by:

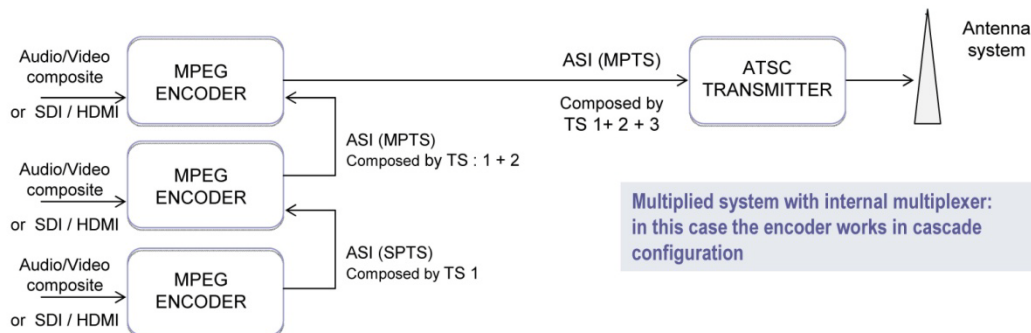
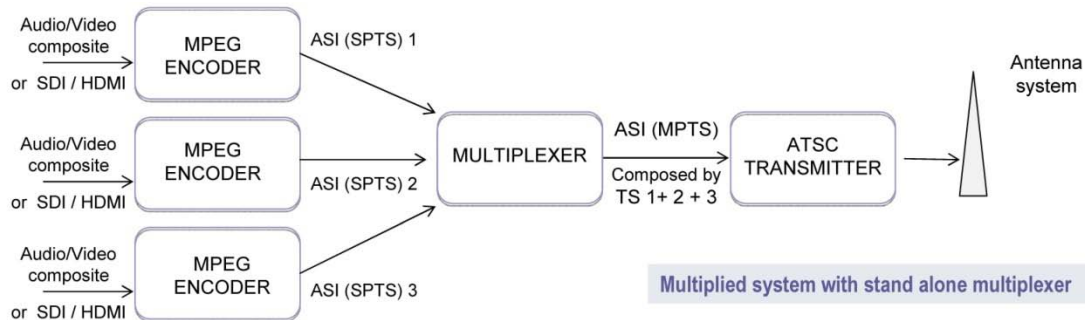
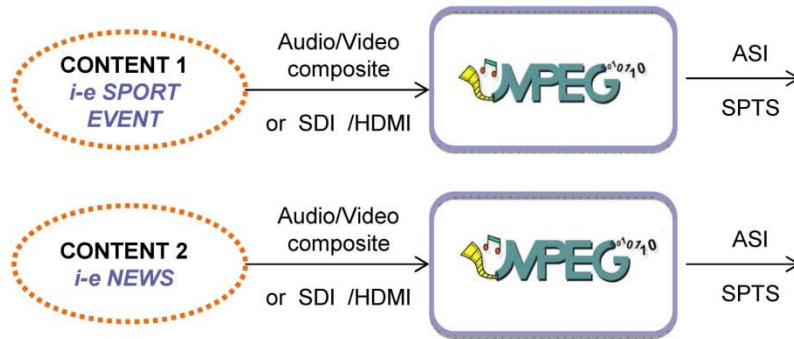
- SINGLE PROGRAM (SPTS)
- MORE PROGRAMS (MPTS)

A single encoder can manage one program.

So to achieve a multiple program stream (MPTS) more encoders are needed (one for every program).

An Encoder provides an ASI signal at its output. More ASI signals can be summed with a device called **MULTIPLEXER** and then sent to the digital modulator. The multiplexer device can be either built into the Encoder or assembled in a separate box.

Here are some examples:





## What are the Key innovation factors of Digital Transmission ?

- 1) Possibility of broadcasting more programs per channel
- 2) High Spectral Efficiency
- 3) Lower ERP requirement
- 4) Better Audio Video Definition ( SD, HD, HEVC)
- 5) Multiple Audio (for example for multi-language purposes)

### HOW TO DECIDE TO MOVE TO DIGITAL

In the majority of cases, the choice is mandatory because the Authorities may have implemented a deadline to switch over to Digital transmission. However, in some circumstances, there is still the possibility of Analog transmission, at least until allowed to do so. NICOM has working on a new professional TV Transmitter line that is able to work in both Analog or Digital at the same time. No need to change parts, no need for new software, everything is on board ready to go. Furthermore, we found a way to lower our costs so that our Transmitters will be very competitive on the market. These transmitters will be customized for every Digital System that is used at the moment in every Country.

In this way we can upload in every transmitter the software for the Analog System used in that particular Country as well as the software for the Digital System that is required.

**For Example:** When we sell a transmitter in the US, it will carry on board both NTSC and ATSC systems.

If we sell a transmitter to Honduras, it will carry NTSC and ISDB-Tb system.

Furthermore, for distributors that would want to keep units in stock ready to go, we can offer the option to upload two Digital Software at the same time so that they can set the unit for example either for ATSC or ISDB-Tb before selling it without any technical modification.

Nicom will offer a different range of power levels for any Digital System starting with 50W up to 1000W.

All transmitters come with a built-in output filter for lower powers, external in case of higher power.



## Contact Us



your request is welcome

Do not hesitate to contact Nicom Sales Department at 619-671-9500 to request technical specifications and pricing!