



Using COFDM in Cable TV

Cable TV networks are going through a process of digitalisation of their services and are facing important investments. **PROMAX** proposes the use of **COFDM modulation** scheme instead of usual QAM modulators. This method allows a much easier access to the subscribers with **implementation costs that can be dramatically reduced**. In addition the system is more robust.

QAM: the one and only alternative for digital CATV?

Traditionally, the QAM digital modulation has been associated to CATV networks transmissions. The main reason is the high compression level using this kind of modulation that allows including up to 10 standard quality programs per channel. This characteristic makes it very suitable to take the most of the free spectrum in the installed network.

Nevertheless the main disadvantage of this system is the QAM modulation, which is **quite vulnerable to the external interferences**. This problem is solved using high quality cables, properly isolated to protect the information transmitted.

The most CATV networks of the world are absolutely involved in the digitalization process and the broadcasters must face to very important investments. First of all, the **head equipments** to transmit the digital signal **must be replaced**, secondly all the users must **replace their analogue decoders** for QAM digital decoders too, and this is not a cheaper operation. On the other hand if the change is carry on, a high quality image and a great range of channels will be offered.

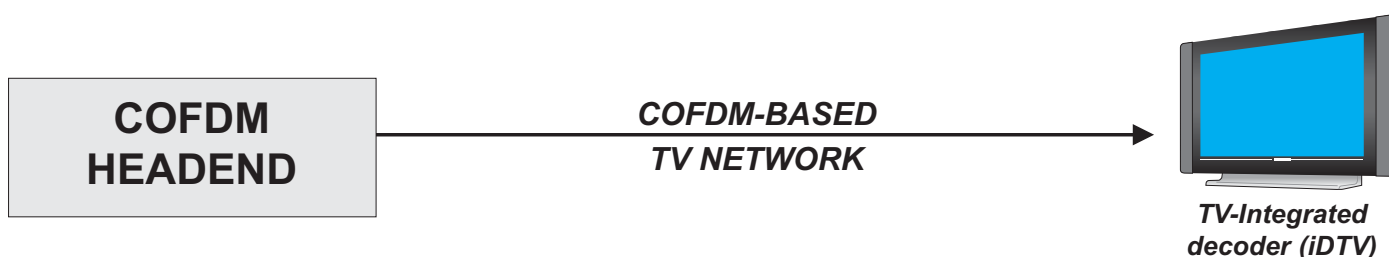


Standard digital CATV network configuration: Expensive headend QAM modulators and subscriber extra cost due to all the QAM decoders must be rented or bought

COFDM: a cheaper choice both for subscribers and broadcasters

Up to know all this process has been a simple routine with no choice. Simply choose the head equipments and the QAM modulators depending on the quality/price that we are looking for and the networks necessities.

Nowadays a **cheaper system** is able to reduce drastically the investments of the head equipments. These equipments have been developed thanks to **PROMAX Electronica**. PROMAX Electronica has found the best solution and his project propose to **place the COFDM modulators instead of the QAM decoders**. With this change not only a **higher robustness** signal is achieved, what is more the equipments **costs are drastically reduced**.



PROMAX Electronica propose an alternative. The Headend PROMAX COFDM modulators are cheaper and nowadays a lot of subscribers have a decoder or will have one in a few months

Although it is represents a **considerable save** of money, this is just a little percentage. **The most important save is obtained at the subscriber house**. Using the COFDM **PROMAX** Modulator the QAM decoders are not necessary due to a great group of users have a TV with a DTT integrated or external DTT decoder and they can enjoy the DTT that is transmitted by aerial.

If they do not have it today, they will have it sooner because in a few months all the TV's will have a DTT tuner integrated. Only one step is necessary, tune all the DTT decoders and enjoy with all the images transmitted via CATV in your screeners.

Free channels and scrambled channels

COFDM modulated and not scrambled Basic bouquets are offered by some television networks, in this way the potential costumers that are connected to the free services are exposed to the private publicity that are broadcasted by their free own channels. The services that require an additional payment are transmitted properly scrambled and could be decrypted. A DTT decoder with decrypter module should be supplied to the subscriber.

Nevertheless.... How many networks costumers would pay for these bouquets? This is a variable rate depends on the area and it can be easily controlled. In those cases the investment will be the same as the QAM system transmission.

In CATV transmissions the COFDM modulation efficiency is something smaller. Approximately half of programs could be transmitted per channels. However, the 100 % of the spectral capacity is not used by any TV cable network. Taking in account only the UHF band, approximately 240 different programs are given out in 48 channels, 5 programs per transponder. Moreover the entire VHF band is completely empty, so that this efficiency is not a real limitation.

A Wide range of PROMAX Electronica modulators

The great range of COFDM modulators are growing up day by day. It makes PROMAX Electronica modulators especially suitable for all the project.

MO-170

This equipment has been specially developed such a **test and distribution signal instrument**. It can not be synchronized with RF networks for that reason can not be used in operators networks. Nevertheless it is perfectly suitable for any other application.

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|-----------------|---|
| OP-170-P | 6 dBm Output power amplifier |
| OP-170-S | Allows the remote control using the SNMP protocol which is commonly used in broadcast and instrumentation |
| OP-170-H | Allows to transmit DVB-H signal. (TV for mobile devices). |
| OP-170-E | White noise generator for C/N testing. Fixed and portable channel simulation in SFN/MFN networks |



MO-180

The MO-180 has been specially designed for **Broadcasting applications**. The modulator could be fully synchronized with the RF network and makes possible all the broadcast applications.

The following features are included by the **MO-180**:

- Fully synchronizable with all the RF operators networks. This allows the modulator to work in all kind of applications.
- The output power is adapted to RF broadcasting input levels
- The necessary Non-Linear Pre-Distortion (NLPD) and crest factor blocks reduction are included to guarantee the correctly transmission using a power amplifier
- Remote control using the SNMP protocol, which is commonly used in broadcast and instrumentation.
- DVB-H signals (TV for mobile devices) broadcasting are included.



MO-160 and MO-161

These equipments have been designed to obtain the maximum quality with the minimum level of features using a Transport Stream input. The **MO-160** is able to work in the UHF band and the **MO-161** is designed to run in all the TV spectrum. Both of them are the most suitable to work in CATV networks which need to generate a lot of COFDM channels.

MO-162 and MO-163

The **MO-162** and **MO-163** are the best choice if you need QPSK-COFDM modulators. These equipments have the same features that the **MO-160** and **MO-161**. What is more a Satellite receptor is included. It allows receiving signal of a transponder using a satellite dish and chooses only the programs that will be modulated in the RF output using COFDM. As the **MO-160/MO-161**, two versions are available depending on the desired output band.

