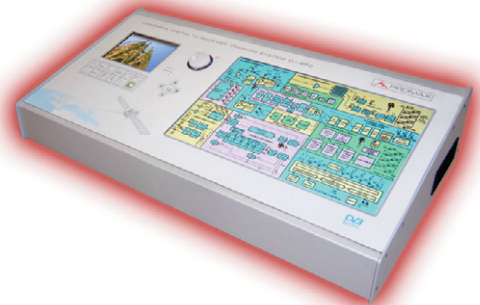


DVB-T Transmitter-Receiver System

OPT-850-A optional kit consists of one QPSK to COFDM transmodulator, two yagi antennas, cables and connectors. It allows to **widen the EU-850 applications**, making it perfect for Digital Television analysis laboratory.

The transmodulator allows to **obtain a COFDM DVB-T signal** with the desired parameters (number of carriers, code rate, constellation, guard interval..) and with selectable frequency (from 45 to 875 MHz) and ready to broadcast by means of an antenna or a cable TV network



Thanks to the possibility of **DVB-T signals broadcasting** through an antenna it is possible to simulate a real broadcast transmission. Moreover, using an additional antenna it makes possible the analysis of the DVB-T signal including every parameter involved, in such way that the student is able to understand the pros and cons of the different configurations.

By means of the use of **OPT-870-A** option the student will experience every concept related to DVB-T:

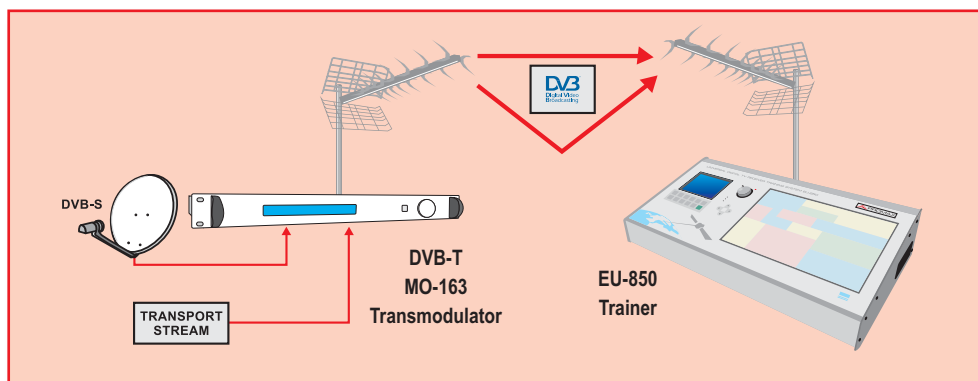
- Number of carriers (2K or 8K).
- Constellation (QPSK, 16-QAM, 64-QAM).
- Guard interval.
- Code rate.
- Hierarchical Transmission.
- Bitrate.
- Bandwidth.
- Spectral inversion.
- Transmitted power.
- Etc.

The chance to **change the parameters of the DVB-T** makes possible for the student to experiment on the results of them on the transport stream.

The transmodulator can use an external transport stream or generate it internally. The external transport stream will be **generated from the DVB-S input** (the transmodulator will use its built in DVB-S receiver) or directly from its serial input (ASI); in both cases the student can adjust the transport stream bitrate to adapt it to the input speed required.

OPT-850-A consists of:

- MO-163 transmodulator.
- 2 high performance UHF Yagi antennas.
- Coaxial cable.
- Connectors.
- Practice manual (with theory).
- Instructions manual.



OPT-850-A makes possible to transmit from a MPEG-2 transport stream or using a DVB-S as input.



Recommended equipment:

Digital Oscilloscopes	OD-410, OD-460 / Series OD-57x, OD-59x.
TV signal generators	GV-998

Transmitter-Receiver DVB-T System

SPECIFICATIONS	EU-850
TUNING	From 45 to 865 and from 950 MHz to 2150 MHz
DIGITAL RECEPTION	Terrestrial (COFDM), Satellite (QPSK) and Cable (QAM). MPEG-2/DVB (MP@ML). Services decoding, service list and PIDs.
ANALOGUE RECEPTION	Terrestrial (PAL, SECAM, NTSC, standards M, N, B, G, I, D, K and L).
FEATURES	Automatic identification of Analogue and Digital signals. 5" TFT-LCD Colour, Scart. Built-in loudspeaker. Spectrum analyser. Active block diagram with Test Points. External units power supply, 22 kHz signal and DISEqC 1.2.
DIGITAL MEASUREMENTS & PARAMETERS	
COFDM	Power, CBER, VBER, MER, C/N. 2k / 8k (Selectable by the user). 1/4, 1/8, 1/16, 1/32 (Selectable by the user). 1/2, 2/3, 3/4, 5/6, 7/8.
Carriers	QPSK, 16-QAM, 64-QAM.
Guard interval	Selectable: ON, OFF.
Code Rate	Hierarchic mode indication.
Modulation	Power, BER, MER, C/N.
Spectral inversion	16/32/64/128/256 QAM.
Hierarchy	1000 a 7000 kbauds.
QAM	Selectable: ON, OFF.
Demodulation	Power, CBER, VBER, MER, C/N.
Symbol rate	From 2 to 45 Mbauds.
Spectral inversion	1/2, 2/3, 3/4, 5/6, 7/8 and AUTO.
QPSK	Selectable: ON, OFF.
Symbol rate	
Code Rate	
Spectral inversion	

SPECIFICATIONS	MO-163
INPUTS	
QPSK	F female connector, From 950 to 2150 MHz (between -65 to -25 dBm).
MPEG-2 Transport Stream	2xASI, 75 Ω BNC f. 188/204 bytes packets auto detec. Burst / continuous packet modes.
Operating modes	Master and slave mode.
IF OUTPUT	
Frequency range	50 Ω BNC female connector.
Spectrum polarity	From 32 to 36 MHz (1 Hz steps). Fixed at 36 MHz when RF output is off.
Power level (average)	Selectable via front panel controls.
In-band amplitude ripple	0 dBm (107 dBmV) fixed.
In-band group delay ripple	< 0.2 dB.
Frequency stability	< 10 ns.
Out-of-band spectral characteristics	20 ppm.
@ ± 3.805 MHz	0 dBc.
@ ± 4.25 MHz	-46 dBc (2k), -56 dBc (8k).
@ ± 5.25 MHz	-56 dBc.
IQ amplitude imbalance	< 0.02%.
IQ quadrature error	< 0.02°.
Central carrier suppression	< -55 dBc.
Harmonics and spurious	< -60 dBc.
MER	> 43 dB.
RF OUTPUT	
Spectrum polarity	50 Ω N-type female connector. From 45 to 875 MHz (1 Hz steps).
Power level (average)	Selectable via front panel controls.
Level of harmonic and spurious	-87 to -27 dBm in 1 dB steps (optional up to +6 dBm).
Frequency stability	< -50 dBc.
MER	20 ppm.
SSB phase noise	> 36 dB.
	≤ -87 dBc/Hz @ 2 kHz.
DVB-T PARAMETERS	
IFFT size	2k, 8k.
Guard intervals	1/4, 1/8, 1/16, 1/32.
Code rates	1/2, 2/3, 3/4, 5/6, 7/8.
Symbol interleaver	Native.
Constellations	QPSK, 16-QAM, 64-QAM.
Hierarchical modes	16QAM and 64QAM constellations with constellation ratio α = 1, 2 or 4.
MFN operation	Available.
TPS signalling	Cell ID.
Channel bandwidth	6, 7 and 8 MHz (user selectable).
PROGRAM SELECTION	Service selection without table rebuilding (PID Filtering).
REMOTE CONTROL	Fast Ethernet (RJ-45 connector).
POWER SUPPLY	90 - 250 V AC (50 - 60 Hz), 20 W.