

## *E-Compact*

*Less energy. More power.*

## MP Series - EX8001

High Efficiency UHF Transmitters

ISDB-T TV Digital: 150 to 300 Watts RMS



English

-  ISDB-T  
Digital TV Standard
-  High Efficiency
-  Redundant Power Supply
-  Smart Fan Control
-  Automatic Linearization
-  Embedded WEB Server
-  Remote Access
-  SFN
-  BTS Decomp
-  Remux
-  Conditional Access
-  Surge Protector

## MP Series

E-Compact Family of Medium Power UHF Digital TV Transmitters features fully solid-state drivers, air-cooled and is structured on standard 19" cabinets.

Its compact design combines high power density per amplifier module and efficient energy consumption, embedded with Real Time A-DPD pre-correction technology that allows to recover MER values in an imperceptible way if there are changes in the equipment output power.

It features the option of Dual Exciter drivers, providing automatic redundancy to the equipment without the need for management by a separate control module.

Based upon Doherty topology Broadband Power Drawer delivers High performance with efficiency up to 38%.

High reliability against power failures.

## Highlights



- ISDB-T EX8001-V4 Exciter.
- Full Equipment control, including Power Drawers, performed by the Exciter Driver, dispensing the need for external control units.
- Power Drawers with high efficiency Doherty topology, operating from 250 W RMS to 370 W RMS @ ISDB-T.
- Real Time A-DPD function automatic non-linear pre-correction and linear pre-correction.
- Built-in parameterizable BTS decompressor, compatible with other brands.
- Embedded remux, allows the signal adjustment according to the need for transmission.
- Onboard satellite receiver, with Free to Air, IRDETO<sup>3</sup>, CONAX<sup>3</sup>, BISS, VERIMATRIX<sup>3</sup> and NAGRAVISION<sup>3</sup> license options.
- Automatic fan speed control, resulting in low noise levels, energy savings and longer device life.
- "Easy Maintenance" concept offering, among others, Plug-In connection for Power Supplies and Power Drawers.
- Up to two power supplies per transmitter, operating in "Share" mode, allows for different levels of power redundancy.

## Available resources

<p><b>Easy Maintenance concept</b> Power Supplies and Power Drawers with plug-in connection, does not require the use of cables and wiring, allowing quick and safe replacement.</p>	<b>STANDARD</b>
<p><b>Embedded WEB Server</b> Remote access<sup>1</sup> of the settings and management of the transmitter through the Ethernet<sup>2</sup> port is possible, using a PC or Smartphone browser, without the need to install drivers or applications.</p>	<b>STANDARD</b>
<p><b>Real Time A-DPD Linear and Nonlinear Pre-Correction</b> Imperceptible Automatic pre-correction applied due to changes in transmitter output power to recover MER values and intermodulation.</p>	<b>STANDARD</b>
<p><b>BTS Decompression</b> Parameterizable BTS decompressor, embedded in the Transmitter, eliminating the use of auxiliary devices in the system, thus permitting interoperability with other brands.</p>	<b>STANDARD</b>
<p><b>Embedded Remux</b> PID filtering, insertion of PSI/SI static tables, Virtual Channel configuration and TMCC parameterization.</p>	<b>STANDARD</b>
<p><b>Exciters Inputs / Outputs</b> <i>Inputs:</i> BTS/TS over IP, 2x ASI/310M, 1PPS, 10MHz e ANTENA GPS. <i>Outputs:</i> 2x ASI/310M, 1PPS, 10MHz, 2x USB 2.0 Type B, USB 2.0 Type A and Ethernet<sup>2</sup> RJ45. <i>The BTS/TS over IP input can be converted to ASI and made available on the ASI/310M outputs without interfering with the modulating signal.</i></p>	<b>STANDARD</b>
<p><b>Passive Elements</b> Critical Mask Filter (50dB), RF probe with low pass filter after mask filter.</p>	<b>STANDARD</b>
<p><b>1200 W Power Supply</b> Power Supplies with plug-in type connection ("Easy Maintenance" concept), eliminates the use of cables and wiring, for quick and safe replacement. EC702MP: 01 power supply present in the Power Module. EC704MP operating up to 250 Watts RMS after filter: 01 power supply present in the Power Module. EC704MP operating from 250 to 300 Watts RMS after filter: 02 power supplies present in the Power Module.</p>	<b>STANDARD</b>
<p><b>Digital manuals in English.</b></p>	<b>STANDARD</b>
<p><b>Dual Exciter</b> Backup driver, which allows automatic redundancy, without the need for management by a separate control module.</p>	<b>OPTIONAL</b>
<p><b>Ethernet<sup>2</sup> Switch standard cabinet 19"</b> Standard with the Double Excitement option.</p>	
<p><b>Instrumental through Software</b> Pre-correction tool, MER reading, constellation and spectral density (GUI8001).</p>	<b>OPTIONAL</b>
<p><b>GPS time base</b> High precision time base sync via GPS. High performance running on SFN (Single Frequency Network). Features an external GPS antenna and surge protector.</p>	<b>OPTIONAL</b>
<p><b>UHF Tuner (Terrestrial Reception)</b> ISDB-T UHF receiver and demodulator for terrestrial signal retransmission. It comes with a 5 or 7 pole mechanical tuning filter, depending on the conditions of the adjacent channels.</p>	<b>OPTIONAL</b>
<p><b>SAT Tuner (Satellite Reception)</b> L-Band DVB-S/S2 receiver compatible with C-band and Ku-band LNBs. Electric surge protector included.</p>	<b>OPTIONAL</b>
<p><b>CAS Tuner (Satellite Reception with Conditional Access)</b> L-Band DVB-S/S2 receiver compatible with C-band and Ku-band LNB. It performs the decryption of up to 04 services simultaneously and visualization of up to 08 services on the display. Electric surge protector included.</p>	<b>OPTIONAL</b>
<p><b>Decryption Licenses for CAS Tuner: IRDETO<sup>3</sup>, CONAX<sup>3</sup>, BISS-1, NAGRAVISION<sup>3</sup> and VERIMATRIX<sup>3</sup></b> Decryption licenses can be purchased individually or together, for new transmitters or for transmitters that are already in field operation. In some cases it is possible to enable licenses remotely.</p>	<b>OPTIONAL</b>
<p><b>Remote telemetry over GPRS</b> Transmitter remote monitoring using the GPRS cell phone network.</p>	<b>OPTIONAL</b>
<p><b>Redundant Power Supply</b> It has a compartment to accommodate up to 02 Power Supplies of 1,200W each, operates in "Share" mode when the 02 Supplies are present. 100% redundancy for power supplies. Optional for EC702MP and EC704MP operating at up to 250 Watts RMS after filter.</p>	<b>OPTIONAL</b>
<p><b>Manuals printed in English.</b></p>	<b>OPTIONAL</b>

## General features

Mounting in standard 19" Rack cabinet;

Fully solid state;

250 Watts or 370 Watts RMS Doherty Power Drawers with LDMOS Transistors;

Air cooled;

Automatic restart in case of power failure;

Operates on SFN (Single Frequency Network) and MFN (Multiple Frequency Network);

All equipment controlled and managed by firmware;

Access to settings and management of parameters via display interface on the front panel of the Exciter or remote<sup>1</sup> via Ethernet<sup>2</sup> (WEB server or SNMP);

Alarm signaling LEDs present on the front panel of the Exciter and Power Drawer;

Access the list of current or occurred alarms via display interface on the front panel of the Exciter or remotely<sup>1</sup> via WEB interface;

VSWR and Overpower protection via hardware and software, with automatic power reduction;

Software protection against module temperature increase, with alarm signaling and power reduction;

Automatic fan rotation speed control;

Automatic quiescent bias current compensation of power transistors as a function of temperature;

Transistor AGING compensation adjustment via Exciter front panel display;

USB communication drivers;

Automatic and programmable input switching in hold on and hold off modes;

Power supply with PFC (Power Factor Correction) and soft starter with In-Rush limitation.

## Models and their specific characteristics (EX8001 - ISDB-T)

	EC702MP* Available with EX9001	EC704MP* Available with EX9001
Output power after filter <sup>4</sup>	150 W	300 W
Output power before filter <sup>4</sup>	211 W	400 W
AC consumption <sup>4</sup>	750 W (Typical)	1170 W (Typical)
Thermal dissipation <sup>4</sup>	2047 BTU/h (Typical)	2969 BTU/h (Typical)
Efficiency after filter <sup>4</sup>	20,0 % (Typical)	25,6 % (Typical)
Efficiency before filter <sup>4</sup>	28,1 % (Typical)	34,2 % (Typical)
Exciter Dimensions height x width x length ; Weight	1 RU x 19 in x 505 mm (19 7/8 in) 7,0 Kg (15,4 lb)	
Power Drawer Dimensions height x width x Length	2 RU x 19" x 635 mm (25 in)	
Power Drawer Weight	16,2 Kg (35,7 lb)	19,0 Kg (41,9 lb)
19" Rack Units	8 RU	

\*Equipment also available with EX9001 exciter (consult specific catalogue).

## Transmission Spectrum Mask (Intermodulation) <sup>6</sup>

	Critical Mask	Subcritical Mask	Non-critical Mask
±3,15 MHz @ BW = 6 MHz	≥50 dB	≥43 dB	≥36 dB
±4,50 MHz @ BW = 6 MHz	≥67 dB	≥60 dB	≥53 dB
±9,00 MHz @ BW = 6 MHz	≥97 dB	≥90 dB	≥83 dB
±15,00 MHz @ BW = 6 MHz	≥97 dB	≥90 dB	≥83 dB

Transmission spectrum mask according to ABNT NBR 15601:2007

## Technical Characteristics

RF	
<b>Standard</b>	ISDB-T
<b>Operation frequency</b>	470 MHz to 806 MHz (Chanel 14 to Chanel 69)
<b>Bandwidth</b>	6 MHz / 8 MHz
<b>Minimum operating power</b>	10 % of rated power <sup>10</sup>
<b>Pré-correction</b>	A-DPD – Non linear Pré-correction Linear
<b>Typical MER <sup>4</sup></b>	≥38 dB
<b>Out-of-channel spurs and harmonic distortions</b>	Better than -60 dBc
<b>Transmission Mask (Intermodulation)</b>	Critical mask
<b>Power stability</b>	±2 %
<b>RF output impedance</b>	50Ω
<b>Output Connections</b>	N-Female DIN 7/16" Female EIA 7/8" EIA 1 5/8"

ASI Inputs / Outputs	
<b>Quantity</b>	02 inputs, 02 Outputs
<b>Standard</b>	DVB-ASI 188 /204 BYTES
<b>Connectors</b>	BNC Female
<b>Impedance</b>	75 Ω

Input TSoIP	
<b>Standard</b>	IEEE802,3u 10 Base-T /100Base TX
<b>Connector</b>	RJ45
<b>Encapsulation</b>	UDP/RTP
<b>IP assignment</b>	Static
<b>Multicast</b>	IGMP v2

GPS antenna input (optional)	
<b>Connectors</b>	SMA Female
<b>Impedance</b>	50 Ω
<b>Accessories</b>	External antenna, cable and surge protector

UHF tuner input (optional)	
<b>Reception band</b>	UHF
<b>Standard</b>	ISDB-T
<b>Connectors</b>	SMA Female (Exciter) N Female (input UHF filter)
<b>Impedance</b>	50 Ω

Satellite tuner input (optional)	
<b>Reception band</b>	L band
<b>Polarization</b>	Vertical / Horizontal
<b>LNB voltage</b>	+13 V, +18 V
<b>Standard</b>	DVB-S / DVB-S2
<b>Connectors</b>	SMA Female (Exciter) F Female (connection w/ LNB)
<b>Impedance</b>	75 Ω
<b>Accessories</b>	surge protector

CAS tuner input (optional)	
<b>Reception band</b>	L band
<b>Polarization</b>	Vertical / Horizontal
<b>LNB voltage</b>	+13 V, +18 V
<b>Standard</b>	DVB-S / DVB-S2
<b>Connectors</b>	SMA Female (Exciter) F Female (connection w/ LNB)
<b>Impedance</b>	75 Ω
<b>Optional decryption licenses<sup>3</sup></b>	IRDETO CONAX NAGRAVISION VERIMATRIX BISS-1
<b>Accessories</b>	surge protector

10MHz external references - Input / output	
<b>Quantity</b>	01 input, 01 output
<b>Connector</b>	BNC Female
<b>Impedance</b>	50 Ω
<b>Input level</b>	0 a +10dBm
<b>Output Level</b>	+10 dBm

1PPS external references - Input / output	
<b>Quantity</b>	01 input, 01 output
<b>Connector</b>	BNC Female
<b>Impedance</b>	1 kΩ
<b>Input level</b>	3V3 LVTTTL
<b>Output Level</b>	3V3 LVTTTL

Linearization inputs. After Filter / Before Filter.	
<b>After Filter Input</b>	Linear pre-correction
<b>Before Filter Input</b>	Nonlinear pre-correction
<b>Connector</b>	SMA Female
<b>Impedance</b>	50 Ω
<b>Input level</b>	-5 to +5 dBm



## Local oscillator

<b>Oscillator</b>	Synthesized by PLL
<b>Frequency stability</b>	±1 Hz (with Internal GPS) ±35 Hz (without Internal GPS)
<b>Phase noise</b>	≤-95 dBc/Hz @ 1 kHz

## ISDB-T Modulation

<b>Mode OFDM</b>	Mode 1: 2K (2048/3,96 KHz) Mode 2: 4K (4096/1,98 KHz) Mode 3: 8K (8192/0,99 KHz)
<b>Guard interval</b>	1/4, 1/8, 1/16, 1/32
<b>Partial reception</b>	Single segment for mobile devices (1-Sec)
<b>Hierarchical Transmission</b>	Support for 3 layers (A, B and C)
<b>Segments</b>	1 to 13
<b>Modulation</b>	QPSK, DQPSK, 16QAM, 64QAM
<b>FEC</b>	1/2, 2/3, 3/4, 5/6, 7/8
<b>Time Interleaving</b>	0, 1, 2, 4

## Electrical Characteristics

Model	PSU	AC Power	Maximum power after the filter
EC702MP <sup>5</sup>	1 to 2	180 to 254 VAC	150 Watts
EC704MP	1	180 to 254 VAC	250 Watts
EC704MP <sup>5</sup>	2	180 to 254 VAC	300 Watts
<b>AC Frequency</b>		43~63 Hz	
<b>PFC</b>		0.95 (typical), 0.9 (minimum)	

## Interfaces

<b>Equipment local control interface</b>	Display LCD 2x40 An keyboard
<b>Signaling leds</b>	Alarm LEDs on the exciter and power drawers
<b>USB</b>	USB 2.0 type B (rear panel) USB 2.0 type A (front panel) USB 2.0 type B (front panel)
<b>Remote access</b>	Connector RJ45 (front panel) Format IEEE802.3u 10 Base-T /100Base TX
<b>Communication interfaces</b>	Ethernet <sup>2</sup> WEB server SNMP Interface GUI8001

## Environment Features

<b>Operating altitude</b>	Up to 2500 meters <sup>7</sup> (8200 ft) <sup>7</sup> above sea level
<b>Environment temperature range</b>	0°C (32°F) to + 45°C (113°F) +25°C (77°F) recommended
<b>Environment humidity range</b>	0 to 95 % non-condensing
<b>Power amplifier cooling</b>	Forced ambient air, front-to-rear flow through high-volume integral fans

## Additional Information

MER ≥ 38 dB for 300 Watts RMS after filter @ EC704MP<sup>5</sup>.  
MER ≥ 38 dB for 150 Watts RMS after filter @ EC702MP<sup>5</sup>.

## Mounting Options



### Desktop

Equipment mounted on a mechanical support for fixing all peripherals and accessories to the transmitter, including the optional ones;  
Transmitter and its peripherals/fixes accessories, forming a single set;  
Support compatible with fixation on 19" Racks;  
Filter attached directly to the mechanical support.



## Rack

Standard 19" rack in 8U size aluminum with reinforced frame;

Connection interfaces available on the top panel of the Rack;

Filter attached to independent rack support

Removable coin-beam rack side and rear panels: easy access and organization of internal devices;

AC power protection circuit;

Three to four vacant slots to accommodate options or other standard 19" rack equipment;

## Notes:

- <sup>1</sup> Consult factory to use transmitter Web Interface access on the same network with multicast stream.
- <sup>2</sup> Ethernet is a trademark of Xerox Corporation.
- <sup>3</sup> Module with PCMCIA CAM slot (Irdeto, Conax, Nagravision and Verimatrix systems), SMARTCARD and CAM not included.
- <sup>4</sup> Considering optimized channel and environmental conditions. It may vary according to channel frequency and operating conditions.
- <sup>5</sup> Consult factory for operation on 100 to 254 VAC power grid
- <sup>6</sup> The transmission mask depends on the type of filter used.
- <sup>7</sup> Rated power up to 2500 meters (8200 ft). Above 2500 meters (8200 ft), consult factory.
- <sup>8</sup> Reference data. MER and output power values vary by channel. For more information, consult the factory.

## KOKUSAI DENKI Electric Linear S/A

Avenida Frederico de Paula Cunha, 1001 – Maristela  
Santa Rita do Sapucaí – MG – Brasil – CEP: 37536-162  
Telephone: +55(35) 3473-3473  
[www.lineardenki.com.br](http://www.lineardenki.com.br)  
[www.kokusai-denki.com.br](http://www.kokusai-denki.com.br)

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