



Description

The innovative EDML4 Digital Microwave Link for fixed applications represents the latest development based on VTE technological experience and knowledge. Specially designed for ASI video broadcasting applications, it guarantees a full compatibility with MFN and SFN networks. Compliant with ETSI EN 302 217-2-2.

Compact 1RU for one-way or two-ways configuration. Full indoor or IDU + ODU configuration. Unprotected (1+0) or protected terminals (1+1). Fully programmable and frequency agile.

Bit-rate capacity: 1 to 210 Mb/s. Modulation from 4QAM up to 256QAM. RS FEC. Programmable convolutional coding. Bandwidth from 2 to 40 MHz depending on modem presetting. IF 70 MHz.

Optional built-in ASI Multiplexer and Demultiplexer (4 or 8 channels) with Priority

Optional SNMP+HTTP remote management facilities, with integrated Ethernet Switch.

DIGITAL MICROWAVE RADIO LINK 210 Mb/s with embedded 4 or 8 Channels ASI MUX / DEMUX

Features summary

MODEM

- 1RU 19"
- Native DVB-ASI (188/204)
- Data rate 1 to 210 Mb/s (BNC, 75 Ohm)
- FEC coding: Reed Solomon
- Convolutional Coding: 1/2 to 9/10 rates
- Modulation (standard): 4QAM to 16 QAM
- Modulation (optional): 4QAM to 256 QAM
- IF Frequency: 70 MHz
- IF Ports: "N" connectors, 75 Ω
- Bandwidth: 1 to 40 MHz depending on configuration
- Resident proprietary software management
- Front panel display
- Ethernet port
- SNMP + HTTP management
- Optoisolated RS 485 interface with surge protection

- ASI MUX/DEMUX, 4 or 8 ch. (option)
- 1+1 Configuration with Hitless Switch (option)
- Power supply: 220 Vac + 24 Vdc

RF TX AND RF RX

- 1RU 19"
- Frequency band: 10.000 to 10.680 MHz (other bands on request)
- Frequency agility in the whole band
- Output Power: +27 dBm r.m.s. with 4 QAM modulation at 10 - 11 GHz
- Optional High Power version (+10 dB)
- IF 70 MHz
- IF Ports: "N" connectors, 75 Ω
- Op. Temperature -10 / + 45° C

TX RF OUTPUT POWER (STANDARD)

Modulation Scheme	RF OUTPUT POWER (dBm)									
	2 GHz	4 GHz	5 GHz	6 L GHz	6 H GHz	10 GHz	11 GHz	14 GHz	18 GHz	23 GHz
4QAM	29	28	28	28	28	27	27	26	24	21
16QAM	26	25	25	25	25	24	24	23	21	18
32QAM	26	25	25	25	25	24	24	23	21	18
64QAM	24	23	24	24	24	23	23	22	20	17
128QAM	23	22	23	23	23	22	22	21	19	16
256QAM	22	21	22	22	22	21	21	20	18	15

TX RF OUTPUT POWER (HIGH POWER OPTION)

Modulation Scheme	RF OUTPUT POWER (dBm)						
	4 GHz	5 GHz	6 L GHz	6 H GHz	10 GHz	11 GHz	14 GHz
4QAM	40	40	40	40	40	40	39
16QAM	37	37	37	37	36	36	36
32QAM	34	34	34	34	33	33	33
64QAM	34	34	34	34	33	33	33
128QAM	33	33	33	33	32	32	32
256QAM	32	32	32	32	32	32	31

TX FREQUENCY AGILITY

Programmable in the whole band
 Minimum step: 250 kHz (50 kHz @ 6 GHz)
 Stability: < ± 5 ppm in temperature and aging

RESIDUAL BER

BER < 10⁻¹² @ Received Power Level 10 dB Above Threshold

RX FREQUENCY AGILITY

Programmable in the whole band
 Minimum step: 250 kHz (50 kHz @ 6 GHz)
 Stability: < ± 5 ppm in temperature and aging

1+1 DIVERSITY CONFIGURATION (HOT STANDBY)

TRANSMITTER: ASI Splitter + RF Coaxial Relay

RECEIVER : 3 dB RF Splitter + ASI Hitless Switchover

FREQUENCY BANDS:

- **2 GHz** : 1,9 ÷ 2,3 GHz
- **4 GHz** : 3,6 ÷ 4,2 GHz
- **5 GHz** : 5,25 ÷ 5,45 GHz
- **6L GHz** : 5,85 ÷ 6,425 GHz
- **6U GHz** : 6,425 ÷ 7,125 GHz
- **10 GHz** : 10,0 ÷ 10,68 GHz
- **11 GHz** : 10,7 ÷ 11,7 GHz
- **14 GHz** : 14,25 ÷ 14,5 GHz
- **18 GHz** : 17,7 ÷ 19,7 GHz
- **23 GHz** : 21,2 ÷ 23,6 GHz

RX THRESHOLDS

RX RF Levels @ Quasi-Error-Free (BER $\leq 2 \times 10^{-4}$ before FEC and $< 10^{-10}$ after FEC)

Examples:

Nominal Capacity (Mbit/s)	Band (MHz)	Mod. Scheme	Convul. Code Rate	GUARANTEED THRESHOLDS (dBm) @ QUASI ERROR-FREE							
				5 GHz	6 L GHz	6 H GHz	10 GHz	11 GHz	14 GHz	18 GHz	23 GHz
2	1,75	4QAM	3/4	-101.0	-101.0	-101.0	-100.0	-100.0	-99.0	-98.0	-96.0
4	3,5	4QAM	3/4	-98.0	-98.0	-98.0	-97.0	-97.0	-96.0	-95.0	-93.0
8	7	4QAM	3/4	-95.0	-95.0	-95.0	-94.0	-94.0	-93.0	-92.0	-90.0
16	14	4QAM	4/5	-92.0	-92.0	-92.0	-91.0	-91.0	-90.0	-89.0	-87.0
34	28	4QAM	4/5	-89.0	-89.0	-89.0	-88.0	-88.0	-87.0	-86.0	-84.0
45	28	4QAM	10/10	-83.5	-83.5	-83.5	-82.5	-82.5	-81.5	-80.5	-78.5
4	1,75	16QAM	2/3	-95.0	-95.0	-95.0	-94.0	-94.0	-93.0	-92.0	-90.0
8	3,5	16QAM	1/2	-92.0	-92.0	-92.0	-91.0	-91.0	-90.0	-89.0	-87.0
16	7	16QAM	2/3	-89.0	-89.0	-89.0	-88.0	-88.0	-87.0	-86.0	-84.0
34	14	16QAM	2/3	-86.0	-86.0	-86.0	-85.0	-85.0	-84.0	-83.0	-81.0
52	28	16QAM	1/2	-84.0	-84.0	-84.0	-83.0	-83.0	-82.0	-81.0	-79.0
70	28	16QAM	2/3	-82.5	-82.5	-82.5	-81.5	-81.5	-80.5	-79.5	-77.5
45	14	32QAM	1/2	-82.5	-82.5	-82.5	-81.5	-81.5	-80.5	-79.5	-77.5
52	14	32QAM	4/5	-81.0	-81.0	-81.0	-80.0	-80.0	-79.0	-78.0	-76.0
104	28	32QAM	4/5	-78.0	-78.0	-78.0	-77.0	-77.0	-76.0	-75.0	-73.0
104	14	128QAM	2/3	-76.0	-76.0	-76.0	-75.0	-75.0	-74.0	-73.0	-71.0
156	28	256QAM	1/2	-69.5	-69.5	-69.5	-68.5	-68.5	-67.5	-66.5	-64.5

IF MODULATOR

Input	: ASI (188 or 204 bytes per block); 75 Ohm BNC
Cable Equalizer	: Max. 350 m of coaxial cable type Belden 1694A
Net Capacity	: 1 Mbit/s to 210 Mbit/s (programmable, modulation dependent).
FEC type	: Reed Solomon, 188/204
Convolutional Code	: 1/2, 2/3, 3/4, 4/5, 5/6, 7/8, 9/10, 1
Modulation Scheme	: 4QAM or 16QAM (Standard Modulator) : 4, 16, 32, 64, 128, or 256QAM (Optional Modulator)
I/Q Balancing	: Automatic
IF Output:	: 70 MHz (75 Ohm)

MQAM and Convolutional Code Possible Combinations:

QAM	Programmable Convolutional Code							
	1/2	2/3	3/4	4/5	5/6	7/8	9/10	10/10
4	1/2	2/3	3/4	4/5	5/6	7/8	9/10	10/10
16	1/2	2/3	3/4	4/5	5/6	7/8	9/10	-
32	1/2	2/3	3/4	4/5	5/6	7/8	9/10	-
64	1/2	2/3	3/4	4/5	5/6	7/8	9/10	-
128	1/2	2/3	3/4	4/5	5/6	7/8	9/10	-
256	1/2	2/3	3/4	4/5	5/6	7/8	9/10	-



MTS EDML4

IF DEMODULATOR

IF Input	: 70 MHz (75 Ohm)
Channel Equalizer	: Fractional
I/Q Balancing	: Automatic
FEC type	: Reed Solomon, 188/204
Convolutional Code	: 1/2, 2/3, 3/4, 4/5, 5/6, 7/8, 9/10, 1
Demodulation Scheme	: 4QAM or 16QAM (Standard Demodulator)
	: 4, 16, 32, 64, 128, 256QAM (Optional Demodulator)
MQAM and Convolutional Code Possible Combinations	: Same as IF Modulator
Net Capacity	: 1 Mbit/s to 210 Mbit/s (programmable, modulation dependent).
Output	: ASI (188 or 204 bytes per block); 75 Ohm BNC
Dejitterizer	: Enabled/disabled when necessary (used without Demultiplexer Unit)

ASI MULTIPLEXER (OPTIONAL ITEM)

Input Signals	: ASI (188 or 204 bytes per block), Burst or Continuous
Input Ports	: BNC, 75 Ohm
Cable Equalizer	: Max. 350 m of coaxial cable type Belden 1694A
Input Channels	: 4 (Standard MUX)
	: 8 (Extended MUX)
Compatibility	: MFN or SFN Broadcasting Networks
Operating Mode:	: Priority given to Channels in Reverse Numerical Order up to 190 Mbit/s max (Ch. n°1: Highest Priority)
Output Net Capacity	: Up to 190 Mbit/s Max. (automatically limited)

ASI DEMULTIPLEXER (OPTIONAL ITEM)

Input Signal	: ASI - 204 bytes per block
Input Net Capacity	: 190 Mbit/s Max
Cable Equalizer	: Max. 350 m of coaxial cable type Belden 1694A
Output Signals	: ASI (188 or 204 bytes per block), Burst or Continuous
Output Ports	: BNC, 75 Ohm
Output Channels	: 4 (Standard DEMUX)
	: 8 (Extended DEMUX)
Compatibility	: MFN or SFN Broadcasting Networks
Dejitterizer	: Enabled/disabled when necessary, in each channel output.

ALARM, MONITORING & CONTROL INTERFACES

Front-Panel	: LCD Display; LEDs; Programming Keys
	: Optional RJ45 for SNMP management with Browser (laptop IP access)
Rear Panel	: Alarm Relay Contacts
	: RS485 Serial Port
	: Optional RJ45 for SNMP management with Browser (IP), with internal Ethernet Switch
	: Received Signal Level Analogue Indication (Voltage proportional in dB to RSL)

POWER SUPPLY

AC Mains:	: 230 V (Standard. Other voltages on request)
DC Battery Input:	: 24 V or 48 V Nominal (Optional, on request)
Power Drain:	: 65 W - Fully Equipped Transmitter
	: 40 W - Fully Equipped Receiver

AMBIENT

Operating Temp.	: -10°C + +45°C
Storage Temp.	: -40°C + +80°C
Humidity	: 95% (non condensing) @ +45°C
Maximum Altitude	: 4500 m o.s.l.

DIMENSIONS AND WEIGHTS

MUX and MODULATOR Unit

Enclosure	: 19"-1 U Rack
Dimensions:	: 483 x 44 x 435 mm
Weight:	: 8 kg

DEMODULATOR and DEMUX Unit

Enclosure	: 19"-1 U Rack
Dimensions:	: 483 x 44 x 435 mm
Weight:	: 8 kg

UPCONVERTER – TX RF Unit

Enclosure	: 19"-1 U Rack
Dimensions:	: 483 x 44 x 435 mm
Weight:	: 8,6 kg

RX RF - DOWNCONVERTER Unit

Enclosure	: 19"-1 U Rack
Dimensions:	: 483 x 44 x 435 mm
Weight:	: 8,6 kg



V.T.E. S.r.l.

Via Salvore, 20 - 21100 Varese (ITALY) - Tel: +39 0332 287389 / +39 0332 236559 – Fax: +39 0332 830630
E-Mail info@vtesrl.it – Web Site www.vtesrl.it – P.IVA IT00585150121