# CW-415x
# QAM MODULATOR

*In the television technology, developing efficient compression techniques and standardizing the MPEG-2 format made it possible to transmit the programs in digital way. Standardizing the modulation and the encoding for the distribution of the signals through both satellite transmission, terrestrial transmission and cable has also been accomplished.*

*The QAM modulator is the basic unit of the cable transmission, allowing the radio and television programs packed in a transport stream to be transposed to a high frequency carrier and transmitted to the subscribers. Since at elaborating the relevant standards, the future's vast data transmission needs have also been reckoned with, these devices are suitable without any modification for the fast transmission of the data signals of computers, routers and other data processing equipment.*

*CableWorld's CW-415x series QAM modulator is a device of high quality digital cable TV systems, which can be used well in computer data transmission networks, too.*


**Main features:**

- QPSK, 16-, 32-, 64-, 128- and 256-QAM operation mode
- Automatic synchronisation to the transport stream
- ASI TS input or optionally LVDS level parallel TS input
- Widely variable bit rate (6 ... 56 Mbit/sec)
- Variable bandwidth and roll-off factor by digital filter
- Variable IF frequency
- Programmable output frequency
- High output level, high signal purity
- Meets the requirements of the DVB, DAVIC and ITU-T J.83 Annex A, B, C standards

## Technical data

| | |
|---|---|
| **Input signal** | DVB standard transport stream |
| **Output signal** | QAM modulated RF carrier |

### Transmission characteristics

| | |
|---|---|
| Modulation modes | QPSK, 16-, 32-, 64-, 128- and 256-QAM |
| Encoding and error protection | according to the DVB-C standard (ETS 300 429) |
| Nominal IF frequency | 36.15 MHz |
| Roll-off factor | 12 %, 15 %, 18 % (variable) |

### Input data

*ASI input* (ISO/IEC 138181-1)

| | |
|---|---|
| Input bit rate | 270 Mbaud |
| Min. input level | 140 $mV_{P-P}$, differential |

*Optional parallel input* (LVDS, DVB-TM1449)

| | |
|---|---|
| Input bit rates | 1 ... 7 MBaud |
| QPSK | 6 ... 14 Mbit/s |
| 16 QAM | 12 ... 28 Mbit/s |
| 32 QAM | 15 ... 35 Mbit/s |
| 64 QAM | 18 ... 42 Mbit/s |
| 128 QAM | 21 ... 49 Mbit/s |
| 256 QAM | 24 ... 56 Mbit/s |
| Packet format | 188 or 204 bytes |
| Input signal level | LVDS synchronous parallel, complies with DVB-TM1449 |
| Input impedance | 100 Ω |
| Input signal | |
| Max. amplitude | 2.0 $V_{P-P}$ |
| Min. amplitude | 0.2 $V_{P-P}$ |
| Common mode voltage | 1.125 ... 1.375 V |

### Output data

| | |
|---|---|
| Number of RF outputs | 1 |
| Nominal output impedance | 75 Ω |
| Nominal output level | 120 dBμV |
| Variable range | 0 ... -12 dB |
| Output frequency ranges | |
| Model CW-4150 | IF (not equipped with channel converter) |
| model CW-4151 | 48 ... 63 MHz |
| model CW-4152 | 76 ... 94 MHz |
| model CW-4153 | 150 ... 300 MHz |
| model CW-4154 | 300 ... 470 MHz |
| model CW-4155 | 470 ... 860 MHz |
| model CW-4156 | 110 ... 150 MHz |
| Frequency accuracy | better than $1x10^{-4}$ (synthesized) |
| Output level stability | better than ± 0.5 dB |
| Signal purity | |
| Harmonic amplitude | less than -60 dB |
| Other products | less than -60 dB |
| IF loop through | |
| Nominal voltage level | 100 dBμV |
| Nominal impedance | 75 Ω |

### Programmable parameters

| | |
|---|---|
| 1. Output signal frequency - Raster | 50 kHz |
| 2. Output signal level | in 99 steps |
| 3. RF output signal on/off | |
| 4. QAM modulation modes | see the User's Guide |

### Additional data

| | | |
|---|---|---|
| Bandwidth | | B = S × (1+k) |
| where | B: | bandwidth (MHz) |
| | S: | data bit rate (MS/s) |
| | k: | roll-off factor |

### General data

| | |
|---|---|
| Service period | continuous |
| Power | 230V +10 % ... -15 % 50/60 Hz |
| Power consumption | max. 75 VA |
| Connectors | |
| - TS ASI input, output | insulated BNC socket |
| - Optional TS parallel input | 25 pin D-socket |
| - RF output | F-socket, optionally BNC |
| - IF input, IF output | F-socket, optionally BNC |
| - CW-Bus connection | RJ-12 6-pole telephony socket |
| Physical dimensions | 19" × 1 module height |
| Width × Height × Depth | 486 × 43.6 × 473 mm |
| Mass | approx. 3.5 kg |
| Environmental data | |
| Operating temperature range | +5 ... +40 °C |
| Relative humidity | max. 80 % |
| Non-operating | -25 ... +45 °C |
| Relative humidity | max. 95 %, non-condensing |

CableWorld Ltd.®
Budapest XI., Kondorfa u 6/B
Hungary
H-1519 Budapest, Pf. 418
Tel.: +36 1 204 7815
Fax: +36 1 204 7839
Internet: www.cableworld.hu
E-mail: cableworld@cableworld.hu