# QATT-7G

4 Channel Step Attenuator 100 kHz … 7000 MHz

## Features

- 4 attenuator channels
- 0 … 95.25 dB in 0.25 dB steps
- extremely wideband
- web interface
- high speed remote control
- synchronous operation

## Applications

- air interface emulations
- AM, FM, DAB, DVB-T, GPS, SDARS…
- GSM, UMTS, LTE, WLAN…
- R&D

## Overview

QATT-7G is a 4 channel switchable step attenuator suitable for the frequency range from 100 kHz up to 7000 MHz in 50 Ohms technology. Each channel has an attenuation range of 95.25 dB adjustable in 0.25 dB steps. The attenuators are based on wear-free semiconductor switches. QATT-7G is the ideal solution for applications where reproducible attenuation adjustments must be made.

The compact dimensions in 19” construction and the low weight of QATT-7G make it ideally suited for applications in laboratories and also for installations in system racks.

With its four channels, QATT-7G is especially suited for applications in radio field emulations.

## Synchronous Operation

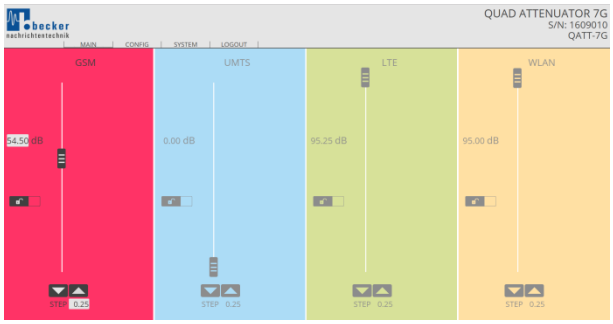
Like many other products of Becker Nachrichtentechnik GmbH (BNT), QATT-7G offers a TRIGGER IO port. This Interface provides a precise trigger pulse which complies with the physical execution of the applied switching command. On the other hand, external pulses can be applied to this port in order to trigger the execution of queued switching commands. Therefore it is possible to link multiple devices to a synchronous switching compound.

## Multiple Control Modes

QATT-7G can be controlled manually either via front panel or via standard remote interfaces.

As remote control interfaces, USB and LAN are available. QATT-7G is controlled through simple ASCII strings.

A special feature of QATT-7G is the web capability. This allows location-independent operation of the device regardless of the user's operating system also for multiple devices in a single network.




*Picture shows web interface of QATT-7G*

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## RF Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| impedance | $Z_{in}$ / $Z_{out}$ | | 50 | | Ohm | |
| low frequency | $f_{min}$ | | | 100 | kHz | |
| high frequency | $f_{max}$ | 7000 | 8000 | | MHz | |
| return loss | $S_{11}$, $S_{22}$ | | -9 | -7 | dB | f < 1 MHz |
| | $S_{11}$, $S_{22}$ | | -12 | -10 | dB | 1 MHz ≤ f < 600 MHz |
| | $S_{11}$, $S_{22}$ | | -16 | -12 | dB | 600 MHz ≤ f ≤ 2000 MHz |
| | $S_{11}$, $S_{22}$ | | -10 | -8 | dB | 2000 MHz < f ≤ 4500 MHz |
| | $S_{11}$, $S_{22}$ | | -13 | -11 | dB | 4500 MHz < f ≤ 6000 MHz |
| | $S_{11}$, $S_{22}$ | | -12 | -8 | dB | f > 6000 MHz |
| insertion loss | $S_{21}$ | | -3.5 | -5.0 | dB | f ≤ 100 MHz |
| | $S_{21}$ | | -4.0 | -6.0 | dB | 100 MHz < f ≤ 600 MHz |
| | $S_{21}$ | | -6.0 | -7.0 | dB | 600 MHz < f ≤ 2000 MHz |
| | $S_{21}$ | | -7.0 | -9.5 | dB | 2000 MHz < f ≤ 4500 MHz |
| | $S_{21}$ | | -9.0 | -12.0 | dB | 4500 MHz < f ≤ 6000 MHz |
| | $S_{21}$ | | -10.5 | -13.5 | dB | f > 6000 MHz |
| attenuation range | a | 0 | | 95.25 | dB | in 0.25 dB steps |
| attenuation accuracy | Δa | | ±0.5 | | dB | f ≤ 2200 MHz @ ATT63.75 dB |
| | Δa | | ±2.0 | | dB | f > 2200 MHz @ ATT63.75 dB |
| attenuator settling time | $t_{set}$ | | 0.3 | | µs | rise/fall time between ATT steps |
| input power | $P_{max}$ | | | +28 | dBm | f ≥ 50 MHz |
| channel isolation | $a_{iso}$ | | -130 | -100 | dB | |
| RF commands processing rate | | | 500 | | cmd/s | setting a single channel in MASTER or OUT mode without additional system load (e.g. web interface) |
| RF connectors | | | N female | | | |

## TRIGGER IO Specifications

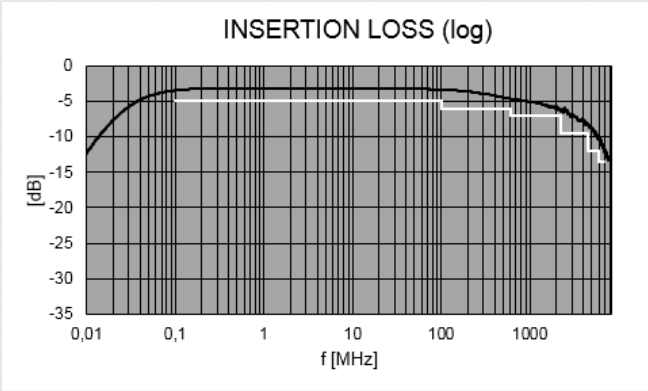
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| connector type | | | BNC female | | | |
| function type | | | open collector, wired AND | | | positive edge = trigger |
| | | | low state = BUSY | | | mode “SLAVE” |
| logic high level | $U_H$ | 2.0 | 5.0 | 5.5 | V | |
| logic low level | $U_L$ | -0.5 | 0.0 | 1.2 | V | |
| pulse width | $T_{high}$ | | 50 | | µs | |
| rise time | $T_R$ | | 0.1[1] | 0.5[2] | µs | |
| sinking current | $I_S$ | | | 60 | mA | |
| passive pull up | | | 1 | | kΩ | |
| active pull up | | | 10 | | mA | only in mode “MASTER” & “OUT”, bus acceleration @ U ≥ 0.78V |
| drivable capacitance | $C_D$ | | | 2 | nF | |
| load capacitance | | | 110 | | pF | mode “SLAVE” |
| trigger offset* | $t_O$ | -500[2] | +580[1] | +1100 | ns | 50% trigger signal to 50% RF-switching (trigger mode “OUT”) |
| trigger offset* | $t_O$ | +100 | +680 | +1200 | ns | 50% trigger signal to 50% RF-switching (trigger mode “MASTER” or “SLAVE”) |

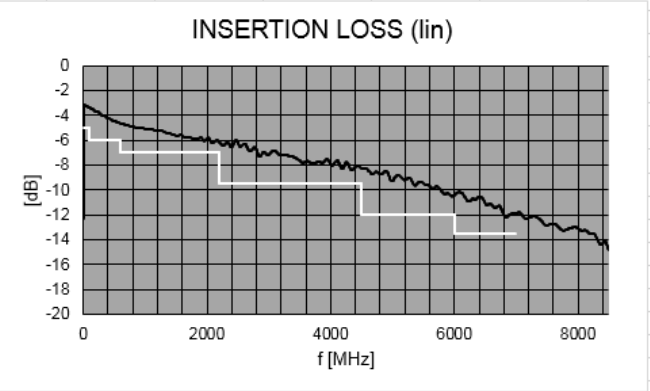
Note 1: capacitive load < 100 pF
Note 2: capacitive load ≤ 2 nF

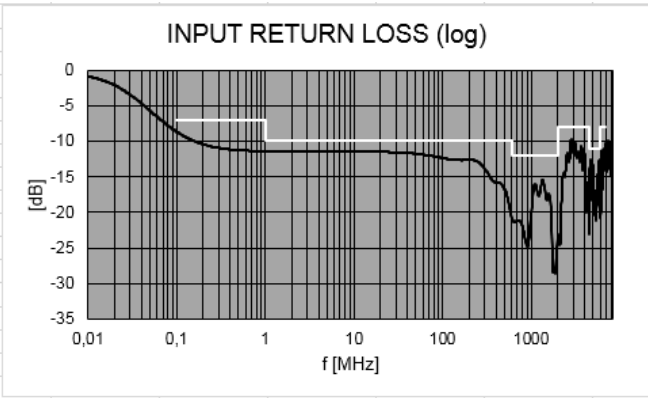
## Common Specifications

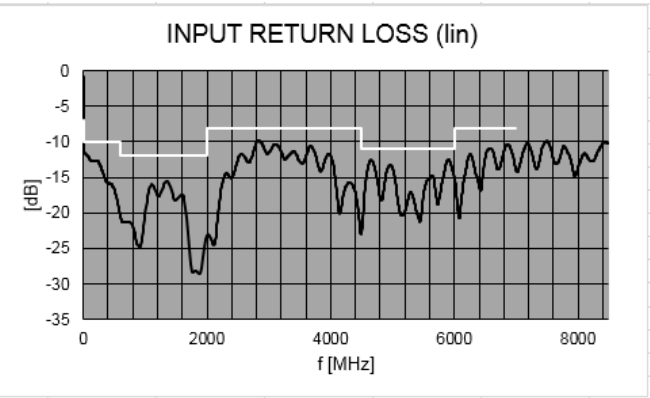
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| power supply | U | 90 | 230 | 260 | V | 50 / 60 Hz AC |
| power consumption | P | | 4 | | W | |
| dimensions | L x W x H | approx. 210 x 482 x 44 | | | mm | 19” 1 U, without connectors and handles |
| weight | m | | 2.8 | | kg | |
| operating temp. range | $T_o$ | +5 | | +40 | °C | |
| storage temp. range | $T_s$ | -40 | | +70 | °C | |
| EMC | in line with EN55011 class B<br>EN 61326-1 (industrial environment)<br>EN 61326-2-1 | | | | | |
| **remote control interfaces** | | | | | | |
| Ethernet/LAN | | RJ45 10/100BaseT | | | | |
| SYNC Port | | BNC female | | | | |
| USB | | 2.0 (high speed) | | | | USB type B |
| ordering information | QATT-7G | 1302.4702.1 | | | | |

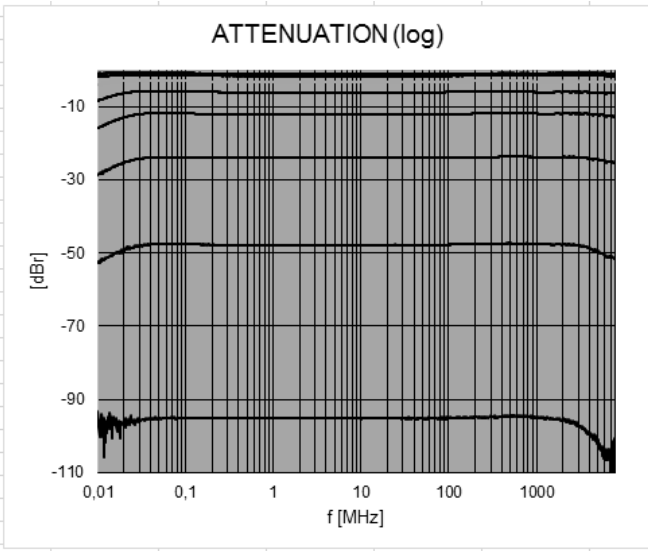
## **S-Parameters** (typical responses)

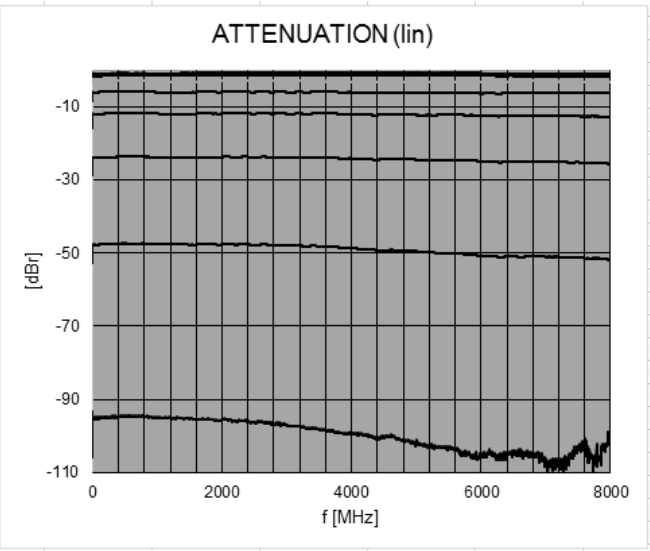


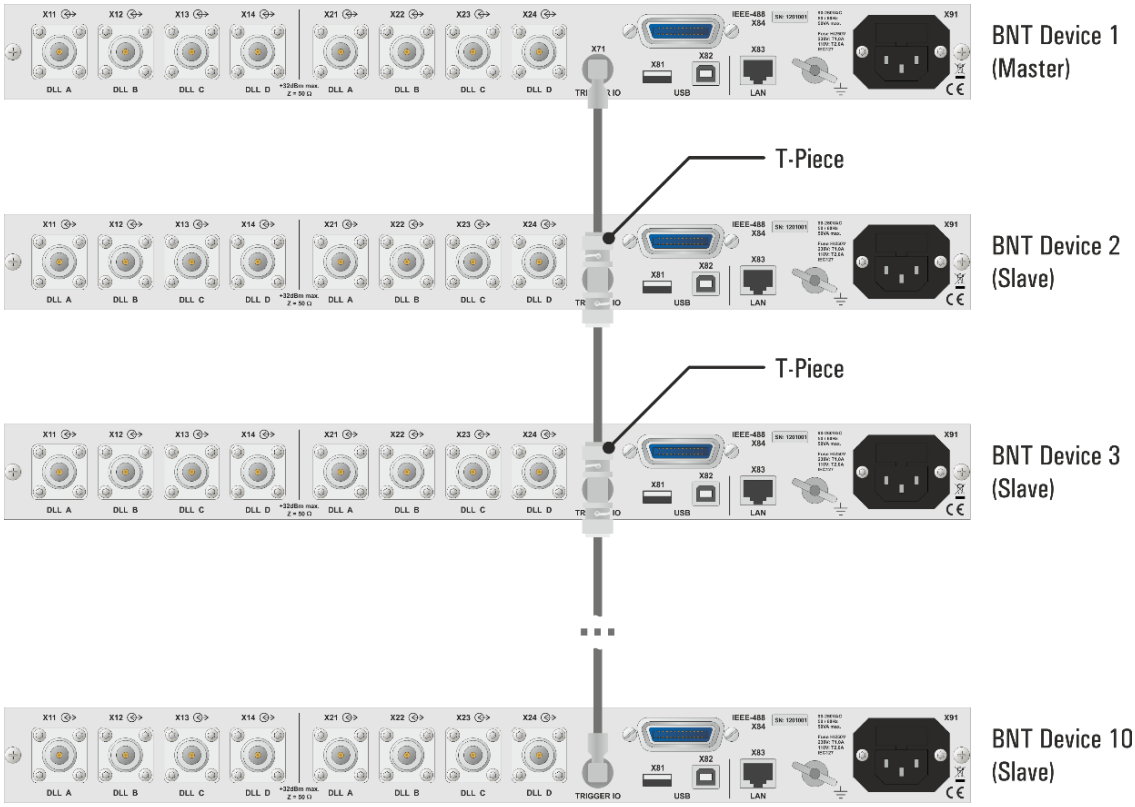



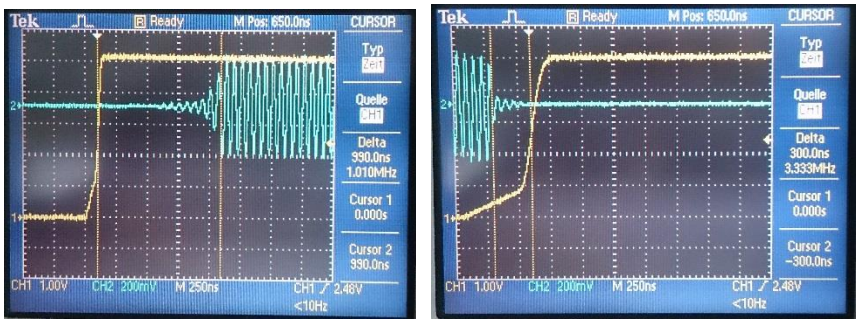



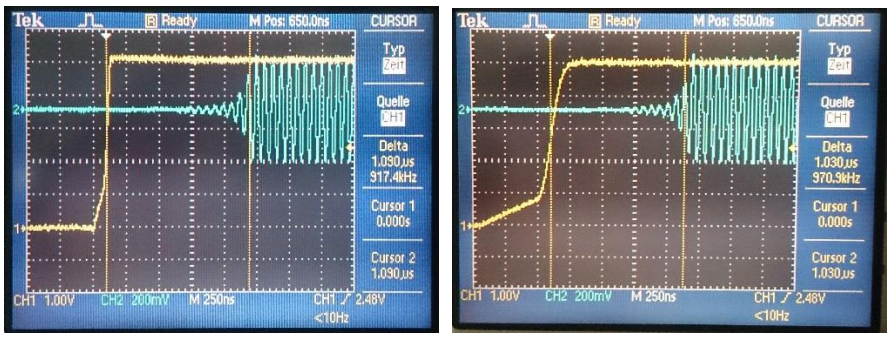
## Scheme of a Trigger Compound




## Trigger IO responses (typical)



External Trigger (yellow) vs. RF Signal (blue), Trigger Mode “OUT”
without capacitive load / RF ON vs. with 2nF load / RF OFF

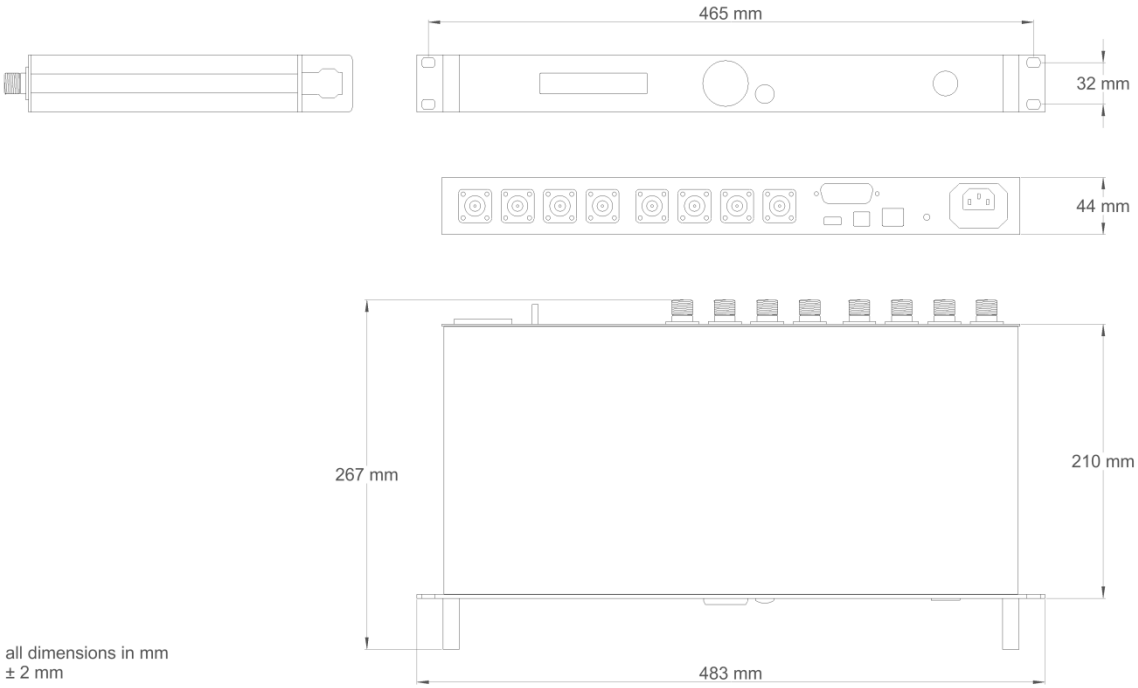


External Trigger (yellow) vs. RF Signal (blue), Trigger Mode “MASTER”, with and without capacitive load

## Front View


## Rear View


## Dimensions




all dimensions in mm
± 2 mm

## Related Products

| Product | Description | P/N |
|---|---|---|
| QATT | 4 Channel Step Attenuator 100 kHz … 4000 MHz | 1302.4002.1 |
| QDLL | 4 Channel Programmable Delay Line 250 MHz … 4000 MHz | 1303.4002.1 |
| AIE4X4 | 4 Channel Air Interface Emulation System 500 …3000 MHz | 1201.4002.1 |
| AIE4X4-MIMO | 4 Channel Air Interface Emulation System 250 … 4000 MHz | 1308.4502.1 |
| AIE-W9 | 9 Port Air Interface Emulator 1800 … 6400 MHz | 1309.4029.1 |