# 4T2-Portable Manual


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# 1 First steps

## 1.1 Installation considerations

Thank you for having chosen the 4T2-Portable digital measurement instrument.
We are confident that you will find the 4T2 a reliable partner in your daily measurement tasks.

Although we tried to make the operation of the 4T2 as simple as possible, there might be the occasional look in the manual required.

Please share with us your comments to help us to improve both the functionality of the 4T2, or the quality of this manual. Do not hesitate to send an email, or if more urgent: call us.

With very best regards,
Your 4T2 Team

The 4T2-Portable is a ruggedised precision instrument. Although great efforts have been made designing the machine to sustain many years of field use and transport, there are natural limits to durability.
It is therefore not recommended to drop or throw the 4T2. It should also be avoided to expose the instrument to high humidity, or water in it's liquid form.
Shall you plan to store the 4T2 in that kind of conditions, ABC recommends to do so in the supplied flight-case or carrying bag.

## 1.2 Which instruments are covered by this manual?

This manual covers all 4T2-Portable instruments.

ABC takes great care that any new features added during the life-span of the instruments are backward-compatible.
Software manuals released after the shipment of the hardware usually refer to all released software versions.
Shall your hardware's application software be missing some of the features mentioned in the manuals, it is likely that there is a new and improved firmware-version available for download.

If you require any assistance to download, install, or with the configuration please contact your local support company, or Advanced Broadcast Components representation in your region.

## 1.3 What is in the box?

- Carrying bag or flight-case
- ABC 4T2-Portable test instrument
- Power-cord
  4T2 Portable Manual (this document)
- 4T2 SW Manual Content-Analyser

Optional:

- Antenna
- Power converter
- Test adaptor kit
- GPS receiver for Coverage Analyser
- Power Sensor for enhanced precision input Level measurements

If you are missing any of these items, please contact Advanced Broadcast Components.

Advanced Broadcast Components recommends saving your box and its packing materials. Original packaging is preferred for shipment or relocation of your device. Substitute packaging may not provide adequate protection.

## 1.4 Environmental aspects

The device has been designed under aspects of environmental friendliness. The packaging has been optimised in terms of recycling possibilities, transport safety and weight savings.
At end of life time the device may be completely recycled. Any re-cycling organisation may separate the material without taking into account special safety regulations.

## 1.5 Safety remarks

This manual addresses qualified personnel being familiar with the relevant safety standards in RF-measurement techniques.

It is recommended to install and operate the 4T2-Portable by qualified personnel only.

Maintenance of the 4T2-Portable instrument shall be performed by qualified ABC personnel only.

⚠ The measurement instrument shall be used only for the range of operations mentioned in this manual. Please adhere to all mentioned data. The product has been developed and manufactured according to all relevant safety standards. Observing the instructions for safety and operations mentioned in the manual using the instrument does not cause any hazardous situation for man or matters. Unqualified operations on hard- and software as well as neglecting the safety hints fixed to the device may lead to personal or material damage.

⚠ Additional or extensional devices to the 4T2-Portable may only be used if recommended by ABC.

⚠ Any other usage or operation from the one mentioned in the manuals will be treated as not agreed.

⚠ All relevant safety and accident prevention instructions have to be observed during commissioning, operation and maintenance.

⚠ All safety regulations and accident prevention instructions according to the specific operation scenario have to be observed. Opening of the 4T2-Portable is not allowed and voids the warranty.

⚠ Regular checks have to be done in order to verify that the power cable connected to the instrument is in good condition. In case of a power cable problem, the cable has to be removed from mains immediately and the defective cable has to be replaced.

⚠ Do not attempt to power the instrument from any receptacle other than a 2 pole 3-wire grounded receptacle.

⚠ Before setting into operation, check for conformity between the allowed voltage range and the mains provided by the local power supply.

⚠ Do not place the instrument close to liquids, don't allow liquids or any foreign objects to get inside.

⚠ Do not place the instrument in direct sunshine or close to strong heat-emitting sources.

⚠ Do not block air vents in the back, or on the front of the instrument.

## 1.6 Important operation remarks

Please take note of the following remarks to make sure that you always get the optimum measurement performance:

⚠ Running other applications while performing 4T2 measurements may have negative influence on the processing speed.

⚠ Make sure that the operating system configuration is not changed, updated or otherwise altered under any circumstances as this may influence the overall performance.

⚠ Installation of not approved third party hardware may damage the 4T2 and is not being covered under the 4T2 warranty.
We recommend to consult ABC, if in doubt of compatibilities of hardware.

⚠ Opening of the 4T2 voids the warranty.
There are no user serviceable parts inside the 4T2.

⚠ The 4T2 BIOS is usually password protected (default pwd: dvbt).
It is not recommended for the user to change the BIOS settings.

# 2 Product overview

The 4T2-Portable platform is an industrial-grade PC running Microsoft Windows™.
Depending on configuration, it performs DVB-T/T2, T-DAB(+), DVB-S/S2, and ASI or UDP measurements as specified in the relevant standards (see technical specifications).

The 4T2-Portable offers the following functions through the 4T2 Content-Analyser application.

- ASI and IP inputs: Transport Stream level measurements
    - Analysis of MPEG-TS PAT, PMT Program Association, and Map Tables
    - Analysis of DVB Service Information (CAT, SDT, EIT, NIT, TOT, TDT)
    - Analysis of ATSC Service Information (MGT, STT, TVCT, EIT, ETT)
    - Visualisation of SDT Service Description Tables
    - Visualisation of NIT Network Information Tables
    - Visualisation of MIP Mega-frame Initialisation Packets
    - Visualisation of PID Packet Identifiers and associated bit-rates
    - Visualisation of bit stuffing
    - Visualisation of time repetition intervals of tables defined in TR.101.290
    - Analysis and visualisation of first, second, and third priority errors according to TR.101.290
    - Analysis of DVB T2-MI Modulator Interface
    - Measurement of PCR Program Clock Reference jitter
    - Content decoding, including AVC and HEVC material
    - Monitor wall-feature with audio bar-graphs
    - Detection of black and freeze conditions on services in the transport stream
    - Detection of audio mute condition on services in the transport stream
    - Triggered capture of Transport Stream to disk in presence of errors (with history)
    - Remote capability with full SNMP support following the DVB MIB, including Traps
    - Input support for files
    - Comprehensive logging features with powerful sorting capabilities
    - Raw data analysis with smart packet-trigger, and bit dependencies checking
    - Smart Packet trigger with expression editor
    - Interface to relay alarm contacts with expression debugger
    - Forwarding of transport stream to IP, File, or ASI output

- Additional RF-functions on DVB-T, or DVB-T2 channels
    - Level (including field strength), MER, EVM, bit errors
    - Graphical displays for
        - Constellation
        - Bit Error Rates with Level and MER data logging
        - In-Band Spectrum, Impulse Response, CCDF, Group Delay & Phase Response

- Additional RF-functions on DVB-S, or DVB-S2 channels
    - Level, MER, EVM, bit errors
    - Graphical displays for
        - Constellation, Bit Error Rates with Level and MER data logging

Although described in this manual, your instrument may not be equipped with all these features as some (like the satellite receiver input) are optional.

# 3 Getting started

## 3.1 Start-up procedure

After unpacking your 4T2, please engage the two latches on each side of the screen cover in order to release the keyboard.


Table 1: Opening the 4T2-Portable Test Set

The keyboard is used to protect the TFT display in transport mode; before performing any measurements release the keyboard as described above.
The keyboard can be separated from the main unit as described below:

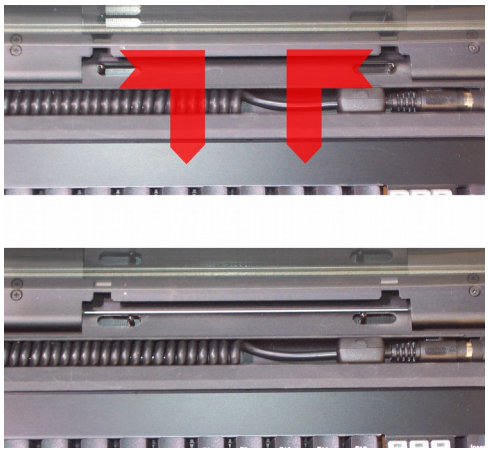

Table 2: Separating the keyboard from the 4T2 Portable Test Set

Connect the power cable to the device, switch on and the device will boot into the operating system.
Please note that the 4T2 requires a warm-up time in order to reach data-sheet accuracy.
In case of an ambient temperature of 25 °C the warm-up time is about 10 minutes.

# 4 Right-hand view connectors and features


| | |
|---|---|
| Power on / screen | Power on, brightness, contrast, and geometry settings of built-in display |
| USB 1/2 | Universal serial bus V.2 (2 x) |
| LAN | Ethernet connector |
| ASI in | DVB-ASI input |
| ASI out | DVB-ASI output |
| RF (1) | Satellite RF input |
| RF (2) | Terrestrial RF input |
| Power switch IEC Power Connector | |

Table 3: 4T2-Portable right-hand view

# 5 Accessories

### Flight-case (optional)

A flight-case is supplied to provide the highest protection to your 4T2 during transportation and travelling.
(product supplied by bw-international Type 61)

### Power Converter (optional)

A power converter (12 V DC to 230 V AC) is available to use your 4T2 in a vehicle.
This device converts the 12 V battery to 230 V AC.

### Test Adaptor Kit (optional)

A set of high-quality RF adaptors is available, to make sure the necessary interfaces are always at hand.
(product supplied by Pomona)

### Calibrated Antenna for Portable Reception (optional)

Calibrated antennas for fixed and portable reception are available as an accessory to use your 4T2 for field- or portable indoor measurements.

Horizontal as well as vertical polarised antennas are available.

(products supplied by Schwarzbeck Messelektronik)

# 6 Technical specifications

| RF Input (DVB-T/T2 & optional DAB/DAB+ terrestrial) | | | |
|---|---|---|---|
| | Input Connector | N female | |
| | Input Range | -90 dBm to 0 dBm | |
| | Frequency Range | 46.5 MHz to 870 MHz (Ch E2 to Ch 70) | |
| | Tuning Resolution | 1 Hz | |
| | Input Impedance | 50 Ohm | |
| | VSWR | < 1.5 | |
| | Noise Figure | < 5 dB | |
| **Measurement Results** | | **Resolution** | **Accuracy** |
| | Input level | 0.1 dBm | ± 0.9 dB @ - 69 dBm to - 0 dBm |
| | | 0.1 dBµV | ± 1.0 dB @ - 90 dBm to - 70 dBm |

| RF Input (DVB-S/S2 satellite; optional) | | | |
|---|---|---|---|
| | Input Connector | BNC female | |
| | Input level | -69 ~ -23 dBm | |
| | Receiving Frequency | 950~2150 MHz | |
| | DVB-S/DVB-S2 demodulator | QPSK, 8PSK, 16APSK, 32APSK | |
| | Symbol Rate | 0. 2 ~ 45 Msps | |
| | Carrier Capture Range | ± 10 MHz | |
| | DVB-S2 QPSK Puncture codes | 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 | |
| | DVB-S2 8PSK Puncture codes | 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 | |
| | DVB-S2 16PSK Puncture codes | 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 | |
| | DVB-S2 32PSK Puncture codes | 3/4, 4/5, 5/6, 8/9, 9/10 | |
| **Measurement Results** | | **Resolution** | **Accuracy** |
| | Input level | 0.1 dBm | ± 2 dB |

| Transport Stream Input / optional output (ASI) | | |
|---|---|---|
| | Connector | BNC female |
| | Impedance | 75 Ohm |
| | Signal Amplitude | 250 mV pp minimum input |
| | | 700 mV pp minimum output |
| | Return loss | >17 dB (transformer coupling) |
| | Data rate | 270 Mbit/s |
| | Data format | Burst and packet mode |
| | Packet length | 188, 204, 208 bytes |

| COFDM Demodulation (DVB-T, DVB-H) | | |
|---|---|---|
| Modulation | QPSK, 16-QAM, 64-QAM<br>(hierarchical, non-hierarchical) | |
| FFT length | 2k / 4k / 8k | |
| Code rates | 1/2, 2/3, 3/4, 5/6, 7/8 | |
| Guard interval factor | 1/4, 1/8, 1/16, 1/32 | |
| Reed Solomon | 188, 204 byte packets | |
| Mode detection | Automatic | |
| Synchronisation time | < 250 ms | |
| **Measurement Results** | **Resolution** | **Accuracy** |
| Frequency Offset | 1 Hz | < 10 Hz with external reference |
| Bandwidth | 0.1 Hz | look-up table |
| Bandwidth Offset | 0.1 Hz | < 10 Hz with external reference |
| Net Bit Rate | 1 bit / s | look-up table |
| Bitrate Offset | 0.1 bit / s | < 10 bit/s with external reference |
| Cell Identifier | - / - | - / - |
| Modulation Error Ratio | 42 dB | ± 1.5dB |

| COFDM Demodulation (DVB-T2) | | |
|---|---|---|
| Modulation | QPSK, 16-QAM, 64-QAM, 256-QAM<br>(rotated, non-rotated) | |
| FFT length | 1k / 2k / 4k / 8k / 16k / 32k (ext. BW) | |
| Code rates | 1/2, 3/5, 2/3, 3/4, 4/5, 5/6 | |
| Guard interval factor | 1/4, 19/128, 1/8, 19/256, 1/16, 1/32, 1/128 | |
| Reed Solomon | 188, 204 byte packets | |
| Mode detection | Automatic | |
| Synchronisation time | < 5 s | |
| **Measurement Results** | **Resolution** | **Accuracy** |
| Frequency Offset | 1 Hz | < 10 Hz with external reference |
| Bandwidth | 0.1 Hz | look-up table |
| Bandwidth Offset | 0.1 Hz | < 10 Hz with external reference |
| Net Bit Rate | 1 bit / s | look-up table |
| Bitrate Offset | 0.1 bit / s | < 10 bit/s with external reference |
| Modulation Error Ratio (on L1-post and data PLP) | 42 dB | ± 1.5dB |

| COFDM Demodulation (DAB, DAB+) | | |
|---|---|---|
| Modes | I (Band III) | |
| Modulation | π/4-DQPSK | |
| Channel spacing | 1.712 MHz | |
| Carrier spacing | 1.537 kHz | |
| FFT length | 2k | |
| Synchronisation time | < 5 s | |
| **Measurement Results** | **Resolution** | **Accuracy** |
| Frequency Offset | 1 Hz | < 10 Hz with external reference |
| Bandwidth | 0.1 Hz | look-up table |
| Bandwidth Offset | 0.1 Hz | < 10 Hz with external reference |
| Net Bit Rate | 1 bit / s | look-up table |
| Bitrate Offset | 0.1 bit / s | < 10 bit/s with external reference |

| COFDM Demodulation (Expert Functions) | |
|---|---|
| In-Band Spectrum | IF-Bandwidth FFT spectrum analysis with shoulder distance measurements |
| CCDF | Cumulated Complementary Distribution Factor linearity analysis |
| Phase Response | In-Band demodulator synchronised phase response measurements |
| Group Delay | In-Band demodulator synchronised group delay measurements |
| Impulse Response | Demodulator synchronised impulse response analysis with marker support |
| Coverage | Map overlay of field-strength and reception quality. |

| MPEG TS Analysis | | |
|---|---|---|
| Please refer to the:<br>4T2 Content-Analyser | 1st, 2nd and 3rd priority ERR according TR.101.290<br>Logging of Errors to file, DVB-T2 MI, Packet Filter,<br>Services Counter, Pie Charts of data rates<br>Multi-Viewer<br>MP2 Audio and AAC+, AAC-L<br>H.262, H.264, H.265 decoder up to UHD<br>Stream Hierarchy tree view, triggered capture<br>TS, PID sorted views, PCR jitter display, ... | |
| **Measurement Results** | **Resolution** | **Accuracy** |
| Log-file (only limited by disk-size) | 1 | - / - |
| Services bit-rates | 1 bit / s | ± 5 µs |

| DAB DAB+ Service Analysis | |
|---|---|
| Ensemble Name | Textual Description |
| Station Name | Textual Description |
| Audio Services | Audio decoded to speakers |
| Services bitrates | Datarate in bit/s |
| Services Coding Format | MPEG2 / AAC+ audio decoder |
| Multimedia Content | DMB-R, DMB-Video, Color Slide Show,<br>DLS/DLS+, TPEG or TMC bit stream |

| Power Measurement Subsystem (optional) | | | |
|---|---|---|---|
| | Dynamic Range (1..6000) MHz | -30 dBm .. +20 dBm | |
| | VSWR | 1.1 typical; 1.3 max | |
| **Measurement Results** | | **F-range [MHz]** | **Accuracy** |
| @ 25°C | @ -30 dBm to +5 dBm | <3000 | ±0.10 dB typical; ±0.30 dB max |
| | | 3000 .. 6000 | ±0.15 dB typical; ±0.30 dB max |
| | @ +5 dBm to +12 dBm | <3000 | ±0.15 dB typical; ±0.30 dB max |
| | | 3000 .. 6000 | ±0.15 dB typical; ±0.30 dB max |
| | @ +12 dBm to +20 dBm | <3000 | ±0.20 dB typical; ±0.40 dB max |
| | | 3000 .. 6000 | ±0.20 dB typical; ±0.40 dB max |
| @ 0..50°C | @ -30 dBm to +5 dBm | <3000 | ±0.25 dB typical |
| | | 3000 .. 6000 | ±0.25 dB typical |
| | @ +5 dBm to +12 dBm | <3000 | ±0.20 dB typical |
| | | 3000 .. 6000 | ±0.20 dB typical |
| | @ +12 dBm to +20 dBm | <3000 | ±0.35 dB typical |
| | | 3000 .. 6000 | ±0.30 dB typical |

| Spectrum Analyser Subsystem (optional) | | |
|---|---|---|
| **Frequency** | | |
| | Frequency Range | 1 Hz to 4.4 GHz, Standard ; 100 kHz to 4.4 GHz AC-coupled |
| | Span Modes | (Center Frequency + Span) or (Start + Stop Frequencies) |
| | Maximum Span | 4.4 GHz |
| | Minimum Span | 10 Hz or Zero Span |
| | Internal reference accuracy | ± 1 ppm (improved with external reference) |
| | Readout Accuracy | reference error ±1 sample |
| | Marker Accuracy | reference error ±1 sample |
| | Resolution Bandwidth | 0.1 Hz to 250 KHz and 5 MHz |
| | Spectral Purity | Residual FM, 3KHz Audio LPF, 15 KHz IF BW: [0.1 Hz + 4 Hz / GHz] typical RMS FM (e.g. 2 GHz RF would have 8.1 Hz RMS FM). Increasing IF BW increases residual FM |
| **Amplitude** | | |
| | Range, 1dB Gain Compression | 1dB Gain Compression to Displayed Average Noise Level (DANL)<br>(attenuator set to 15dB, preamp off) +16dBm Typical, 1Hz to 150MHz (100 kHz to 150 MHz, Option 3) +19dBm Typical, 150MHz to 4.4GHz |
| | Displayed Average Noise Level | 0dB input attenuation, 1Hz RBW |
| | Absolute Accuracy (Reference level ≤0 dBm) | ± 1.5 dB |
| | Absolute Accuracy (0 dBm < Reference level ≤ 10 dBm) | ± 2.0 dB |
| | Relative Accuracy (Reference level ≤0 dBm) | ±0.25 dB |
| | Maximum Safe Input Level (preamp off, 15 dB atten) | +20dBm |
| | DC Volts | < ±0.2V absolute maximum (±16VDC, option 3) |
| | Residual Responses (Input terminated, ≤100 KHz span, 0 dB atten, preamp on) | <-80 dBm 1<br>Note 1: Known residual responses at multiples of 10 MHz < -80 dBm typical |

| Frequency | RF Preamp Off | RF Preamp On |
|---|---|---|
| 10Hz | -124 dBm | NA |
| 100Hz to 10KHz | -130 dBm | NA |
| 10KHz to 500KHz | -142 dBm | NA |
| 500KHz to 10MHz | -142 dBm | -153 dBm |
| 10MHz to 100MHz | -148 dBm | -161 dBm |
| 100MHz to 1GHz | -144 dBm | -158 dBm |
| 1GHz to 2.6GHz | -139 dBm | -151 dBm |
| 2.6GHz to 3.3GHz | -135 dBm | -151 dBm |
| 3.3GHz to 4.4GHz | -128 dBm | -134 dBm |

| Spectrum Analyser Subsystem (optional) | | |
|---|---|---|
| | Spurious Responses<br>(≤100 KHz span, CW tone input) | < -80 dBm typical<br><br>Typical Maximum LO feed-through<br>(preamp on, attenuator set to 15 dB)<br>1Hz to 500KHz -70 dBm<br>500KHz to 1GHz -57 dBm<br>1GHz to 2.3GHz -47dBm<br>2.3GHz to 2.6GHz -40 dBm<br>2.6GHz to 3.0GHz -27 dBm<br>3.0GHz to 4.4GHz -35 dBm |
| Sweep | | |
| | Zero Span Sweep Time<br>0.1 ms to 10 sec | ± 0.1% |

| PC Data | | |
|---|---|---|
| | Processor | Intel quad-core CPU, i7 Haswell or later |
| | External Bus | 4 x USB 3 |
| | RAM | >= 16 GB DDR-4 2100 |
| | Storage | >= 200 GB SDD SATA-III |
| | Display | 15.4" TFT |
| | Audio | 2 Speakers |
| | Input Devices | Touch Pad, Keyboard |
| | Network | 2 Ethernet (TCP/IP) 1 Gbit/s |
| | Operating System | Microsoft Windows™ 10 |

| Mechanical / Environmental | | |
|---|---|---|
| | Dimensions (w x h x d) | 420 x 280 x 150 mm |
| | Weight | 8.0 kg |
| | Power Supply | 47 .. 63 Hz;  90 .. 260 V;  350 W |
| | Operating Temperature | 0 °C .. + 40 °C |
| | Storage Temperature | -20 °C .. + 50 °C |
| | Relative Humidity | 5% .. 85% (non-condensing) |
| | Shock | 3 g max |

| Standards / Qualifications | | |
|---|---|---|
| | DVB-T DVB-T2 compliance | EN 300 744, EN 302 755,<br>TS 101 190, TS 101 191, TS 102 773 |
| | DAB DAB(+) compliance | ETSI EN 300 401, EN 301 234, TS 102 563<br>ES 201 735, EN 300 797, TR 101 496-3 |
| | Measurement Guidelines | TR 101 290 |
| | MPEG Compliance | ISO/IEC 13818-1; ITU-T H.222.0 |
| | EMC | DIN EN 55022: 2001-09<br>DIN EN 55024: 2002-11<br>DIN EN 55013: 2003-10<br>DIN EN 61000-3-2: 2001-12 |
| | Safety | EN 60950-1 |
| | Environmental Protection | EN 60 529; DIN VDE 470; IP20 |
| | Temperature Range | ETS 300 019-1-7  Class 7.1 |
| | Vibration | ETS 300 019-1-7  Class 7.1 |
| | Humidity | ETS 300 019-1-7  Class 7.1 |
| | Transportation | ETS 300 019-2-2  Class 2.3 |
| | Storage | ETS 300 019-1-1  Class 1.2 |

# 7 Miscellaneous

## 7.1 Declaration of conformity

| CE | DECLARATION OF CONFORMITY<br>according to EN 45014 | ABC |
|---|---|---|

| | |
|---|---|
| Manufacturer : | Advanced Broadcast Components<br>Frankfurterstrasse 21, 64720 Michelstadt,<br>Germany |

We declare under our responsibility that the product:

| | |
|---|---|
| Product Name : | 4T2-Portable |
| Model Number : | 10. 100. 000 |
| Trademark : | 4T2 |

is in conformity with the essential requirements of the R&TTE Directive 1999/5/EC. The above mentioned product is in compliance with the following European standards:

| | |
|---|---|
| Electrical Safety | EN 60950-1:2001 |
| EMC | ETSI EN 55022:2001-09<br>ETSI EN 55024:2001-11<br>ETSI EN 55013:2003-10 (partly)<br>ETSI EN 61000-3-2:2001-12 |
| Low Voltage Directive | 73/23/EWG |

Michelstadt Germany, 01.04.2019

Frank Wenzl
CEO

## 7.2 Maintenance and calibration

The 4T2-Portable has been designed as a robust test unit, which under any circumstances should not require special maintenance routines.

We do, however, recommend sending your receiver to ABC to undergo a calibration procedure in defined intervals. This will ensure continuously high precision measurement results.

## 7.3 Dimensions and shipping information

| | Packing Option | Status | Dimensions (h x w x d) [mm] | Weight [kg] |
|---|---|---|---|---|
| 4T2 Portable Test Set | None | | 300 x 420 x 155 | 8.1 |
| 4T2 Portable Test Set | Flight-case | standard | 440 x 520 x 230 | 13.6 |

## 7.4 Application notes

A number of application notes are available from Advanced Broadcast Components These documents give further insight into the theory of operation and special applications.

The most up-to-date source for application notes is the internet. Printed copies can be ordered directly from ABC.

## 7.5 Annex A - Alternative Connector Layout

Shown below is an alternative connector layout, where the 4T2 Portable has been equipped with a Dektec DTA2160 triple ASI, GbitE card.


| | |
|---|---|
| Power on / screen | Power on, brightness, contrast, and geometry settings of built-in display |
| USB 1/2 | Universal serial bus V.2 (2 x) |
| LAN | Ethernet connector |
| ASI in/out | DVB-ASI input/output (Dektec Port 1) |
| ASI in/out | DVB-ASI output/output (Dektec Port 2) |
| RF (SAT) | Satellite RF input |
| RF (DTT) | Terrestrial RF input |
| Power switch | |
| IEC Power Connector | |

Table 4: 4T2-Portable (alternative connector layout) right-hand view


| | |
|---|---|
| ASI in/out | DVB-ASI output/output (Dektec Port 3) |
| LAN | Ethernet connector (Dektec GbitE) |
| USB | Universal serial bus V.2 |
| HDMI 1.4 | Digital Video/Audio output |

Table 5: 4T2-Portable (alternative connector layout) left-hand view

## 7.6 Waiver

While the information contained in this document has been carefully compiled to the best of our present knowledge, it is not intended as representation or warranty of any kind on our part regarding the suitability of the products concerned for any particular use or purpose and neither shall any statement contained herein be construed as a recommendation to infringe any industrial property rights or as a license to use any such rights. The suitability of each product for any particular purpose must be checked beforehand with our specialists.

## 7.7 Document history

| Date | Release | Status |
|---|---|---|
| 01.08.12 | 1.0.0 | Approved as pre-release |
| 15.02.13 | 1.1.0 | Approved |
| 01.10.14 | 1.1.1 | Approved |
| 01.05.15 | 1.1.2 | Approved |
| 19.01.17 | 1.1.3 | Approved |