R&S®TSVP Accessory Products

Supplement

5040726602
Version 04

ROHDE&SCHWARZ
Make ideas real

This document describes the following R&S®TSVP Accessory Products:

- R&S®TS-PFP9 (5038.9094.02)
- R&S®TS-PSCBRR (5038.8975.02), R&S®TS-PSCBRRX (5038.8975.03)
- R&S®TS-PRIOC (5038.8946.02)
- R&S®TS-PFP6 (5038.8969.02)
- R&S®TS-PXI6153 (5038.8981.02, 5038.8981.03, 5038.8981.22, 5038.8981.31, 5038.8981.04)
- R&S®TS-PAIM (5038.8998.02), R&S®TS-PAIM+ (5038.8998.04)
- R&S®TS-PXI6141 (5038.9271.21, 5038.9271.41 or 5038.9271.42)

Mühldorfstr. 15, 81671 München, Germany
Phone: +49 89 41 29 - 0
Fax: +49 89 41 29 12 164
Email: info@rohde-schwarz.com
Internet: www.rohde-schwarz.com

5040.7266.02 | Version 04 | R&S®TSVP Accessory Products

Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol, e.g. R&S®TSVP is indicated as R&S TSVP.

Contents

1 Safety information (multilingual)

This option or accessory is designed for a specific Rohde & Schwarz product. Multilingual safety information is delivered with the product. Follow the provided installation instructions.

Esta opción o este accesorio están diseñados para un producto Rohde & Schwarz concreto. El producto va acompañado de información de seguridad en varios idiomas. Siga las instrucciones de instalación puestas a disposición.

Diese Option oder dieses Zubehör ist für ein bestimmtes Rohde & Schwarz Produkt vorgesehen. Mit dem Produkt werden mehrsprachige Sicherheitsinformationen geliefert. Befolgen Sie die mitgelieferten Installationsanweisungen.

Cette option ou cet accessoire est conçu pour un produit Rohde & Schwarz spécifique. Des informations de sécurité multilingues sont fournies avec le produit. Suivez les instructions d'installation fournies.

Questa funzione opzionale o accessoria è progettata per un prodotto Rohde & Schwarz specifico. Con il prodotto sono fornite informazioni sulla sicurezza in formato multilingue. Seguire le istruzioni di installazione allegate.

Esta(e) opção ou acessório foi concebida(o) para um produto específico da Rohde & Schwarz. Serão fornecidas informações de segurança multilingues com o produto. Siga as instruções de instalação fornecidas.

Αυτή η προαιρετική επιλογή ή εξάρτημα έχει σχεδιαστεί για συγκεκριμένο προϊόν Rohde & Schwarz. Μαζί με το προϊόν παρέχονται πληροφορίες ασφαλείας σε πολλές γλώσσες. Ακολουθήστε τις παρεχόμενες οδηγίες εγκατάστασης.

Din l-għażla jew aċċessorju huma mfassla għal prodott Rohde & Schwarz speċifiku. L-informazzjoni multilingwi dwar is-sikurezza hija pprovduta mal-prodott. Segwi l-istruzzjonijiet ipprovduti għall-installazzjoni.

Deze optie of dit accessoire is ontwikkeld voor een specifiek product van Rohde & Schwarz. Het product wordt geleverd met veiligheidsinformatie in meerdere talen. Volg de meegeleverde installatie-instructies.

Denne mulighed eller tilbehørsdel er designet til et specifikt Rohde & Schwarz produkt. En flersproget sikkerhedsanvisning leveres sammen med produktet. Følg de medfølgende installationsanvisninger.

Detta tillval eller tillbehör är avsett för en särskild produkt från Rohde & Schwarz. Säkerhetsinformation på flera språk medföljer produkten. Följ de medföljande installationsanvisningarna.

Tämä vaihtoehto tai lisävaruste on suunniteltu tietylle Rohde & Schwarz -yrityksen tuotteelle. Tuotteen mukana on toimitettu monikieliset turvallisuusohjeet. Noudata annettuja asennusohjeita.

Dette alternativet eller ekstrautstyret er utformet for et spesifikt Rohde & Schwarz produkt. Flerspråklig sikkerhetsinformasjon leveres med produktet. Overhold installasjonsveiledningen som følger med.

See valik või lisaseade on mõeldud konkreetsele Rohde & Schwarz tootele. Tootega on kaasas mitmekeelne ohutusteave. Järgige kaasasolevaid paigaldusjuhiseid.

Šī opcija vai piederums ir izstrādāts īpaši Rohde & Schwarz produktam. Produktam pievienota drošības informācija vairākās valodās. Ievērojiet sniegtos uzstādīšanas norādījumus.

Ši parinktis ar priedas skirti konkrečiam Rohde & Schwarz gaminiui. Su gaminiu pateikiama saugos informacijos keliomis kalbomis. Laikykitės pateikiamų montavimo nurodymų.

Þessi auka- eða fylgibúnaður er hannaður fyrir tiltekna Rohde & Schwarz vöru. Öryggisupplýsingar á mörgum tungumálum fylgja með vörunni. Fylgið meðfylgjandi uppsetningarleiðbeiningum.

Tá an rogha nó an oiriúint seo ceaptha le haghaidh táirge Rohde & Schwarz sonrach. Cuirtear eolas sábháilteachta ilteangach ar fáil leis an táirge. Lean na treoracha suiteála a thugtar.

Эта опция или принадлежность предназначена для конкретного продукта Rohde & Schwarz. В комплект поставки продукта входят инструкции по технике безопасности на нескольких языках. Соблюдайте прилагаемые инструкции по установке.

Ця опція або приладдя призначені для конкретного виробу Rohde & Schwarz. Інструкції з техніки безпеки кількома мовами постачаються разом із виробом. Дотримуйтеся наданих інструкцій зі встановлення.

Ta opcja lub akcesorium jest przeznaczone do określonego produktu Rohde & Schwarz. Dostarczany produkt zawiera informacje w wielu językach dotyczące bezpieczeństwa. Należy postępować zgodnie z dostarczonymi instrukcjami instalacji.

Tato varianta nebo příslušenství je určeno pro konkrétní produkt Rohde & Schwarz. S produktem jsou dodávány vícejazyčné bezpečnostní informace. Řiďte se přiloženými pokyny k instalaci.

Táto verzia alebo príslušenstvo je navrhnutá pre špecifický výrobok Rohde & Schwarz. S výrobkom sa dodávajú viacjazyčné bezpečnostné pokyny. Riaďte sa dodanými pokynmi na inštaláciu.

Ta možnost ali dodatek je zasnovan za določen izdelek podjetja Rohde & Schwarz. Izdelku so priložena varnostna navodila v več jezikih. Upoštevajte priložena navodila za namestitev.

Ezt a beállítást vagy tartozékot egy adott Rohde & Schwarz termékhez tervezték. A termékhez többnyelvű biztonsági információt mellékelünk. Kövesse a mellékelt szerelési utasításokat.

Тази опция или аксесоар са проектирани за специфичен продукт на Rohde & Schwarz. Многоезикова информация за безопасност се доставя с продукта. Следвайте предоставените инструкции за монтаж.

Ova opcija ili oprema namijenjena je za određeni proizvod tvrtke Rohde & Schwarz. Uz proizvod su dostavljene sigurnosne napomene na više jezika. Pratite isporučene upute za ugradnju.

Ova opcija ili pribor je dizajniran za određeni Rohde & Schwarz proizvod. Proizvodu su priložene sigurnosne informacije na više jezika. Slijedite priložena uputstva za instalaciju.

Ova opcija ili dodatni pribor je projektovan za određeni Rohde & Schwarz proizvod. Bezbednosne informacije na više jezika se isporučuju uz proizvod. Sledite dostavljena uputstva za instalaciju.

Această opțiune sau acest accesoriu a fost conceput pentru un produs specific Rohde & Schwarz. Informațiile multilingve privind siguranța sunt livrate împreună cu produsul. Urmați instrucțiunile de instalare furnizate.

Ky opsion ose aksesor është krijuar për një produkt specifik Rohde & Schwarz. Bashkë me produktin jepen edhe informacionet e sigurisë në shumë gjuhë. Ndiqni udhëzimet e dhëna të instalimit.

Оваа опција или додаток се наменети за одреден производ на Rohde & Schwarz. Со производот се испорачани повеќејазични безбедносни упатства. Следете ги дадените упатства за инсталација.

Bu opsiyon veya aksesuar, belirli bir Rohde & Schwarz ürünü için tasarlanmıştır. Çok dilli güvenlik uyarıları ürünle birlikte teslim edilir. Size sağlanan kurulum talimatlarına uyun.

אפשרות זו או האביזר מיועדים למוצר ספציפי של Rohde & Schwarz. מידע רב-לשוני בנושא בטיחות מצורף למוצר. יש לפעול בהתאם להנחיות ההתקנה המצורפות.

تم تصميم هذا الخيار أو الملحق لمنتج معين من منتجات Rohde & Schwarz. يتم تزويد معلومات السلامة متعددة اللغات مع المنتج. اتبع تعليمات التركيب الموضحة.

این قابلیت یا وسیله جانبی منحصراً برای محصول به خصوص Rohde & Schwarz طراحی شده است. اطلاعات ایمنی چندزبانه همراه این دستگاه ارائه شده است. دستورالعمل‌های نصب ارائه شده را دنبال کنید.

اس اختیار یا حصے کو مخصوص Rohde & Schwarz پروڈکٹ کے لئے تیار کیا گیا ہے۔ پروڈکٹ کے ساتھ کثیر السانی زبانوں میں تحفظ کی معلومات فراہم کی جاتی ہیں۔ فراہم کردہ تنصیب کی ہدایات پر عمل کریں۔

Şu opsiýa ýa-da esbap Rohde & Schwarz anyk önüm üçin niýetlenilen. Dürli dildäki howpsuzlyk barada maglumat önüm bilen bile üpjün edilýär. Üpjün edilen gurnama ugrukdyrmalaryny ýerine ýetiriň.

इस विकल्प या एक्सेसरी को एक विशेष Rohde & Schwarz उत्पाद के लिए डिज़ाइन किया गया है. उत्पाद के साथ बहुभाषी सुरक्षा जानकारी दी जाती है. प्रदान किए गए इंस्टालेशन अनुदेशों का पालन करें.

本**选**件或附件**专门设计**用于特定的 Rohde & Schwarz **产**品。**产**品随附多**种语**言版本的安全**资讯**。**谨**遵文件中的安装**说**明。

本オプションアクセサリは、特定の Rohde & Schwarz 製品向けに設計されています。多言語で記載された安全情報が製品に付属します。付属のインストール手順に従ってください。

이 옵션 또는 액세서리는 특정 Rohde & Schwarz 제품용으로 설계되었습니다. 제품과 함께 다국어로 작성된 안전 정보가 제공됩니다. 함께 제공된 설치 지침을 따르십시오.

本選配或配件專門設計用於特定的 Rohde & Schwarz **產**品。**產**品隨附多種語言版本的安全資訊。遵守文件中的安裝**說**明。

Tùy chọn hoặc phụ kiện này dành riêng cho một sản phẩm Rohde & Schwarz cụ thể. Thông tin an toàn đa ngôn ngữ được cung cấp kèm theo sản phẩm. Thực hiện theo hướng dẫn lắp đặt kèm theo.

ตัวเลือกหรืออุปกรณ์เสริมนี้ออกแบบมาสำหรับผลิตภัณฑ์ Rohde & Schwarz โดยเฉพาะ โดยจะมีการจัดส่งข้อมูลด้านความปลอดภัยหลายภาษามาให้พร้อมกับผลิตภัณฑ์ ปฏิบัติตามคำแนะนำในการติดตั้งที่ให้ไว้

Pilihan atau aksesori ini direka bentuk untuk produk Rohde & Schwarz yang tertentu. Maklumat keselamatan berbilang bahasa disertakan bersama produk. Ikut arahan pemasangan yang diberikan.

Opsi atau aksesori ini dirancang untuk produk Rohde & Schwarz tertentu. Informasi keamanan dalam beberapa bahasa juga disertakan bersama produk. Ikuti petunjuk pemasangan yang disediakan.

Esta opción o este accesorio están diseñados para un producto Rohde & Schwarz en concreto. El producto va acompañado de información de seguridad en varios idiomas. Siga las instrucciones de instalación proporcionadas con el producto.

Esta opção ou acessório foi desenvolvido para um produto Rohde & Schwarz específico. Informações de segurança em vários idiomas acompanham o produto. Siga as instruções de instalação disponibilizadas.

2 Welcome

2.1 Scope

The R&S TSVP Accessory Products expand the test system versatile platform R&S TSVP by different kind of application-specific communication, signal transmission and further unique functional modules. The modules can be ordered individually.

This manual contains information about the R&S TSVP Accessory Products that follows:

- R&S TS-PFP9 interface extension panel for the system controller
- R&S TS-PSCBRR BroadR-Reach main module and
  R&S TS-PSCBRRX BroadR-Reach extension module
- R&S TS-PRIOC rear-I/O break-out panel for the R&S TS-PSC6 system controller
- R&S TS-PFP6 PXI 61xx break-out front panel for R&S TSVP
- R&S TS-PXI6141 intelligent programmable communication controller for automotive ethernet
- R&S TS-PXI6153 intelligent programmable communication controller
- R&S TS-PAIM and R&S TS-PAIM+ audio impedance matching modules

This user manual encompasses installing, programming and operating of the modules. The operating instructions provide information about the special features of the modules, block diagrams and pin assignment of the connectors.

The accessory products can be used to provide R&S TSVP-based equipment with flexible, expandable functionality or to combine them with other measuring instruments to achieve extremely powerful hybrid test systems.

The product documentation helps you to use the R&S TSVP Accessory Products safely and efficiently. Follow the instructions provided here and in the R&S TSVP user manual. Keep the product documentation nearby and offer it to other users.

For detailed information, refer to the R&S TSVP user manuals.

2.2 Conventions used in the documentation

2.2.1 Typographical conventions

The following text markers are used throughout this documentation:

Convention	Description
"Graphical user interface elements"	All names of graphical user interface elements on the screen, such as dialog boxes, menus, options, buttons, and softkeys are enclosed by quotation marks.
[Keys]	Key and knob names are enclosed by square brackets.
`Filenames, commands, program code`	Filenames, commands, coding samples and screen output are distinguished by their font.
Input	Input to be entered by the user is displayed in italics.
Links	Links that you can click are displayed in blue font.
"References"	References to other parts of the documentation are enclosed by quotation marks.

2.2.2 Notes on screenshots

When describing the functions of the product, we use sample screenshots. These screenshots are meant to illustrate as many as possible of the provided functions and possible interdependencies between parameters. The shown values may not represent realistic usage scenarios.

The screenshots usually show a fully equipped product, that is: with all options installed. Thus, some functions shown in the screenshots may not be available in your particular product configuration.

2.2.3 Notes to pictures and graphic elements

When describing the functions of the accessory products, we use sample pictures, graphics and screenshots. These visualizations are meant to illustrate as many as possible of the provided functions. The shown values may not represent realistic usage scenarios.

The visualizations usually show a fully equipped product. Thus, some functions shown may not be available in your particular product configuration.

3 Documentation overview

This section provides an overview of the TSVP system user documentation.

All documents are delivered with the Generic Test Software Library ("R&S GTSL") installation package. After installing the software, you can open all the documentation from the Windows "Start" menu. Additionally, you can find detailed information about the software interfaces in the "R&S GTSL Help" folder in the Windows "Start" menu.

The user documentation and "R&S GTSL" installation package are also available for download in GLORIS at:

https://gloris.rohde-schwarz.com/

For details, see the TSVP Getting Started manual.

3.1 Getting started manual

Introduces the R&S TSVP (Test System Versatile Platform) and describes how to set up and start working with the product. It includes safety information.

A printed version is delivered with the instrument.

3.2 User manuals

Separate manuals are provided for the base units, the individual plug-in module types, as well as for the control software and the calibration tool:

- Base unit manual
  The base unit user manuals introduce the base units and describes how to set up and operate the product. It includes safety information and information on maintenance and instrument interfaces. It includes the contents of the getting started manual.
- Plug-in module manuals
  Contain the description of the specific modules. Basic information on setting up the R&S TSVP (Test System Versatile Platform) is not included.
- In-System calibration user manuals
  Provide all the information required for installation and operation of the in-system calibration R&S TS-ISC solution.
- Control software
  - R&S GTSL
    Generic Test Software Library
  - R&S EGTSL
    Enhanced Generic Test Software Library
  - R&S IC-Check
    Generic Test Software Library

3.3 System manual

Describes the complete TSVP system as a whole, including the combined use of R&S CompactTSVP and R&S PowerTSVP, plug-in modules and generic test software. It also includes typical use cases.

Additionally, it describes known installation problems (hardware and software) along with possible solutions.

3.4 Service manual

Describes the self-test to check correct operation, troubleshooting and fault elimination, and contains mechanical drawings and spare part lists.

3.5 Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

3.6 Brochures and specifications

Separate brochures are provided for the base unit, the individual plug-in module types, as well as for the control software. The brochures provide an overview of the base units and each additional module, and also contain the technical specifications. They also list the hardware options and their order numbers, and optional accessories.

3.7 Release notes and open source acknowledgment

The release notes list new features, improvements and known issues of the current software version. In addition, the available firmware versions and the firmware update procedure for plug-in modules are described.

The open-source acknowledgment document provides verbatim license texts of the used open source software.

4 R&S TS-PFP9

4.1 General

Figure 4-1: R&S TS-PFP9 VTAC Interface Front Panel

The R&S TS-PFP9 is a front interface panel for system controller. The 8 HP accessory product expands high speed legacy ports of the industrial embedded computer with VPC series 90 VTAC HSD signal module.

4.2 Key features

The front panel VPC Series 90 VTAC HSD signal module is preloaded with:

- 3 x USB 3.0 (type A, male), length 12"
- 3 x RJ45 CAT6, length 12"

Figure 4-2: Front view of R&S TS-PFP9 VTAC Interface Front Panel

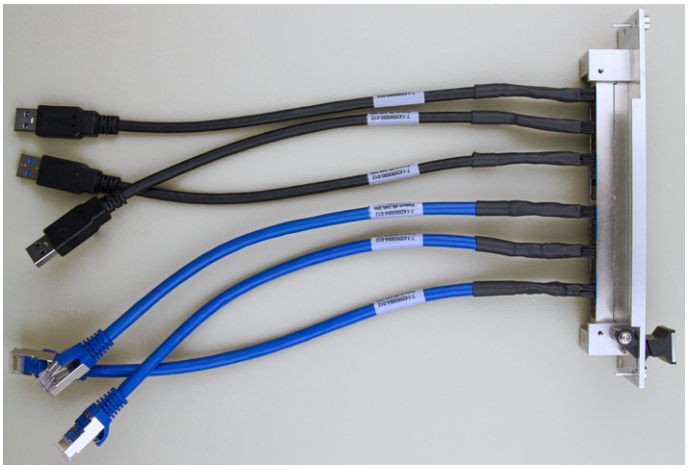
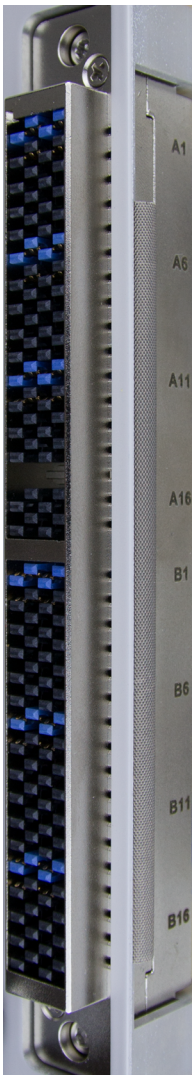


Figure 4-3: Side view of R&S TS-PFP9 VTAC Interface Front Panel

4.3 Interface description



Pos.	Port	Configuration	Insert
A1	P1	USB 3.0 type A (m)	-1
A2	P1	USB 3.0 type A (m)	-2
A3	P1		
A4	P1		
A5	P2		
A6	P2	USB 3.0 type A (m)	-1
A7	P2	USB 3.0 type A (m)	-2
A8	P2		
A9	P2		
A10	P3		
A11	P3	USB 3.0 type A (m)	-1
A12	P3	USB 3.0 type A (m)	-2
A13	P3		
A14	P3		
A15	P7		
A16	P8		
A17			
reserved	P4		
B1	P4	RJ45 CAT6	-1
B2	P4	RJ45 CAT6	-2
B3	P4		
B4	P4		
B5	P4		
B6	P5		
B7	P5	RJ45 CAT6	-1
B8	P5	RJ45 CAT6	-2
B9	P5		
B10	P5		
B11	P5		
B12	P6		
B13	P6	RJ45 CAT6	-1

B14	P6	RJ45 CAT6	-2
B15	P6		
B16	P6		
B17	P6		

4.4 Example of configuration

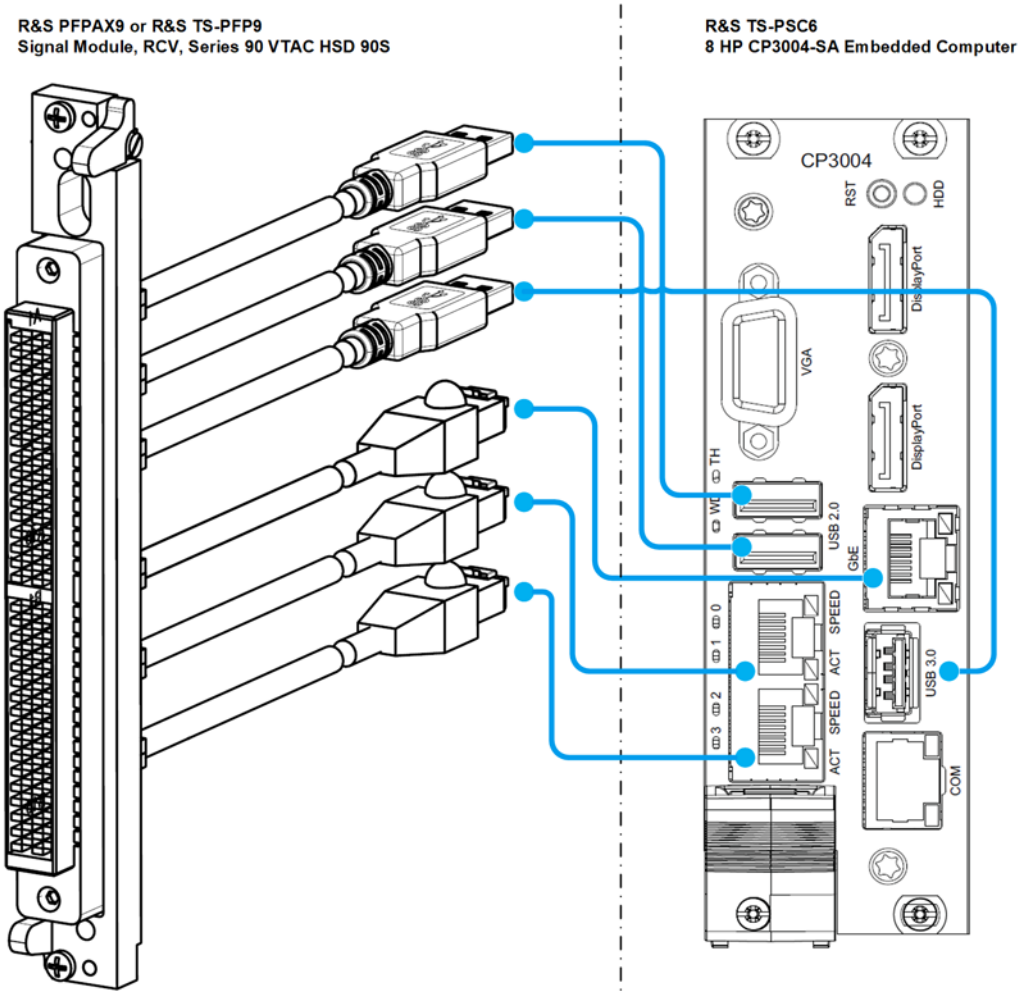


Figure 4-4: R&S TS-PFP9 configuration proposal

5 R&S TS-PSCBRR and R&S TS-PSCBRRX

5.1 General

Figure 5-1: R&S TS-PSCBRR BroadR-Reach Media Converter 100Base-T1 BCM

The modules include the 100BASE-T1 MediaConverter_BCM of the supplier Technica Engineering GmbH. The 100BASE-T1 MediaConverter_BCM transmits data frames directly from the physical layer BroadR-Reach (100BASE-T1) to Fast Ethernet (100BASE-TX) with constant delay time of 2.0 µs.

The option R&S TS-PSCBRRX expands the R&S TS-PSCBRR base unit with a second BroadR-reach port.

For detailed information, see documentation of the supplier Technica Engineering GmbH.

5.2 Key features

It offers the following key feature:

- Converts IEEE 100BASE-T1 100 MBit/s fullduplex 1 x twisted pair unshielded to Fast Ethernet 100BASETX fullduplex 2 x twisted pair shielded or unshielded
- Broadcom 100BASE-T1 Technology
- Primary/secondary configuration (DIP-switches)
- Configuration with DIP-Switches (Primary/Secondary)
- Power requirement: 8 V to 16 V DC, power consumption: 2 W

- Automotive MQS connector included (100BASE-T1)
- Standard Ethernet RJ45 connector

Options

The R&S TS-PSCBRR is expandable by a second controller by ordering type R&S TS-PSCBRRX.

5.3 Functional description

The 100BASE-T1 MediaConverter_BCM expands the computer with an additional interface functionality by conversion of the Ethernet to 100BASE-T1BroadR-Reach™. The module is prepared for use inside the R&S TSVP in conjunction with an embedded computer and separate signal feedthrough modules.

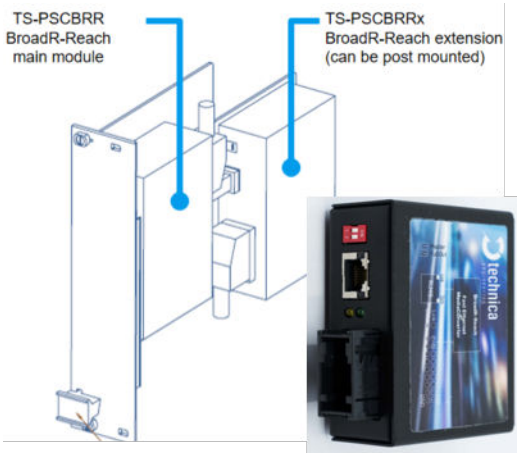


Figure 5-2: R&S TS-PSCBRR BroadR-Reach Media Converter 100Base-T1 BCM

Figure 5-3: R&S TS-PSCBRR BroadR-Reach Media Converter 100Base-T1 BCM internal connectors

Signal is lead through either by separate configured PFPAX9 VPC VTAC high-speed signal module (separate position) or by TS-PFP9 VTAC high speed signal front panel (separate position).

Wiring for BroadR-Reach is part of the type TS-PSCBRR / TS-PSCBRRX and not included in TS-PFP9 or PFPAX9.

The DIP switches are set to the default value (secondary mode) as follows:

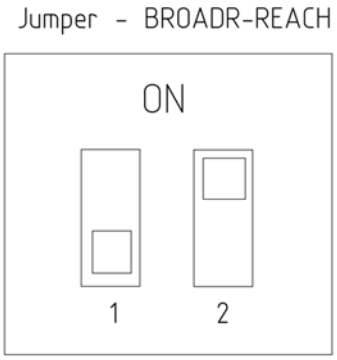


Figure 5-4: DIP switches default value, secondary mode

5.4 Interface description

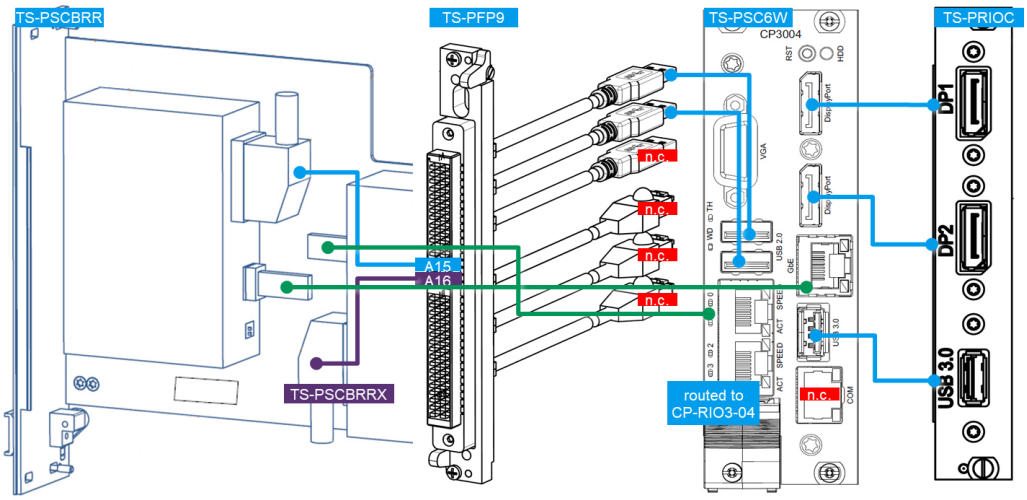


Figure 5-5: R&S TS-PSCBRR, R&S TS-PSCBRRX, overview

Table 5-1: Interface description of R&S TS-PFP9 with R&S TS-PSCBRR and R&S TS-PSCBRRX

Pos.	Port	Configuration	Insert
A1	P1	USB 3.0 type A (m)	-1
A2	P1	USB 3.0 type A (m)	-2
A3	P1		
A4	P1		
A5	P2		

A6	P2	USB 3.0 type A (m)	-1
A7	P2	USB 3.0 type A (m)	-2
A8	P2		
A9	P2		
A10	P3		
A11	P3	USB 3.0 type A (m)	-1
A12	P3	USB 3.0 type A (m)	-2
A13	P3		
A14	P3		
A15	P7	TS-PSCBRR	-1
A16	P8	TS-PSCBRRX	-1
A17			
reserved	P4		
B1	P4	RJ45 CAT6	-1
B2	P4	RJ45 CAT6	-2
B3	P4		
B4	P4		
B5	P4		
B6	P5		
B7	P5	RJ45 CAT6	-1
B8	P5	RJ45 CAT6	-2
B9	P5		
B10	P5		
B11	P5		
B12	P6		
B13	P6	RJ45 CAT6	-1
B14	P6	RJ45 CAT6	-2
B15	P6		
B16	P6		
B17	P6		

Wiring for BroadR-Reach is part of the type TS-PSCBRR / TS-PSCBRRX and not included in TS-PFP9 or PFPAX9.

BroadR-reach PIN assignment

MQS	Signal		INSERT	
1	12V	red	PIN 3	Twisted-pair
10	GND	brown	PIN 2	=ΛΛΛΛ=
8	N	green	PIN 6	Twisted-pair
9	P	blue	PIN 7	=ΛΛΛΛ=

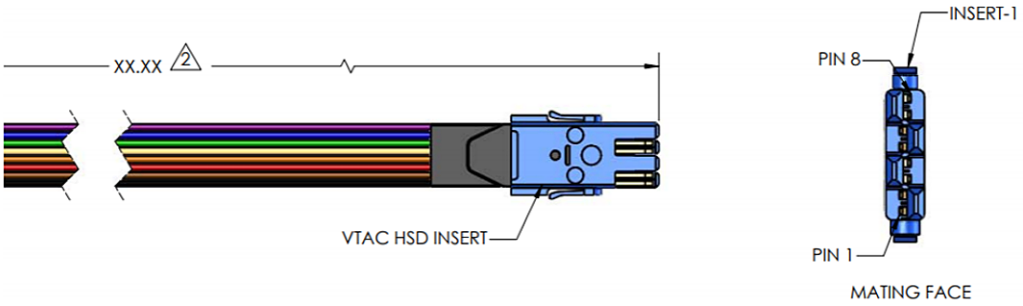


Figure 5-6: VPC VTAC RCV Insert 8 conductors, flying lead 7-142895000-012

6 R&S TS-PRIOC

6.1 General

The R&S TS-PRIOC is a rear-I/O break-out panel for the R&S TS-PSC6 system controller. It is an accessory product to lead through legacy ports of the industrial embedded computer.

Figure 6-1: R&S TS-PRIOC connectors and cabling

R&S TS-PRIOC supports:

- 1 x USB 3.0 (type A, female)
- 2 x display port

The rear panel requires 4 HP space in the chassis and has to be placed right from the R&S TS-PRIO3 rear I/O module of the system controller.

6.2 Interface description

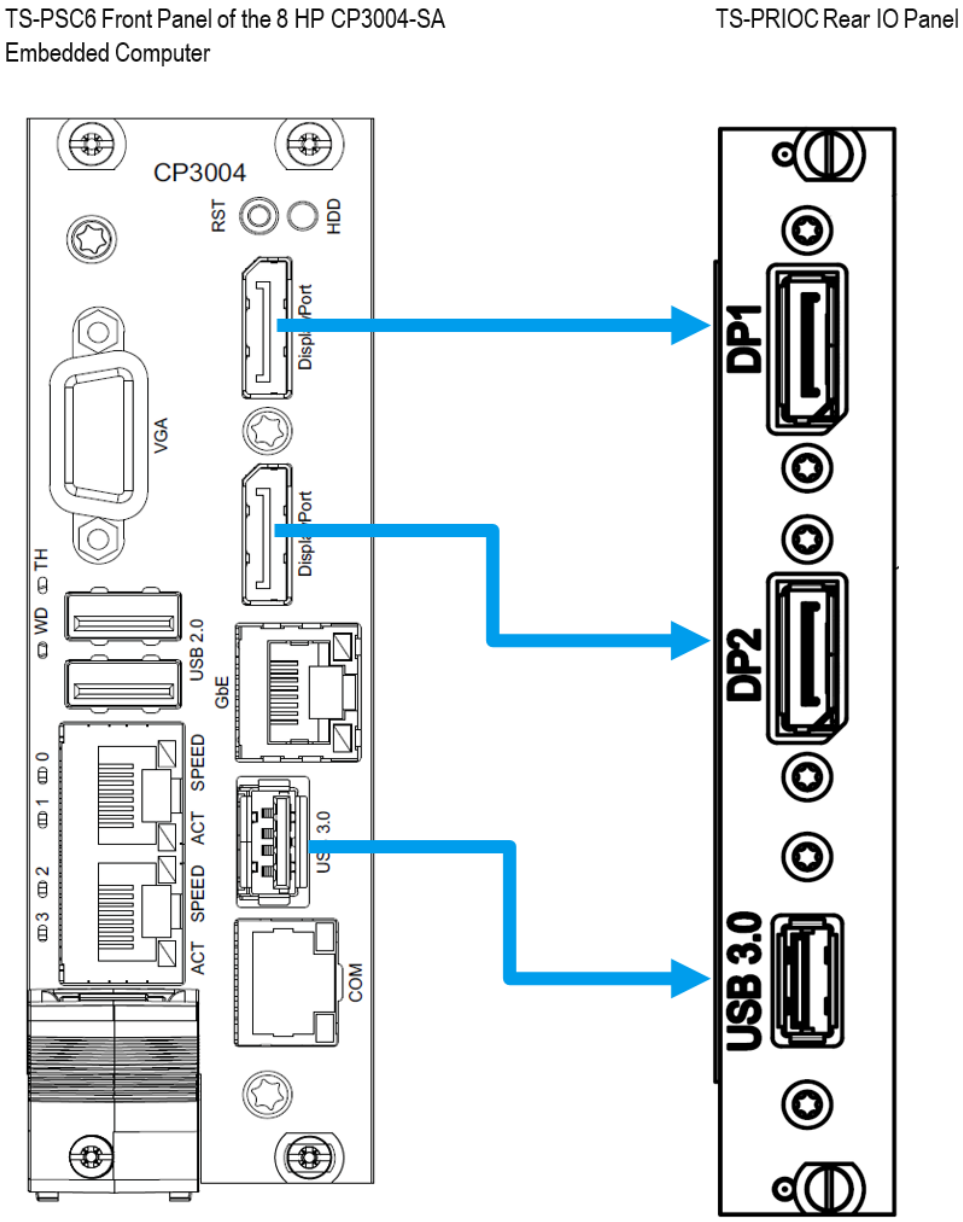


Figure 6-2: cTSVP Rear-IO break-out panel for TS-PSC6

Figure 6-3: R&S TSVP rear view with R&S TS-PRIOC (slot A4)

7 R&S TS-PFP6

7.1 General

The R&S TS-PFP6 PXI 61xx break-out front panel for R&S TSVP includes wiring of the 68-pin module connector to the R&S TSVP front panel with harmonized DIN 41612 module connector, 96 pin, female.

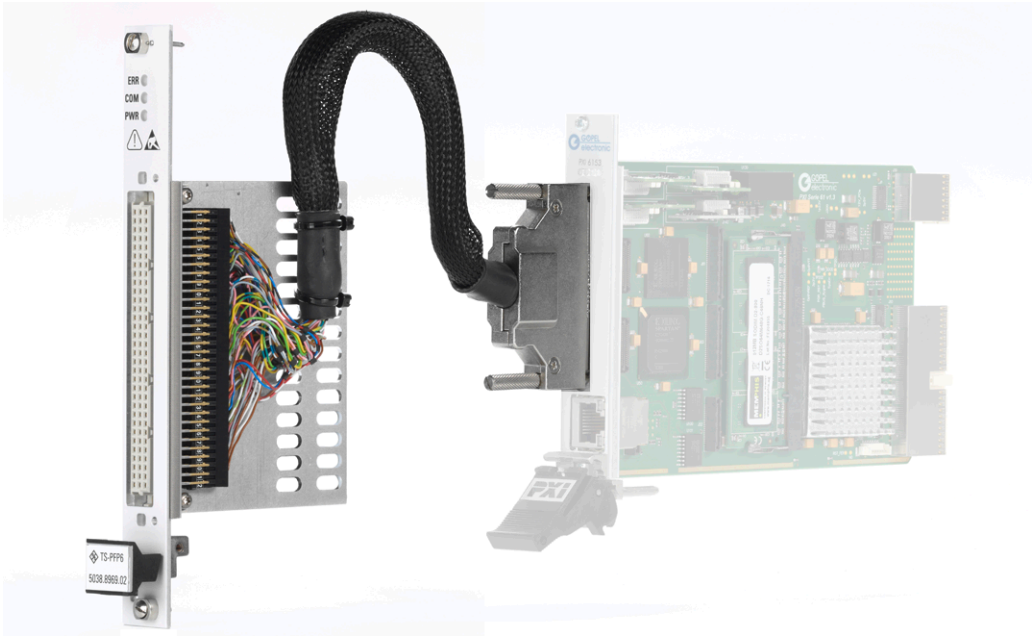


Figure 7-1: R&S TS-PFP6 PXI 61xx break-out front panel connected to R&S TS-PXI6153

7.2 Interface description

Table 7-1: R&S TS-PFP6 for TS-PXI61xx DIN 41612 front connector (f) pinout

Pin	A			B	
1	CAN1_H	LIN1	K-Line1	R_{low}-CAN1_H	*) $UBat_{extern\_iso1}$
2	CAN1_L		L-Line1	R_{low}-CAN1_L	*) GND_{iso1}
3	GNDiso			$UBAT_{extern1}$	*) do not connect
4	CAN2_H	LIN2	K-Line2	R_{low}-CAN2_H	*) $UBat_{extern\_iso2}$
5	CAN2_L		L-Line2	R_{low}-CAN2_L	*) GND_{iso2}
6	GNDiso			$UBAT_{extern2}$	*) do not connect
7	CAN3_H	LIN3	K-Line3	Rlow-CAN3_H	*) $UBat_{extern\_iso3}$
8	CAN3_L		L-Line3	R_{low}-CAN3_L	*) GND_{iso3}
9	GNDiso			$UBAT_{extern3}$	*) do not connect
10	CAN4_H	LIN4	K-Line4	R_{low}-CAN4_H	*) $UBat_{extern\_iso4}$
11	CAN4_L		L-Line4	R_{low}-CAN4_L	*) GND_{iso4}
12	GNDiso			$UBAT_{extern4}$	*) do not connect
13	FlexRay1A_BP			FlexRay1B_BP	
14	FlexRay1A_BM			FlexRay1B_BM	
15	GNDiso			GNDiso	
16	FlexRay2A_BP			FlexRay2B_BP	CAN6_H
17	FlexRay2A_BM			FlexRay2B_BM	CAN6_L
18	GNDiso			U_{EXT_IO}	
19	DIGITAL_OUT1			DIGITAL_IN1	
20	DIGITAL_OUT2			DIGITAL_IN2	
21	DIGITAL_OUT3			DIGITAL_IN3	
22	DIGITAL_OUT4			DIGITAL_IN4	
23	IO_EXP1			IO_EXP11	
24	IO_EXP2			IO_EXP12	
25	IO_EXP3			IO_EXP13	
26	IO_EXP4			IO_EXP14	
27	IO_EXP5			IO_EXP15	
28	IO_EXP6			IO_EXP16	
29	IO_EXP7			IO_EXP17	
30	IO_EXP8			IO_EXP18	

Pin	A			B	
31	IO_EXP9			IO_EXP19	
32	IO_EXP10			IO_EXP20	

8 R&S TS-PXI6141

8.1 General

The R&S TS-PXI6141 Automotive Ethernet module is a programmable, intelligent multibus controller providing various communication interfaces for vehicle network testing and general control applications. The module is suitable for test and validation of Ethernet-based in-vehicle networks.

Different SFP modules can be implemented to use the module for all supplied interfaces. The R&S TS-PXI6141 intelligent programmable communication controller is available with different preconfigurations, see Chapter 13, "Ordering information", on page 51.

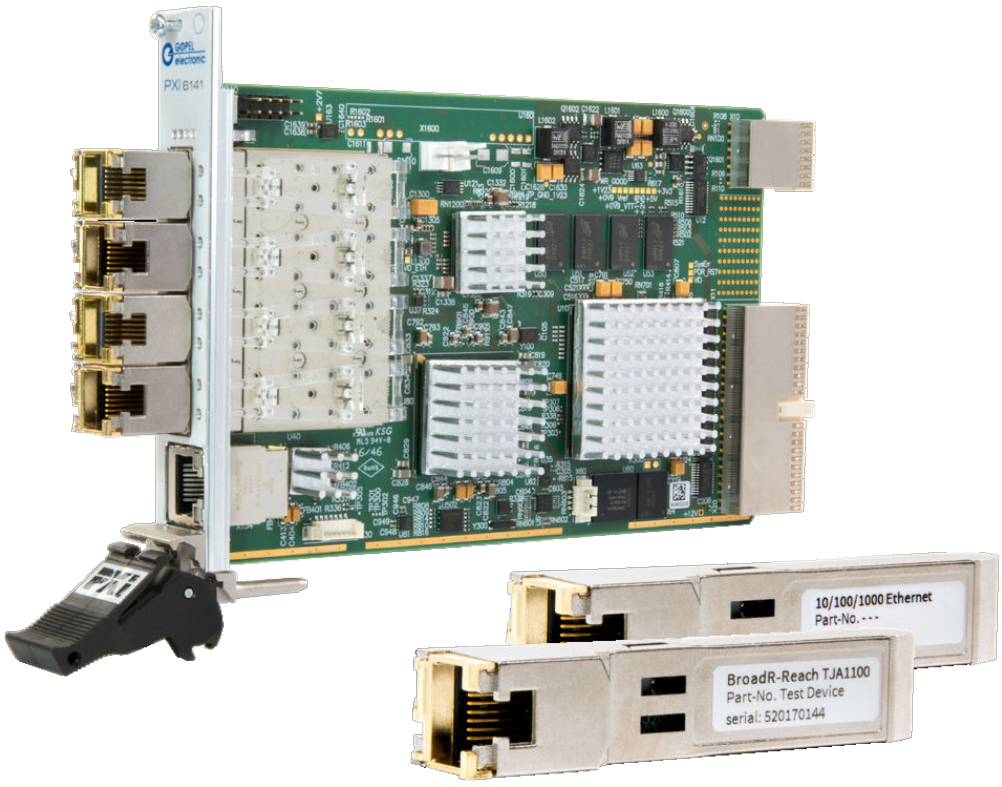


Figure 8-1: R&S TS-PXI6141 module and samples of SFP transceivers for BroadR-reach and 1000Base-T1

8.2 Key features

It offers the following key feature:

- Flexible test platform for Automotive Ethernet

- Modular transceiver system (four modular transceiver bays)
- A total of five independent 10/100/1000 Mbit MAC interfaces
- Trace-capture on all SFP interfaces with precise hardware timestamps
- FPGA based switching fabric which allows multiple data path for tapping and bypassing, PHY to PHY routing, PHY to MAC routing
- Bypassing with packet injection through internal switches to inject:
  - Additional traffic from MAC/packet generator
  - Eroneous frames from the packet generator
- Fourfold integrated FPGA based packet generator (up to 100 % busload with valid and erroneous data)
- Trace data acquisition on all interfaces with precise hardware time stamps
- Trace data generation in the pcap-ng format
- Cyclic and event-based transmission of unicast, multicast and broadcast messages
- Diagnostics over Ethernet (DoIP)
- Comprehensive G-API and LabVIEW virtual instrument library

8.3 Technical data

Table 8-1: Specifications

Host interface	PXI™ 32-bit, 33 MHz
Dimensions (without bracket and handle)	3U standard module and occupies one slot width. 160 mm x 100 mm (L x W)
Number of interfaces	Five independent 10/100/1000 Mbit MAC interfaces
Modular configuration	SFP transceiver modules supporting different types of interfaces: • 100Base-T1 (BroadR-Reach) • 1000Base-T1 • 10/100/1000Base-T
Packet generator	Fourfold integrated FPGA based packet generator up to 100 % busload with valid and erroneous data
Simulation	All MACs can simulate independent traffic for multiple ECUs, each virtual ECU with its own MAC and IP addresses
Capturing	Monitoring the network traffic of each MAC • Using wireshark network analyzer tool or the G API • pCAPng format
Software support	G API and LabVIEW virtual instrument library

8.4 Related product descriptions

For a detailed description, refer to the documentation of the supplier GOEPEL electronic GmbH, component R&S TS-PXI6141.

9 R&S TS-PXI6153

9.1 General

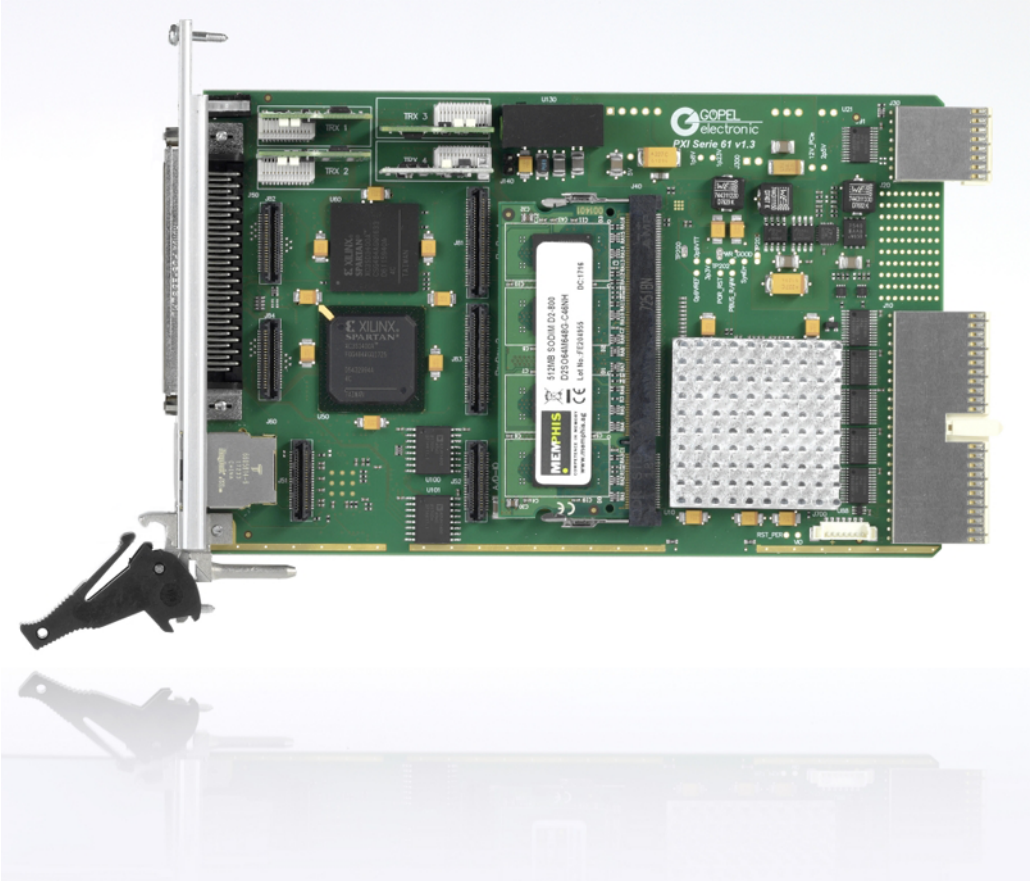


Figure 9-1: R&S TS-PXI6153 (5038.8981.02)

The R&S TS-PXI6153 intelligent programmable communication controller is a powerful communication controller for CAN, LIN, K-Line, MOST and FlexRay. The controller can be individually and flexibly configured with a wide range of options to satisfy their needs or expand the functionality at a later stage. In the basic configuration, the user has two separate communication interfaces. It can be optionally extended by up to four additional ports.

In addition to the parameterization of the controller via the standard Windows API, the user can run and debug own program code directly with support of the onboard API. After successful installation, the Series 61 module can start the user code automatically without PC support.

The R&S TS-PXI6153 intelligent programmable communication controller is available with different preconfigurations, see Chapter 13, "Ordering information", on page 51.

9.2 Key features

It offers the following key feature:

- Power PC 600 MHz with real-time operating system QNX
- 512 MBytes of RAM, 256 Mbytes of flash memory
- Maximum up to six separate communication ports for CAN, LIN, K-Line and Flex-Ray
- Exchangeable bus transceivers
- Up to six analog inputs and outputs in parallel with the communication ports
- Up to eight digital inputs and outputs in parallel with the communication ports
- Galvanic isolation of all resources
- Portability to different hardware platforms. Based on the current Series 61 modules for PCI, PXI, USB and Ethernet

For a detailed description, refer to the documentation from the supplier *GÖPEL electronic GmbH*, component *PXI 6153*.

9.3 Interface description

The R&S TS-PXI6153 can be connected via R&S TS-PFP6 to the front of the R&S TSVP.

10 R&S TS-PAIM, R&S TS-PAIM+

10.1 General

The R&S TS-PAIM is an audio impedance matching module (application specific):

- Works together with separate analog signal generator like R&S TS-PFG and signal analyzer like R&S TS-PAM.
- Configurable for different analog audio specific scenarios.
- $A^2B^®$ analog audio to automotive audio bus multichannel I2S/TDMI transceiver board (analog devices AD2428WG1BZ secondary), this is suitable if the DUT is an $A^2B^®$ primary.

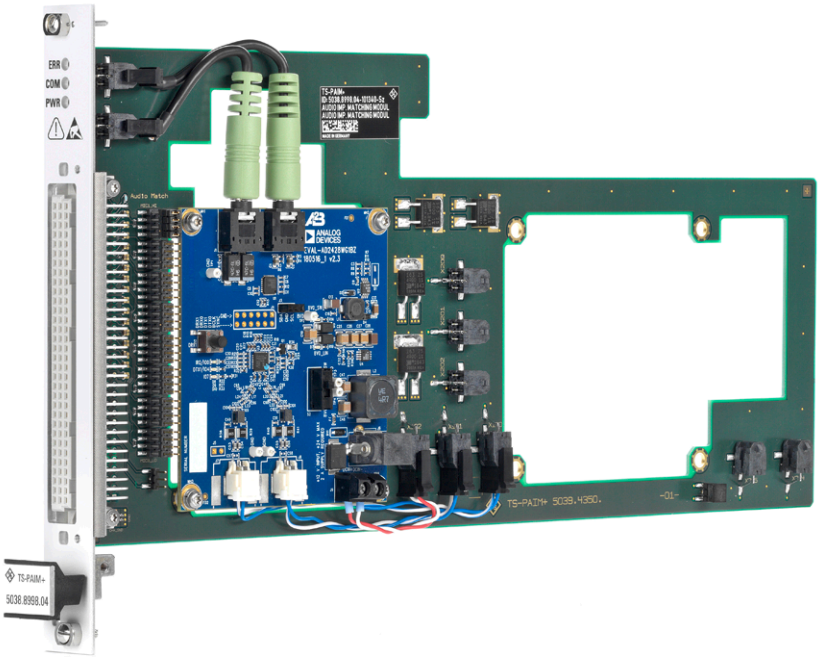


Figure 10-1: R&S TS-PAIM+

There are two different product change indexes (PCI). With the release of the PCI 02.00, the older releases are no longer available.

- PCI 02.00 and higher: supporting phantom-powering and T-powering for all audio impedance matching circuit clusters in parallel without interference in-between. In case of T-powering, if separated and independent power supplies are used. This release is indicated with a label at the module front panel.
- PCI lower than 02.00: supports T-powering only if one audio impedance matching circuit cluster is used in the application.

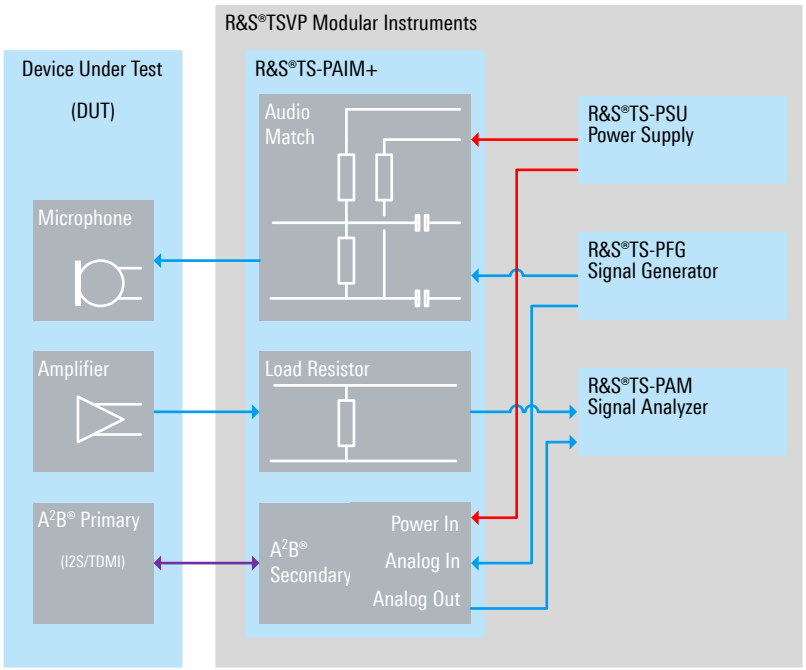


Figure 10-2: Interaction of R&S TS-PAIM and R&S TS-PAIM+ with a Device Under Test (DUT)

10.2 Technical data

PCI 02.00 and higher

Specifications			
Usage	Use on R&S®TSVP platform		1 slot required
Interfaces	Control bus	only TS-PAIM+	A²B®
	Front connector X10		DIN 61612, 96 pin, female
Module features	Microphone impedance matching network	Channels	8
		Phantom powering	Configurable 340 Ohm / 200 mW or 680 Ohm / 100 mW or open
		Input impedance	680 Ohm / 100 mW max.
		Coupling	AC
		Voltage	10 Vrms max.
	Loudspeaker load resistors	Channels	2
		Configuration	4 Ohm or 8 Ohm
		Power dissipation	10 W max. each

Specifications			
	AM radio impedance matching network	Channels	2
		Impedance	50 Ohm
		Power dissipation	1 W max. each
General data	Power consumption	A2B_PWR (1x board)	unconfigured +12 Vdc, 20 mA/typ.
			configured +12 Vdc, 50 mA/typ.
		PP_HI (1x audio impedance match)	all jumpers set (1340 Ohm) +8 Vdc, 6 mA/typ.
	Dimensions	W x H x D	20 mm × 174 mm × 300 mm (0.8 in × 6.8 in × 12.4 in)
	Weight		0.6 kg

PCI lower than 02.00

Specifications			
Usage	Use on R&S®TSVP platform		1 slot required
Interfaces	Control bus	only TS-PAIM+	A^2B®
	Front connector X10		DIN 61612, 96 pin
Module features	Microphone impedance matching network	Channels	8
		Phantom powering	Configurable 340 Ω or 680 Ω or open
		Input impedance	680 Ω
		Coupling	AC
		Voltage	10 Vrms max.
	Loudspeaker load resistors	Channels	2
		Configuration	4 Ω or 8 Ω
		Power dissipation	10 W max. each
	AM radio impedance matching network	Channels	2
		Impedance	50 Ω
		Power dissipation	100 mW max. each
General data	Power consumption	A2B_PWR (1x board)	unconfigured +12 V DC, 20 mA/typ.

Specifications			
			configured +12 V DC, 50 mA/typ.
		PP_HI (1x audio impedance match)	all jumpers set (1340 Ω) +8 V DC, 6 mA/typ.
	Dimensions	W x H x D	20 mm × 174 mm × 300 mm (0.8 in × 6.8 in × 12.4 in)
	Weight		0.7 kg

10.3 Key features

R&S TS-PAIM (R&S TS-PAIM+) audio impedance matching module for R&S TSVP offers the following key feature:

- 8 x audio signal conditioning and impedance matching network signal paths
- AC coupling of each audio signal paths
- Jumpers for configuration of alternative phantom powering clamping resistors of 340 Ω or 680 Ω for the audio signal paths
- 2 x loudspeaker load resistors, configurable with 4 Ω or 8 Ω
- 2 x 50 Ω impedance match for AM-radio signals, each generated by the TS-PFG function generator module
- DIN 41612 module front connector, 96 pin (f)
- One or two piggyback for an optional A^2B® secondary board (variant R&S TS-PAIM +)

10.4 Block diagram

PCI 02.00 and higher

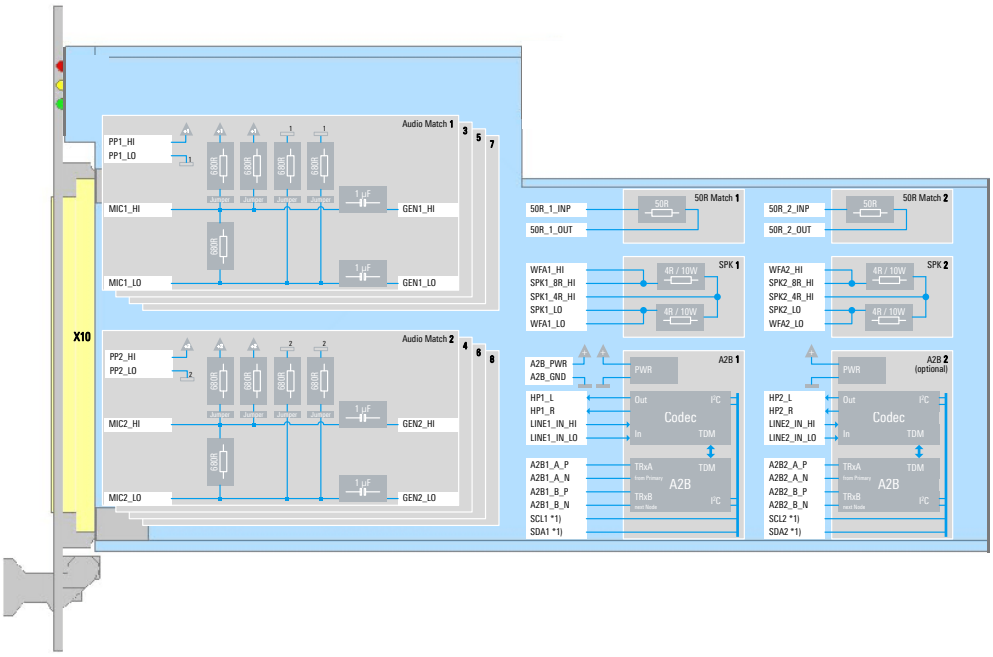


Figure 10-3: PCI 02.00 and higher audio impedance matching module

PCI lower than 02.00

Figure 10-4: PCI lower than 02.00 audio impedance matching module

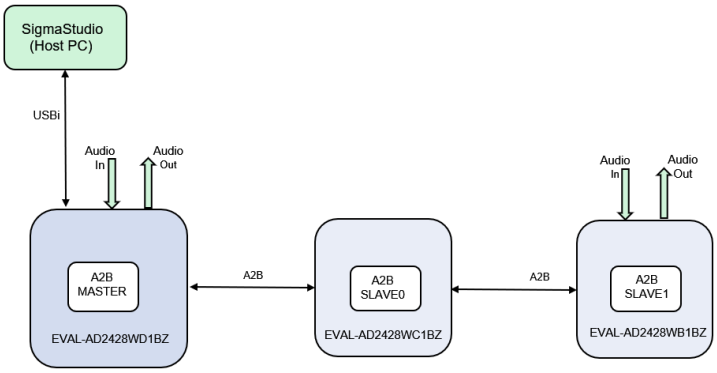
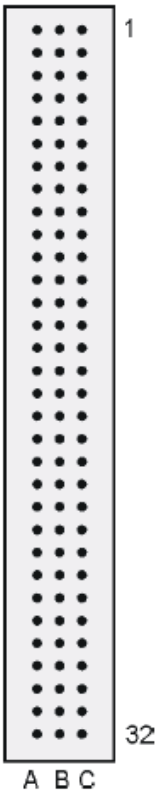


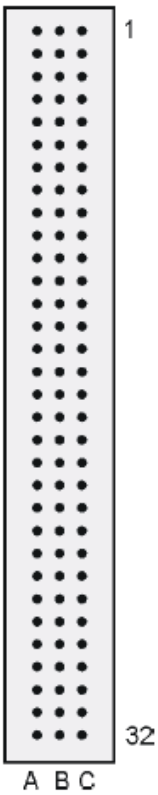
Figure 10-5: A2B system with PC as host (refer to "A2B QUICK START GUIDE", Analog Devices, Inc.)

10.5 Interface description

PCI 02.00 and higher



	A	B	C
1	50R_1_INP	GND	50R_1_OUT
2	50R_2_INP	GND	50R_2_OUT
3	GEN1_HI		MIC1_HI
4	GEN1_LO		MIC1_LO
5	GEN2_HI	PP2_HI	MIC2_HI
6	GEN2_LO	PP2_LO	MIC2_LO
7	GEN3_HI	PP3_HI	MIC3_HI
8	GEN3_LO	PP3_LO	MIC3_LO
9	GEN4_HI	PP4_HI	MIC4_HI
10	GEN4_LO	PP4_LO	MIC4_LO
11	GEN5_HI	PP5_HI	MIC5_HI
12	GEN5_LO	PP5_LO	MIC5_LO
13	GEN6_HI	PP6_HI	MIC6_HI
14	GEN6_LO	PP6_LO	MIC6_LO
15	GEN7_HI	PP7_HI	MIC7_HI
16	GEN7_LO	PP7_LO	MIC7_LO
17	GEN8_HI	PP8_HI	MIC8_HI
18	GEN8_LO	PP8_LO	MIC8_LO
19	PP1_HI	WFA1_HI	SPK1_8R_HI
20	PP1_LO		SPK1_4R_HI
21	A2B_PWR	WFA1_LO	SPK1_LO
22	A2B_PWR	WFA2_HI	SPK2_8R_HI
23	A2B_GND		SPK2_4R_HI
24	A2B_GND	WFA2_LO	SPK2_LO
25	SCL1 *1)	A2B1_A_P	A2B2_A_P
26	SDA1 *1)	A2B1_A_N	A2B2_A_N
27	SCL2 *1)	A2B1_B_P	A2B2_B_P
28	SDA2 *1)	A2B1_B_N	A2B2_B_N
29	HP1_L	HP2_L	
30	HP1_R	HP2_R	
31	LINE1_IN_HI	LINE2_IN_HI	
32	LINE1_IN_LO	LINE2_IN_LO	CHA_GND
*1) not equipped, for future use			



PCI lower than 02.00

	A	B	C
1	50R_1_INP	GND	50R_1_OUT
2	50R_2_INP	GND	50R_2_OUT
3	GEN1_HI		MIC1_HI
4	GEN1_LO		MIC1_LO
5	GEN2_HI		MIC2_HI
6	GEN2_LO		MIC2_LO
7	GEN3_HI		MIC3_HI
8	GEN3_LO		MIC3_LO
9	GEN4_HI		MIC4_HI
10	GEN4_LO		MIC4_LO
11	GEN5_HI		MIC5_HI
12	GEN5_LO		MIC5_LO
13	GEN6_HI		MIC6_HI
14	GEN6_LO		MIC6_LO
15	GEN7_HI		MIC7_HI
16	GEN7_LO		MIC7_LO
17	GEN8_HI		MIC8_HI
18	GEN8_LO		MIC8_LO
19	PP_HI	WFA1_HI	SPK1_8R_HI
20	PP_LO		SPK1_4R_HI
21	A2B_PWR	WFA1_LO	SPK1_LO
22	A2B_PWR	WFA2_HI	SPK2_8R_HI
23	A2B_GND		SPK2_4R_HI
24	A2B_GND	WFA2_LO	SPK2_LO
25	SCL1 *1)	A2B1_A_P	A2B2_A_P
26	SDA1 *1)	A2B1_A_N	A2B2_A_N
27	SCL2 *1)	A2B1_B_P	A2B2_B_P
28	SDA2 *1)	A2B1_B_N	A2B2_B_N
29	HP1_L	HP2_L	
30	HP1_R	HP2_R	
*1) not equipped, for future use			

	A	B	C
31	LINE1_IN_HI	LINE2_IN_HI	
32	LINE1_IN_LO	LINE2_IN_LO	CHA_GND
*1) not equipped, for future use			

10.6 Functional description

Audio impedance matching networks

Phantom power is a method of sending DC electrical voltage through microphone cables.

Phantom power, in the context of professional audio equipment, is DC electric power transmitted through microphone cables to operate microphones that contain active electronic circuitry. It is best known as a convenient power source for condenser microphones, though many active direct boxes also use it. The technique is also used in other applications where power supply and signal communication take place over the same wires. Typically, the phantom powering places the same DC voltage on both signal lines of a balanced connection. Possible interference voltages in the supply do not affect the signal due to the symmetrical cable routing (common mode rejection). "David Miles Huber, Robert E. Runstein Modern Recording Techniques, Focal Press 2009 ISBN 0-240-81069-4, page 117"

For phantom powering systems, based on transformerless inputs, an easy method with two decoupling resistors is common, which prevents a short circuit of the signal wires, but also limits the maximum transferable power per wire.

Depending on the microphone voltage and current consumption, different clamping resistors can be configured on R&S TS-PAIM. Thanks to lead out the phantom powering lines, it is possible to clamp the decoupling resistors against different leads of the external phantom powering supply.

The R&S TS-PAIM has capacitors in each line for blocking DC voltage against the external audio generator output, which is simulating the analog microphone signal. This is important in the case that an unsymmetrical (unbalanced) audio generator is connected. The R&S TS-PFG functional generator module is able to provide symmetrical (balanced) and floating audio signals.

Different supply methods

T-powering compared with phantom powering is using a different voltage supply method. The phantom powering method is driving the same voltage potential into the both differential audio lines *a* and *b* against the shielding line. In the end, between both audio signal lines *a* and *b*, no voltage can be measured. On the other hand, the T-powering method is driving the high supply potential only into the audio line *a* and the low potential against the shielding line. In the result, between the audio signal lines *a* and *b* depending from the current consumption of the microphone more or less the full supply

voltage can be measured. The R&S TS-PAIM audio impedance matching module supports both methods by leading out the supply lines to the front connector X10.

Important note

Differences between the product change indices PCI 02.00 and higher, respectively lower than 02.00 have to be considered:

The release PCI 02.00 or higher: Supporting phantom-powering and T-powering for all audio impedance matching circuit clusters in parallel without interference in-between. In case of T-powering, if separated and independent power supplies are used. This release is indicated with a label at the module front panel.

The release PCI <02.00 is supporting T-powering only, if only one audio impedance matching circuit cluster is used in the application.

Configuration

PCI 02.00 and higher: By default all audio impedance matching network [audio match 1 : audio match 8] are fully configured. That means all 32 jumpers are set.

PCI lower than 02.00: By default, only the audio impedance matching network [audio match 1] is fully configured. That means all 4 jumpers are set. All other networks are unconfigured, no jumpers are set by default.

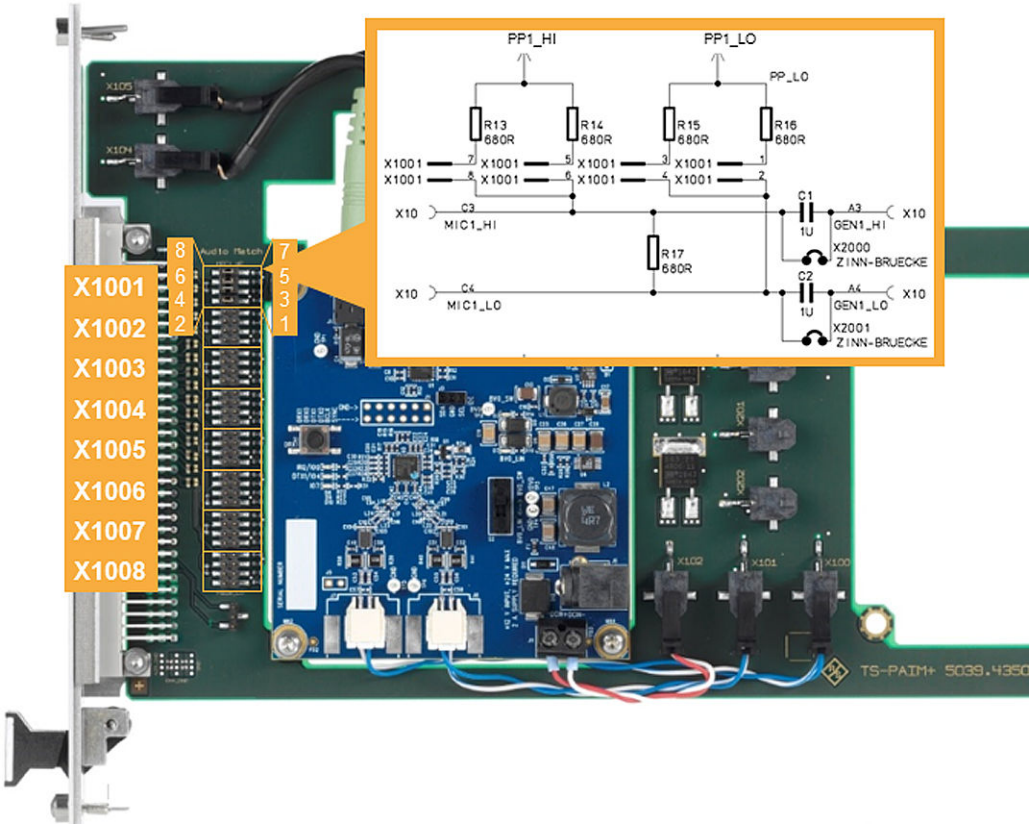


Figure 10-6: Configuration of R&S TS-PAIM and R&S TS-PAIM+

Table 10-1: Configuration of the audio impedance matching network 1

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1001	8	7	Closed	Closed
X1001	6	5	Closed	Closed
X1001	4	3	Closed	Closed
X1001	2	1	Closed	Closed

Table 10-2: Configuration of the audio impedance matching network 2

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1002	8	7	Open	Closed
X1002	6	5	Open	Closed
X1002	4	3	Open	Closed
X1002	2	1	Open	Closed

Table 10-3: Configuration of the audio impedance matching network 3

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1003	8	7	Open	Closed
X1003	6	5	Open	Closed
X1003	4	3	Open	Closed
X1003	2	1	Open	Closed

Table 10-4: Configuration of the audio impedance matching network 4

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1004	8	7	Open	Closed
X1004	6	5	Open	Closed
X1004	4	3	Open	Closed
X1004	2	1	Open	Closed

Table 10-5: Configuration of the audio impedance matching network 5

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1005	8	7	Open	Closed
X1005	6	5	Open	Closed

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1005	4	3	Open	Closed
X1005	2	1	Open	Closed

Table 10-6: Configuration of the audio impedance matching network 6

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1006	8	7	Open	Closed
X1006	6	5	Open	Closed
X1006	4	3	Open	Closed
X1006	2	1	Open	Closed

Table 10-7: Configuration of the audio impedance matching network 7

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1007	8	7	Open	Closed
X1007	6	5	Open	Closed
X1007	4	3	Open	Closed
X1007	2	1	Open	Closed

Table 10-8: Configuration of the audio impedance matching network 7

Jumper	Pin 1	Pin 2	Default configuration PCI lower than 02.00	Default configuration PCI 02.00 and higher
X1008	8	7	Open	Closed
X1008	6	5	Open	Closed
X1008	4	3	Open	Closed
X1008	2	1	Open	Closed

Loudspeaker load resistors

The R&S TS-PAIM audio impedance matching is equipped with two resistor circuits to simulate a typical loudspeaker load. By choosing the right signal pins at the module front connector X10, 4 Ω or 8 Ω can be simulated. Additionally for each load circuit two independent signal lines (WFAx_HI/WFAx_LO) are feed out to be connected with an audio signal analyzer like the R&S TS-PAM signal analyzer module. This allows to perform typical audio quality measurements like frequency response, total harmonic distortion and noise.

A²B® secondary daughter module

Automotive Audio Bus® technology provides a multichannel, I²S/TDM link over distances of up to 15 meters between nodes. It embeds bidirectional synchronous data, clock, control data, and power onto a single, differential wire pair. A²B supports a direct point-to-point connection and allows multiple daisy-chained nodes at different locations to contribute or consume time division multiplexed channel content. A²B is a single primary, multiple secondary systems where the transceiver at the host controller is the primary. It generates clock, synchronization, and framing for all secondary nodes. The primary A²B transceiver is programmable over a control bus (I²C) for configuration and read back. An extension of this control bus is embedded in the A²B® data stream, allowing direct access of registers and status information on secondary transceivers, as well as I²C-to-I²C communication over distance.

A²B®

Typical target applications include:

- Audio ECU communication links
- Active noise cancellation (ANC)
- Road noise cancellation (RNC)
- Microphone arrays for hands-free, in-car communications and eCall systems

The R&S TS-PAIM+ audio impedance matching module is equipped with an analog device AD2428WG1BZ A²B® secondary module. This A²B® secondary module is only suitable if the device under test (DUT) is an A²B® primary unit.

Operating

For operation, refer to the user instructions from Analog Devices, Inc. .

The user information is only available from Analog Devices, Inc. (www.analog.com).

In addition, the technical data of the configured analog devices AD2428WG1BZ A²B secondary module are available from Analog Devices, Inc. .

The A²B-secondary daughter module requires external power at the signal lines A2B_PWR and A2B_GND, which are accessible at the front connector X10. In conjunction with the DUT, which should be an A²B primary module, the A²B secondary daughter module can automatically be configured. On demand with the signal lines LINE1_IN_HI/LO at X10, an external audio signal generator like the R&S TS-PFG functional generator module can supply an audio signal into the A²B secondary daughter module and e.g. replayed by analog output lines like loudspeaker outputs of a DUT (A²B-primary unit). The signal can also be transferred vice versa by supplying the A²B-primary unit with and analog audio signal and acquire the by A²B digital passed signal at the analog signal lines HP1_L/HP1_R at the front connector X10.

10.7 Application hints for analog audio

General rules

It is known in audio engineering that analog circuits must always be set up in such a way that hum signal pick-up is avoided. For this reason, it is important that a ground connection (grounding contact) is provided at only one point in the entire application circuit.

Driving the microphone channels with an analog audio signal generator

Best practice is to use the generator output channels in a differential and electronic floating configuration. With the R&S TS-PFG functional generator module, this is possible by always using both signals at each output channel like CHx_HI and CHx_LO, and by not connecting the signal CHx_LO with GND.

Measuring analog audio signals

To make optimum use of the possibilities of floating measurement of R&S TS-PAM, it is important to look at the grounding. The unit under test or the measuring instrument must be grounded to obtain reproducible, stable measuring results. Only with slow measuring techniques (e.g. battery operated hand multimeters) the hum can be equalized by decelerating averaging. For fast and accurate measurements, one must give some thought to the grounding. It is important here to only provide a single grounding point.

Best practice is the use of differential measurement with two channels, refer to user manual R&S TS-PAM, chapter "Particulars of Floating Measurements".

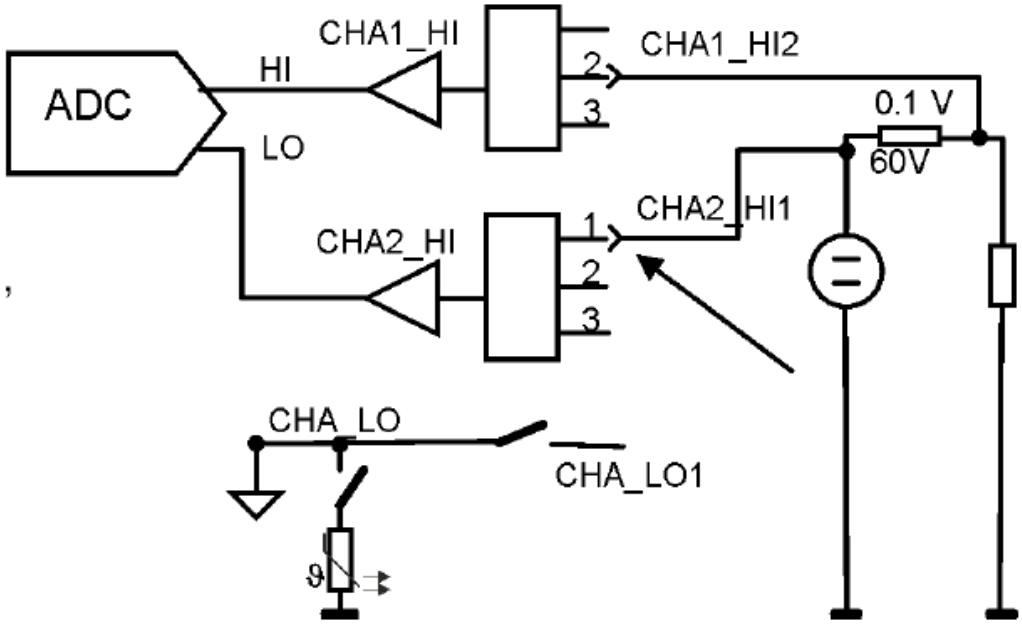


Figure 10-7: Topology

With the illustrated topology, the measurement can be done on a different potential. However, a high-resistance separate channel with low capacitance is used as reference. For reproducible measurements, the input ranges with 1 MΩ input resistance must be used. This resistance must be selected specifically in the small measuring ranges.

Reason: Since the acquisition unit is operated here without direct reference potential, leakage currents of the operational amplifier cannot otherwise flow to the reference potential CHA_LO.

Advantage: The high-resistance input from CHA2_HI1 distorts the signal on the unit under test very little.

Measurement can be done in the more accurate small measurement ranges:

- High accuracy
- Low interference and suppressed hum loops
- No additional ground wire is required

Disadvantage: An additional acquisition channel is necessary.

11 Installing the modules

11.1 Module configuration R&S TSVP

Because of the different properties of plug-in modules, there are restrictions on the use of plug-in slots. Table 11-1 gives an overview of which modules can be operated in which plug-in slots.

Table 11-1: Module configuration R&S TSVP, front

Front side	A1	A2	A3	A4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
R&S TS-PSCBRR R&S TS-PSCBRRX	x																			
R&S TS-PFP9					x															
R&S TS-PXI6141							x *1)	x *1)	x	x	x	x	x	x	x	x	x	x		
R&S TS-PXI6153 R&S TS-PFP6							x	x	x	x	x	x	x	x	x	x	x	x		
R&S TS-PAIM R&S TS-PAIM+							x	x	x	x	x	x	x	x	x	x	x	x	x	x
*1) works only with a dedicated firmware version which is using the onboard 10 MHz reference-clock instead of the PXI clock from the backplane																				

11.2 Module installation

For installation of R&S TS-PSCBRR and R&S TS-PSCBRRX, see Chapter 11.3, "Installation of R&S TS-PSCBRR, R&S TS-PSCBRRX", on page 48.

To install a module, proceed as follows:

1. Run down and power off the R&S TSVP.
2. Select a suitable front slot (see Table 11-1).
3. Remove the appropriate front panel by slackening off the screws.
4. **NOTICE!** Damaged backplane due to bent pins. Bent pins may result in permanent damage to the backplane. Check the backplane connector for bent pins! Any pins that are bent must be straightened! When the module is connected, it must be guided with both hands and carefully pressed into the backplane connector.

   Insert the module.
5. **NOTICE!** Due to the front panel section of the modules there is a risk of a short circuit with components underneath a long module in the slot directly to the right

(viewed from the front). For this reason, the modules must absolutely be screwed in place properly.

Push in the module using moderate pressure.

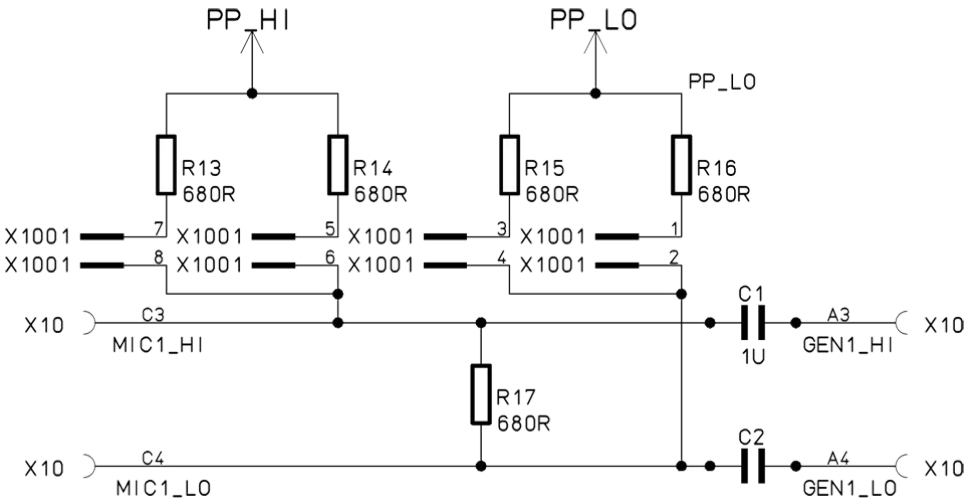
6. Tighten the upper and lower screws on the front panel of the module.

For detailed information, refer to the R&S TSVP user manual.

11.3 Installation of R&S TS-PSCBRR, R&S TS-PSCBRRX

To install a modules R&S TS-PSCBRR and R&S TS-PSCBRRX, proceed as follows:

1. Run down and power off the R&S TSVP.
2. Select a slot A1/A2 (see Table 11-1).
3. Remove the appropriate front panel by slackening off the screws.
4. Insert guided slide rail.



1 = Guided slide rails
2 = R&S TS-PSCBRR, R&S TS-PSCBRRX

5. **NOTICE!** Damaged backplane due to bent pins. Bent pins may result in permanent damage to the backplane. Check the backplane connector for bent pins! Any pins that are bent must be straightened! When the module is connected, it must be guided with both hands and carefully pressed into the backplane connector.

   Insert the module.

6. Push in the module using moderate pressure.

7. Tighten the upper and lower screws on the front panel of the module. The modules must absolutely be screwed in place properly.

For detailed information, refer to the R&S TSVP user manual.

12 Troubleshooting

For detailed information about troubleshooting, refer to the R&S TSVP system manual.

13 Ordering information

Type	Designation	Order No.
R&S TS-PRIOC	Rear-IO break-out panel for R&S PSC7 Accessory product to lead through the legacy ports of the industrial embedded computer. Supported ports are: • 1x USB 3.1 • 2x Display Port	5038.8946.02
R&S TS-PFP6	PXI61xx break-out front panel for R&S TSVP Wiring of the 68-pin connector to the R&S TSVP front panel with harmonized DIN 41612 connector (f), 96-pin	5038.8969.02
R&S TS-PFP9	Front interface extension panel for system controller, 8 HP Accessory product to expand high speed legacy ports of the industrial embedded computer with VPC Series 90 VTAC HSD signal module preloaded with: • 3x USB 3.0 (type A, male), length 12" • 3x RJ45 CAT6, length 12"	5038.9094.02
R&S TS-PSCBRR	BroadR-Reach 100BASE-T1-MediaConverter BCM module Media converter module (supplier Technica) for R&S TSVP Chipset: BCM89810 **Note:** Signal is feedthrough either by already configured • R&S PFPAX9 VPC VTAC high speed signal module (separate item) or • R&S TS-PFP9 VTAC high speed signal front panel (separate item)	5038.8975.02
R&S TS-PSCBRRX	BroadR-Reach 100BASE-T1-MediaConverter extension Media converter extension module (supplier Technica) for R&S TSVP Chipset: BCM89810 **Note:** R&S TS-PSCBRR (5038.8975.02) must already be configured	5038.8975.03
R&S TS-PXI6141	R&S TS-PXI6141 modular controller for automotive ethernet, configured with: • 2x SFP-Transceiver-modules for 100Base-T1/1000Base-T1 Type: 88Q2112 Rev.A2 • Ethernet diagnosis software via IP (DoIP) acc. to ISO 13400-2	5038.9271.21
R&S TS-PXI6141	R&S TS-PXI6141 modular controller for automotive ethernet, configured with: • 4x SFP-Transceiver-modules for 100Base-T1/1000Base-T1 Type: 88Q2112 Rev.A2 • Ethernet diagnosis software via IP (DoIP) acc. to ISO 13400-2	5038.9271.41
R&S TS-PXI6141	R&S TS-PXI6141 modular controller for automotive ethernet, configured with: • 3x SFP-transceiver modules for 100Base-T1/1000Base-T1 Type: 88Q2112 Rev.A2 • 1x SFP-transceiver module for 100Base-T1/1000Base-T Type: Marvell 88E1111 • Ethernet diagnostic software over IP (DoIP) acc. ISO 13400-2	5038.9271.42

Type	Designation	Order No.
R&S TS-PXI6153	R&S TS-PXI6153.01 configurable controller for CAN and LIN, configured with: • 2x CAN HS ports and 2x transceiver modules (high speed TJA1041A) • 2x LIN ports and 2x transceiver modules (TJA1020) • CAN diagnostic software on board UDS based on CAN-ISO-TP **Note:** Total quantity of installable ports and transceiver modules are 4	5038.8981.02
R&S TS-PXI6153	R&S TS-PXI6153 configurable controller for CAN-FD and LIN configured with: • 3x CAN-FD ports incl. 3x transceiver modules (TJA1044GT) (compatible with CAN high-speed transceiver TJA1041A) • 1x LIN port incl. 1x transceiver module (TJA1020) **Note:** Total quantity of installable ports and transceiver modules are 4	5038.8981.03
R&S TS-PXI6153	R&S TS-PXI6153 communication controller configured with: • 2x CAN HS ports incl. transceiver modules (high speed TJA1041A) • 2x LIN/K-Line ports incl. transceiver modules (L9637) • CAN diagnostic software on board UDS based on CAN-ISO-TP **Note:** Total quantity of installable ports and transceiver modules are 4	5038.8981.22
R&S TS-PXI6153	R&S TS-PXI6153 configurable controller for CAN-FD and LIN configured with: • 3x CAN-FD ports incl. 3x transceiver modules (TJA1044GT) (compatible with CAN high-speed transceiver TJA1041A) • 1x LIN port incl. transceiver module (TJA1020) • CAN diagnostic software on board UDS based on CAN-ISO-TP **Note:** Total quantity of installable ports and transceiver modules are 4	5038.8981.31
R&S TS-PXI6153	R&S TS-PXI6153 controller CAN-FD configured with: • 4x CAN-FD ports incl. transceiver modules (TJA1044GT) (compatible with CAN high-speed transceiver TJA1041A) • CAN diagnostic software on board UDS based on CAN-ISO-TP **Note:** Total quantity of installable ports and transceiver modules are 4	5038.8981.04
R&S TS-PAIM	Audio impedance matching module for R&S TSVP, including: • Audio signal conditioning and impedance matching network • Loudspeaker load resistors • Jumpers for configuration in 3 variants • R&S TSVP front panel with DIN 41612 connector (f), 96 pins • Installation position for an optional A2B board (separate item)	5038.8998.02
R&S TS-PAIM+	Audio impedance matching module for TSVP, including: • Audio signal conditioning and impedance matching network • Loudspeaker load resistors • Jumpers for configuration in 3 variants • R&S TSVP front panel with DIN 41612 connector (f), 96 pins • A2B board as piggyback	5038.8998.04

Glossary: Abbreviations

A

ANC: Active noise cancellation

ATE: Automatic test equipment

C

cPCI: CompactPCI (open standard of the PICMG (PCI Industrial Manufacturers Group) that adapts the PCI standard for industrial applications

D

DIN: Deutsche Industrie-Norm (German Industry Standard)

DUT: Device under test

E

EMC: Electromagnetic compatibility

ESD: Electrostatic discharge

G

GND: Ground

GUI: Graphical user interface

H

HSD: High speed data

HW: Hardware

I

IEC: International Electrotechnical Commission

IP: Internet protocol

L

LAN: Local area network

LED: Light emitting diode

P

PDF: Portable document format

PE: Potential earth

PXI: PCI eXtensions for Instrumentation (standard defined by National Instruments which expands the CompactPCI, using its mechanical specifications and the connection with the system controller)

R

R&S: Rohde & Schwarz (registered trademark)

RNC: Road noise cancellation

S

SW: Software

T

TM: Test management

TSVP: Test system versatile platform (R&S CompactTSVP - Modular PXI based instruments)

U

USB: Universal serial bus

UUT: Unit under test

V

VDE: Verband der Elektrotechnik, Elektronik und Informationstechnologie (Association of Electrical Engineering and Information Technology)

X

X: R&S designation for connectors, e.g. X1