

# R&S® TS-PSM2

## Multiplex/Switch Module 2

### User Manual



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This manual describes the following R&S®TSVP models:

- R&S®TS-PSM2
- R&S®TS-PRIO

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The following abbreviations are used throughout this manual: R&S®TS-PSM2 is abbreviated as R&S TS-PSM2, R&S®TS-PRIO as R&S TS-PRIO.

# Basic Safety Instructions

## Always read through and comply with the following safety instructions!

All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standards of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment they require are designed, built and tested in accordance with the safety standards that apply in each case. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed, built and tested in accordance with the EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, you must observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for any purpose other than its designated purpose or in disregard of the manufacturer's instructions. The manufacturer shall assume no responsibility for such use of the product.

The product is used for its designated purpose if it is used in accordance with its product documentation and within its performance limits (see data sheet, documentation, the following safety instructions). Using the product requires technical skills and, in some cases, a basic knowledge of English. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel with the required skills be allowed to use the product. If personal safety gear is required for using Rohde & Schwarz products, this will be indicated at the appropriate place in the product documentation. Keep the basic safety instructions and the product documentation in a safe place and pass them on to the subsequent users.

Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before and when using the product. It is also absolutely essential to observe the additional safety instructions on personal safety, for example, that appear in relevant parts of the product documentation. In these safety instructions, the word "product" refers to all merchandise sold and distributed by the Rohde & Schwarz group of companies, including instruments, systems and all accessories. For product-specific information, see the data sheet and the product documentation.

## Safety labels on products

The following safety labels are used on products to warn against risks and dangers.

Symbol	Meaning	Symbol	Meaning
	Notice, general danger location Observe product documentation		ON/OFF Power
	Caution when handling heavy equipment		Standby indication
	Danger of electric shock		Direct current (DC)

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Symbol	Meaning	Symbol	Meaning
	Caution ! Hot surface		Alternating current (AC)
	Protective conductor terminal To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth		Direct/alternating current (DC/AC)
	Earth (Ground)		Class II Equipment to identify equipment meeting the safety requirements specified for Class II equipment (device protected by double or reinforced insulation)
	Frame or chassis Ground terminal		EU labeling for batteries and accumulators For additional information, see section "Waste disposal/Environmental protection", item 1.
	Be careful when handling electrostatic sensitive devices		EU labeling for separate collection of electrical and electronic devices For additional information, see section "Waste disposal/Environmental protection", item 2.
	Warning! Laser radiation For additional information, see section "Operation", item 7.		

### Signal words and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



Indicates information considered important, but not hazard-related, e.g. messages relating to property damage.  
In the product documentation, the word ATTENTION is used synonymously.

These signal words are in accordance with the standard definition for civil applications in the European Economic Area. Definitions that deviate from the standard definition may also exist in other economic areas or military applications. It is therefore essential to make sure that the signal words described here are always used only in connection with the related product documentation and the related product. The use of signal words in connection with unrelated products or documentation can result in misinterpretation and in personal injury or material damage.

## Basic Safety Instructions

### Operating states and operating positions

*The product may be operated only under the operating conditions and in the positions specified by the manufacturer, without the product's ventilation being obstructed. If the manufacturer's specifications are not observed, this can result in electric shock, fire and/or serious personal injury or death. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed.*

1. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products: predefined operating position is always with the housing floor facing down, IP protection 2X, use only indoors, max. operating altitude 2000 m above sea level, max. transport altitude 4500 m above sea level. A tolerance of  $\pm 10\%$  shall apply to the nominal voltage and  $\pm 5\%$  to the nominal frequency, overvoltage category 2, pollution degree 2.
2. Do not place the product on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves). An installation that is not carried out as described in the product documentation could result in personal injury or even death.
3. Do not place the product on heat-generating devices such as radiators or fan heaters. The ambient temperature must not exceed the maximum temperature specified in the product documentation or in the data sheet. Product overheating can cause electric shock, fire and/or serious personal injury or even death.

### Electrical safety

*If the information on electrical safety is not observed either at all or to the extent necessary, electric shock, fire and/or serious personal injury or death may occur.*

1. Prior to switching on the product, always ensure that the nominal voltage setting on the product matches the nominal voltage of the mains-supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
2. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with a protective conductor contact and protective conductor.
3. Intentionally breaking the protective conductor either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.
4. If there is no power switch for disconnecting the product from the mains, or if the power switch is not suitable for this purpose, use the plug of the connecting cable to disconnect the product from the mains. In such cases, always ensure that the power plug is easily reachable and accessible at all times. For example, if the power plug is the disconnecting device, the length of the connecting cable must not exceed 3 m. Functional or electronic switches are not suitable for providing disconnection from the AC supply network. If products without power switches are integrated into racks or systems, the disconnecting device must be provided at the system level.
5. Never use the product if the power cable is damaged. Check the power cables on a regular basis to ensure that they are in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, ensure that the cable cannot be damaged and that no one can be hurt by, for example, tripping over the cable or suffering an electric shock.

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6. The product may be operated only from TN/TT supply networks fuse-protected with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
7. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket provided for this purpose. Otherwise, sparks that result in fire and/or injuries may occur.
8. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
9. For measurements in circuits with voltages  $V_{rms} > 30$  V, suitable measures (e.g. appropriate measuring equipment, fuse protection, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
10. Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC 60950-1 / EN 60950-1 or IEC 61010-1 / EN 61010-1 standards that apply in each case.
11. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
12. If a product is to be permanently installed, the connection between the protective conductor terminal on site and the product's protective conductor must be made first before any other connection is made. The product may be installed and connected only by a licensed electrician.
13. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fuse-protected in such a way that anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.
14. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.
15. Any object that is not designed to be placed in the openings of the housing must not be used for this purpose. Doing so can cause short circuits inside the product and/or electric shocks, fire or injuries.
16. Unless specified otherwise, products are not liquid-proof (see also section "Operating states and operating positions", item 1). Therefore, the equipment must be protected against penetration by liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.
17. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.
18. Prior to cleaning the product, disconnect it completely from the power supply (e.g. AC supply network or battery). Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluents for cellulose lacquers.

## Operation

1. Operating the products requires special training and intense concentration. Make sure that persons who use the products are physically, mentally and emotionally fit enough to do so; otherwise, injuries or material damage may occur. It is the responsibility of the employer/operator to select suitable personnel for operating the products.

## Basic Safety Instructions

2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal/Environmental protection", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.
6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. Laser products are given warning labels that are standardized according to their laser class. Lasers can cause biological harm due to the properties of their radiation and due to their extremely concentrated electromagnetic power. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).
8. EMC classes (in line with EN 55011/CISPR 11, and analogously with EN 55022/CISPR 22, EN 55032/CISPR 32)
  - Class A equipment:  
Equipment suitable for use in all environments except residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings  
Note: Class A equipment is intended for use in an industrial environment. This equipment may cause radio disturbances in residential environments, due to possible conducted as well as radiated disturbances. In this case, the operator may be required to take appropriate measures to eliminate these disturbances.
  - Class B equipment:  
Equipment suitable for use in residential environments and environments that are directly connected to a low-voltage supply network that supplies residential buildings

### Repair and service

1. The product may be opened only by authorized, specially trained personnel. Before any work is performed on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.

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- Adjustments, replacement of parts, maintenance and repair may be performed only by electrical experts authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, protective conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps ensure the continued safety of the product.

### Batteries and rechargeable batteries/cells

*If the information regarding batteries and rechargeable batteries/cells is not observed either at all or to the extent necessary, product users may be exposed to the risk of explosions, fire and/or serious personal injury, and, in some cases, death. Batteries and rechargeable batteries with alkaline electrolytes (e.g. lithium cells) must be handled in accordance with the EN 62133 standard.*

- Cells must not be taken apart or crushed.
- Cells or batteries must not be exposed to heat or fire. Storage in direct sunlight must be avoided. Keep cells and batteries clean and dry. Clean soiled connectors using a dry, clean cloth.
- Cells or batteries must not be short-circuited. Cells or batteries must not be stored in a box or in a drawer where they can short-circuit each other, or where they can be short-circuited by other conductive materials. Cells and batteries must not be removed from their original packaging until they are ready to be used.
- Cells and batteries must not be exposed to any mechanical shocks that are stronger than permitted.
- If a cell develops a leak, the fluid must not be allowed to come into contact with the skin or eyes. If contact occurs, wash the affected area with plenty of water and seek medical aid.
- Improperly replacing or charging cells or batteries that contain alkaline electrolytes (e.g. lithium cells) can cause explosions. Replace cells or batteries only with the matching Rohde & Schwarz type (see parts list) in order to ensure the safety of the product.
- Cells and batteries must be recycled and kept separate from residual waste. Rechargeable batteries and normal batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.

### Transport

- The product may be very heavy. Therefore, the product must be handled with care. In some cases, the user may require a suitable means of lifting or moving the product (e.g. with a lift-truck) to avoid back or other physical injuries.
- Handles on the products are designed exclusively to enable personnel to transport the product. It is therefore not permissible to use handles to fasten the product to or on transport equipment such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport or lifting. Observe the safety regulations of the manufacturer of the means of transport or lifting. Noncompliance can result in personal injury or material damage.
- If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely and properly. The manufacturer assumes no responsibility for accidents or collisions. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident.



## Instrucciones de seguridad elementales

### Waste disposal/Environmental protection

1. Specially marked equipment has a battery or accumulator that must not be disposed of with unsorted municipal waste, but must be collected separately. It may only be disposed of at a suitable collection point or via a Rohde & Schwarz customer service center.
2. Waste electrical and electronic equipment must not be disposed of with unsorted municipal waste, but must be collected separately.  
Rohde & Schwarz GmbH & Co. KG has developed a disposal concept and takes full responsibility for take-back obligations and disposal obligations for manufacturers within the EU. Contact your Rohde & Schwarz customer service center for environmentally responsible disposal of the product.
3. If products or their components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
4. If handling the product releases hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

For additional information about environmental protection, visit the Rohde & Schwarz website.

## Instrucciones de seguridad elementales

### ¡Es imprescindible leer y cumplir las siguientes instrucciones e informaciones de seguridad!

El principio del grupo de empresas Rohde & Schwarz consiste en tener nuestros productos siempre al día con los estándares de seguridad y de ofrecer a nuestros clientes el máximo grado de seguridad. Nuestros productos y todos los equipos adicionales son siempre fabricados y examinados según las normas de seguridad vigentes. Nuestro sistema de garantía de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el certificado de conformidad de la UE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.

Además queda en la responsabilidad del usuario utilizar el producto en la forma debida. Este producto está destinado exclusivamente al uso en la industria y el laboratorio o, si ha sido expresamente autorizado, para aplicaciones de campo y de ninguna manera deberá ser utilizado de modo que alguna persona/cosa pueda sufrir daño. El uso del producto fuera de sus fines definidos o sin tener en cuenta las instrucciones del fabricante queda en la responsabilidad del usuario. El fabricante no se hace en ninguna forma responsable de consecuencias a causa del mal uso del producto.

## Instrucciones de seguridad elementales

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado conforme a las indicaciones de la correspondiente documentación del producto y dentro del margen de rendimiento definido (ver hoja de datos, documentación, informaciones de seguridad que siguen). El uso del producto hace necesarios conocimientos técnicos y ciertos conocimientos del idioma inglés. Por eso se debe tener en cuenta que el producto solo pueda ser operado por personal especializado o personas instruidas en profundidad con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de Rohde & Schwarz, encontraría la información debida en la documentación del producto en el capítulo correspondiente. Guarde bien las informaciones de seguridad elementales, así como la documentación del producto, y entréguelas a usuarios posteriores.

Tener en cuenta las informaciones de seguridad sirve para evitar en lo posible lesiones o daños por peligros de toda clase. Por eso es imprescindible leer detalladamente y comprender por completo las siguientes informaciones de seguridad antes de usar el producto, y respetarlas durante el uso del producto. Deberán tenerse en cuenta todas las demás informaciones de seguridad, como p. ej. las referentes a la protección de personas, que encontrarán en el capítulo correspondiente de la documentación del producto y que también son de obligado cumplimiento. En las presentes informaciones de seguridad se recogen todos los objetos que distribuye el grupo de empresas Rohde & Schwarz bajo la denominación de "producto", entre ellos también aparatos, instalaciones así como toda clase de accesorios. Los datos específicos del producto figuran en la hoja de datos y en la documentación del producto.

### Señalización de seguridad de los productos

Las siguientes señales de seguridad se utilizan en los productos para advertir sobre riesgos y peligros.

Símbolo	Significado	Símbolo	Significado
	Aviso: punto de peligro general Observar la documentación del producto		Tensión de alimentación de PUESTA EN MARCHA / PARADA
	Atención en el manejo de dispositivos de peso elevado		Indicación de estado de espera (standby)
	Peligro de choque eléctrico		Corriente continua (DC)
	Advertencia: superficie caliente		Corriente alterna (AC)
	Conexión a conductor de protección		Corriente continua / Corriente alterna (DC/AC)
	Conexión a tierra		El aparato está protegido en su totalidad por un aislamiento doble (reforzado)
	Conexión a masa		Distintivo de la UE para baterías y acumuladores  Más información en la sección "Eliminación/protección del medio ambiente", punto 1.

## Instrucciones de seguridad elementales

Símbolo	Significado	Símbolo	Significado
	Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD)		Distintivo de la UE para la eliminación por separado de dispositivos eléctricos y electrónicos  Más información en la sección "Eliminación/protección del medio ambiente", punto 2.
	Advertencia: rayo láser  Más información en la sección "Funcionamiento", punto 7.		

### Palabras de señal y su significado

En la documentación del producto se utilizan las siguientes palabras de señal con el fin de advertir contra riesgos y peligros.



Indica una situación de peligro que, si no se evita, causa lesiones graves o incluso la muerte.



Indica una situación de peligro que, si no se evita, puede causar lesiones graves o incluso la muerte.



Indica una situación de peligro que, si no se evita, puede causar lesiones leves o moderadas.



Indica información que se considera importante, pero no en relación con situaciones de peligro; p. ej., avisos sobre posibles daños materiales.

En la documentación del producto se emplea de forma sinónima el término CUIDADO.

Las palabras de señal corresponden a la definición habitual para aplicaciones civiles en el área económica europea. Pueden existir definiciones diferentes a esta definición en otras áreas económicas o en aplicaciones militares. Por eso se deberá tener en cuenta que las palabras de señal aquí descritas sean utilizadas siempre solamente en combinación con la correspondiente documentación del producto y solamente en combinación con el producto correspondiente. La utilización de las palabras de señal en combinación con productos o documentaciones que no les correspondan puede llevar a interpretaciones equivocadas y tener por consecuencia daños en personas u objetos.

### Estados operativos y posiciones de funcionamiento

*El producto solamente debe ser utilizado según lo indicado por el fabricante respecto a los estados operativos y posiciones de funcionamiento sin que se obstruya la ventilación. Si no se siguen las indicaciones del fabricante, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte. En todos los trabajos deberán ser tenidas en cuenta las normas nacionales y locales de seguridad del trabajo y de prevención de accidentes.*

## Instrucciones de seguridad elementales

1. Si no se convino de otra manera, es para los productos Rohde & Schwarz válido lo que sigue: como posición de funcionamiento se define por principio la posición con el suelo de la caja para abajo, modo de protección IP 2X, uso solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4500 m sobre el nivel del mar. Se aplicará una tolerancia de  $\pm 10\%$  sobre el voltaje nominal y de  $\pm 5\%$  sobre la frecuencia nominal. Categoría de sobrecarga eléctrica 2, índice de suciedad 2.
2. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptos para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (p. ej. paredes y estantes). Si se realiza la instalación de modo distinto al indicado en la documentación del producto, se pueden causar lesiones o, en determinadas circunstancias, incluso la muerte.
3. No ponga el producto sobre aparatos que generen calor (p. ej. radiadores o calefactores). La temperatura ambiente no debe superar la temperatura máxima especificada en la documentación del producto o en la hoja de datos. En caso de sobrecalentamiento del producto, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

### Seguridad eléctrica

*Si no se siguen (o se siguen de modo insuficiente) las indicaciones del fabricante en cuanto a seguridad eléctrica, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.*

1. Antes de la puesta en marcha del producto se deberá comprobar siempre que la tensión preseleccionada en el producto coincida con la de la red de alimentación eléctrica. Si es necesario modificar el ajuste de tensión, también se deberán cambiar en caso dado los fusibles correspondientes del producto.
2. Los productos de la clase de protección I con alimentación móvil y enchufe individual solamente podrán enchufarse a tomas de corriente con contacto de seguridad y con conductor de protección conectado.
3. Queda prohibida la interrupción intencionada del conductor de protección, tanto en la toma de corriente como en el mismo producto. La interrupción puede tener como consecuencia el riesgo de que el producto sea fuente de choques eléctricos. Si se utilizan cables alargadores o regletas de enchufe, deberá garantizarse la realización de un examen regular de los mismos en cuanto a su estado técnico de seguridad.
4. Si el producto no está equipado con un interruptor para desconectarlo de la red, o bien si el interruptor existente no resulta apropiado para la desconexión de la red, el enchufe del cable de conexión se deberá considerar como un dispositivo de desconexión. El dispositivo de desconexión se debe poder alcanzar fácilmente y debe estar siempre bien accesible. Si, p. ej., el enchufe de conexión a la red es el dispositivo de desconexión, la longitud del cable de conexión no debe superar 3 m). Los interruptores selectores o electrónicos no son aptos para el corte de la red eléctrica. Si se integran productos sin interruptor en bastidores o instalaciones, se deberá colocar el interruptor en el nivel de la instalación.
5. No utilice nunca el producto si está dañado el cable de conexión a red. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegúrese, mediante las medidas de protección y de instalación adecuadas, de que el cable de conexión a red no pueda ser dañado o de que nadie pueda ser dañado por él, p. ej. al tropezar o por un choque eléctrico.

## Instrucciones de seguridad elementales

6. Solamente está permitido el funcionamiento en redes de alimentación TN/TT aseguradas con fusibles de 16 A como máximo (utilización de fusibles de mayor amperaje solo previa consulta con el grupo de empresas Rohde & Schwarz).
7. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. La no observación de estas medidas puede provocar chispas, fuego y/o lesiones.
8. No sobrecargue las tomas de corriente, los cables alargadores o las regletas de enchufe ya que esto podría causar fuego o choques eléctricos.
9. En las mediciones en circuitos de corriente con una tensión  $U_{\text{eff}} > 30 \text{ V}$  se deberán tomar las medidas apropiadas para impedir cualquier peligro (p. ej. medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
10. Para la conexión con dispositivos informáticos como un PC o un ordenador industrial, debe comprobarse que éstos cumplan los estándares IEC60950-1/EN60950-1 o IEC61010-1/EN 61010-1 válidos en cada caso.
11. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar lesiones, fuego o daños en el producto.
12. Si un producto se instala en un lugar fijo, se deberá primero conectar el conductor de protección fijo con el conductor de protección del producto antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
13. En el caso de dispositivos fijos que no estén provistos de fusibles, interruptor automático ni otros mecanismos de seguridad similares, el circuito de alimentación debe estar protegido de modo que todas las personas que puedan acceder al producto, así como el producto mismo, estén a salvo de posibles daños.
14. Todo producto debe estar protegido contra sobretensión (debida p. ej. a una caída del rayo) mediante los correspondientes sistemas de protección. Si no, el personal que lo utilice quedará expuesto al peligro de choque eléctrico.
15. No debe introducirse en los orificios de la caja del aparato ningún objeto que no esté destinado a ello. Esto puede producir cortocircuitos en el producto y/o puede causar choques eléctricos, fuego o lesiones.
16. Salvo indicación contraria, los productos no están impermeabilizados (ver también el capítulo "Estados operativos y posiciones de funcionamiento", punto 1). Por eso es necesario tomar las medidas necesarias para evitar la entrada de líquidos. En caso contrario, existe peligro de choque eléctrico para el usuario o de daños en el producto, que también pueden redundar en peligro para las personas.
17. No utilice el producto en condiciones en las que pueda producirse o ya se hayan producido condensaciones sobre el producto o en el interior de éste, como p. ej. al desplazarlo de un lugar frío a otro caliente. La entrada de agua aumenta el riesgo de choque eléctrico.
18. Antes de la limpieza, desconecte por completo el producto de la alimentación de tensión (p. ej. red de alimentación o batería). Realice la limpieza de los aparatos con un paño suave, que no se deshilache. No utilice bajo ningún concepto productos de limpieza químicos como alcohol, acetona o diluyentes para lacas nitrocelulósicas.

## Instrucciones de seguridad elementales

### Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados —los llamados alérgenos (p. ej. el níquel)—. Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación/protección del medio ambiente", punto 1.
5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.
7. Los productos con láser están provistos de indicaciones de advertencia normalizadas en función de la clase de láser del que se trate. Los rayos láser pueden provocar daños de tipo biológico a causa de las propiedades de su radiación y debido a su concentración extrema de potencia electromagnética. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).
8. Clases de compatibilidad electromagnética (conforme a EN 55011 / CISPR 11; y en analogía con EN 55022 / CISPR 22, EN 55032 / CISPR 32)
  - Aparato de clase A:  
Aparato adecuado para su uso en todos los entornos excepto en los residenciales y en aquellos conectados directamente a una red de distribución de baja tensión que suministra corriente a edificios residenciales.  
Nota: Los aparatos de clase A están destinados al uso en entornos industriales. Estos aparatos pueden causar perturbaciones radioeléctricas en entornos residenciales debido a posibles perturbaciones guiadas o radiadas. En este caso, se le podrá solicitar al operador que tome las medidas adecuadas para eliminar estas perturbaciones.
  - Aparato de clase B:  
Aparato adecuado para su uso en entornos residenciales, así como en aquellos conectados directamente a una red de distribución de baja tensión que suministra corriente a edificios residenciales.

## Instrucciones de seguridad elementales

### Reparación y mantenimiento

1. El producto solamente debe ser abierto por personal especializado con autorización para ello. Antes de manipular el producto o abrirlo, es obligatorio desconectarlo de la tensión de alimentación, para evitar toda posibilidad de choque eléctrico.
2. El ajuste, el cambio de partes, el mantenimiento y la reparación deberán ser efectuadas solamente por electricistas autorizados por Rohde & Schwarz. Si se reponen partes con importancia para los aspectos de seguridad (p. ej. el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada cambio de partes relevantes para la seguridad deberá realizarse un control de seguridad (control a primera vista, control del conductor de protección, medición de resistencia de aislamiento, medición de la corriente de fuga, control de funcionamiento). Con esto queda garantizada la seguridad del producto.

### Baterías y acumuladores o celdas

*Si no se siguen (o se siguen de modo insuficiente) las indicaciones en cuanto a las baterías y acumuladores o celdas, pueden producirse explosiones, incendios y/o lesiones graves con posible consecuencia de muerte. El manejo de baterías y acumuladores con electrolitos alcalinos (p. ej. celdas de litio) debe seguir el estándar EN 62133.*

1. No deben desmontarse, abrirse ni triturarse las celdas.
2. Las celdas o baterías no deben someterse a calor ni fuego. Debe evitarse el almacenamiento a la luz directa del sol. Las celdas y baterías deben mantenerse limpias y secas. Limpiar las conexiones sucias con un paño seco y limpio.
3. Las celdas o baterías no deben cortocircuitarse. Es peligroso almacenar las celdas o baterías en estuches o cajones en cuyo interior puedan cortocircuitarse por contacto recíproco o por contacto con otros materiales conductores. No deben extraerse las celdas o baterías de sus embalajes originales hasta el momento en que vayan a utilizarse.
4. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.
5. En caso de falta de estanqueidad de una celda, el líquido vertido no debe entrar en contacto con la piel ni los ojos. Si se produce contacto, lavar con agua abundante la zona afectada y avisar a un médico.
6. En caso de cambio o recarga inadecuados, las celdas o baterías que contienen electrolitos alcalinos (p. ej. las celdas de litio) pueden explotar. Para garantizar la seguridad del producto, las celdas o baterías solo deben ser sustituidas por el tipo Rohde & Schwarz correspondiente (ver lista de recambios).
7. Las baterías y celdas deben reciclarse y no deben tirarse a la basura doméstica. Las baterías o acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de eliminación y reciclaje.

### Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.

## Instrucciones de seguridad elementales

2. Las asas instaladas en los productos sirven solamente de ayuda para el transporte del producto por personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como p. ej. grúas, carretillas elevadoras de horquilla, carros etc. Es responsabilidad suya fijar los productos de manera segura a los medios de transporte o elevación. Para evitar daños personales o daños en el producto, siga las instrucciones de seguridad del fabricante del medio de transporte o elevación utilizado.
3. Si se utiliza el producto dentro de un vehículo, recae de manera exclusiva en el conductor la responsabilidad de conducir el vehículo de manera segura y adecuada. El fabricante no asumirá ninguna responsabilidad por accidentes o colisiones. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Asegure el producto dentro del vehículo debidamente para evitar, en caso de un accidente, lesiones u otra clase de daños.

### Eliminación/protección del medio ambiente

1. Los dispositivos marcados contienen una batería o un acumulador que no se debe desechar con los residuos domésticos sin clasificar, sino que debe ser recogido por separado. La eliminación se debe efectuar exclusivamente a través de un punto de recogida apropiado o del servicio de atención al cliente de Rohde & Schwarz.
2. Los dispositivos eléctricos usados no se deben desechar con los residuos domésticos sin clasificar, sino que deben ser recogidos por separado.  
Rohde & Schwarz GmbH & Co.KG ha elaborado un concepto de eliminación de residuos y asume plenamente los deberes de recogida y eliminación para los fabricantes dentro de la UE. Para desechar el producto de manera respetuosa con el medio ambiente, dirijase a su servicio de atención al cliente de Rohde & Schwarz.
3. Si se trabaja de manera mecánica y/o térmica cualquier producto o componente más allá del funcionamiento previsto, pueden liberarse sustancias peligrosas (polvos con contenido de metales pesados como p. ej. plomo, berilio o níquel). Por eso el producto solo debe ser desmontado por personal especializado con formación adecuada. Un desmontaje inadecuado puede ocasionar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes a la eliminación de residuos.
4. En caso de que durante el trato del producto se formen sustancias peligrosas o combustibles que deban tratarse como residuos especiales (p. ej. refrigerantes o aceites de motor con intervalos de cambio definidos), deben tenerse en cuenta las indicaciones de seguridad del fabricante de dichas sustancias y las normas regionales de eliminación de residuos. Tenga en cuenta también en caso necesario las indicaciones de seguridad especiales contenidas en la documentación del producto. La eliminación incorrecta de sustancias peligrosas o combustibles puede causar daños a la salud o daños al medio ambiente.

Se puede encontrar más información sobre la protección del medio ambiente en la página web de Rohde & Schwarz.



# Quality management and environmental management

Certified Quality System  
**ISO 9001**

Certified Environmental System  
**ISO 14001**

## Sehr geehrter Kunde,

Sie haben sich für den Kauf eines Rohde&Schwarz Produktes entschieden. Sie erhalten damit ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unserer Qualitäts- und Umweltmanagementsysteme entwickelt, gefertigt und geprüft. Rohde&Schwarz ist unter anderem nach den Managementsystemen ISO9001 und ISO 14001 zertifiziert.

## Der Umwelt verpflichtet

- Energie-effiziente, RoHS-konforme Produkte
- Kontinuierliche Weiterentwicklung nachhaltiger Umweltkonzepte
- ISO 14001-zertifiziertes Umweltmanagementsystem

## Dear customer,

You have decided to buy a Rohde&Schwarz product. This product has been manufactured using the most advanced methods. It was developed, manufactured and tested in compliance with our quality management and environmental management systems. Rohde&Schwarz has been certified, for example, according to the ISO9001 and ISO 14001 management systems.

## Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

## Cher client,

Vous avez choisi d'acheter un produit Rohde&Schwarz. Vous disposez donc d'un produit fabriqué d'après les méthodes les plus avancées. Le développement, la fabrication et les tests de ce produit ont été effectués selon nos systèmes de management de qualité et de management environnemental. La société Rohde&Schwarz a été homologuée, entre autres, conformément aux systèmes de management ISO9001 et ISO 14001.

## Engagement écologique

- Produits à efficience énergétique
- Amélioration continue de la durabilité environnementale
- Système de management environnemental certifié selon ISO 14001



# Customer Support

## Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

## Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

### Europe, Africa, Middle East

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# 1 Usage

## 1.1 General

The ROHDE & SCHWARZ Multiplex/Switch Module R&S TS-PSM2 is designed for switching or distribution of signals of medium power up to 125 VDC or currents up to 2 ADC. The R&S analog bus can be used to measure voltages and currents on all circuit nodes. These functions are especially important if current must be measured for the test object in normal operation and in addition a measurement must be performed in standby mode. In addition to the functionality of a simple power switching module, small signals can be switched in the lower MHz range with high quality.

The R&S TS-PSM2 can be used in the R&S CompactTSVP and R&S PowerTSVP (TSVP = Test System Versatile Platform).

The 96-pin connector connects flush with the TSVP. It is used to establish contact with test objects. If necessary, an additional adapter frame can be used.

The R&S TS-PSM2 is controlled by the CAN bus present in the R&S CompactTSVP and R&S PowerTSVP. The side connector and the system connector allow for project-specific extensions.

In the rear I/O area, an R&S TS-PRIO Rear Transmission Module can be used for the R&S TS-PSM2. This makes it possible to route the local analog bus out to the rear of the R&S CompactTSVP or R&S PowerTSVP.

## 1.2 Safety instructions

---

### CAUTION

In order to prevent danger to users when voltages dangerous to the touch are in use, the Test System Versatile Platform R&S CompactTSVP TS-PCA3 and R&S PowerTSVP TS-PWA3 should never be operated with the housing open or with the front and back panels open. General safety regulations must be observed.

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### NOTICE

If signals with voltages dangerous to the touch are being transferred via the analog bus, all modules involved must be specified for the relevant voltage.

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For additional information on operation with voltages dangerous to the touch, see [Chapter 6.4, "Instructions for operation with voltages dangerous to the touch"](#), on page 21.

## 1.3 Characteristics

**Table 1-1: Characteristics R&S TS-PSM2**

<b>Characteristics R&amp;S TS-PSM2</b>
Switching module for power supplies and loads with medium power.
Switching of voltages up to 125 V
Switching of currents up to 2 A
8 relay groups, each with: 1 Multiplexer 4:1, two-pin, DPST or 1 change-over contact, one-pin, SPDT with shunt resistor 3 make contacts, one-pin, SPST with shunt resistor 1 make contact, two-pin, DPDT to local Powerbus/side plug connector
Indirect current measurement via shunt resistors
Direct current measurement via R&S analog bus and plug-in module R&S TS-PSAM (<1 A)
Self-test of all relays via analog bus and plug-in module R&S TS-PSAM
Control bus: CAN
For use in R&S CompactTSVP and R&S PowerTSVP

**Table 1-2: Characteristics R&S TS-PRIO**

<b>Characteristics R&amp;S TS-PRIO</b>
Direct routing out of the local analog bus LABxy of the R&S TSPSM2 to the connector on the rear panel
Wiring of the local analog bus LABxy of the R&S TS-PSM2 via relays to the connector on the rear panel
Automatic detection via SPI

## 2 View

Figure 2-1 shows the view of the Multiplex/Switch Module R&S TS-PSM2.

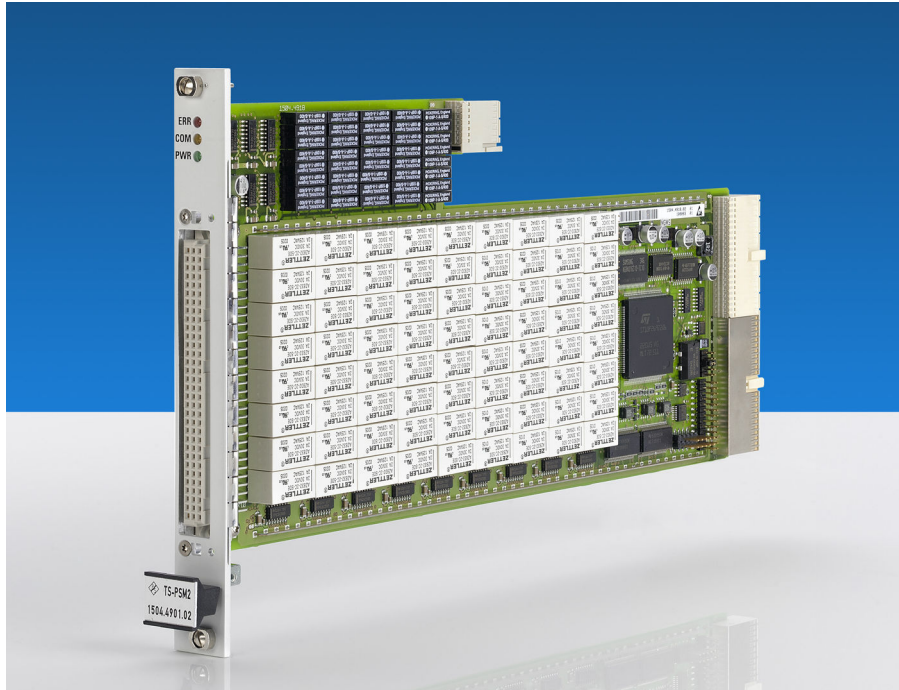


Figure 2-1: View of the R&S TS-PSM2

Figure 2-2 shows the view of the Rear Transmission Module R&S TS-PRIO



Figure 2-2: View of the R&S TS-PRIO

### 3 Block Diagrams

Figure 3-1 and Figure 3-2 shows the functional block diagram and the block diagram of the Multiplex/Switch Module R&S TS-PSM2.

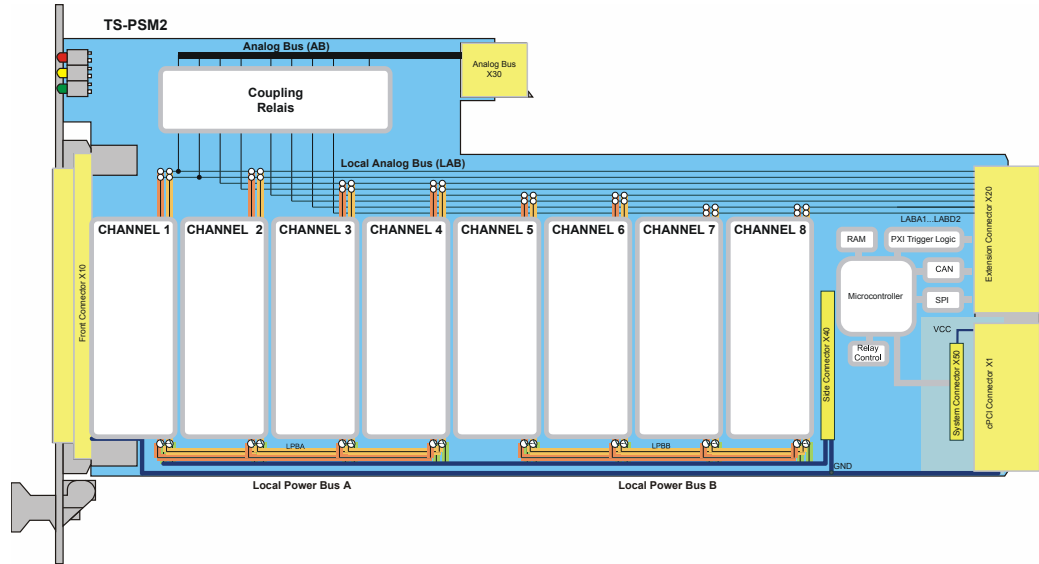


Figure 3-1: Functional block diagram R&S TS-PSM2

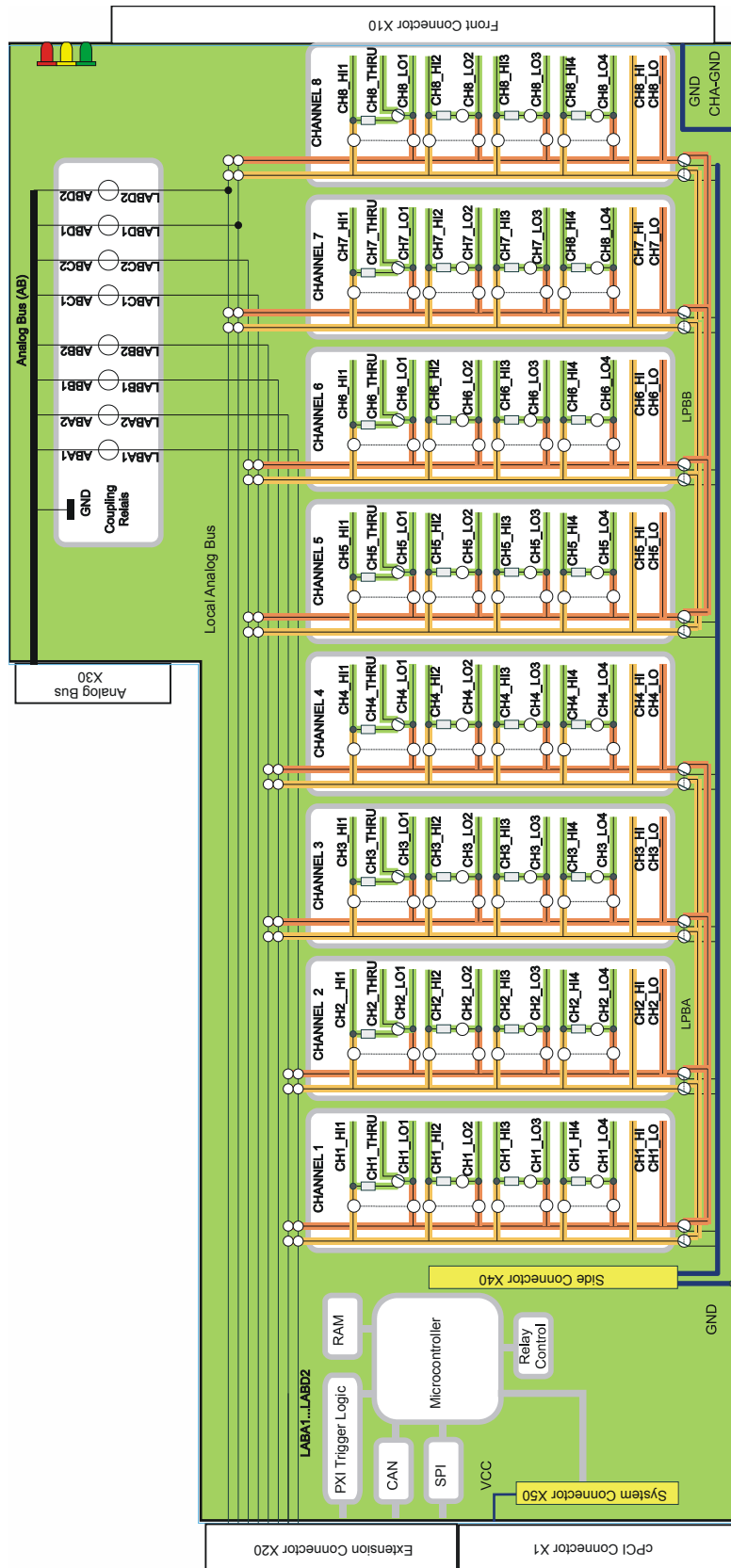


Figure 3-2: Detailed block diagram R&S TS-PSM2

## 4 Layout

### 4.1 R&S TS-PSM2

#### 4.1.1 Mechanical layout

The Multiplex/Switch Module R&S TS-PSM2 is designed as a long plug-in card for front installation in the TSVP housing. The installation depth is 300 mm. The front panel has 4 height units.

X1/X20 connectors are used to make connections to the cPCI backplane of the R&S CompactTSVP; X20 connector is used for connections to the control backplane of the R&S PowerTSVP. The X30 connector connects the R&S TS-PSM2 with the analog bus backplane in the TSVP housing. The test object and peripheral devices are connected to the X10 connection on the front. The X40 side connector and the X50 system connector can be used project-specifically. The X4 and X5 connectors are used for internal purposes.

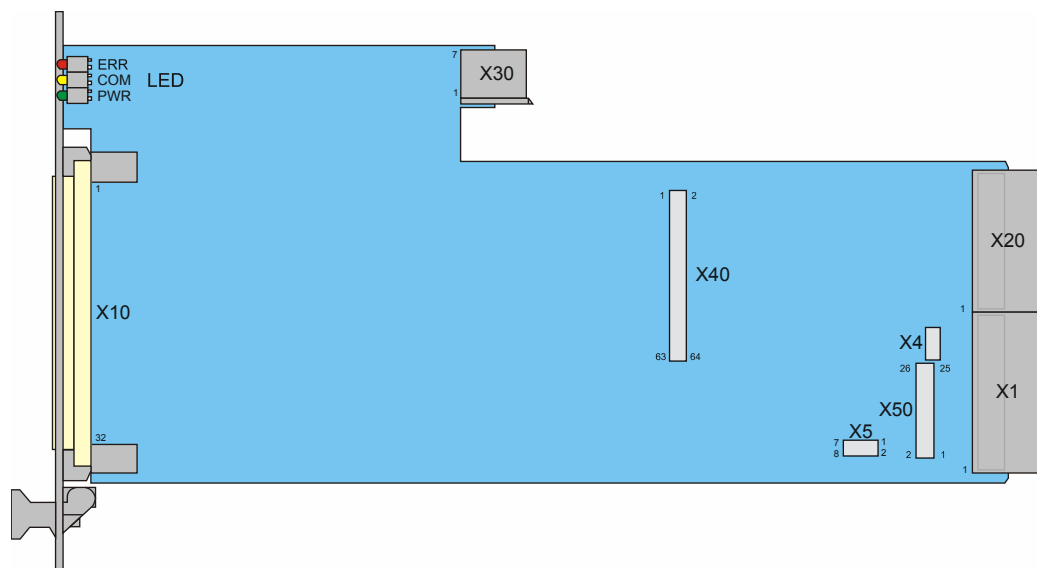


Figure 4-1: Arrangement of connectors and LEDs

Table 4-1: Connector on the R&S TS-PSM2

Abbreviation	Verwendung
X1	cPCI Connector
X4	Clock Configuration
X5	RS232 Interface
X10	Front Connector



Abbreviation	Verwendung
X20	PXI/Extension Connector
X30	Analog Bus Connector
X40	Side Connector
X50	System Connector

### 4.1.2 Display Elements

The front panel of the R&S TS-PSM2 contains three light-emitting diodes (LED's) with the following functions:

*Table 4-2: Display elements on the R&S TS-PSM2*

LED	Beschreibung
ERR (red)	Fault condition: Lights up when a fault is detected on the R&S TS-PSM2 in the power-on test after the supply voltage is switched on.
COM (yellow)	Communication: Lights up briefly when the R&S TS-PSM2 is accessed via the interface.
PWR (green)	Power: Lights up when all supply voltages are present.

## 4.2 R&S TS-PRIO

### 4.2.1 Mechanical layout

Figure 4-2 shows the connector layout of the Rear Transmission Module R&S TS-PRIO.

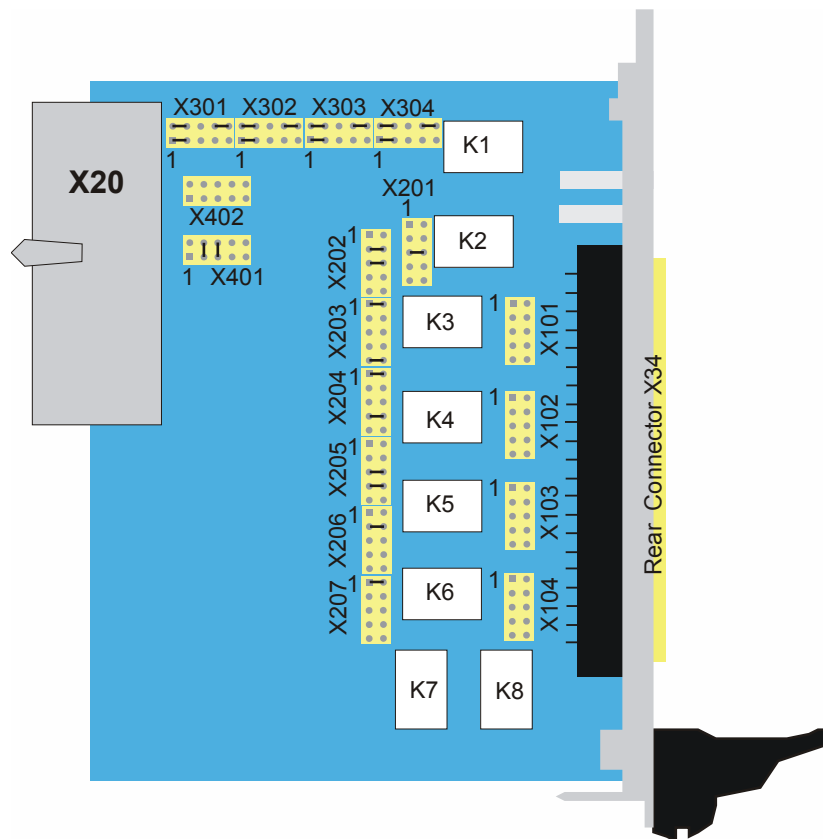


Figure 4-2: Arrangement of connectors R&S TS-PRIO

## 4.2.2 Display Elements

There are four LEDs on the rear panel of the R&S TS-PRIO module. The LEDs are connected to connectors X301 to X304 and can be connected to signals via jumpers.

In the delivery configuration of the jumpers, the associated LED is lit when voltage is applied to R\_AUXn. The brightness depends on the voltage.

Table 4-3: Display elements on the R&S TS-PRIO

LED	Is lit when
H1	a voltage of > 3V is applied to R_AUX1
H2	a voltage of > 3V is applied to R_AUX2
H3	a voltage of > 3V is applied to R_AUX3
H4	a voltage of > 3V is applied to R_AUX4

## 5 Function Description

### 5.1 R&S TS-PSM2

(see [Chapter 3, "Block Diagrams"](#), on page 6)

#### 5.1.1 Signal concept

The design and construction of the Multiplex/Switch Module R&S TS-PSM2 guarantee excellent guiding of load and measurement paths. Both „Force“ channels with high currents as well as „Sense“ channels of voltage and current sources or loads are guided to the test object via the R&S TS-PSM2. In the opposite direction, test objects can be switched with single- or multi-pin loads. Eight two-pin 4-to-1 multiplexers make it possible to select from four measurement signals. These signals can be configured via local power buses (LPBA and LPBB) to larger multiplexers or can be applied to GND.

Access to the R&S analog bus makes it possible to connect all input channels with measurement and stimulus modules of the R&S CompactTSVP without the need for any additional external wiring.

In order to facilitate measurements of high currents without voltage drops interfering, low-Ohm shunt resistors (22 mΩ) are inserted into each channel. The instantaneous current can be measured indirectly through these shunt resistors as a voltage value.

All channels are shielded in a low-Ohm design. This reduces voltage drops and cross-talk.

#### 5.1.2 System Functions

The system functions are implemented by a local processor with internal flash.

Communication with the system controller in the R&S CompactTSVP is via the CAN bus.

The functions of the R&S TS-PSM2 can be summarized as follows:

- Analog function test
- Connection of voltage/current sources
- Connection of test component loads (original loads, simulated/electronic load)
- Switch simulation
- Power Multiplexer

### 5.1.3 Flexibility

The structure of the R&S TS-PSM2 in addition to the wide voltage and current range, combined with effective use extending into the lower MHz range, guarantee a high level of flexibility and a wide range of uses. Even complex yet flexible load systems with original loads and/or electronic loads can be implemented using multiple module-internal connections.

Figure 5-1 shows the basic principle with a switching group consisting of four switching elements. Detail implementation with two changeover contacts offers advantages for sensed current measurements because the contact resistance of the relay is not introduced as an error. There is no need to take this into consideration in the function.

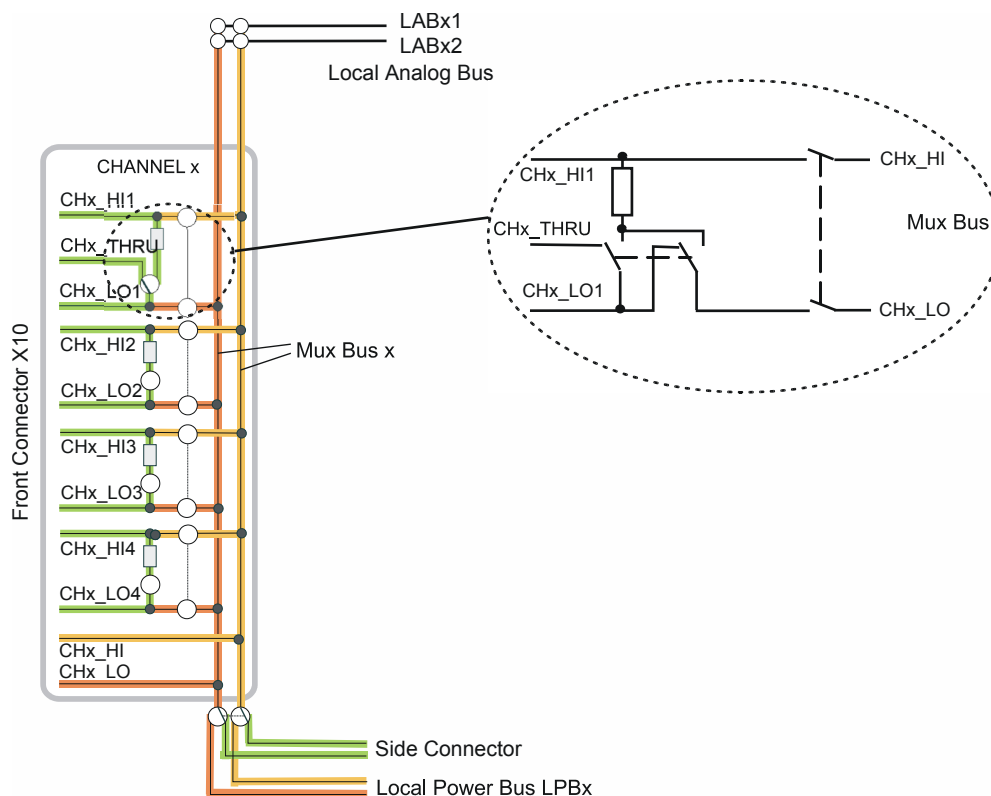


Figure 5-1: Switching group

This switching group is present eight times on the R&S TS-PSM2 module. Four input channels each can be switched with two pins to a separate Mux bus. In addition, each bus can be switched to the local analog bus LABxx (max. 1 A), the local Powerbus LPBx or the side connector.

Input channels with R&S CompactTSVP measuring system and PXI measuring system can be connected via the R&S analog bus. The local analog bus is also directed to connector X20. Signals can also be connected here from the back of the R&S CompactTSVP through corresponding rear I/O modules.

The local Powerbus lines are accessible on side connector X40. In this case standard PXI modules, which typically do not have a relay multiplexer, can have access to the multiplexers or the R&S analog bus via flat-band cable on the side. Another application

consists of integrating project-specific additions via the side and system connector X50 (for example passive loads, terminating resistors, voltage distributors, etc.).

### 5.1.4 Compactness

The layout of the R&S TS-PSM2 (one slot) with 112 relays offers maximum space savings. Extremely high-powered and compact measurement and load systems can be set up with as many as 12 modules in the R&S CompactTSVP and 16 modules in R&S PowerTSVP. These measurement and load systems can be integrated directly into manufacturing cells, which makes them very cost-efficient.

### 5.1.5 Noise Immunity

Optimum response to electrical interference or rises in temperature is achieved by the controller on the serial differential CAN bus (Controller Area Network).

### 5.1.6 Sample applications

#### 5.1.6.1 Simple switching function - normally open, 1-pin.

The relay switches the channel on and off; the shunt resistor is not used.

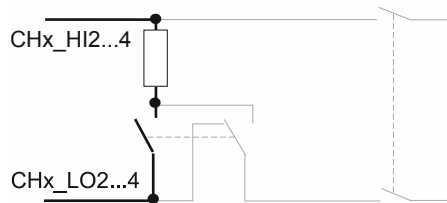


Figure 5-2: The relay switches the channel on and off; the shunt resistor is not used.

#### 5.1.6.2 Simple switching function - changeover contact, 1-pin.

The relay switches the channel; the shunt resistor is not used.

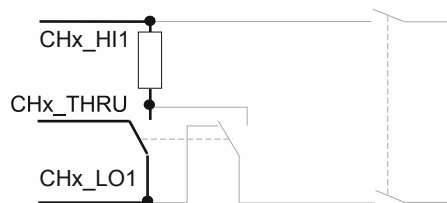


Figure 5-3: Simple switching function - changeover contact, 1-pin.

### 5.1.6.3 Current measurement - indirect, via shunt resistor

The circuit is closed or opened through the relay. The voltage drop on the shunt resistor is measured with a voltmeter via the R&S analog bus. The current can be calculated from the voltage and the value of the shunt. The second relay contact is used to eliminate the measurement error caused by the resistance of the switching contact.

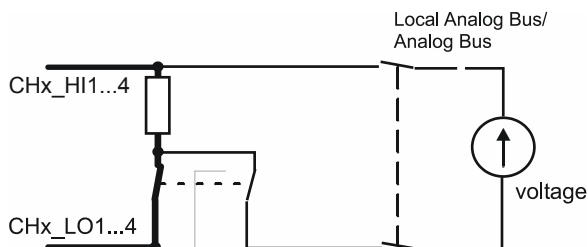


Figure 5-4: Current measurement - indirect, via shunt resistor

### 5.1.6.4 Current measurement - direct, up to 1 A

The current is measured directly with a current measurement device via the analog bus.

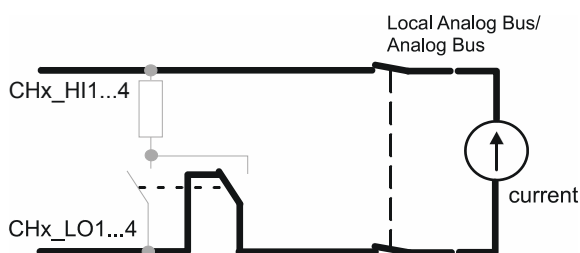


Figure 5-5: Current measurement - direct, up to 1 A

### 5.1.6.5 Multiplexer - test object signals

Up to four test object signals can be multiplexed to a single local bus. If necessary, the local bus can be connected with up to three additional local buses or with the global R&S analog bus.

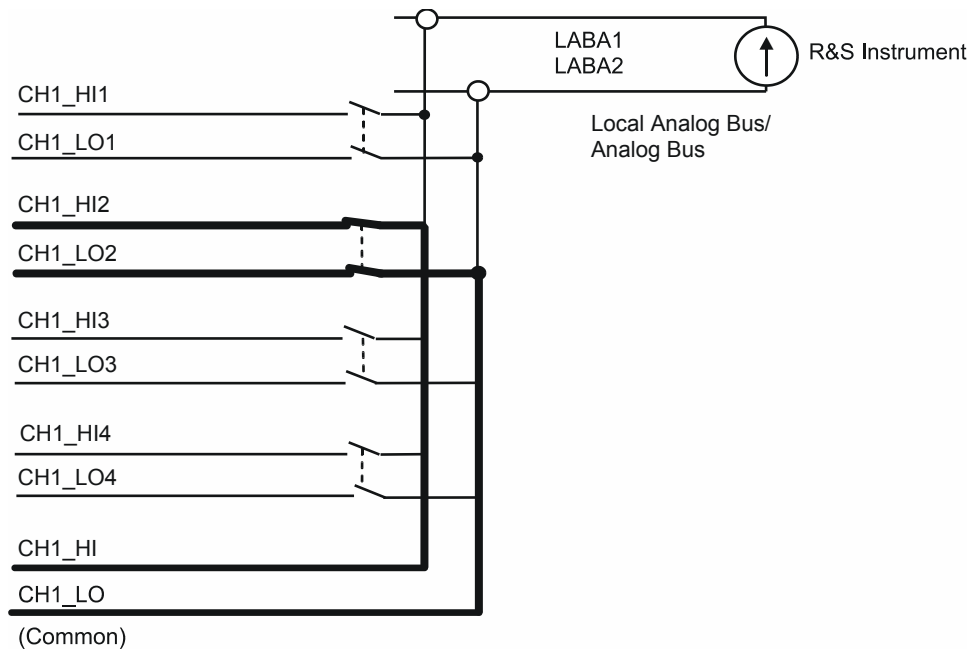


Figure 5-6: Multiplexer - test object signals

### 5.1.6.6 Multiplexer - CompactPCI/PXI instruments

Signals of adjacent CompactPCI/PXI modules can be directed to the local multiplex bus via the side connector and a two-pin changeover contact. Routing to the global R&S analog bus is also possible.

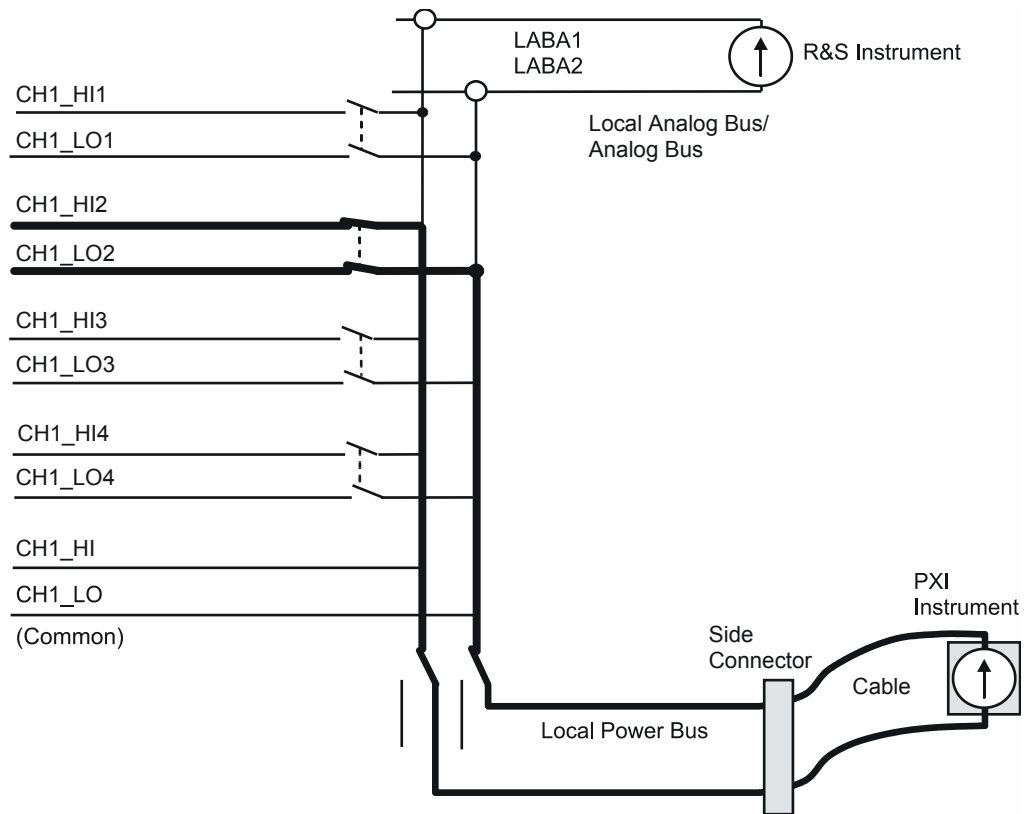


Figure 5-7: Multiplexer - CompactPCI/PXI instruments

5.1.6.7 Multiplexer - external components, up to 1 A

Signals of external components can be directed to the local multiplexer bus via the local R&S analog bus and an optional customer-specific rear I/O module. Routing to the global R&S analog bus is also possible.



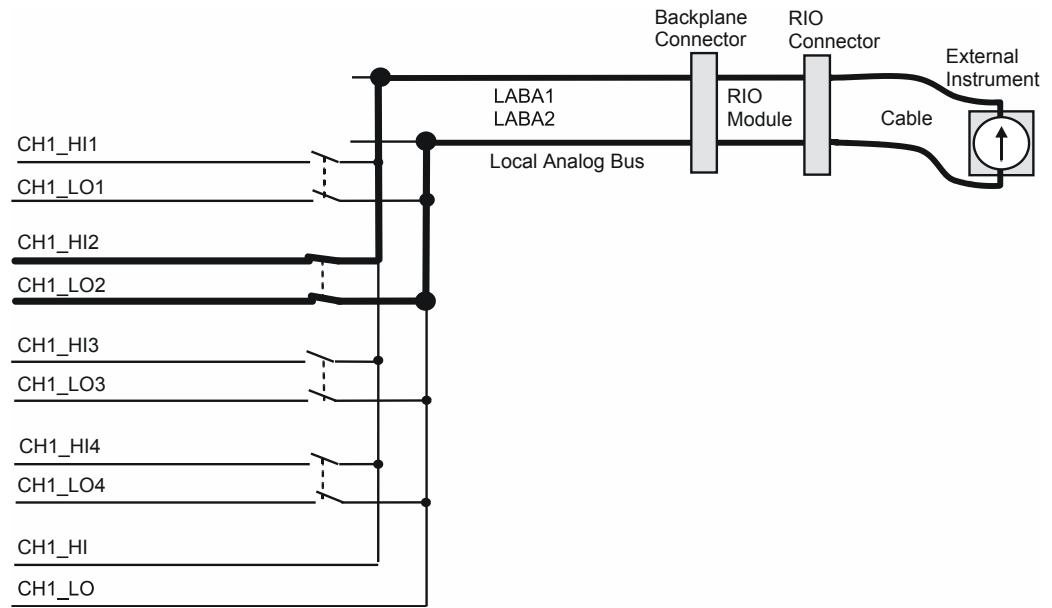


Figure 5-8: Multiplexer - external components, up to 1 A

## 5.2 R&S TS-PRIO

### 5.2.1 Analog Bus Wiring

The R&S TS-PRIO module is equipped with 8 channels wired identically as follows (shown with the example of channel 1).

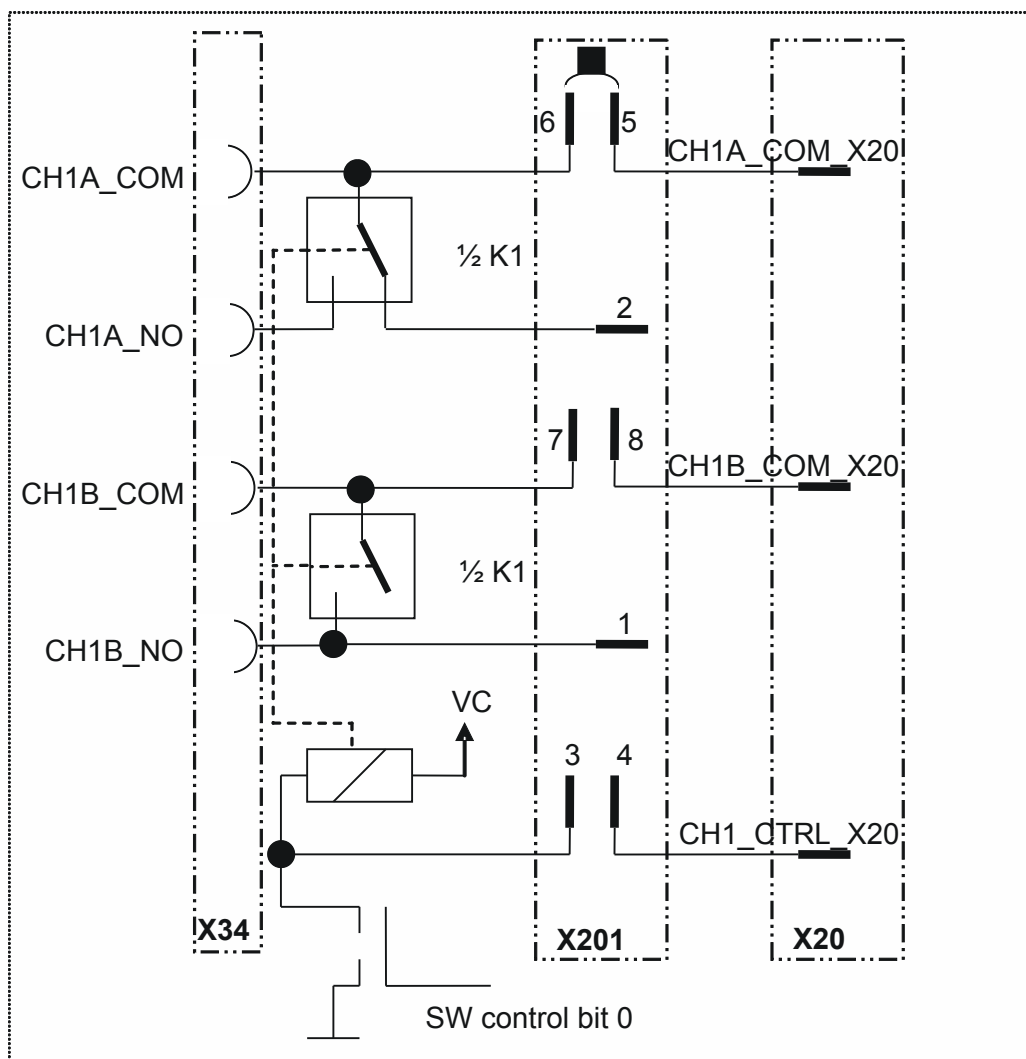


Figure 5-9: Circuit diagram of channel 1 R&S TS-PRIO



X201 to X207 are 10-pin connectors, of which only 8 contacts are used for one channel. For this reason, X201.9 (CH2B\_NO) is the first contact for channel 2, X202.7 for channel 3 etc. Thus the contact assignment shown above ONLY applies to channel 1. All the other channels are offset by 2 contacts as compared to the previous channel. The jumpers are also plugged differently on the channels!

The local analog bus lines of the R&S TS-PSM2 are input at the CHxA\_COM\_X20 lines. The following contact table applies:

Table 5-1: Wiring of the local analog bus on R&S TS-PRIO

Local analog bus	R&S TS-PRIO signal
LABA1	CH1A_COM_X20
LABB1	CH2A_COM_X20

Local analog bus	R&S TS-PRIO signal
LABA2	CH3A_COM_X20
LABB2	CH4A_COM_X20
LABC1	CH5A_COM_X20
LABD1	CH6A_COM_X20
LABC2	CH7A_COM_X20
LABD2	CH8A_COM_X20

The R&S TS-PSM2 software can switch the relay in the above circuit diagram via the following function. Then, the signal present at the analog bus or CHxA\_COM\_X20 is additionally routed to pin CHxA\_NO.

```
ViStatus rpsm2_Connect (ViSession instrumentHandle,
                        ViChar _VI_FAR channel1[],
                        ViChar _VI_FAR channel2[]);
```

The following mapping table of the names in the software to the pin names applies:

**Table 5-2: Mapping of the SW names to R&S TS-PRIO signals**

Name in SW	R&S TS-PRIO signal
ILa1	CH1A_NO
ILb1	CH2A_NO
ILa2	CH3A_NO
ILb2	CH4A_NO
ILc1	CH5A_NO
ILd1	CH6A_NO
ILc2	CH7A_NO
ILd2	CH8A_NO

## 5.2.2 Wiring of the AUX Lines

The AUX lines AUX1\_X20 and AUX2\_X20 can be wired to the rear panel of connector X34 by setting a jumper.

**Table 5-3: Wiring of the AUX lines**

Signal at X20	Jumper	Signal at X34
AUX1_X20	X301. 5-6	R_AUX1
AUX2_X20	X302. 5-6	R_AUX2

The signals R\_AUX3 and R\_AUX4 are reserved for future expansions.

## 6 Commissioning

### 6.1 Installation R&S TS-PSM2

To install the Multiplex/Switch Module R&S TS-PSM2, proceed as follows:

- Run down and power off the TSVP
- Remove the front panel from the rear side of the TSVP chassis by slackening off the screws

---

#### **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 module is connected, it must be guided with both hands and carefully pressed into the backplane connector.

---

- Applying moderate pressure, insert the plug-in module
- The upper catch pin of the plug-in module must be guided into the right hole, while the lower one is guided into the left hole on the TSVP housing
- The Multiplex/Switch Module R&S TS-PSM2 is correctly located when a distinct 'stop' can be felt
- Tighten the top and bottom screws on the front panel of the Multiplex/Switch Module R&S TS-PSM2

### 6.2 Initialisation of the plug-in module

After the system is booted, the R&S TS-PSM2 is initialised. Signals GA0 ... GA5 on the cPCI bus are used for slot identification.

### 6.3 Installation of the R&S TS-PRIO

To install the R&S TS-PRIO module, proceed as follows:

- The installation of the R&S TS-PSM2 module is a prerequisite.
- Select the appropriate rear I/O slot for the R&S TS-PSM2 module.
- Remove the front panel from the rear side of the TSVP chassis by slackening off the screws

**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 module is connected, it must be guided with both hands and carefully pressed into the backplane connector.

- Push in the R&S TS-PRIO module using moderate pressure.
- The R&S TS-PRIO module must be pushed in especially carefully to ensure that the connector is properly inserted into the guide of the socket opening in the backplane. The connector must not be misaligned when inserted. The short circuit board guides alone do not ensure absolutely reliable guiding.
- The R&S TS-PRIO module has been inserted properly when a definite stop can be felt.
- Tighten the two fastening screws on the front plate of the R&S TS-PRIO module.

## 6.4 Instructions for operation with voltages dangerous to the touch

In conformity with EN 61010-1, the following voltage limit values are considered „dangerous and active“.

- 70 V DC
- 33 V AC eff
- 46.7 V AC peak

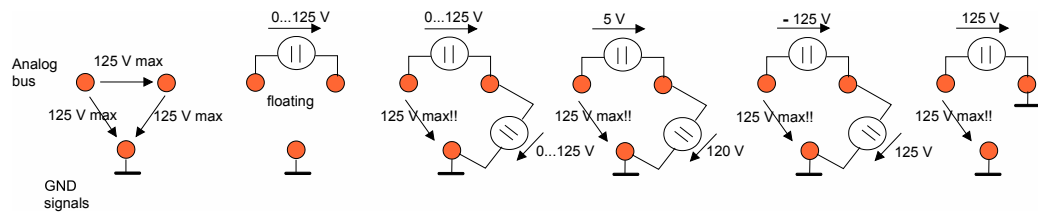
**NOTICE**

When operating the Multiplex/Switch Module R&S TS-PSM2 above these voltage limit values, the requirements of EN61010-1 must be observed.

The Multiplex/Switch Module R&S TS-PSM2 and Test System Versatile Platform R&S CompactTSVP are designed for a maximum voltage of 125 V between ground-free measurement devices, analog buses and GND. Care must be taken to ensure that this limit is not exceeded at any time, even as the sum of voltages, and thus not as a results of alternating signals.

[Figure 6-1](#) shows a typical permissible voltage configuration between analog buses and ground.

## Instructions for operation with voltages dangerous to the touch



**Figure 6-1: Permissible voltages on analog bus lines**

For reasons of fire prevention in conformity with EN 61010-1, we recommend limiting the current or output for DC sources to 150 VA.

## 7 Software

### 7.1 Software R&S TS-PSM2

#### 7.1.1 Driver Software

A LabWindows IVI driver is available to control the Multiplex/Switch Module R&S TS-PSM2 that supports class IVI SWITCH. All additional functions of the hardware are supported by specific extensions of the driver. The driver is a component of the ROHDE & SCHWARZ GTSL software. All functions of the driver are documented extensively in online Help and in the LabWindows/CVI Function Panels.

During driver installation, the following software modules are installed:

**Table 7-1: Driver Installation R&S TS-PSM2**

Module	Path	Comment
rspsm2.dll	<GTSL directory>\Bin	Driver
rspsm2.hlp / rspsm2.chm	<GTSL directory>\Bin	Help files
rspsm2.fp	<GTSL directory>\Bin	LabWindows CVI Function Panel file, function panels for CVI development interface
rspsm2.sub	<GTSL directory>\Bin	LabWindows CVI attribute file. This file is required by some „function panels“.
rspsm2.lib	<GTSL directory>\Bin	Import Library
rspsm2.h	<GTSL directory>\ Include	Header file for the driver



To use the driver, the IVI and VISA libraries from National Instruments are necessary.

#### 7.1.2 Softpanel

The software package of the R&S TS-PSM2 includes a so-called softpanel. The softpanel enables interactive operation of the module.

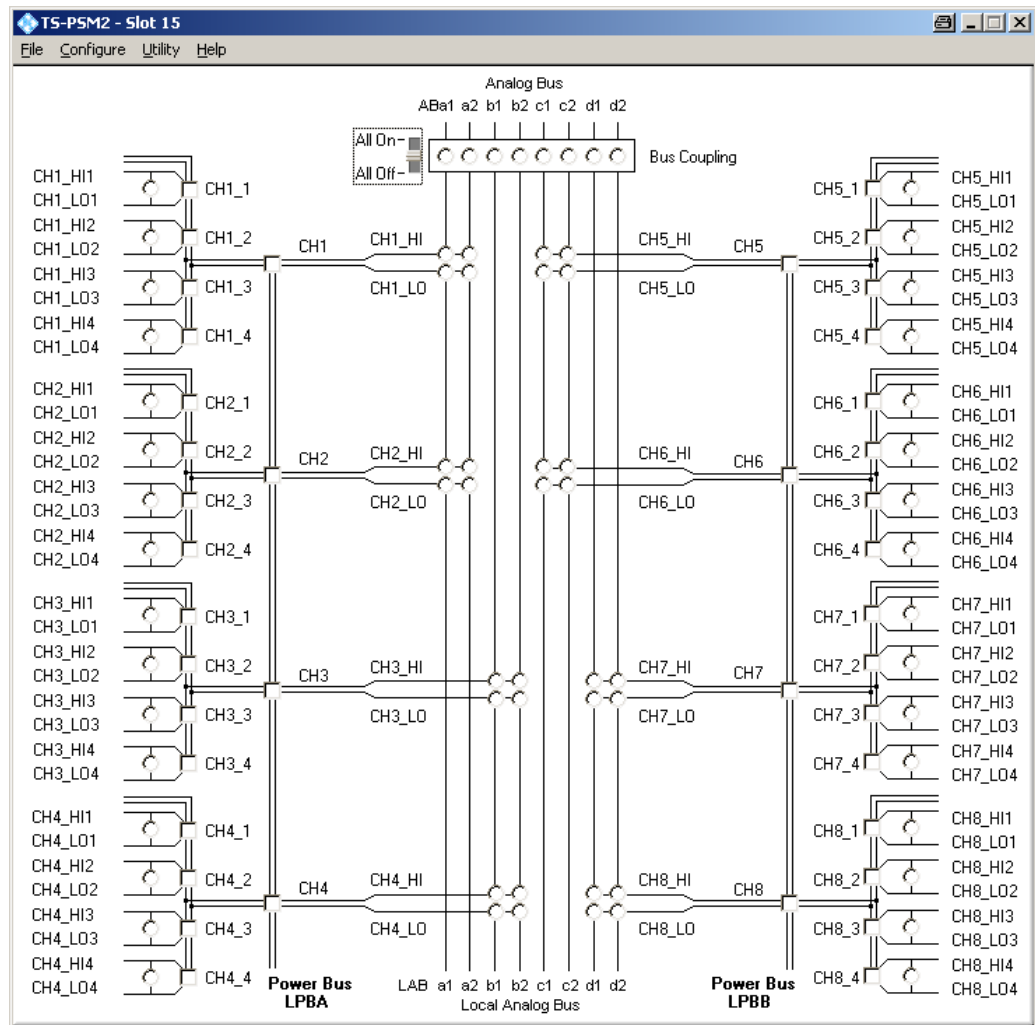


Figure 7-1: Softpanel R&S TS-PSM2

## 7.1.3 Sample programme

### 7.1.3.1 Programming with GTSL libraries

/\*

This example connects TS-PSM2 channel 1 to different internal and external switch channels.

Error handling is not considered in this sample in order to keep it easy to read. The return status should be checked for "errorOccured" after each library call.

The following configuration files are used in this example:



```

physical.ini
-----

[device->psm2_7]
Description = "TS-PSM2, Slot 7"
Type       = PSM2
ResourceDesc = CAN0::0::2::7
DriverDll   = rpsm2.dll
DriverPrefix = rpsm2
DriverOption = "Simulate=0,RangeCheck=1"

; the analog bus pseudo device is used by the switch manager
[device->abus]
Type       = AB

Psm2Application.ini
-----

[bench->switch]

; configure the TS-PSM2 as switch device
SwitchDevice1 = device->psm2_7
AnalogBus     = device->abus
AppChannelTable = io_channel->switch

; configure the switch channels
[io_channel->switch]

; TS-PSM2 channels
CH1     = psm2_7!CH1
CH1_1   = psm2_7!CH1_1
CH1_HI  = psm2_7!CH1_HI
CH1_LO  = psm2_7!CH1_LO

; TS-PSM2 local power bus
LPBA    = psm2_7!LPBA
; TS-PSM2 local analog bus
LABa1   = psm2_7!LABa1
LABa2   = psm2_7!LABa2

; TSVP system wide analog bus
ABa1    = abus!ABa1
ABa2    = abus!ABa2

*/

#include "resmgr.h"
#include "swmgr.h"

```

```
int main (int argc, char *argv[])
{
    long residSwmgr; /* resource ID for switch manager library */

    short errorOccurred = 0;
    long errorCode = 0;
    char errorMessage [GTSL_ERROR_BUFFER_SIZE] = "";

    /* load the physical and application configuration files */
    RESMGR_Setup ( 0, "physical.ini", "Psm2Application.ini",
                  &errorOccurred, &errorCode, errorMessage);

    /* initialize the switch manager library */
    SWMGR_Setup ( 0, "bench->switch", &residSwmgr,
                  &errorOccurred, &errorCode, errorMessage);

    /* connect channel 1 to local power bus A */
    SWMGR_Connect ( 0, residSwmgr, "CH1", "LPBA",
                    &errorOccurred, &errorCode, errorMessage);

    /* connect channel 1 to local front connector */
    SWMGR_Connect ( 0, residSwmgr, "CH1", "CH1_1",
                    &errorOccurred, &errorCode, errorMessage);

    /* connect channel 1 to local analog bus lines */
    SWMGR_Connect ( 0, residSwmgr, "CH1_HI", "LABa1",
                    &errorOccurred, &errorCode, errorMessage);
    SWMGR_Connect ( 0, residSwmgr, "CH1_LO", "LABa2",
                    &errorOccurred, &errorCode, errorMessage);

    /* connect local analog bus lines to analog bus line on backplane */
    SWMGR_Connect ( 0, residSwmgr, "LABa1", "ABa1",
                    &errorOccurred, &errorCode, errorMessage);
    SWMGR_Connect ( 0, residSwmgr, "LABa2", "ABa2",
                    &errorOccurred, &errorCode, errorMessage);

    /* wait until relays have settled; timeout 500 ms */
    SWMGR_WaitForDebounce ( 0, residSwmgr, 500,
                             &errorOccurred, &errorCode, errorMessage);

    /* disconnect channel 1 from local front connector */
    SWMGR_Disconnect ( 0, residSwmgr, "CH1", "CH1_1",
                       &errorOccurred, &errorCode, errorMessage);

    /* wait until relays have settled; timeout 500 ms */
    SWMGR_WaitForDebounce ( 0, residSwmgr, 500,
                             &errorOccurred, &errorCode, errorMessage);

    /* disconnect the rest */
```

```

SWMGR_DisconnectAll ( 0, residSwmgr,
                    &errorOccurred, &errorCode, errorMessage);

/* close the library */
SWMGR_Cleanup ( 0, residSwmgr,
               &errorOccurred, &errorCode, errorMessage);

RESMGR_Cleanup ( 0, &errorOccurred, &errorCode, errorMessage);

return 0;
}

```

### 7.1.3.2 Programming with device drivers

```

/*
   Error handling is not considered in this sample in order to
   keep it easy to read. The return status should be checked for
   VI_SUCCESS after each driver call.
*/

#include "rspsm2.h"

int main (int argc, char *argv[])
{
    ViSession vi;
    ViStatus status;

    /*
       open a session to the device driver. The resource descriptor
       depends on the slot number of the module and must be adapted
       to the target system.
    */
    status = rspsm2_InitWithOptions ("CAN0::0::2::7::INSTR",
                                    VI_TRUE,
                                    VI_TRUE,
                                    "Simulate=0,RangeCheck=1",
                                    &vi);

    /* connect channel 1 to Local Power Bus A */
    status = rspsm2_Connect (vi, "CH1", "LPBA");
    /* connect channel 1 to front connector */
    status = rspsm2_Connect (vi, "CH1", "CH1_1");

    /* connect channel 1 HI to local analog bus line */
    status = rspsm2_Connect (vi, "CH1_HI", "LABa1");

    /* connect channel 1 LO to local analog bus line */
    status = rspsm2_Connect (vi, "CH1_LO", "LABa2");
}

```

```
/* connect local analog bus line to analog bus line on back plane */
status = rspsm2_Connect (vi, "ABa1", "LABa1");

/* connect local analog bus line to analog bus line on back plane */
status = rspsm2_Connect (vi, "ABa2", "LABa2");

/* wait until relays have settled; timeout 500 ms */
status = rspsm2_WaitForDebounce (vi, 500.0);

/* disconnect channel 1 from front connector */
status = rspsm2_Disconnect (vi, "CH1", "CH1_1");

/* wait until relay has settled; timeout 500 ms */
status = rspsm2_WaitForDebounce (vi, 500.0);

/* disconnect the rest */
status = rspsm2_DisconnectAll(vi);

/* close the driver session */
status = rspsm2_close (vi);

return 0;
}
```

## 7.2 Software R&S TS-PRIO

Simple routing out of the LABxy pins of an R&S TS-PSM2 does not require any software. However, if the relays on the R&S TS-PRIO are to be used, the software for the R&S TS-PSM2 must be installed correctly.

Support for R&S TS-PRIO is available as of the following versions of the R&S TS-PSM2 software:

Firmware: psm2.h86 as of version 1.05 (GTSL version 2.81)

Drivers: rspsm2.dll as of version 1.11 (GTSL version 2.81)

The firmware can be updated using the "Firmware Update" tool. Start the tool via Start => Programs => GTSL => Tools => Firmware Update.

## 8 Self-Test

### 8.1 Self-Test R&S TS-PSM2

The R&S TS-PSM2 has a built-in self-test capability. The following tests are implemented:

- LED-Test
- Power-on test
- TSVP Self-Test

#### 8.1.1 LED Test

After power-on, all three LED's light up for around three seconds to indicate that the 5 V supply is present and all LED's are working. The following statements can be made about the different LED states:

*Table 8-1: Statements about the LED Test*

LED	Description
One LED does not light up	Hardware problem on the module LED faulty
No LED's light up	No +5 V supply

#### 8.1.2 Power on test

The power on test runs in parallel to the LED test. The following observations may be made about the different display states of the LEDs.

*Table 8-2: Observations about the power on test*

LED	Description
PWR LED (green) on	Power supply voltage present
PWR LED (green) off	Power supply voltage missing
ERR LED (red) off	No error is present
ERR LED (red) Is lit or flashing	Hardware error present (processor is not starting, SPI error)

#### 8.1.3 TSVP self-test

As part of the TSVP self test, an extensive test of the R&S TS-PSM2 module is performed and an exhaustive protocol is generated. This is done with the „Self-Test Support Library“.

The R&S TS-PSAM analog stimulus and measurement module is used as a measurement unit in the TSVP self-test. The functionality of the modules in the system is insured by measurements via the analog bus.

The analog bus and the local Powerbus are first tested for not-allowed voltages. These voltages could possibly come from an outside source, for example through sources connected to the back. After an isolation measurement between the buses, all relays (coupling, matrix, local Powerbus, Multiplexer, sense relay) and the shunt resistors are tested.

---

**NOTICE**

For information on starting the self-test and the order of the work steps required as well as for a detailed description of the tested parameters and procedures, refer to the Service Manual R&S CompactTSVP / R&S PowerTSVP.

---

## 8.2 Self-Test R&S TS-PRIO

The R&S TS-PRIO module can be detected automatically by the R&S TS-PSM2 module plugged in on the front.

For this reason, the module will be shown as a testable module in the TSVP self-test. When the self-test is performed, the module code will be read and the result written into the report.

# 9 Interface description

## 9.1 R&S TS-PSM2

### 9.1.1 Connector X1

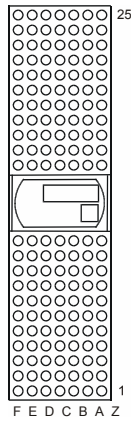


Figure 9-1: R&S TS-PSM2 Connector X1 (view: mating side)

Pin	F	E	D	C	B	A	Z
25	GND	+5V				+5V	GND
24	GND				+5V		GND
23	GND		+5V				GND
22	GND				GND		GND
21	GND						GND
20	GND				GND		GND
19	GND		GND				GND
18	GND				GND		GND
17	GND		GND				GND
16	GND				GND		GND
15	GND		GND				GND
12..14							
11	GND		GND				GND
10	GND				GND		GND
9	GND		GND				GND
8	GND				GND		GND
7	GND		GND				GND
6	GND				GND		GND
5	GND		GND				GND
4	GND				GND		GND
3	GND		+5V				GND
2	GND				+5V		GND
1	GND	+5V				+5V	GND
Pin	F	E	D	C	B	A	Z

Figure 9-2: R&S TS-PSM2 Assignment of X1

### 9.1.2 Connector X4

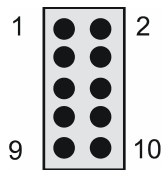


Figure 9-3: R&S TS-PSM2 Connector X4 (view: mating side)

Table 9-1: R&S TS-PSM2 Assignment of X4

Pin	Signal	Pin	Signal
1	PRO_DAT_4	2	GND
3	MAN_RST/	4	GND
5	OSC_CLK10	6	PRO_CLK10
7	PXI_CLK10	8	PRO_CLK_R
9	OSC_OE	10	GND

### 9.1.3 Connector X5

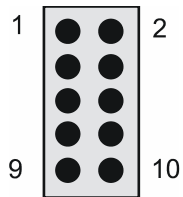


Figure 9-4: R&S TS-PSM2 Connector X5 (view: mating side)

Table 9-2: R&S TS-PSM2 Assignment of X5

Pin	Signal	Pin	Signal
1	nc	2	nc
3	RS232_RXD/	4	Nc
5	RS232_TXD/	6	nc
7	RS232_CTS/	8	T2_low
9	GND	10	GND



### 9.1.4 Connector X10

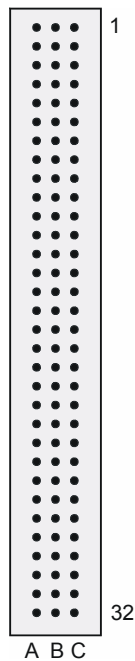


Figure 9-5: R&S TS-PSM2 Connector X10 (view: mating side)

Table 9-3: R&S TS-PSM2 Assignment of X10 (Signals printed in bold are high power)

Pin	A	B	C
1	CH1_HI1	CH1_LO1	<b>CH1_THRU</b>
2	CH1_HI2	CH1_LO2	CH1_HI3
3	CH1_LO3	CH1_HI4	CH1_LO4
4	CH1_HI	CH1_LO	CH2_HI1
5	CH2_LO1	<b>CH2_THRU</b>	CH2_HI2
6	CH2_LO2	CH2_HI3	CH2_LO3
7	CH2_HI4	CH2_LO4	CH2_HI
8	CH2_LO	CH3_HI1	CH3_LO1
9	<b>CH3_THRU</b>	CH3_HI2	CH3_LO2
10	CH3_HI3	CH3_LO3	CH3_HI4
11	CH3_LO4	CH3_HI	CH3_LO
12	CH4_HI1	CH4_LO1	<b>CH4_THRU</b>
13	CH4_HI2	CH4_LO2	CH4_HI3
14	CH4_LO3	CH4_HI4	CH4_LO4
15	CH4_HI	CH4_LO	CH5_HI1
16	CH5_LO1	<b>CH5_THRU</b>	CH5_HI2

Pin	A	B	C
17	CH5_LO2	CH5_HI3	CH5_LO3
18	CH5_HI4	CH5_LO4	CH5_HI
19	CH5_LO	CH6_HI1	CH6_LO1
20	<b>CH6_THRU</b>	CH6_HI2	CH6_LO2
21	CH6_HI3	CH6_LO3	CH6_HI4
22	CH6_LO4	CH6_HI	CH6_LO
23	CH7_HI1	CH7_LO1	<b>CH7_THRU</b>
24	CH7_HI2	CH7_LO2	CH7_HI3
25	CH7_LO3	CH7_HI4	CH7_LO4
26	CH7_HI	CH7_LO	CH8_HI1
27	CH8_LO1	<b>CH8_THRU</b>	CH8_HI2
28	CH8_LO2	CH8_HI3	CH8_LO3
29	CH8_HI4	CH8_LO4	CH8_HI
30	CH8_LO	<b>GND</b>	<b>GND</b>
31	<b>GND</b>	<b>GND</b>	<b>GND</b>
32	<b>GND</b>	<b>GND</b>	<b>CHA-GND</b>

The CHA\_GND signal is connected with the front plate of the module and via two 10 nF capacitors with GND. The front plate itself has no direct connection to GND. When a test object is connected, the test object GND should be connected to GND. To avoid ripple loops, do not connect GND and CHA\_GND.

### 9.1.5 Connector X20

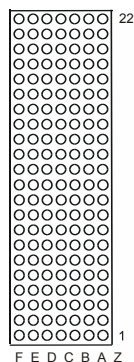


Figure 9-6: R&S TS-PSM2 Connector X20 (view: mating side)

Pin	F	E	D	C	B	A	Z
22		GA0	GA1	GA2	GA3	GA4	
21					GA5		
20		+5V (PWA)	GND	+5V (PWA)	AUX1R	AUX2R	
19		AUX1L	AUX2L	+5V (PWA)	GND		
18		PXI_TRIG6	CAN_EN ab PCA V4.0	PXI_TRIG5	PXI_TRIG4	PXI_TRIG3	
17		PXI_CLK10			GND	PXI_TRIG2	
16		PXI_TRIG7	GND		PXI_TRIG0	PXI_TRIG1	
15		+5V	+5V (PWA)		GND		
14							
13							
12	NP	LABA1				LABC1	NP
11	NP						NP
10		LABB1				LABD1	
9							
8		LABA2				LABC2	
7							
6		LABB2				LABD2	
5							
4							
3		RSA0	RRST#		GND	RSD0	
2			RSDI	RSA1		RSCLK	
1		+5V (PWA)	CAN_L	CAN_H	GND	RCS#	
Pin	F	E	D	C	B	A	Z

Figure 9-7: R&S TS-PSM2 Assignment of X20 (NP = not populated)

### 9.1.6 Connector X30

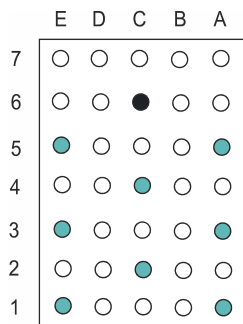


Figure 9-8: Connector X30 (mating side)

Table 9-4: X30 Pinning Schedule

Pin	E	D	C	B	A
7					
6			GND		
5	ABC1				ABA1
4			ABB1		
3	ABC2				ABB2

Pin	E	D	C	B	A
2			ABA2		
1	ABD2				ABD1

### 9.1.7 Connector X40

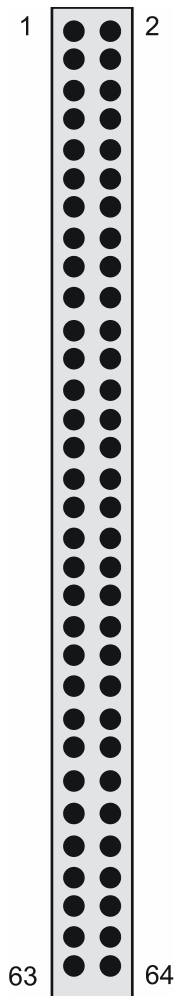


Figure 9-9: R&S TS-PSM2 Connector X40 (view: mating side)

Table 9-5: R&S TS-PSM2 Assignment of X40, Version 1.x and Version 2.x

Pin	Signal	Pin	Signal
1	LABA1	2	GND
3	LABC1	4	GND
5	LABD1	6	GND
7	LABB1	8	GND

Pin	Signal	Pin	Signal
9	LABC2	10	GND
11	LABA2	12	GND
13	LABD2	14	GND
15	LABB2	16	GND
17	AUX2R	18	GND
19	AUX1R	20	GND
21	AUX2L	22	GND
23	AUX1L	24	GND
25	CH1_SIDECON_HI	26	GND
27	CH1_SIDECON_LO	28	GND
29	CH2_SIDECON_HI	30	GND
31	CH2_SIDECON_LO	32	GND
33	CH3_SIDECON_HI	34	GND
35	CH3_SIDECON_LO	36	GND
37	CH4_SIDECON_HI	38	GND
39	CH4_SIDECON_LO	40	GND
41		42	GND
43		44	GND
45		46	GND
47		48	GND
49	CH5_SIDECON_HI	50	GND
51	CH5_SIDECON_LO	52	GND
53	CH6_SIDECON_HI	54	GND
55	CH6_SIDECON_LO	56	GND
57	CH7_SIDECON_HI	58	GND
59	CH7_SIDECON_LO	60	GND
61	CH8_SIDECON_HI	62	GND
63	CH8_SIDECON_LO	64	GND

**Table 9-6: R&S TS-PSM2 Assignment of X40, from Version 3.x**

Pin	Signal	Pin	Signal
1	LABA1	2	GND
3	LABA2	4	GND
5	LABB1	6	GND

Pin	Signal	Pin	Signal
7	LABB2	8	GND
9	LABC1	10	GND
11	LABC2	12	GND
13	LABD1	14	GND
15	LABD2	16	GND
17	AUX2R	18	GND
19	AUX1R	20	GND
21	AUX2L	22	GND
23	AUX1L	24	GND
25	CH1_SIDECON_HI	26	GND
27	CH1_SIDECON_LO	28	GND
29	CH2_SIDECON_HI	30	GND
31	CH2_SIDECON_LO	32	GND
33	CH3_SIDECON_HI	34	GND
35	CH3_SIDECON_LO	36	GND
37	CH4_SIDECON_HI	38	GND
39	CH4_SIDECON_LO	40	GND
41		42	GND
43		44	GND
45		46	GND
47		48	GND
49	CH5_SIDECON_HI	50	GND
51	CH5_SIDECON_LO	52	GND
53	CH6_SIDECON_HI	54	GND
55	CH6_SIDECON_LO	56	GND
57	CH7_SIDECON_HI	58	GND
59	CH7_SIDECON_LO	60	GND
61	CH8_SIDECON_HI	62	GND
63	CH8_SIDECON_LO	64	GND

### 9.1.8 Connector X50

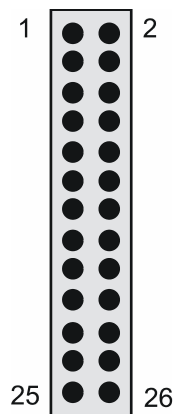


Figure 9-10: R&S TS-PSM2 Connector X50 (view: mating side)

Table 9-7: R&S TS-PSM2 Assignment of X50

Pin	Signal	Pin	Signal
1	RRST/	2	RCS
3	RSCLK	4	RSDI
5	RSDO	6	RSA0
7	RSA1	8	GA0
9	GA1	10	GA2
11	GA3	12	GA4
13	CAN_H	14	CAN_L
15	SYSCON_IO_0	16	SYSCON_IO_1
17	SYSCON_IO_2	18	SYSCON_IO_3
19	SYSCON_IO_4	20	SYSCON_IO_5
21	SYSCON_IO_6	22	SYSCON_IO_7
23	PRO_CLK10	24	PRO_RST_IN
25	+5V	26	GND

## 9.2 R&S TS-PRIO

### 9.2.1 Connector X20

X20 connector type: CPCI design AB22, socket terminal connector, 110-pin

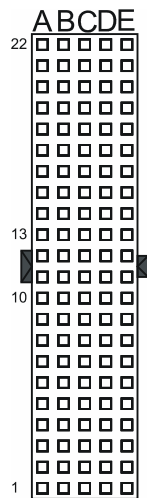


Figure 9-11: R&amp;S TS-PRIO Connector X20

Table 9-8: R&amp;S TS-PRIO Assignment of connector X20

Pin	Z	A	B	C	D	E	F
22	GND						GND
21	GND						GND
20	GND			+5V_PXI_OUT	GND	+5V_PXI_OUT	GND
19	GND	-12V_PXI	GND	+5V_PXI_OUT	AUX2_X20	AUX1_X20	GND
18	GND				CAN_EN_i		GND
17	GND		GND	+5V_PXI_I N	+5V_PXI_I N		GND
16	GND			+5V_PXI_I N	GND		GND
15	GND		GND	+5V_PXI_I N	+5V_PXI_OUT		GND
14	NC						NC
13	NC						NC
12	NP	CH5A_CO M_X20		CH1B_CO M_X20		CH1A_CO M_X20	NP
11	NP	CH5_CTR L_X20		CH2B_CO M_X20		CH1_CTR L_X20	NP
10	NC	CH6A_CO M_X20		CH3B_CO M_X20		CH2A_CO M_X20	NC
9	NC	CH6_CTR L_X20		CH4B_CO M_X20		CH2_CTR L_X20	NC
8	NC	CH7A_CO M_X20		CH5B_CO M_X20		CH3A_CO M_X20	NC



Pin	Z	A	B	C	D	E	F
7	NC	CH7_CTR L_X20		CH6B_CO M_X20		CH3_CTR L_X20	NC
6	NC	CH8A_CO M_X20		CH7B_CO M_X20		CH4A_CO M_X20	NC
5	NC	CH8_CTR L_X20		CH8B_CO M_X20		CH4_CTR L_X20	NC
4	NC						NC
3	GND	RSDO	GND		RRST#	RSA0	GND
2	GND	RSCLK		RSA1	RSDI	+12V_PXI	GND
1	GND	RCS#	GND			+5V_PXI OUT	GND
Pin	Z	A	B	C	D	E	F

### 9.2.2 Rear Connector X34

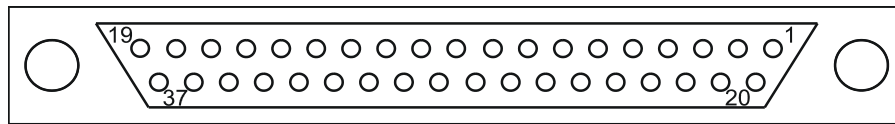


Figure 9-12: R&S TS-PRIO Connector X34

Table 9-9: R&S TS-PRIO Assignment of connector X34

Pin	Signal		Pin	
1	GND		20	R_AUX1
2	R_AUX2		21	R_AUX3
3	R_AUX4		22	CH1B_NO
4	CH1A_NO		23	CH1B_COM
5	CH1A_COM		24	CH2B_NO
6	CH2A_NO		25	CH2B_COM
7	CH2A_COM		26	CH3B_NO
8	CH3A_NO		27	CH3B_COM
9	CH3A_COM		28	CH4B_NO
10	CH4A_NO		29	CH4B_COM
11	CH4A_COM		30	CH5B_NO
12	CH5A_NO		31	CH5B_COM
13	CH5A_COM		32	CH6B_NO
14	CH6A_NO		33	CH6B_COM

Pin	Signal		Pin	
15	CH6A_COM		34	CH7B_NO
16	CH7A_NO		35	CH7B_COM
17	CH7A_COM		36	CH8B_NO
18	CH8A_NO		37	CH8B_COM
19	CH8A_COM			

### 9.2.3 Jumper



The jumpers available on the module have been correctly configured ex works for the function described above.

The delivery status is described in the following.	
X401	3-4 5-6
X201	5-6
X202	3-4 5-6
X203	1-2 9-10
X204	1-2 7-8
X205	5-6 7-8
X206	3-4
X207	1-2
X301	1-3 2-4 8-10
X302	1-3 2-4 8-10

X303	1-3 2-4 8-10
X304	1-3 2-4 8-10

## 10 Specifications

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**NOTICE**

The technical data of the Multiplex/Switch Module 2 R&S TS-PSM2 are shown in the corresponding data sheets.

In the event of any discrepancies between data in this user manual and technical data in the data sheet, the data sheet takes precedence.

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