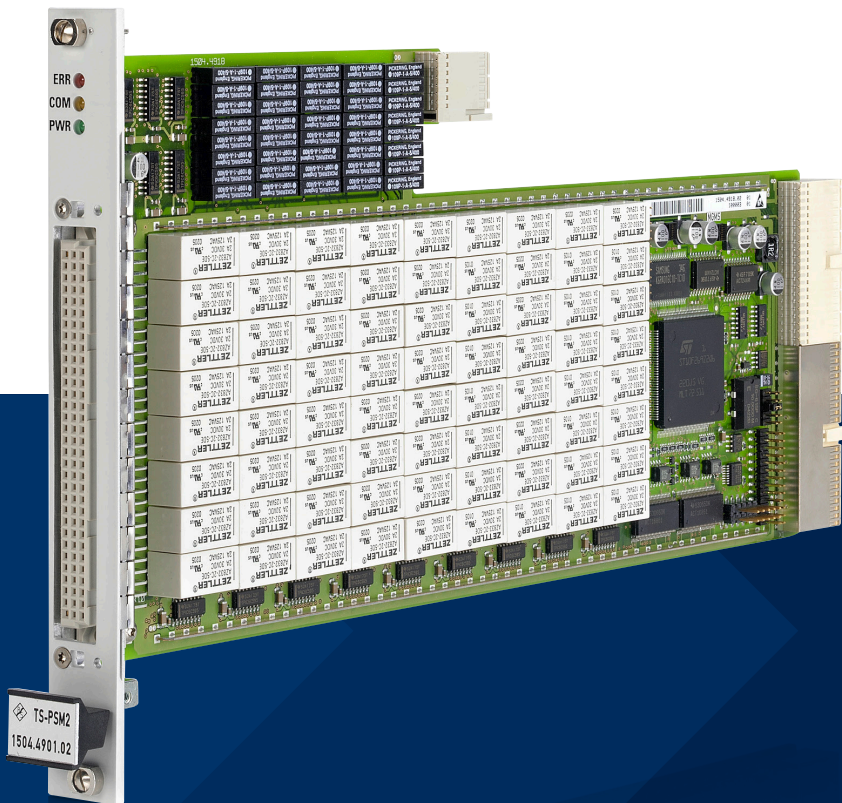


# R&S® TS-PSM2 MULTIPLEX/SWITCH MODULE

For medium-power signals



Product Brochure  
Version 03.00

**ROHDE & SCHWARZ**

Make ideas real



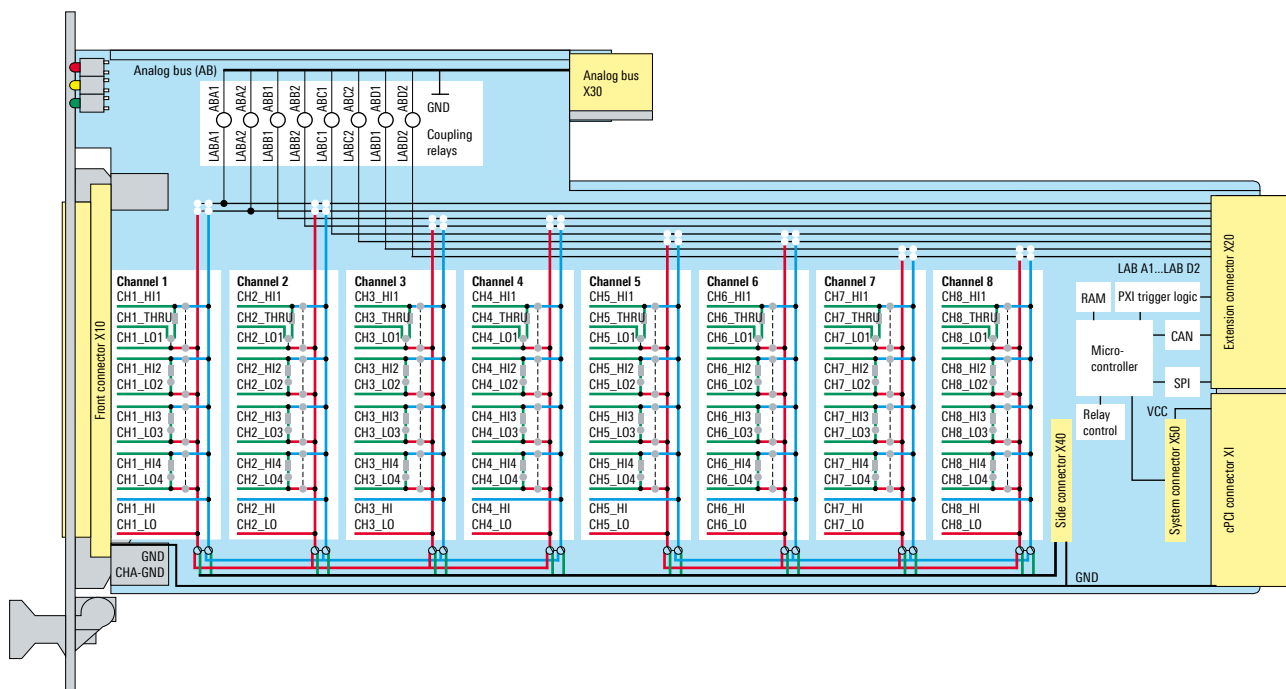
# AT A GLANCE

The R&S®TS-PSM2 is a multiplexer and switching module for medium-power signals and is controlled via a CAN bus. Its innovative technology and versatile wiring capabilities make it ideal for automotive applications.

## Key facts

- ▶ Medium-power switching module for voltages up to 120 V DC and currents up to 2 A
- ▶ Eight independent groups of 3 SPST/1 SPDT relay channels or 4-to-1 DPST relay multiplexers
- ▶ Relay multiplexers can be cascaded via local power buses
- ▶ Indirect current measurements on each SPxT channel via shunt resistors
- ▶ Direct current measurements up to 1 A on all channels via R&S®TSVP analog measurement bus and R&S®TS-PSAM
- ▶ Connection of CompactPCI/PXI modules via side connector
- ▶ Self-test of all relays via R&S®TSVP analog measurement bus and R&S®TS-PSAM
- ▶ Access to R&S®TSVP analog measurement bus via eight bus lines
- ▶ Control via CAN bus
- ▶ Device driver for LabWindows/CVI
- ▶ Generic test software library (GTSL) in DLL format

## Functional block diagram



# PRODUCT INTRODUCTION

The special design of the module ensures that lines for differential signals in the audio frequency range are wired with very low interference.

Featuring wide voltage and current ranges and the flexible use of simple switches or complex multiplexers, the module offers high versatility and expandability. Even complex load systems with real or electronically simulated loads and integrated current measurement capability can be implemented. All channels are shielded and designed with low impedance to keep crosstalk and voltage drops to a minimum.

The R&S®TS-PSM2 multiplex/switch module requires a single slot in the R&S®TSVP base units.

# FLEXIBLE SIGNAL ROUTING

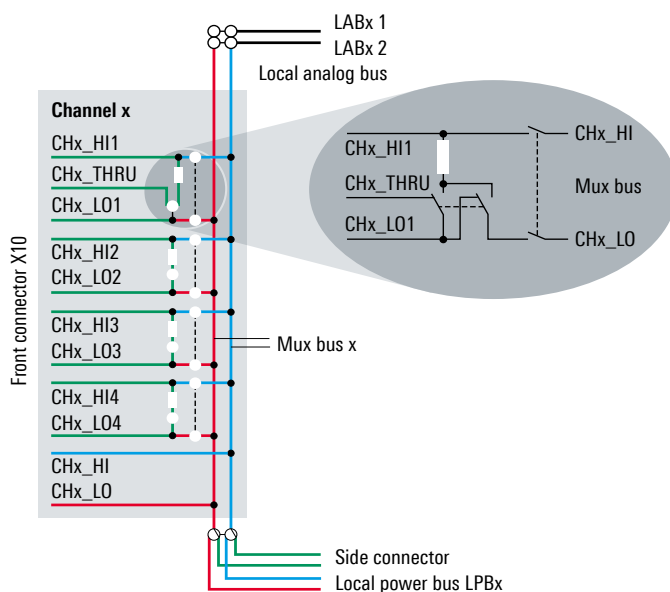
The module includes eight identical, independent relay groups that can be cascaded via the local power bus to form larger units. Each group contains a double-pole 4-to-1 multiplexer as well as three single-pole make contacts and one single-pole make-break changeover contact. The module can thus be used as a switch or a multiplexer, depending on the application.

Low-impedance shunt resistors in each switching channel enable even high currents to be measured without voltage drops. With the relay closed, the resistors enable the actual current to be measured indirectly by tapping the voltage via the multiplexer. The relay is designed with two changeover contacts, thus preventing any measurement error due to the resistance of the relay contact.

Each multiplexer bus can also be connected to the local analog bus (LABx), the local power bus (LPBx) or the side connector. The Rohde&Schwarz analog bus allows all channels to be connected to R&S®TSVP measurement and stimulus modules; no extra external wiring is required.

The side connector and appropriate wiring enable the R&S®TS-PSM2 to multiplex signals from CompactPCI/PXI modules or to switch them to the Rohde&Schwarz analog bus.

## Structure of a relay group



# TYPICAL APPLICATIONS

- ▶ Multiplexing of audio frequency signals
- ▶ Multiplexing of medium-power voltage and current sources
- ▶ Switching of DUT loads with optional current measurement
- ▶ Multiplexing of measurement and stimulus signals of CompactPCI/PXI modules in the system
- ▶ Switch simulation

# SELF-TEST AND DIAGNOSTICS FOR RELIABLE OPERATION

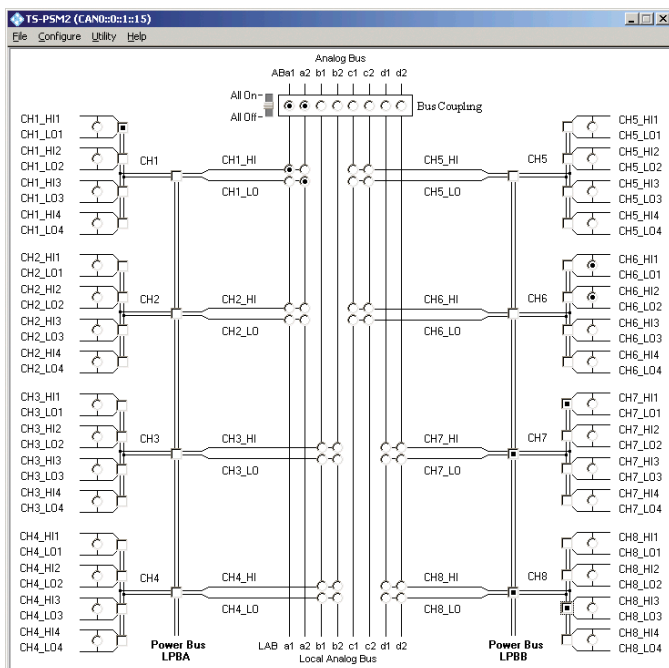
The built-in self-test capability of the module ranges from rapid diagnostics to a fully automatic test of all relays and switching paths (requires R&S®TS-PSAM).

Diagnostic LEDs on the front panel make system integration faster and easier, as the user can see at a glance whether the module is working properly.

# SOFTWARE SUPPORT

The R&S®TS-PSM2 multiplex/switch module is supplied with an IVI-compliant LabWindows/CVI driver, which offers control panels and online help as common features. Alternatively, all switching functions can be called via the GTSL switch manager.

Soft front panel



# SPECIFICATIONS

## Specifications

<b>Application in the R&amp;S®TSVP platform</b>	CAN bus controlled module	1 slot required
<b>Interface</b>		
Control bus		CAN 2.0b (1 Mbit/s)
Front DUT connector		DIN41612, 96 pins
Rear I/O connector		CompactPCI connector J2, 110 pins
<b>Control logic</b>		
Local microprocessor		ST10, 16 bit, 40 MHz
<b>Channel switching characteristics</b>		
Eight relay groups		
	single SPST/SPDT switch with current measurement shunt	3 × SPST/1 × SPDT
	nominal value	22 mΩ
	accuracy at +23°C	±1%
	temperature coefficient	±75 ppm/K
	additional error (with max. current on all channels)	±0.5%
	max. shunt current	2 A with current on every second channel, 1.5 A with current on all channels
	or	
	DPST multiplexer	4-to-1
	with changeover of CHx_COM	DPDT: connection to either local power bus or side connector
Relay type Zettler AZ 832		
	max. switching voltage	120 V DC/50 V AC (RMS)
	max. switching current	2 A at 30 V DC resistive, 2 A at 50 V AC (RMS) resistive
	max. switching power	60 W/250 VA
	switching time (including bouncing)	typ. 5 ms
<b>Analog measurement bus and coupling relays</b>		
Number of bus lines		8
Relay type Pickering 109		
	switching voltage DC/AC (RMS)	max. 120 V/50 V
	switching current DC/AC (RMS)	max. 1 A/1 A
	switching power	max. 10 W/10 VA
	switching time (including bouncing)	< 0.5 ms
<b>Path resistance, DC (typical, initially)</b>		
Input-to-input	within relay group	< 250 mΩ
Input-to-input	relay group to relay group	< 500 mΩ
<b>Local power busses</b>		
	number of bus lines	two bipolar local power busses (LPBA and LPBB)
	max. ampacity	6 A

## Specifications

### Frequency characteristics (50 Ω termination)

	20 kHz	100 kHz	1 MHz	5 MHz	
Insertion loss					
Within relay group	≤ 0.1 dB	≤ 0.2 dB	≤ 0.5 dB	≤ 2 dB	3 dB at ≥ 15 MHz
Relay group to relay group	≤ 0.1 dB	≤ 0.2 dB	≤ 0.5 dB	≤ 2 dB	3 dB at ≥ 10 MHz
Crosstalk					
Within relay group	≤ -80 dB	≤ -65 dB	≤ -50 dB	≤ -40 dB	
Relay group to relay group	≤ -70 dB	≤ -55 dB	≤ -45 dB	≤ -35 dB	

### General data

Power consumption		+5 V/1 A (with 25 % of relays activated)
Environmental conditions		
Temperature	operating temperature range	+5 °C to +40 °C
	storage temperature range	-10 °C to +60 °C
Damp heat		+40 °C, 80 % rel. humidity, steady state, in line with EN 60068-2-78
Altitude	operating	up to 2000 m
Mechanical resistance		
Vibration	sinusoidal	in line with EN 60068-2-6, frequency range: 5 Hz to 55 Hz, displacement: 0.3 mm (peak-to-peak) (1.8 g at 55 Hz), frequency range: 55 Hz to 150 Hz, acceleration: 0.5 g constant
	random	in line with EN 60068-2-64, 8 Hz to 500 Hz, acceleration 1.2 g (RMS); 5 min/axis
Shock		shock test in line with MIL-STD-810G, method 516.6, procedure I: shock response spectrum ramp 6 dB/octave up to 45 Hz, 45 Hz to 2000 Hz: max. 40 g
Product conformity		
Electromagnetic compatibility	EU: in line with EMC Directive 2014/30/EC	applied harmonized standards: ▶ EN 61326-1 (industrial environment) ▶ EN 61326-2-1 ▶ EN 55011 Group 1, Class A
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EC	applied harmonized standard: EN 61010-1
	USA	applied standard: UL61010
	Canada	applied standard: CSA-C22.2 No. 61010-1
RoHS	EU: in line with the restriction of the use of hazardous substances in electrical and electronic equipment 2011/65/EU	compliant; applied harmonized standard: EN IEC 63000
Dimensions	W × H × D	20 mm × 174 mm × 316 mm (0.79 in × 6.85 in × 12.44 in)
Weight		0.6 kg (1.32 lb)
Calibration		not required

# ORDERING INFORMATION

Designation	Type	Order No.
Multiplex/switch module	R&S®TS-PSM2	1504.4901.02
Rear I/O instrument extension, for R&S®TS-PMB/TS-PSM2	R&S®TS-PRIO	1510.8005.02

## Service that adds value

- ▶ Worldwide
- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

## Rohde & Schwarz

The Rohde&Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

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## Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

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