ROHDE&SCHWARZ

USER MANUAL

Multiplex/Switch Module 2

R&S®TS-PSM2

User Manual

for ROHDE & SCHWARZ Multiplex/Switch Module R&S TS-PSM2

2nd Issue / 08.06 / GB 1504.4799.12

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Safety Instructions

Attention!
Electrostatic sensitive devices require special care

CERTIFICATE

DQS GmbH

Deutsche Gesellschaft zur Zertifizierung von Managementsystemen

hereby certifies that the company

Rohde & Schwarz GmbH & Co. KG

Mühldorfstrasse 15
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with the production sites as listed in the annex

for the scope
Design and Development, Production, Sales, Services of Electronic-Measurement and Communication-Equipment and Systems

has implemented and maintains a

Quality Management System.

An audit, documented in a report, has verified that this quality management system fulfills the requirements of the following standard:

DIN EN ISO 9001 : 2000

December 2000 edition

The quality management system of the sites marked with (*) in the annex fulfills the requirements set out by the international and German Road Traffic Regulations
including the approval objects as listed in the appendix.

This certificate is valid until	2008-01-23
Certificate Registration No.	001954 QM/ST
Frankfurt am Main	2005-01-24

This certificate is based on a quality audit in cooperation with the CETECOM ICT Services GmbH as a Notified Body under the Scope of the EC directive 99/5/EC.
It was verified by the Notified Body that the supplementary requirements of the Annex V of the European Concil Directive 99/5/EC are fulfilled.

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Appendix to Certificate Registration No.: 001954 QM/ST

Rohde & Schwarz GmbH & Co. KG

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The international and German Road Traffic Law
was audited regarding the following approval objects:

No.: 22 Electrical/Electronic Sub Assembly

This appendix (as of 2005-01-24) is only valid in connection
with the above-mentioned certificate.

Annex to Certificate Registration No.: 001954 QM ST

Rohde & Schwarz GmbH & Co. KG

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Organizational unit/site	Scope
ROHDE & SCHWARZ GmbH & Co. KG Service Centre Cologne **ROHDE & SCHWARZ Systems GmbH** Graf-Zeppelin-Strasse 18 D-51147 Köln	Technical services in the field of measuring/communication techniques maintenance/repair calibration training technical documentation Development, production, systems
Rohde & Schwarz FTK GmbH Wendenschloßstrasse 168 D-12557 Berlin	Design and Development, Production and Sale of Communication Equipment, Installations and systems
Rohde & Schwarz GmbH & Co. KG Kaikenrieder Strasse 27 D-94244 Teisnach	Design and Development, Production, Sales, Services of Electronic-Measurement and Communication-Equipment and Systems
Rohde & Schwarz závod Vimperk s.r.o. Spidrova 49 CZE-38501 Vimperk Tschechische Republik	Design and Development, Production, Sales, Services of Electronic-Measurement and Communication-Equipment and Systems
(*) **Rohde & Schwarz GmbH & Co. KG** Mühldorfstrasse 15 81671 München	Design and Development, Production, Sales, Services of Electronic-Measurement and Communication-Equipment and Systems
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If you have any technical queries about this Rohde & Schwarz equipment, our Hotline at the Support Center of Rohde & Schwarz Sales-GmbH will be glad to help.

Our team will discuss your queries and look for solutions to your problems.

The Hotline is open Mondays to Fridays from 08.00 to 17.00 hrs.

For queries outside office hours, you can leave a message or send a note via fax or email. We will then get back to you as soon as possible.

ROHDE & SCHWARZ

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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 output 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). It is inserted into the front of the TSVP housing.

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 connected on the rear of the CAN/PXI bus and on the analog bus of the TSVP backplane. The side connector and the system connector allow for project-specific extensions.

1.2 Safety instructions

WARNING!

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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CAUTION!

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

For additional information on operation with voltages dangerous to the touch, see Section 6.3.

1.3 Characteristics

Characteristics R&S TS-PSM2
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 1-1 Characteristics R&S TS-PSM2

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2 View

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

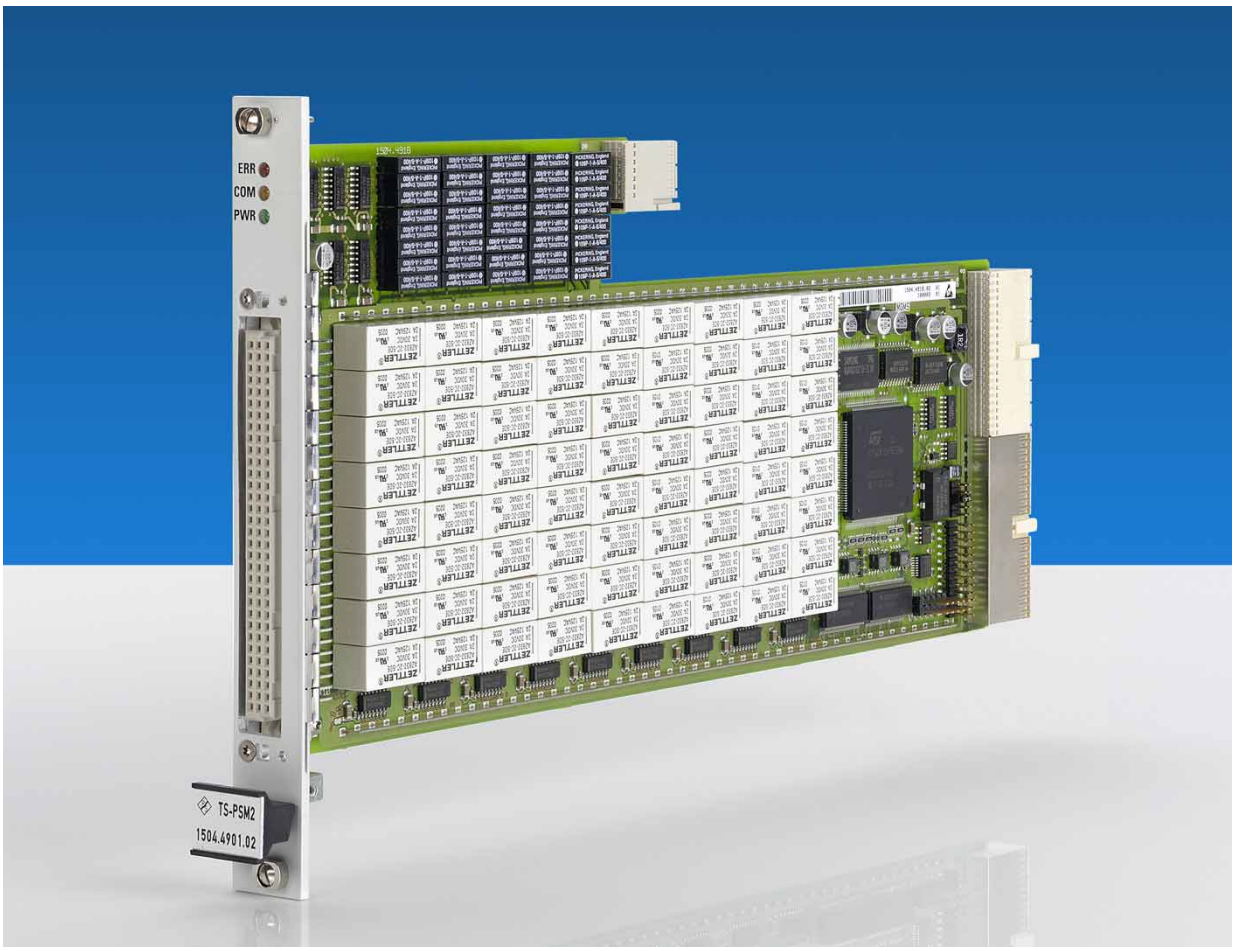

Figure 2-1 View of the R&S TS-PSM2

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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.

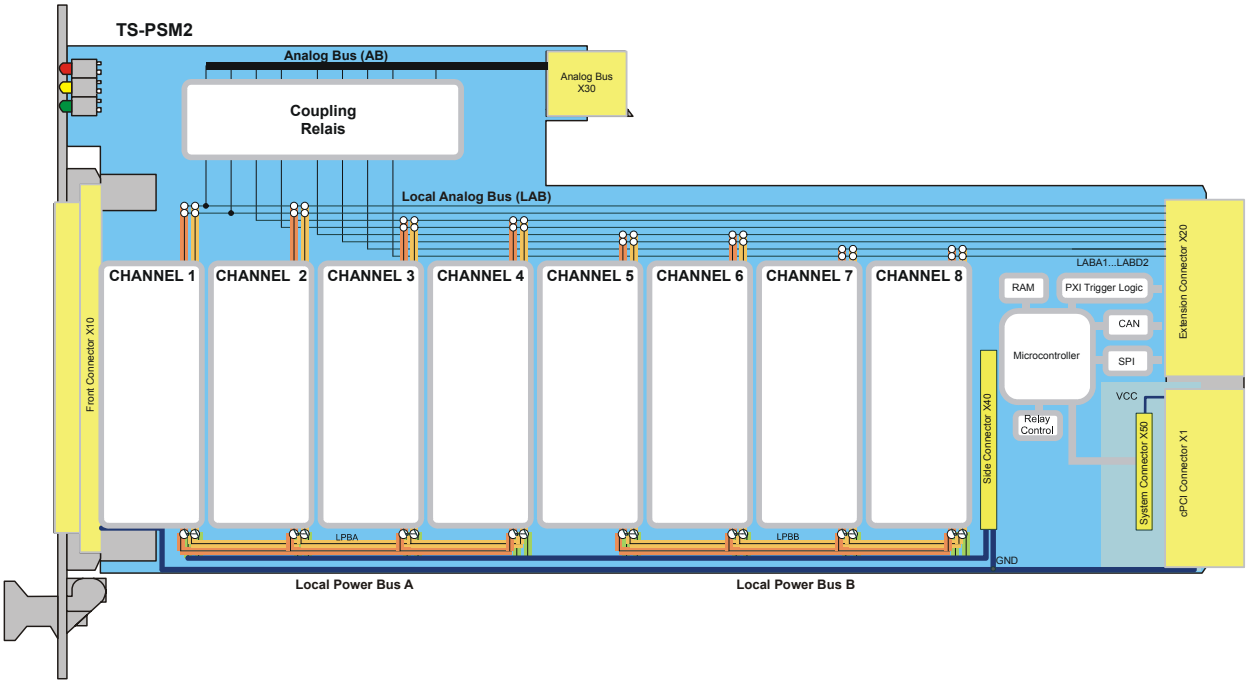

Figure 3-1 Functional block diagram R&S TS-PSM2

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

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4 Layout

4.1 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.

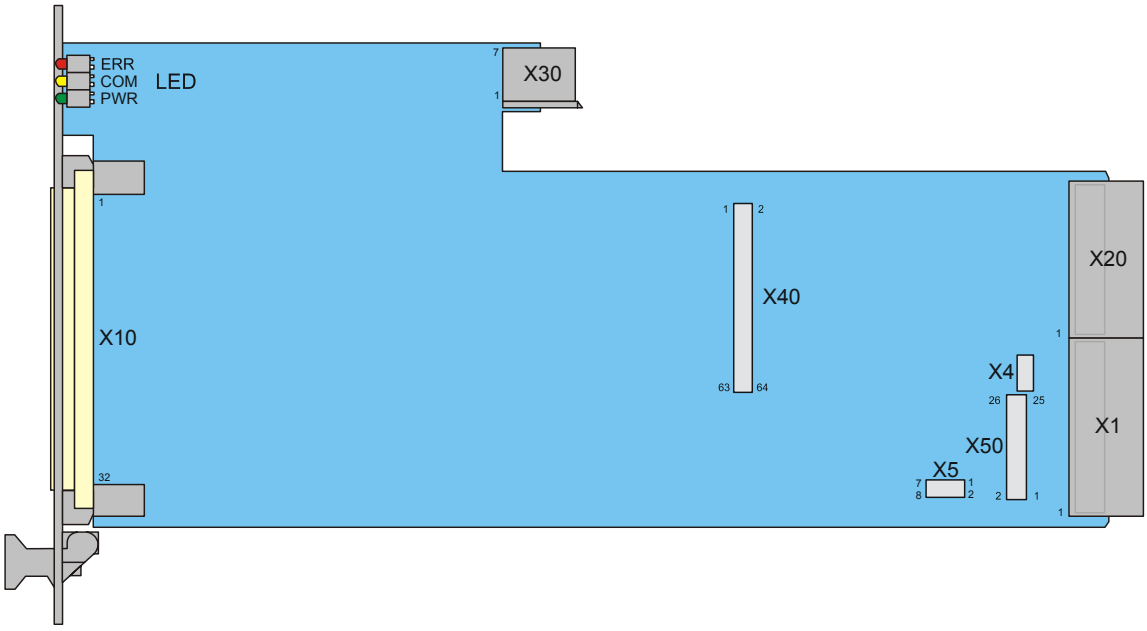

Figure 4-1 Arrangement of connectors and LEDs

Abbreviation	Use
X1	cPCI Connector
X4	Clock Configuration
X5	RS232 Interface
X10	Front Connector
X20	PXI/Extension Connector
X30	Analog Bus Connector
X40	Side Connector
X50	System Connector

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

4.2 Display elements

(see Figure 4-1)

There are three light diodes (LEDs) on the front of the R&S TS-PSM2 with the following functions:

LED	Description
ERR (red)	Error: Lit if an error is discovered after the system is turned on during the startup test on the R&S TS-PSM2 .
COM (yellow)	Communication: Lit briefly to indicate access to the R&S TS-PSM2 via the interface.
PWR (green)	Power supply voltage: Lit if all power supply voltages are present.

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

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5 Function Description

(see Chapter 3, Functional block diagram)

5.1 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 resisters (22 mΩ) are inserted into each channel. The instantaneous current can be measured indirectly through these shunt resisters as a voltage value.

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

5.2 System functions

The system functions are implemented by a local processor with internal Flash. There is also an external SRAM. Communication with the system controller in the R&S CompactTSVP is via the CAN bus.

The functions of the R&S TS-PSM2 may be summarised as follows:

- Analog function test
- Switching voltage/current sources
- Switching test object loads (original loads, simulated/electronic loads)
- Power Multiplexer
- Switch simulation

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5.3 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.

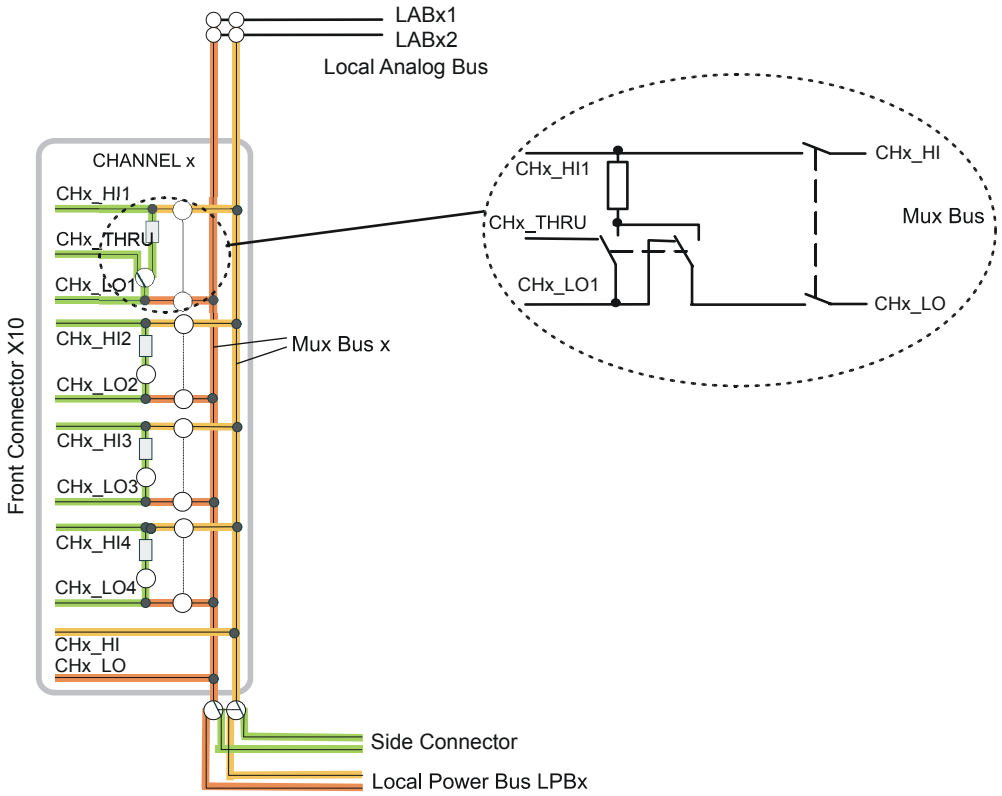

Figure 5-1 Switching group

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

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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.).

5.4 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.

5.5 Interference immunity

Optimal behaviour regarding electrical interference or temperature increases is achieved by control through the serial differential CAN bus (Controller Area Network).

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5.6 Sample applications

5.6.1 Simple switching function - normally open, 1-pin.

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

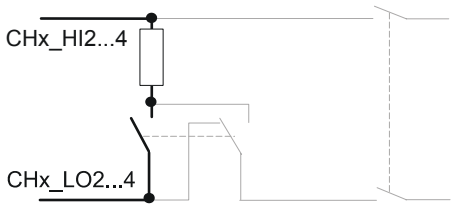

Figure 5-2 Simple switching function - normally open, 1-pin

5.6.2 Simple switching function - changeover contact, 1-pin.

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

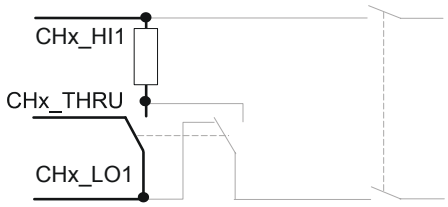

Figure 5-3 Simple switching function - changeover contact, 1-pin.

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5.6.3 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.

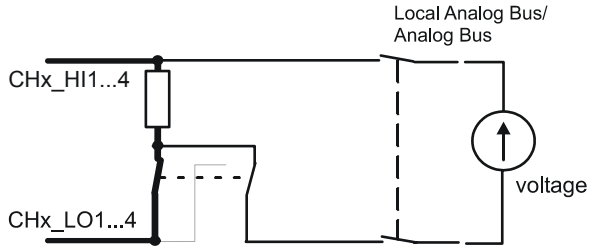

Figure 5-4 Current measurement - indirect, via shunt resistor

5.6.4 Current measurement - direct, up to 1 A

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

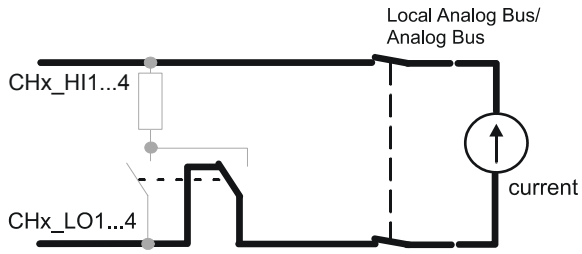

Figure 5-5 Current measurement - direct, up to 1 A

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5.6.5 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.

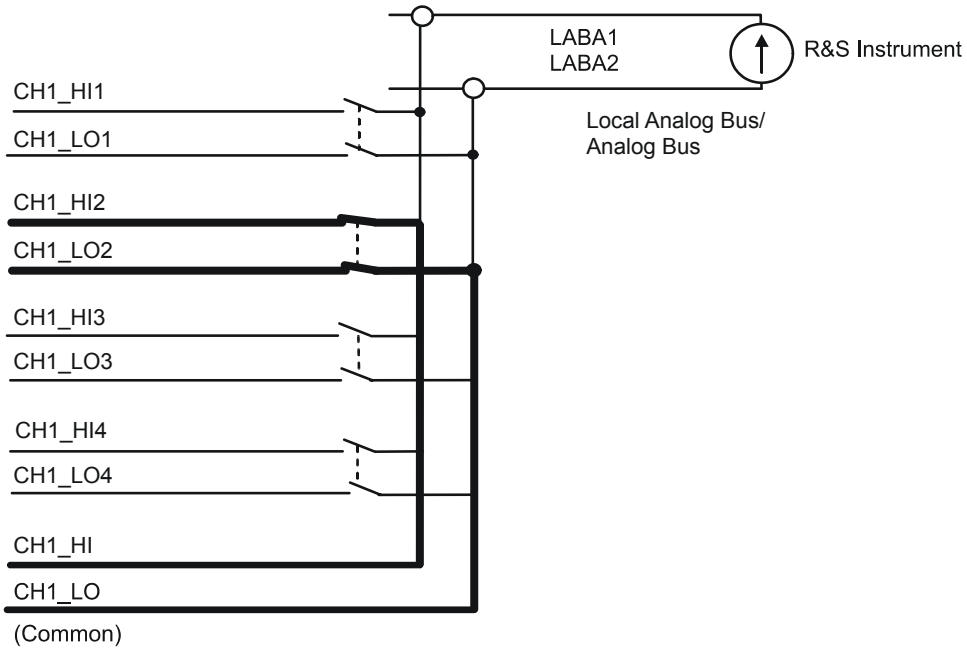

Figure 5-6 Multiplexer - test object signals

5.6.6 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.

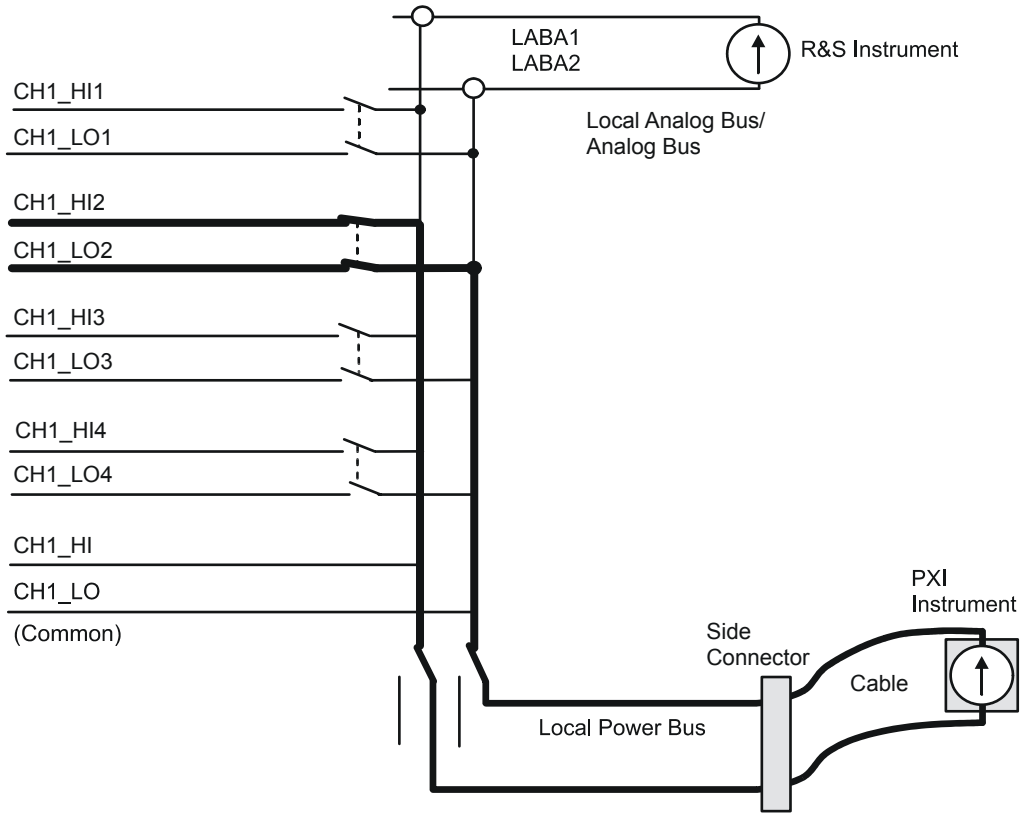

Figure 5-7 Multiplexer - CompactPCI/PXI instruments

5.6.7 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.

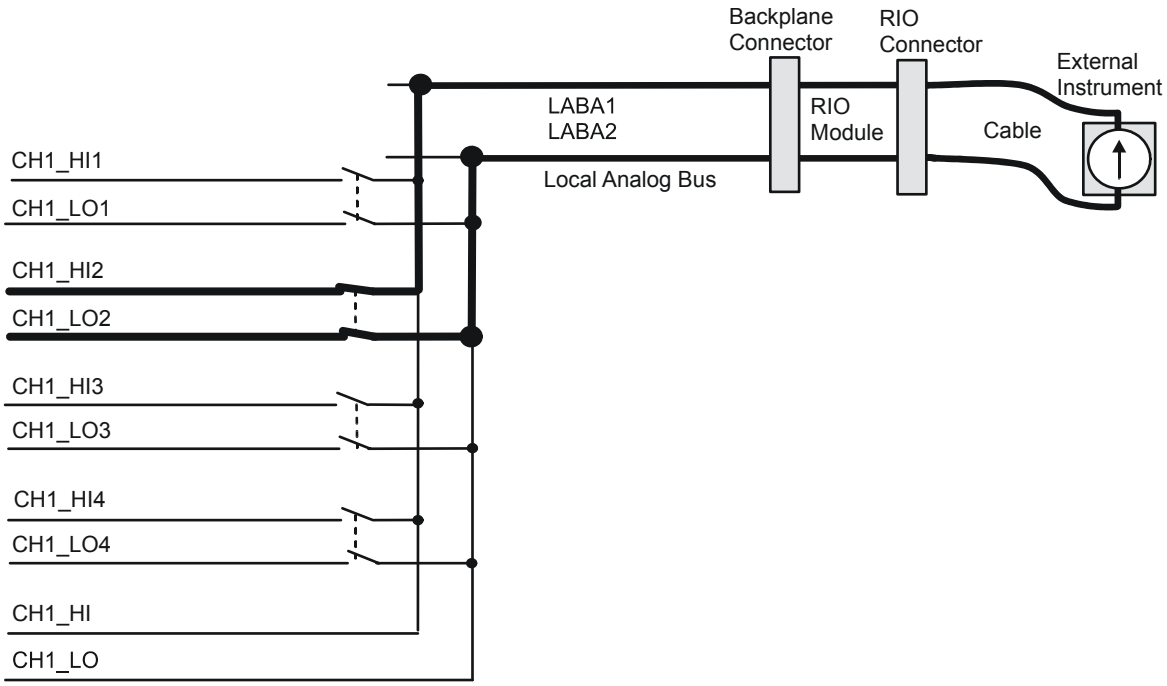

Figure 5-8 Multiplexer - external components, up to 1 A

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6 Commissioning

6.1 Installation of the plug-in module

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

- Shut down the TSVP and turn it off.
- Select a suitable front plug-in slot.
- Loosen the screws and remove the appropriate front plate section on the TSVP housing.

CAUTION!

Check the backplane connectors for bent pins! Any pins that are bent must be straightened!
Failure to observe this instruction may result in permanent damage to the backplane!

- 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

CAUTION!

When inserting the plug-in module, use both hands to guide it and carefully press it into the backplane connectors.

- When the plug-in module is correctly inserted, you will feel it reach a definite mechanical limit
- Tighten the upper and lower screws on the front plate of the plug-in module.

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.

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6.3 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

WARNING!

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.

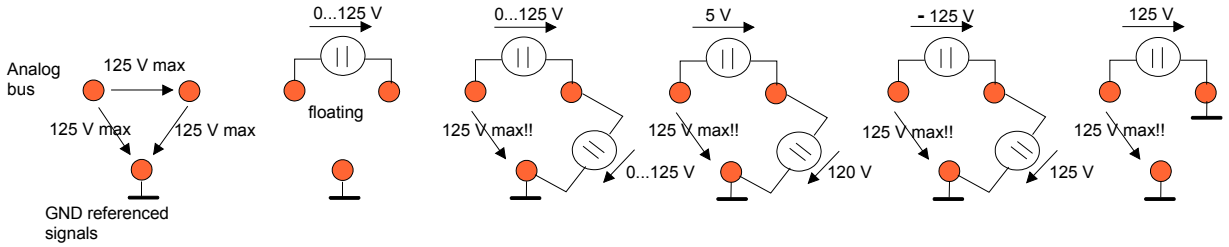

Figure 6-1 Permissible voltages on analog bus lines

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

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7 Software

7.1 Driver software

A LabWindows IVI driver is available to control the Multiplex/Switch Module R&S TS-PSM2 that supports class IVI SWTCH. 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.

The following software modules are installed during driver installation:

Module	Path	Note
rspsm2.dll	<GTSL directory>\Bin	Driver
rspsm2.hlp	<GTSL directory>\Bin	Help file
rspsm2.fp	<GTSL directory>\Bin	LabWindows CVI Function Panel File, Function Panels for CVI Development Environment
rspsm2.sub	<GTSL directory>\Bin	LabWindows CVI attribute file. This file is required by several„Function Panels“.
rspsm2.lib	<GTSL directory>\Bin	Import library
rspsm2.h	<GTSL directory>\Include	Header file for driver

Table 7-1 Driver installation R&S TS-PSM2

NOTE:

The IVI and VISA library of National Instruments are required to operate the driver.

7.2 Softpanel

A "Soft-Panel" is included with the software package for R&S TS-PSM2 (see Figure 7-1). The Soft-Panel requires the support of the IVI driver. It makes it possible to operate the module interactively pointing on the screen and clicking with the mouse.

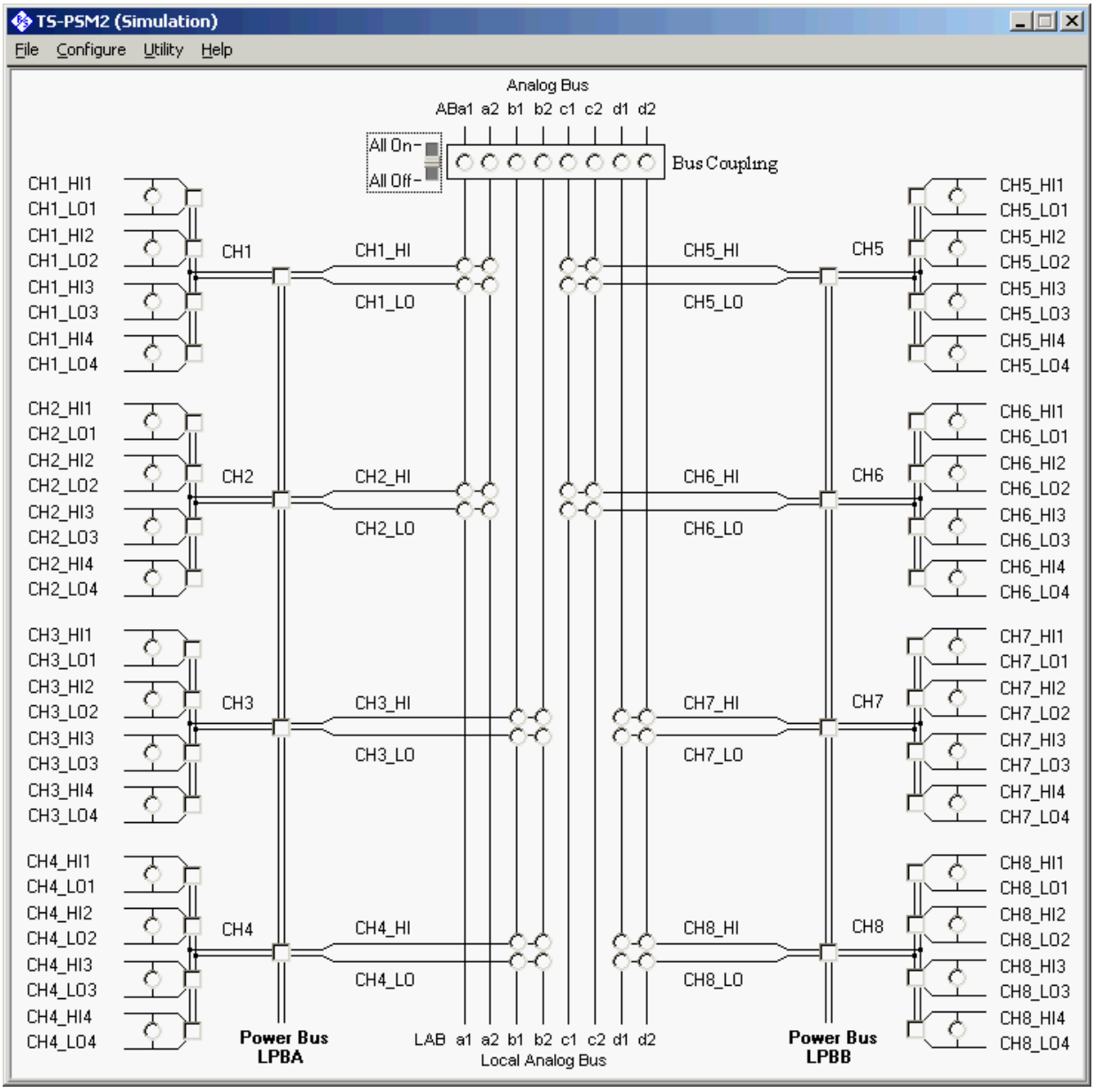

Figure 7-1 Softpanel R&S TS-PSM2

7.3 Sample programme

7.3.1 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    = rspsm2.dll
DriverPrefix = rspsm2
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
```

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```
; 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,
```

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```
&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;
}
```

7.3.2 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;
}
```

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8 Self-Test

The Multiplex/Switch Module R&S TS-PSM2 has an integrated capability for self-test. The following tests are possible:

- LED test
- Power on test
- TSVP self-test

8.1 LED test

After the system is turned on, all three LEDs are lit for about three seconds. This indicates that the 5-V power supply has been applied; all LEDs are in proper order. The following observations may be made about different display states:

LED	Description
One individual LED is not lit	Hardware problem in the module
All LEDs are not lit	+5 V power supply voltage missing

Table 8-1 Observations about the LED test

8.2 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.

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

Table 8-2 Observations about the power on test

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LED	Description
ERR LED (red) Is lit or flashing	Hardware error present (processor is not starting, SPI error)

Table 8-2 Observations about the power on test

8.3 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.

NOTE:

For information on starting the self-test and the order of required work steps, please consult the GTSL Software Description or the GTSL online Help. A detailed description of the parameters and sequences tested may be found in the R&S CompactTSVP / R&S PowerTSVP Service Manual.

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9 Interface description

9.1 Connector X1

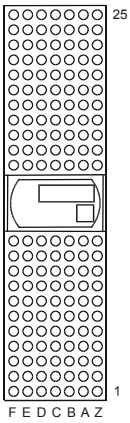

Figure 9-1 Connector X1 (view: mating side)

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

Table 9-1 Assignment of X1

9.2 Connector X4

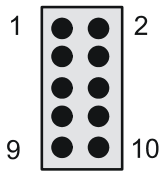

Figure 9-2 Connector X4 (view: mating side)

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

Table 9-2 Assignment of X4

9.3 Connector X5

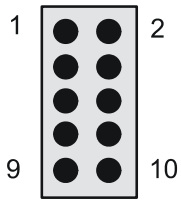

Figure 9-3 Connector X5 (view: mating side)

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

Table 9-3 Assignment of X5

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9.4 Connector X10

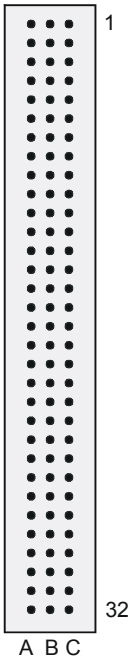

Figure 9-4 Connector X10 (view: mating side)

Pin	A	B	C
1	CH1_HI1	CH1_LO1	**CH1_THRU**
2	CH1_HI2	CH1_LO2	CH1_HI3
3	CH1_LO3	CH1_HI4	CH1_LO4
4	CH1_HI	CH1_LO	CH2_HI1
5	CH2_LO1	**CH2_THRU**	CH2_HI2
6	CH2_LO2	CH2_HI3	CH2_LO3
7	CH2_HI4	CH2_LO4	CH2_HI
8	CH2_LO	CH3_HI1	CH3_LO1
9	**CH3_THRU**	CH3_HI2	CH3_LO2
10	CH3_HI3	CH3_LO3	CH3_HI4
11	CH3_LO4	CH3_HI	CH3_LO
12	CH4_HI1	CH4_LO1	**CH4_THRU**
13	CH4_HI2	CH4_LO2	CH4_HI3

Table 9-4 Assignment of X10

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Pin	A	B	C
14	CH4_LO3	CH4_HI4	CH4_LO4
15	CH4_HI	CH4_LO	CH5_HI1
16	CH5_LO1	**CH5_THRU**	CH5_HI2
17	CH5_LO2	CH5_HI3	CH5_LO3
18	CH5_HI4	CH5_LO4	CH5_HI
19	CH5_LO	CH6_HI1	CH6_LO1
20	**CH6_THRU**	CH6_HI2	CH6_LO2
21	CH6_HI3	CH6_LO3	CH6_HI4
22	CH6_LO4	CH6_HI	CH6_LO
23	CH7_HI1	CH7_LO1	**CH7_THRU**
24	CH7_HI2	CH7_LO2	CH7_HI3
25	CH7_LO3	CH7_HI4	CH7_LO4
26	CH7_HI	CH7_LO	CH8_HI1
27	CH8_LO1	**CH8_THRU**	CH8_HI2
28	CH8_LO2	CH8_HI3	CH8_LO3
29	CH8_HI4	CH8_LO4	CH8_HI
30	CH8_LO	**GND**	**GND**
31	**GND**	**GND**	**GND**
32	**GND**	**GND**	**CHA-GND**

Table 9-4 Assignment of X10

Note: Signals printed in bold are high power

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.

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9.5 Connector X20

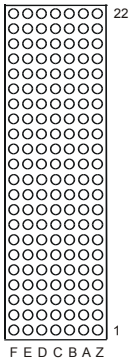

Figure 9-5 Connector X20 (view: mating side)

NP = not populated

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

Table 9-5 Assignment of X20

9.6 Connector X30

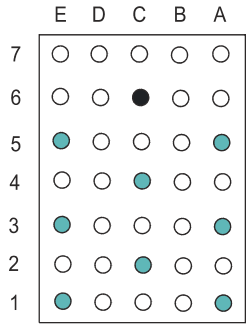

Figure 9-6 Connector X30 (view: mating side)

Pin	E	D	C	B	A
7					
6			GND		
5	ABC1				ABA1
4			ABB1		
3	ABC2				ABB2
2			ABA2		
1	ABD2				ABD1

Table 9-6 Assignment of X30

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9.7 Connector X40

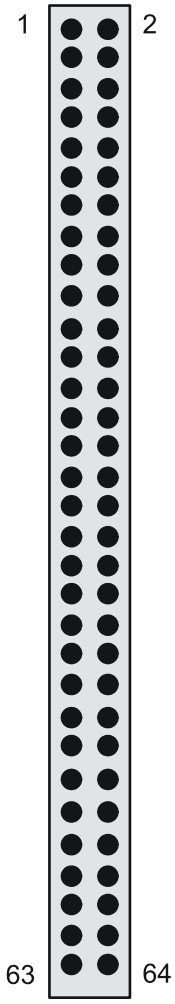

Figure 9-7 Connector X40 (view: mating side)

Pin	Signal	Pin	Signal
1	LABA1	2	GND
3	LABC1	4	GND
5	LABD1	6	GND
7	LABB1	8	GND
9	LABC2	10	GND
11	LABA2	12	GND
13	LABD2	14	GND

Table 9-7 Assignment of X40

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Pin	Signal	Pin	Signal
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 9-7 Assignment of X40

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9.8 Connector X50

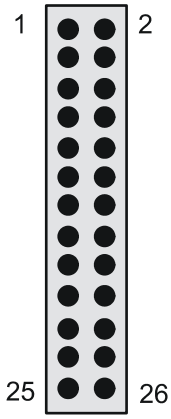

Figure 9-8 Connector X50 (view: mating side)

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

Table 9-8 Assignment of X50

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10 Specifications

NOTE:

Technical data for the Multiplex/Switch Module R&S TS-PSM2 is specified in the corresponding data sheets.
If there are discrepancies between the information in this operating manual and the values of the data sheet, the values of the data sheet take precedence.

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