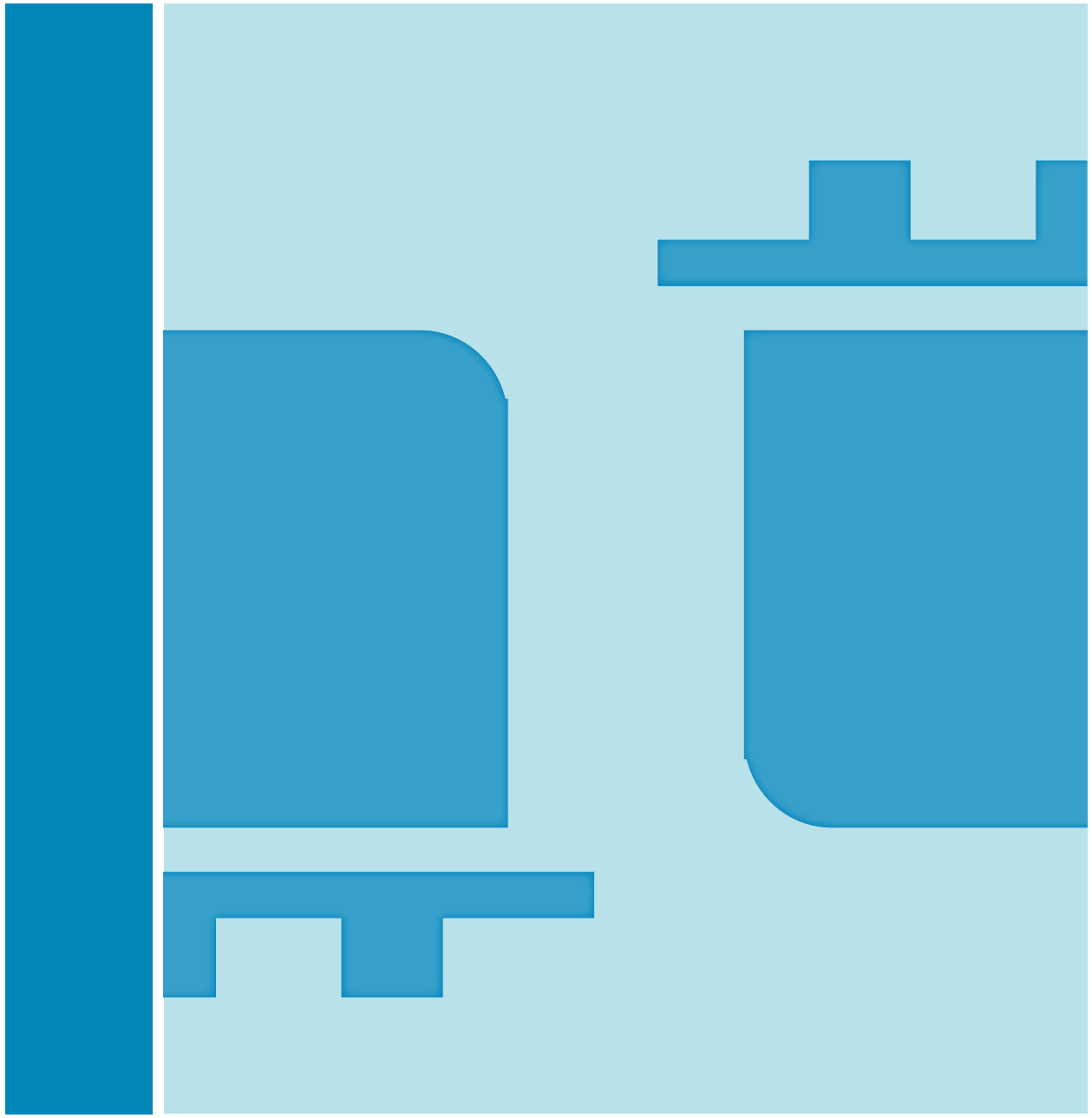


**SECTION 8**



**Other**



## Contents

### Other Components

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## RF & Microwave Products

### GENERAL INFORMATION

Specialized in passive RF & Microwave components, Radiall's engineering staff develops and manufactures a wide range of other coaxial standard devices including terminations, attenuators, coaxial couplers, detectors, rotary joints, filters, and phase shifters. This range covers a wide frequency spectrum from DC to 50 GHz for telecom, aerospace, instrumentation and military application.

Radiall introduced TestPro cables assemblies into the market for test and measurement applications, in order to meet customers needs.

For Space applications, Radiall also offers a full range of space components built according to ESA specifications including attenuators, terminations, couplers, connectors, coaxial cable assemblies (flexible or semi-rigid cables) for L, S, C, X, Ku and Ka band applications.



### TERMINATIONS

Radiall's range of terminations is intended to terminate a coaxial transmission through characteristic impedance and dissipating the RF incident power. The main features of our full range of terminations include:

- Power range from 0.5W to 1000W
- Frequency from DC up to 50 GHz
- 50Ω Impedance
- High repeatability
- Compatibility with Broad type connections: BMA, BNC, QMA, QN, N, SMA, SMA2.9, SMB, SMP, SSMA, TNC, 1.0/2.3, 7/16, 2.4mm
- Connector interface according to applicable MIL, DIN, NF and CEI
- Dedicated range for test & measurement with the lowest VSWR



### ATTENUATORS

Attenuators are linear passive transition line components designed to be inserted between two coaxial lines to reduce the input power in a matched system by a predetermined ratio. This ratio is expressed in logarithmic terms. 3dB as a power ratio is 2, 6dB is 4, 20dB is 100, and 30dB is 1000. The main features of our full range of coaxial attenuators include:

- Power range from 1W to 100W
- Frequency from DC up to 40 GHz
- High repeatability
- 50Ω Impedance
- Compatibility with Broad type connections : BNC, QN, N, SMA, SMA 2.9, SMB, TNC, 7/16
- Connector interface according to applicable MIL, DIN, NF and CEI
- Dedicated range for test & measurement with the lowest VSWR



## RF & Microwave Products

### COAXIAL COUPLERS

Radiall's coaxial couplers offer a reliable design to meet the needs of microwave applications. The main features of our full range of coaxial couplers include:

- Directional & 3dB Hybrid 90° couplers
- Power range from 50 to 500 Watts
- Frequency from 0.15 GHz to 8 GHz
- 6, 10, 20 & 30 dB coupling factors
- SMA, Type N offered, TNC 7/16
- Dedicated range providing flat frequency response
- Possibility to design custom coaxial couplers as per customer requirements



### SPECIAL MICROWAVE COMPONENTS

Radiall offers a complete range of special Microwave components suitable for applications utilizing the following devices:

- Feedthrough terminations
- Detectors
- Rotary joints
- DC Blocks
- Monitor tees
- Signal samplers
- Phase shifters
- Filters



#### Feed through terminations

These components are used to properly terminate a transmission line while testing with a high impedance measuring system such as an oscilloscope input.

#### Detectors

A detector is a 2 port device capable of supplying a low frequency signal on its output port (video), of a level proportional to the RF power applied to its input port.

#### Rotary joints

These components provide the transition between 2 coaxial transmission lines that rotate while maintaining necessary RF characteristics.

#### DC blocks

DC blocks are composed of a capacitor inserted to the central conductor of the coaxial line. They block any DC or low frequency current present in the line.

#### Signal samplers

These devices are used to sample part of an RF signal from a coaxial line. They are not directive, and the sample incident reflects energy.

#### Phase shifters

These components create a mechanical adjustable phase shift by variation in the physical length of the transmission line.

**TestPro Cable Assemblies**



TestPro cables are dedicated to bench test cable assemblies. Our TestPro range differs from the SHF range, because the cables and connectors are designed for high performance and testing and measurement.

While others propose cosmetic solutions to appear more robust without any real performance advantages, Radiall's design offers a full range of test bench cables that performs better than any other product on the market.

Test cable assemblies are intended for daily use in component and assembly shops, test labs and automatic test equipment applications. They differ from standard cable assemblies in that they are specifically designed for applications that require repeated connect/disconnect procedures, strenuous flexing situations and applications where cable and connector durability is important.

Key characteristics of the Testpro range include:

- Rugged interface: 5,000 mating/unmating lifecycle
- Flex life: over 20,000 cycles
- High flexibility
- Outstanding phase and loss stability for long calibration intervals

	TestPro 4.2	TestPro 3	TestPo 2 (launch 2014)
Frequency	DC - 18 GHz	DC - 26.5 GHz / DC- 40 GHz	DC - 50 GHz / DC - 67 GHz
Impedance	50 Ω ± 2 Ω	50 Ω ± 1 Ω	50 Ω ± 1 Ω
IL (dB/m)	2.10 @ 18 GHz	2.41 @ 26.5 GHz - 3.11 @ 40 GHz	5.00 @ 50 GHz - 5.92 @ 67 GHz
Test IL (dB/ft)	0.64 @ 18 GHz	0.73 @ 26.5 GHz - 0.94 @ 40 GHz	1.52 @ 50 GHz - 1.80 @ 67 GHz
Phase with flexure stability	2° @ 18 GHz	2° @ 26.5 GHz - 5° @ 40 GHz	6° @ 50 GHz - 8° @ 67 GHz
Amplitude stability (dB)	0.05 @ 18 GHz	0.05 @ 40 GHz	0.05 @ 50 GHz
Shielding Effectiveness	-110 dB min @ 1 GHz	-100 dB min @ 1 GHz	-100 dB min @ 1 GHz
Crush resistance	135 lb/linear in.	260 lb/linear in.	260 lb/linear in.
Minimum bend radius	25 mm (1 in.)	25 mm (1 in.)	25 mm (1 in.)
Temperature (°C)	-55 / + 125 °C	-55 / + 125 °C	-55 / + 125 °C
Connectors	SMA, N, TNC, PC7	SMA 3.5, SMA 2.9, NMD 2.9, TVAC 2.9, SMA 2.4mm, N	2.4mm / 1.85 mm
Flexure life cycle	10,000	20,000	20,000
Mating cycles durability	5,000	5,000	5,000
Armor	Available	Integrated	Integrated
RoHS/REACH	Yes	Yes	Yes

\*Please refer to Testpro catalog D1A295TE

## Space Qualified Products

### COAXIAL CONNECTORS

Full range of coaxial connectors operating up to Ka band.

- SMA and SMA 2.9 interfaces ESCC QPL:

Qualified according to ESCC 3402 specifications by European Space Agency (ESA)



- TNC and SMP interfaces classified EPPL: ESA Preferred Part List

Radiall has expended the SMP range to include, SMP-LOCK connectors featuring a robust locking mechanism. Qualified for space applications, this new interface is the best solution when size, weight, security, and high RF performance are required.

This new interface is compatible with most of Radiall products below.

### LOW LOSSES CABLE ASSEMBLIES

Space qualified low loss flexible coaxial cable assemblies up to 40 GHz

- Available connectors: SMA, SMA 2.9, TNC or SMP

### SEMI-RIGID CABLE ASSEMBLIES

Space qualified semi-rigid coaxial cable assemblies up to 40 GHz

- Available connectors: SMA, SMA 2.9, TNC or SMP

### COUPLERS AND POWER DIVIDERS

Space qualified passive couplers DC-22 GHz and power dividers DC-31 GHz

- Admissible power up to 200 WCW

- Available connectors: SMA, SMA 2.9 and TNC





## Space Qualified Products

### COAXIAL SWITCHES

A full range of light weight Space qualified switches operating up to the Ka band.

- SPDT, DPDT, DP3T and T switch configurations available
- Available connectors: SMA, SMA 2.9 and TNC

### TERMINATIONS

Range of low power coaxial loads up to 40 GHz and ESA qualified (European Space Agency).

- Available connectors: SMA, SMA 2.9, SMP and TNC interface

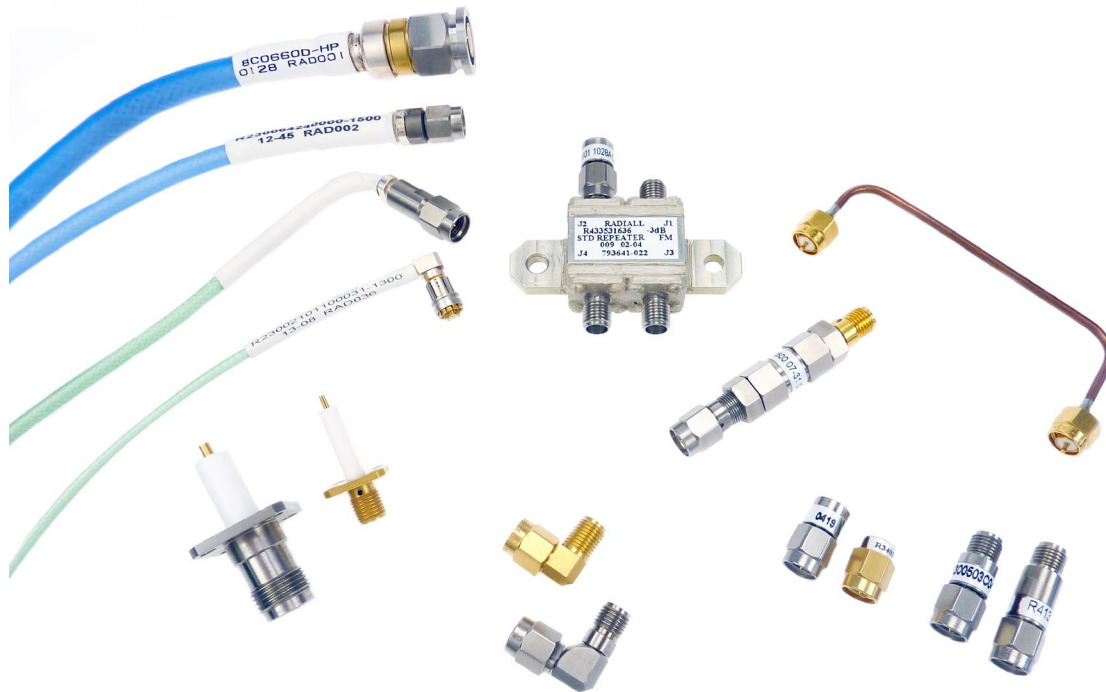
### ATTENUATORS

Range of low power coaxial attenuators DC - 40 GHz qualified by European Space Agency (ESA).

- Available connectors: SMA, SMA 2.9 interface
- Attenuation 0 to 30 dB

### PHASE SHIFTERS

These components create a mechanical adjustable phase shift by variation in the physical length of the transmission line up to 22 GHz.

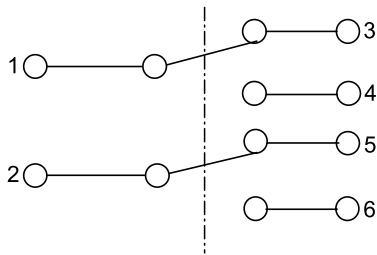


## Switches Application

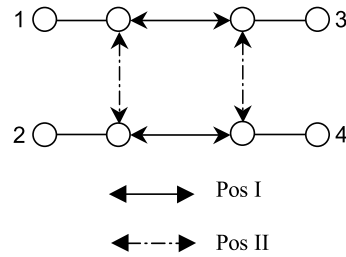
### COAXIAL TRANSFER SWITCHES (DPDT)

A DPDT is Double Pole Double Throw switch that provides two independent pairs of RF paths that are actuated simultaneously. The transfer switch is a modified DPDT device, where as a true DPDT switch is a six port device that contains completely independent transmission paths.

In a transfer switch, two transmission paths are not completely independent as shown below:



DPDT

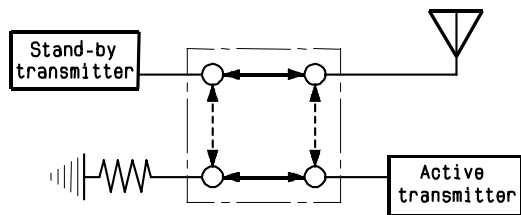


TRANSFER

Examples of transfer switch applications:

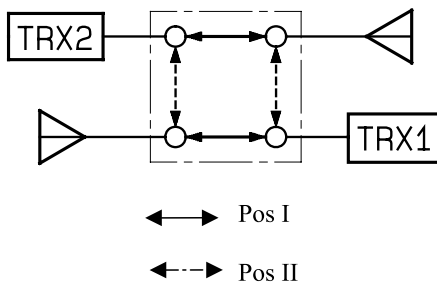
R577 Ramses, R593 Platinum or R513 Titanium series can be selected for this application

Redundancy of two transmitters:



Active transmitters are connected directly to the antenna. A second transmitter is terminated to a medium power termination, and put in stand by position, ready to switch to the antenna in case of a failure of the active transmitter. This is done to create redundancy for antenna maintenance.

Two transmitters to two antennas:

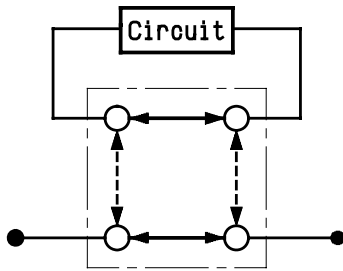


For better signal diversity, 2 antennas are alternately connected to either of the two transmitters.



## Switches Application

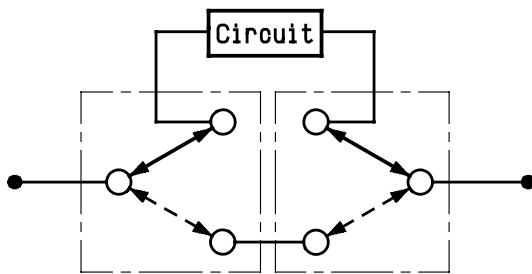
Coaxial Transfer as a bypass switch for circuit insertion applications:



A full RF or microwave passive circuit or circuit element as a filter can be inserted into a coaxial transmission line by using a transfer switch. This element is shortened by a transfer blade in through position.

Other RF arrangements for a bypass function:

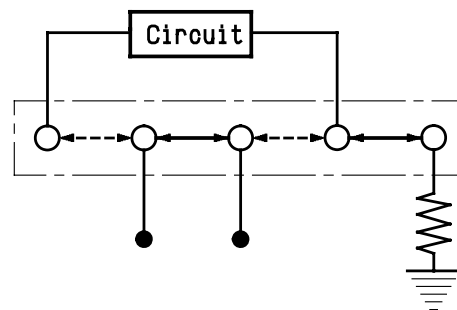
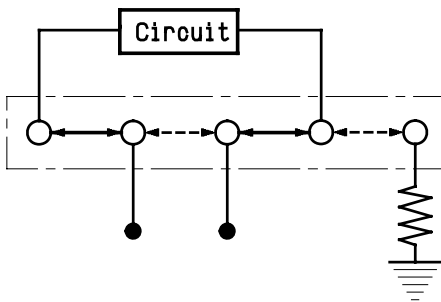
- Two SPDT switches configured to operate as a bypass switch
- R570 RAMSES, R596 (Surface Mount Technology) or R595 PLATINUM series can be used to achieve a bypass function



A more basic option, SPDT (Single Pole Double Throw) can be used to perform a bypass switch function. The advantage of using 2 SPDT relays instead of a transfer switch is a possible reduction in total package size. Generally, the use of 2 SPDT creates a higher isolation than a transfer switch.

A DP3T switch configured to operate as a transfer switch:

A R585 Ramses or R595 Platinum series can be selected to insert a passive or active component or circuit in a RF or microwave line.



An active component as an amplifier can be inserted in a microwave line; this amplifier is connected to a 50 Ohm termination (as a booster in stand-by status) when not inserted in the main coaxial line.