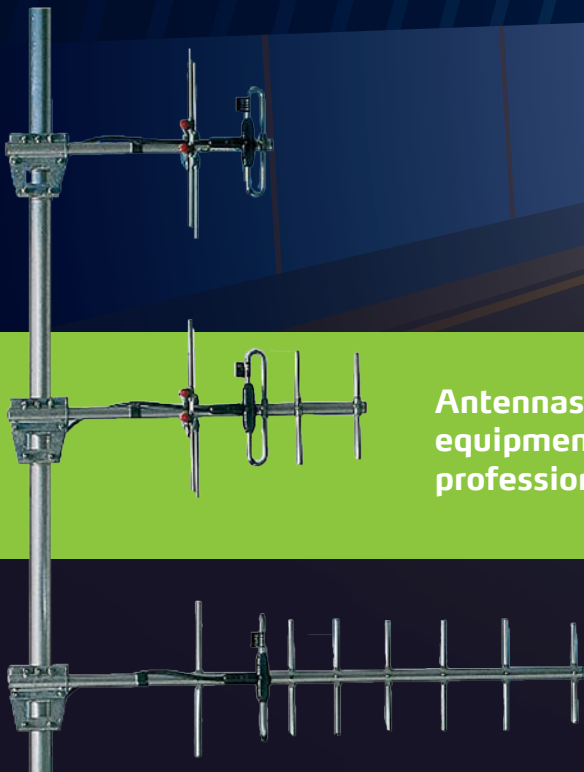




Passive Components for

DAS Solutions

- Tunnels
- Buildings
- Basements
- Parking Garages
- Offshore Platforms

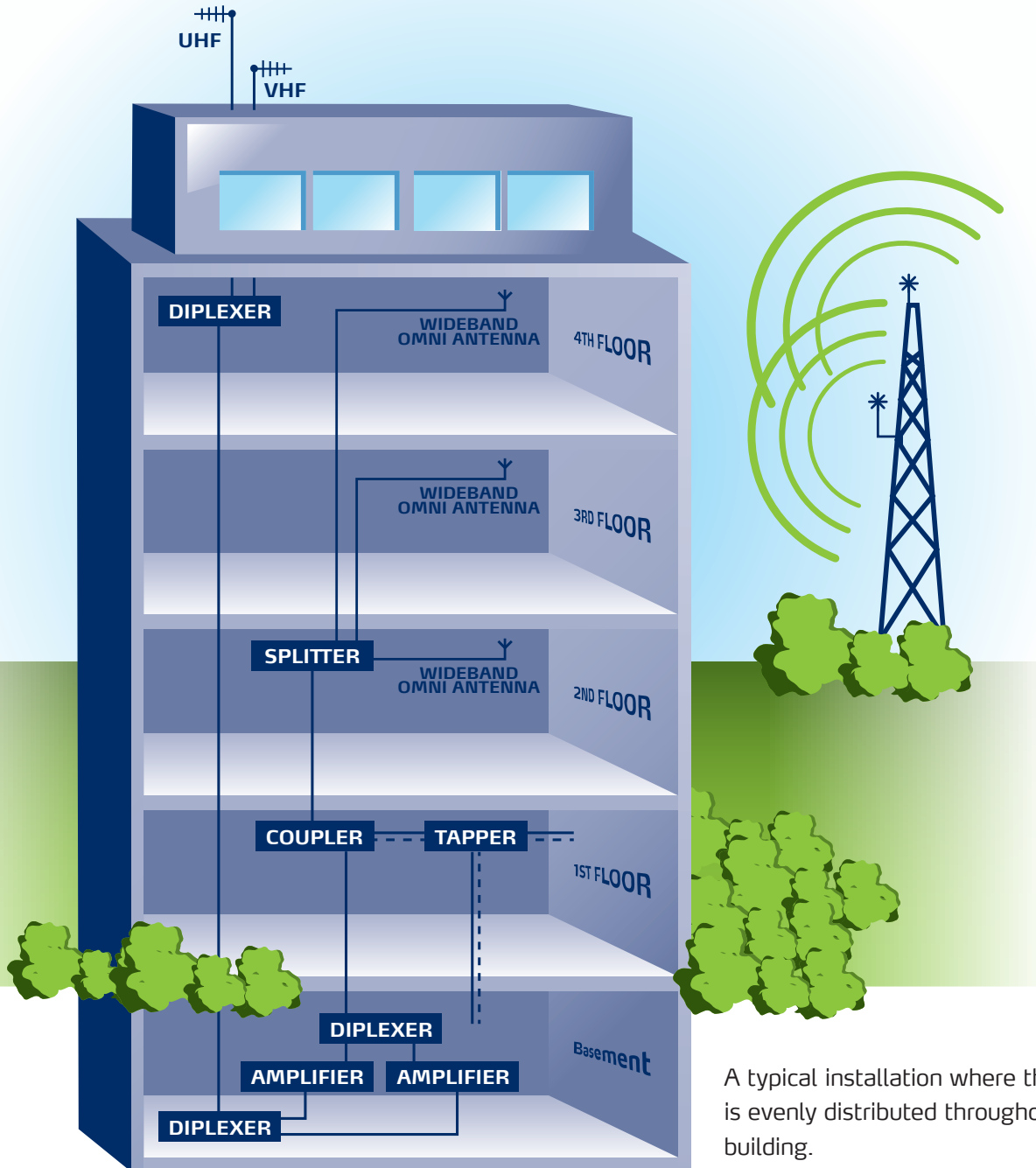


Antennas, filters and combiner
equipment developed to cover
professional indoor communication

"Improve quality of service"

High Quality Components

Consistency in Products and Performance



A typical installation where the RF signal is evenly distributed throughout the whole building.

Engineering reliable R.F. coverage into confined spaces can be a challenge. Coverage problems can exist in airports, office buildings, tunnels, mines, parking garages or on offshore platforms.

Planning maximum coverage with minimum headaches requires a comprehensive range of R.F. components from a manufacturing partner that understands your project needs.

Procom A/S has the experience, support and the quality products for your DAS project!



DAS

Distributed Antenna System Components

Procom's DAS product portfolio includes couplers, power splitters, dummy loads, attenuators, isolators, circulators, power monitors and a world class range of industrial quality indoor and outdoor antennas. Procom's system components are designed by experienced engineers with a focus on the professional user. High quality materials, sturdy construction and extensive Q.C ensure superior quality with excellent low PIM specifications.

System components assist in coupling, filtering or attenuating the requested frequencies.

A wide range of components allow interfacing to Trunked Networks, Public Cellular Systems and Mission Critical Communications Systems for Emergency Services/First Responders. Other applications include buses, cruise ships, tankers, trains & subways.

Current building codes often dictate building materials which effectively shield radio waves. A well designed DAS system can ensure the reliable use of R.F. devices with coverage being distributed efficiently and reliably.

In buildings with public access there is often a requirement for Emergency Services/First Responders to be able to communicate effectively. This requires a reliable and secure R.F. infrastructure to distribute the R.F. signals for such critical applications.

With a comprehensive catalog of DAS components, as well as a dedicated team of engineering staff, Procom A/S can supply standard and custom components engineered to the highest standard of quality and performance.

Most DAS components are now available with Low PIM specifications.

Inside Buildings

Adequate Coverage and Bandwidth



Procom's wide variety of products are well matched and allow for an optimum solution for all applications

A basic building installation will start with a roof mounted antenna system. The signal is amplified and fed into the distributed antenna system. The amplified signal can be split through multiple power splitters in a carefully balanced manner. This will ensure even

distribution of the available signal. The overall design of the system must be carefully planned. This process is simplified by the consistent build quality and rigorous Q.C of the individual Procom components to ensure uniform performance. To guarantee optimal

results over the lifetime of the installation, Procom has developed power monitoring components to allow for the measurement of signal strength and SWR readings in real-time.



Sport Stadiums



Public Transportation



Staircases



Warehouses



Inside Buildings

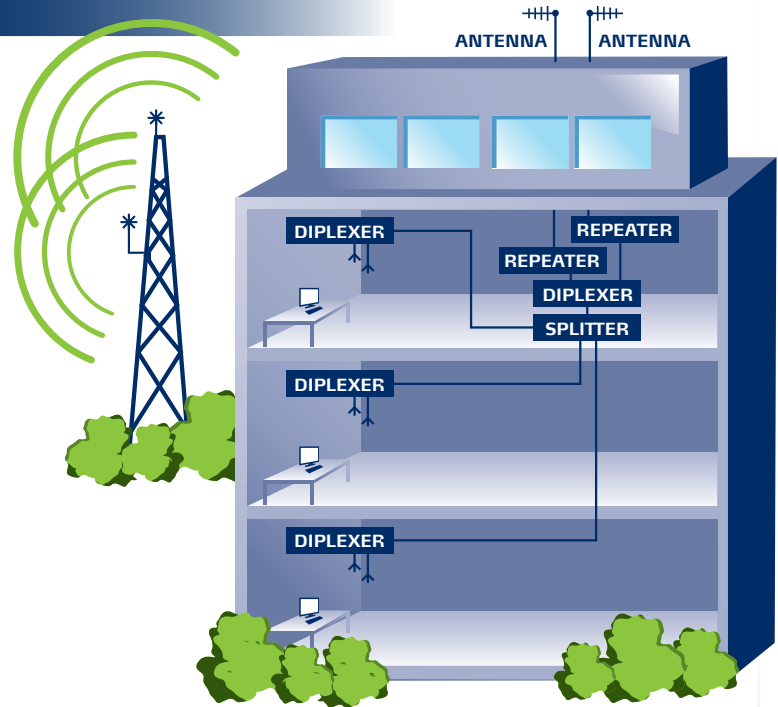


Shopping Centers

An optimum solution

Procom's products are well matched to ensure an optimal solution.

- **The repeater** amplifies the external R.F. signal on both transmit (TX) and receive (RX).
- **The diplexer** combines the low and high R.F. spectrum into one single cable and vice versa from one cable to two antennas.
- **The power splitter** splits the entire R.F. signal in 2, 3 or 4 ways.



The DAS Components are augmented with a comprehensive array of circularly polarized panel antennas. These can be mounted on

walls or ceilings. Their design ensures optimized indoor performance with reduced reflections and minimal dead-spots. In tunnel applications, it is

more common to use leaky feeder cables to transmit and receive signals.

Low PIM products available

Coverage in Transport

Planes, Trains, Buses & Ships



Demanding requirements

- Spurious R.F. from the environment
- Many users, confined area
- Seamless coverage required by commuters

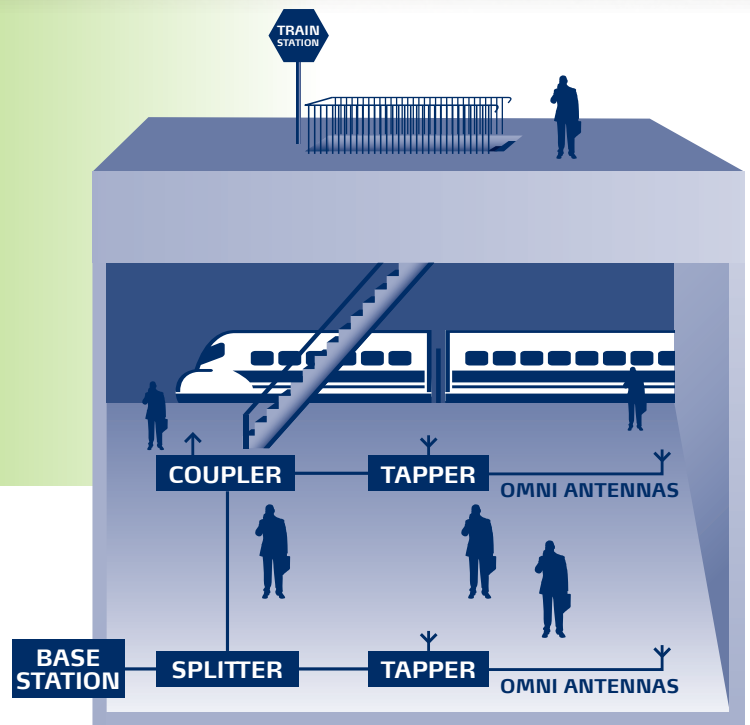
DAS solutions that enable many necessary services to work efficiently and reliably in challenging conditions.



PRO-DIPX



PRO-HPS



Coverage in Tunnels

Broadband Services



Broadband products for many frequencies

Broadband components ensure multi band service solutions. Users require FM broadcast services that can transmit alerts in case of an emergency. Cellular services must be available and First Responders must have communications in case of incidents and emergencies.



PRO-DIPX



PRO-ISO-PHY-TETRA

Coverage in Hospitals

Wide Area Coverage Indoors

Reliable service, critical demand

Well-designed DAS components with Low PIM will help to ensure no interference to medical equipment. A well planned installation with good grounding and well placed cable runs will help to resist radiation from other services as well as ensure mission critical communications in required areas.



PRO-PMI



PRO-PHY

Coverage on Oil Rigs

Rugged Components for Rough Environments

ATEX devices available



Multiple services

DAS components enable operability between aeronautical operations, local marine traffic, hand-held users, Wi-Fi and instruments using R.F. links. Newly available ATEX solutions help to ensure complete coverage in living quarters, offices, storage facilities and production areas. Procom DAS components help to provide safety in communications for critical applications.



DC-BLK



PRO-TAP

DAS Components

Reliable Services using Quality Components

Whether using leaky feeder cables or circularly polarized antennas, Procom offers a wide range of passive, Low PIM components to support your DAS installation. All components are encapsulated to ensure a

weather tight seal. As a result, these DAS components can be used in tunnels, marginal environments and even outdoors. All components are individually tested before leaving the factory and can be specified with

the users choice of connectors and, in some cases, mounting options. This helps to ensure a quick, easy installation and reliable performance.

Power Splitters

Power splitters are frequently used in distributed antenna systems in buildings or tunnels. The power splitter splits the signal evenly and with minimal loss and reflections. Application areas: Multiband antennas; radiating cables and distributed antenna systems.

- > **Model: PRO-HPS... 70-470 or 380-2700**
- > **Frequency range 70-470 or 380-2700 MHz**
- > **Max. input power 500 W**
- > **2, 3 & 4 way high power splitter covering the 380-2700 MHz band**
- > **Excellent PIM performance**
- > **Low insertion loss and good impedance match**
- > **Divider output (dB): 3/5/6**
- > **Low SWR 1 : 1,25**
- > **Standard connector: N-female or 7-16 DIN-female**



Couplers

Procom's compact power divider programme comprises equal and unequal power dividers, directional couplers, broad-banded power hybrids, cascaded Wilkinson-hybrids and power splitters. Procom's compact power dividers offer high isolation and excellent amplitude and phase balance. Detailed product specifications are available on www.procom.dk. The product line comprises 18 different products with the following main features:

- > **Model: PRO-PHY... & PRO-DIR...**
- > **Frequency range 80-2700 MHz**
- > **Input power 200 W**
- > **Divider output 3 to 30 dB**
- > **Low SWR typ. 1 : 1,2**
- > **Standard connector: N-female or 7-16 DIN-female**



Power Tappers

A taper is a device that taps off a portion of the signal while allowing the rest of the signal to pass through with a minimum of loss. For correct function and low SWR on the main line input and output ports the coupled taper port must be terminated in 50 Ω .

Power tappers are frequently used in distributed antenna systems in buildings or tunnels. Tappers operate similarly to directional couplers but without the directivity (no isolation between output port and coupled port) and have relatively broad bandwidths.

- > **Model: PRO-TAP 150-2700-...** 4,8 dB/6 dB/8 dB/10 dB/15 dB/20 dB
- > **Frequency: 150-1550 MHz & 1650-2700 MHz**
- > **500 W power taper with 4.8 to 20 dB coupling**
- > **Max. input power: 500 W**
- > **Very low insertion loss over the entire frequency range**
- > **Standard connector: N-female or 7-16 DIN-female**



Diplexers

Used for splitting and combining the signal...

...if a feeder cable carries multiband frequencies which have to be split to specific antennas for high performance. Diplexers are passive devices that combine two ports into a single common port. They prevent intermodulation and keep reflected SWR to a minimum for each of the input transmitters. A typical example would be the simultaneous operation of two different band radio transceivers on a common antenna.

- > **Model: PRO-DIPX series**
- > **Low- and high-frequency ranges**
- > **Max. input power (watts): 10 to 200**
- > **Divider output (dB): 6/8/10/20**
- > **Low SWR over the entire frequency band**
- > **Standard connector: N-female or 7-16 DIN-female**



Mobile TETRA Combiners

To ensure the highest possible isolation between several TETRA- radios, Procom has developed new combiners. The two-, three-, four-, six- and eight-station TETRA-combiners give a trouble-free connection of two or three or four or six TETRA stations into an arbitrary TETRA-running antenna.

The unique isolation of 60 dB between the stations is higher than or equal to what the ETSI-standard is demanding.

ETSI compliant connection from two to six radios.

- > **The PRO-ISO-PHY-TETRA-4 combiner provides the possibility of connecting up to four TETRA radios into one common antenna**
- > **Models for connecting two, three, four, six and eight TETRA radios**
- > **The smallest and most compact design on the market**
- > **Suitable for both stationary and mobile use**



State-of-the-art Antennas

Omnidirectional, Directional, and Patch Antennas

Procom offers many types of antennas. These include omnidirectional, directional and patch antennas. Designs range from light weight mobile antennas to heavy duty base station models that are engineered to resist damage from lightning storms

and models that are rated for maximum wind speeds of > 170mph. Rugged design and solid R.F. performance result in high MTBF. Many omnidirectional antennas are available in a selection of gains and tilt as required. Available frequencies

are typically 60Mhz to 6.0Ghz. Lower band VHF (35Mhz to 60Mhz) available on request.

CXL Antennas

Procom's CXL antennas cover frequency ranges from 66 MHz to 5900 MHz. All the CXL antennas are coaxial - and omnidirectional antennas. Procom has CXL antennas with the following bracket types:

SL: Slim line - price competitive for high gain antennas / LW: Lightweight - modern style base station antenna, most commonly used / C: Similar to LW for larger size antennas

HD: Heavy Duty - High Gain/High Power, recommended for marginal weather conditions

- > **Frequency ranges: 66 to 5900 MHz**
- > **Max. input power: 250 W**
- > **Low SWR over the entire frequency band**
- > **Standard connector: N-female or 7-16 DIN-female**

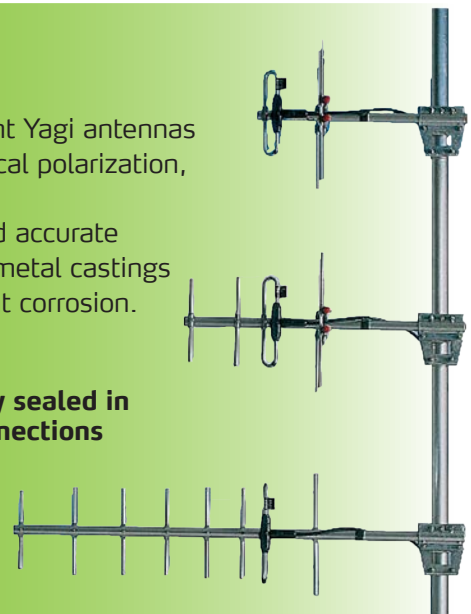


Directional Antennas

S.2Y, S.4Y and S.8Y These antennas are 2-, 4- and 8-element Yagi antennas with 3, 7, and 10 dBd gain, respectively. When mounted for vertical polarization, the horizontal coverage is S.2Y: 150°, S.4Y: 90° and S.8Y: 58°.

These Yagis incorporate baluns optimized for wide bandwidth and accurate matching. Radiating elements, supporting booms and adjoining metal castings have been constructed in high-quality aluminium alloys to prevent corrosion. All metal parts are DC-grounded.

- > **The entire balun unit and feeder cable inlet are completely sealed in a polythene moulding ensuring permanent waterproof connections**
- > **Supplied with a 3 m "tail" of RG 213 terminated with an N-female connector**
- > **Designed for back mounting**



Indoor Circular Polarized Antennas

PCPI WIFI and PCPI DCS/UMTS are Right Hand Circular Polarized patch antennas for indoor use. Circular polarized antenna is chosen to avoid out-of-phase signals. Specially designed for closed rooms.



- > Low profile antennas for the 2400 - 2500 or 1710 - 2200 MHz band
- > PCPI DCS/UMTS covers the DCS and the UMTS frequency range 1710 - 2200 MHz with a radiation gain of 5 dBic

PCPI GPS Extend is used where GPS-signals are missing. It is a Low profile antenna for reradiating the GPS signal. Outdoor GPS antenna is necessary.



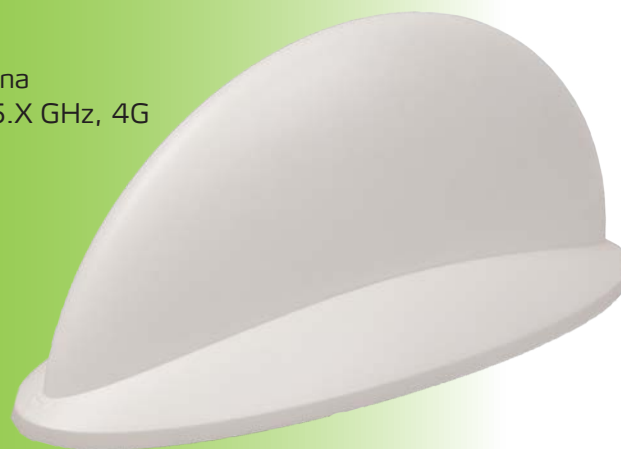
- > Covers the GPS frequency 1575 MHz with a radiation gain of 5 dBic
- > Full size 2λ circular patch antenna
- > Internal 25 dB selective amplifier
- > 5V DC output on N-connector for feeding outside GPS antenna with built-in amplifier

Low-profile Ultra Wideband Omnidirectional DAS Antennas

UWB-I 380-6000 is an Ultra Wideband Omnidirectional Antenna capable of supporting TETRA, GSM, PCS, UMTS, WIFI 2.4 and 5.X GHz, 4G LTE and WiMax.

- > Covers 380 - 6000 MHz frequencies with a radiation gain of approx. 0 dBi
- > Omnidirectional coverage
- > No need for external ground plane
- > Vertical polarization
- > Max. power 50 W

Provided with external coaxial cable with N-female connector.



Size: 107x 325 mm

Indoor or Outdoor Linear or Circular Polarized Patch Antennas

LPO TETRA/380-470 is an Indoor Linear Polarized low profile Antenna for mounting on ceiling.

PCPO xH/TETRA/... is a Left or Right Hand Circular Polarized patch antenna for outdoor use. The antennas are carefully sealed with a discrete cover.

- > Low-profile antennas for the 380 - 470 MHz band
- > LPO TETRA/380-470 for ceiling mount
- > Bandwidth 90 MHz
- > PCPO xH/TETRA/... for wall or mast mount
- > Bandwidth 50 MHz with a radiation gain of 7 dBic



Size: 231 mm x 81 mm



Size: 345 x 345 x 60 mm

Product Overview

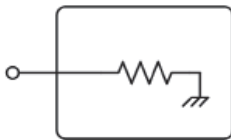
Attenuators



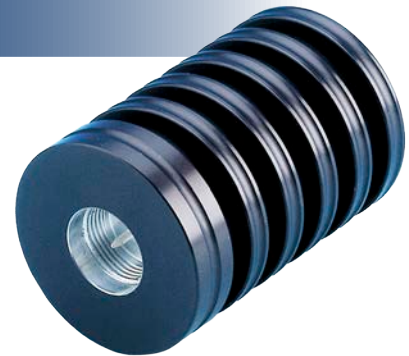
- 3 dB, 6 dB, 10 dB, 20 dB and 30 dB attenuators.
- Very low SWR - attenuation flatness suitable for:
- Coaxial Transmission Lines
- Power Monitors
- Watt Meters



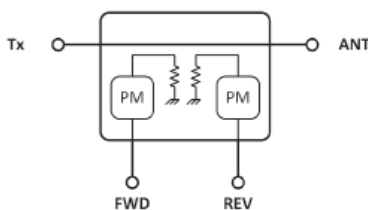
Loads



- Coaxial loads with very low SWR - especially suitable for:
- Power Hybrids
- Isolators
- Coaxial Transmission Lines
- Power Monitors and Watt meters
- Receiver Multicouplers



Power monitors



- Directional and bi-directional power monitors
- Spectrum related from 66 to 960 MHz
- Input power up to 250W
- Very low insertion loss <0,1dB
- Impedance 50Ω



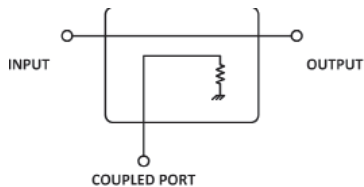
DC-blocks



- Models covering from 50 to 2.500MHz
- DC-blocking of both conductor and ground for galvanic separation
- High R.F. power rating
- High DC voltage rating
- Large frequency range
- Available with N- or 7/16 DIN-connectors
- IP65



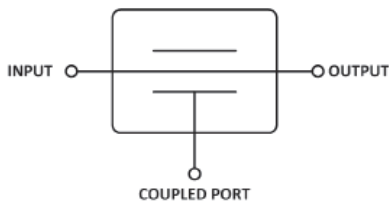
Couplers



- Directional Couplers covering from 80 to 2.700MHz
- Small coupling values and isolation between outputs
- Low SWR on all ports
- Directivity
- Isolation between outputs
- High Power
- IP64



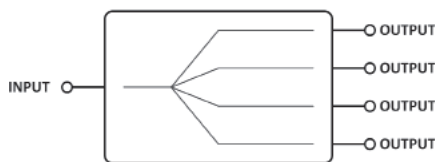
Power Tappers



- Multi band power tappers
- Low SWR on Input/Output ports
- No directivity
- Wide bandwidth 150 to 2.700MHz
- High Power
- Accurate coupling values
- IP68 (7/16), IP65 (N)



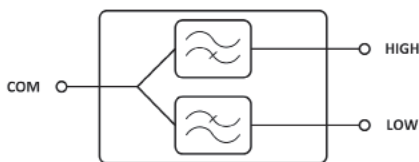
Power Splitters



- Very Low Insertion Loss
- No directivity
- Wide bandwidth 380 to 2.700MHz
- Equal splitting between multiple output ports
- High Power performance
- IP66



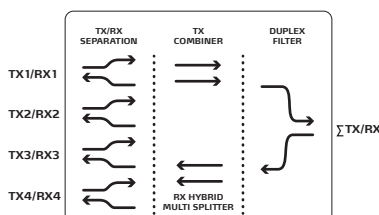
Diplexers



- Combine or split two frequency bands
- IP67 rated for both indoor and outdoor use
- Chebychev filter design ensures very high isolation
- Very low insertion loss
- Wide temperature range
- N or 7/16 DIN-female connectors on all ports
- IP67 rated for both indoor and outdoor use



Mobile TETRA Combiners



- Easy way to combine mobile units used as repeaters
- High isolation between ports >60dB
- Passive unit
- Very small
- 19" rack tray on request
- IP62



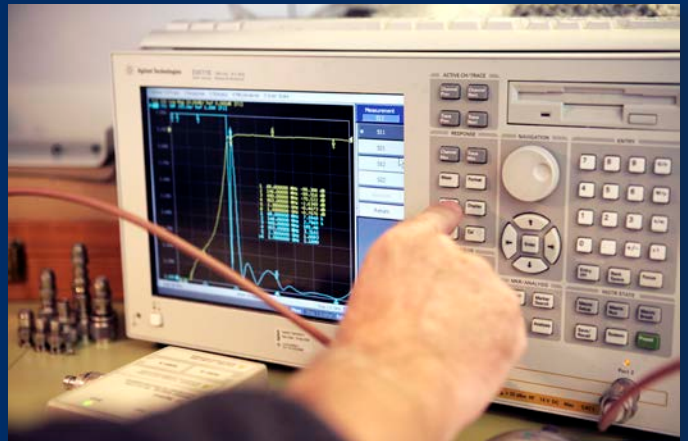
About PROCOM A/S

Founded in 1980, Procom A/S is one of the world's leading suppliers of rugged R.F. antennas. Based in Frederikssund, north of Copenhagen, Denmark, Procom produces a wide range of R.F. products including antennas, filters, combiners, couplers and R.F. measuring equipment for two way communications

Factories are located in Denmark and the U.K. with four sales offices in Europe and a network of dealers worldwide. Essential ingredients in the success of the company are a workforce dedicated to producing quality R.F. products and an in-house engineering team that can customize products to a client's specification.

Procom's growing client list includes large and small companies, government agencies, including military forces, law enforcement and First Responder teams.

When quality and reliability are critical to your R.F. communications project, contact Procom A/S.



Focused R.F. Engineering, World Class Products

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