RF INDUSTRIES
NASDAQ: RFIL
Connecting a Wireless World

Precision Products for Demanding Applications

Low PIM Products

for Distributed Antenna Systems and Wireless Infrastructure

- Low PIM Coaxial Cable Assemblies
- Plenum Rated, Low PIM, Low Loss Coaxial Cable Assemblies
- Low PIM Coaxial Adapters
- Low PIM Power Splitters, Couplers and Termination Loads

Distributed Antenna Systems

Wireless Infrastructure

Why is Passive Intermodulation Important?

Read more about passive intermodulation (PIM) and its importance to your installations at our website: www.rfindustries.com/white-paper.html. Below are some excerpts.

Intermodulation Distortion in RF Connectors

By Ronnie Rice, RF Technical Support Manager
RF Precision Products by RF Connectors, A Division of RF Industries, San Diego, California

Introduction

Intermodulation distortion or IMD has always existed in RF transmission paths. Until about the early 1990's, cellular communications had relatively low power carrier levels. Intermodulation distortion in passive devices was not necessarily a problem because the distortion levels were significantly below the noise floor of the broadcast system. The mobile communication industry grew rapidly and the need for greater channel capacity meant higher broadcast powers at base stations. Typical RF connectors such as the "N" connector satisfied the earlier demands but as the sensitivity of the receivers increased, a condition within RF connectors was exposed.

Scan with your smart phone to read the article

What is IMD?

IMD occurs when two or more signals occupy the same transmission paths as in full duplex... (go to www.rfindustries.com/white-paper.html to read more)

Intermod and Connectors: Silver Plate Beats Nickel

By Manny Gutsche, Vice President, Sales & Marketing RF Industries
Article as ran in Mobile Radio Technology in March 1992

When connectors made entirely of non-ferromagnetic materials are used, they do not have to become the weak link in a communications system, causing harmful and hard-to-find intermod interference.

Scan with your smart phone to read the article

Intermod

The simple mention of the word is dreadful to most two-way radio communications technicians. Intermod refers to intermodulation interference, a mixture of two or more signals that results in one or more unwanted signals disrupting reception. The cause usually is found in transmitters, receivers, transmitting combiners, receiver multicouplers, antenna systems and dissimilar metal junctions near transmitters. Few technicians think to examine coaxial connectors used with-in the system.

The introduction of 800MHz and 900MHz trunked and cellular communications systems that... (go to www.rfindustries.com/white-paper.html to read more)

RF INDUSTRIES
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Low PIM Coax Cable Assemblies

100% PIM Tested to Assure Performance

Low PIM .141" Conformable Semi-Rigid Cable Assemblies

PIMtracker™ Verification System

- Low PIM:
  ≤ -155dBc N assemblies
  ≤ -140dBc QMA assemblies
- Operating Frequency:
  up to 3,000 MHz
- VSWR: ≤ 1.20:1 up to 2,400 MHz
- Jacketed
- Available in custom lengths

QMA

N

Low PIM Conformable Semi-Rigid .141" Available in custom lengths	
Description	**Number**
N Male to N Male; DC-3 GHz, conformable semi-rigid .141", 3 foot	P2RFC-2000-36
N Male to N Male; DC-3 GHz, conformable semi-rigid .141", 6 foot	P2RFC-2000-72
N Male to N Male; DC-3 GHz, conformable semi-rigid .141", 9 foot	P2RFC-2000-108
N Male to QMA Male; conformable semi-rigid .141", custom length	P2RFC-2102-XX

XX = custom length in inches

Low PIM 1/2" Super Flexible Corrugated Cable Assemblies

- Low PIM: ≤ -155dBc
- Operating Frequency:
  up to 3000 MHz
- VSWR: ≤ 1.10:1 up to 2,400 MHz
  ≤ 1.15:1 up to 3,000 MHz
- Helical copper tube construction
- Available in custom lengths

N

7-16 DIN

Low PIM 1/2 " Super Flexible Corrugated Available in custom lengths	
Description	**Number**
7-16 DIN Male to 7-16 DIN Male; 1/2" Super Flexible Cable, 3 foot	P2RFC-2007-36
7-16 DIN Male to 7-16 DIN Male; 1/2" Super Flexible Cable, 6 foot	P2RFC-2007-72
7-16 DIN Male to 7-16 DIN Male; 1/2" Super Flexible Cable, 9 foot	P2RFC-2007-108
N Male to N Male; 1/2" Super Flexible Cable, 3 foot	P2RFC-2008-36
N Male to N Male; 1/2" Super Flexible Cable, 6 foot	P2RFC-2008-72
N Male to N Male; 1/2" F Super lexible Cable, 9 foot	P2RFC-2008-108

Low PIM 1/2" Flexible Corrugated Cable Assemblies

- Low PIM: ≤ -155dBc
- Operating Frequency:
  up to 3000 MHz
- VSWR: ≤ 1.10:1 up to 2,400 MHz
  ≤ 1.15:1 up to 3,000 MHz
- Corrugated copper tube
  construction
- Available in custom lengths

N

7-16 DIN

Low PIM 1/2 " Flexible Corrugated Available in custom lengths	
Description	**Number**
7-16 DIN Male to 7-16 DIN Male; 1/2" Flexible Cable, 3 foot	P2RFC-2009-36
7-16 DIN Male to 7-16 DIN Male; 1/2" Flexible Cable, 6 foot	P2RFC-2009-72
7-16 DIN Male to 7-16 DIN Male; 1/2" Flexible Cable, 9 foot	P2RFC-2009-108
N Male to N Male; 1/2" Flexible Cable, 3 foot	P2RFC-2010-36
N Male to N Male; 1/2" Flexible Cable, 6 foot	P2RFC-2010-72
N Male to N Male; 1/2" Flexible Cable, 9 foot	P2RFC-2010-108

Manufactured by RF Cable Assembly
Division of RF Industries

Assembled in the USA

RF INDUSTRIES
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Connecting a Wireless World

Plenum Rated, Low PIM Low Loss Coax Cable Assemblies

Times Microwave Cable, Assembled by RF Industries

Using 1/4" Super Flexible Times Microwave SPP-250-LLPL™ Cable

- Corrugated copper outer conductor providing greater than 100dB RF Shielding
- Excellent PIM performance ≤-155dBc
- Operating Frequency: up to 6 GHz

UL910 plenum rated, satisfying building code requirements

- Cable assemblies are 100% PIM tested
- Low passive intermodulation distortion (PIM)
- Highly flexible for ease of installation
- Available in custom lengths

Cable Images for illustration purposes

PIMtracker™ Verification System

Available in custom lengths	Times Microwave Connectors	RF Industries Connectors
Description	**Part Number**	**Part Number**
N Male Right Angle to N Male Right Angle	P2RFC-2049-39 P2RFC-2049-78	
N Male to N Male	P2RFC-2035-39 P2RFC-2035-78	P2RFC-2072-39 P2RFC-2072-78
N Male to 7-16 DIN Male	P2RFC-2044-39 P2RFC-2044-78	P2RFC-2073-39 P2RFC-2073-78
7-16 DIN Male to 7-16 DIN Male	P2RFC-2046-39 P2RFC-2046-78	P2RFC-2074-39 P2RFC-2074-78
N Male to 4.1-9.5 (Mini) DIN Male		P2RFC-2075-39 P2RFC-2075-78
4.1-9.5 (Mini) DIN Male to 4.1-9.5 (Mini) DIN Male		P2RFC-2076-39 P2RFC-2076-78
7-16 DIN Male to 4.1-9.5 (Mini) DIN Male		P2RFC-2077-39 P2RFC-2077-78
N Male to N Female		P2RFC-2112-39* P2RFC-2112-78*
N Male Right Angle to N Male		P2RFC-2113-39* P2RFC-2113-78*
7-16 DIN Male Right Angle to N Male		P2RFC-2126-39* P2RFC-2126-78*
N Male to SMA Male		P2RFC-2129-39* P2RFC-2129-78*
7-16 DIN Male Right Angle to 7-16 DIN Male		P2RFC-2137-39* P2RFC-2137-78*
N Female to 7-16 DIN Male		P2RFC-2138-39* P2RFC-2138-78*

Lengths: 39 inches (1 meter), 78 inches (2 meters)
*Uses both RF Industries and Times Microwave connectors.

Connectors for SPP-250-LLPL Cable Available Separately

NOTE: Due to the precise nature of the soldering of the inner and outer conductors to achieve low PIM specifications, RF Industries cannot guarantee PIM performance on the finished assemblies when connectors are field installed. If you need guaranteed PIM performance, we strongly recommend factory installed assemblies made to your specifications.

N Male
RFN-1002-HPL

4.1-9.5 (Mini) DIN Male
RFD-4195-HPL

TIMES MICROWAVE SYSTEMS

Assembled in the USA

Manufactured by

RF Cable Assembly
Division of RF Industries
(800) 233-1728 (858) 549-6340
www.rfcables.com
rfi@rfindustries.com

RF INDUSTRIES
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Connecting a Wireless World

Plenum Rated, Low PIM Low Loss Coax Cable Assemblies

Times Microwave Cable, Assembled by RF Industries

Using Times Microwave TFT-402-LF™ Cable

- Highly flexible flat braided outer conductor
- Cost effective alternative to semi-flexible solder braid cables
- Excellent PIM Performance
  ≤ -155dBc
  ≤ -140dBc QMA assemblies
  ≤ -155dBc Premium QMA assemblies
- Operating Frequency: up to 3 GHz

UL910 plenum rated, satisfying building code requirements

- Cable assemblies are 100% PIM tested
- Low passive intermodulation distortion (PIM)
- Highly flexible for ease of installation
- Available in custom lengths

Cable Images for illustration purposes

PIMtracker™ Verification System

Available in custom lengths	Times Microwave Connectors	RF Industries Connectors
Description	**Part Number**	**Part Number**
N Male to N Male	P2RFC-2034-39 P2RFC-2034-78	P2RFC-2064-39 P2RFC-2064-78
N Male to 7-16 DIN Male	P2RFC-2036-39 P2RFC-2036-78	P2RFC-2065-39 P2RFC-2065-78
7-16 DIN Male to 7-16 DIN Male	P2RFC-2037-39 P2RFC-2037-78	P2RFC-2066-39 P2RFC-2066-78
SMA Male to SMA Male	P2RFC-2038-39 P2RFC-2038-78	P2RFC-2067-39 P2RFC-2067-78
N Male to SMA Male	P2RFC-2039-39 P2RFC-2039-78	P2RFC-2068-39 P2RFC-2068-78
N Male to 4.1-9.5 (Mini) DIN Male		P2RFC-2069-39 P2RFC-2069-78
4.1-9.5 (Mini) DIN Male to 4.1-9.5 (Mini) DIN Male		P2RFC-2070-39 P2RFC-2070-78
4.1-9.5 (Mini) DIN Male to 7-16 DIN Male		P2RFC-2071-39 P2RFC-2071-78
N Male to 7-16 DIN Male	P2RFC-2103-39 P2RFC-2103-78	
QMA Male to QMA Male		P2RFC-2104-XX
Premium QMA Male to Premium QMA Male		P2RFC-2146-XX**
QMA Male to N Male	P2RFC-2105-XX	P2RFC-2160-XX
Premium QMA Male to N Male*	P2RFC-2120-XX	P2RFC-2163-XX*
7-16 DIN Male to N Female	P2RFC-2115-39 P2RFC-2115-78	
N Male Right Angle to SMA Male	P2RFC-2130-39 P2RFC-2130-78	
QMA Male Right Angle to 7-16 DIN Male		P2RFC-2132-39* P2RFC-2132-78*
QMA Male Right Angle to N Male Right Angle		P2RFC-2133-39* P2RFC-2133-78*
QMA Male Right Angle to QMA Male Right Angle		P2RFC-2134-39 P2RFC-2134-78

Lengths: 39 inches (1 meter), 78 inches (2 meters), XX = custom length in inches.
**Uses both RF Industries and Times Microwave connectors*
*** Premium QMA assembly with ≤-155dBc.*

CONNECTORS FOR TFT-402-LF CABLE AVAILABLE SEPARATELY

NOTE: Due to the precise nature of the soldering of the inner and outer conductors to achieve low PIM specifications, RF Industries cannot guarantee PIM performance on the finished assemblies when connectors are field installed. If you need guaranteed PIM performance, we strongly recommend factory installed assemblies made to your specifications.

N Male
RFN-1002-SR2FL

4.1-9.5 (Mini) DIN Male
RFD-4195-SR2FL

Manufactured by

RF Cable Assembly
Division of RF Industries
(800) 233-1728 (858) 549-6340
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rfi@rfindustries.com

Assembled in the USA

TIMES MICROWAVE SYSTEMS

RF INDUSTRIES
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Connecting a Wireless World

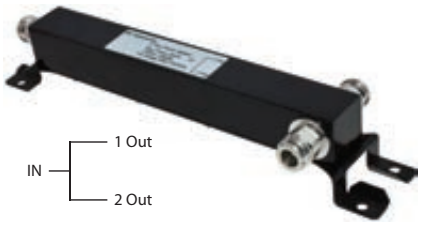
Power Splitters, Hybrid Couplers and Termination Loads

Low PIM, Low VSWR, 50 Ohm Impedance

Specifications

- Low PIM
- Low VSWR
- Multiple configurations
- 50 Ohm impedance
- ROHS Compliant

RoHS compliant



Description	2 Way Power Splitter, N Female
Part Number	RFPS-2-NF
Average Power	300 watts
Peak Power	1 Kw
VSWR	≤ 1.20
Frequency Range	698-2700 MHz
Insertion Loss	≤ 0.1 dB
Split Loss	3 dB
PIM3	≤ -155 dBc

Description	3 Way Power Splitter, N Female
Part Number	RFPS-3-NF
Average Power	300 watts
Peak Power	1 Kw
VSWR	≤ 1.25
Frequency Range	698-2700 MHz
Insertion Loss	≤ 0.2 dB
Split Loss	4.8 dB
PIM3	≤ -155 dBc

Description	4 Way Power Splitter, N Female
Part Number	RFPS-4-NF
Average Power	300 watts
Peak Power	1 Kw
VSWR	≤ 1.3
Frequency Range	698-2700 MHz
Insertion Loss	≤ 0.3 dB
Split Loss	6 dB
PIM3	≤ -155 dBc

Description	3dB Hybrid Coupler, N Female
Part Number	RFHC-3-NF
Frequency Range	698-2700 MHz
PIM3	≤ -155 dBc

Description	30w Termination Load, N Male
Part Number	RFLOAD-NM30
Average Power	30 watts
Frequency Range	0-3 GHz
PIM3	≤ -110 dBc

Description	50w Termination Load, N Male
Part Number	RFLOAD-NM50
Average Power Max	50 watts
Frequency Range	0-3 GHz
PIM3	≤ -110 dBc

Manufactured by

RF connectors
RF Connectors
Division of RF Industries

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RF INDUSTRIES
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Low PIM Coax Adapters
7-16 DIN

7-16 DIN to 7-16 DIN & 7-16 DIN to N Adapter Features

- Low PIM: ≤ -155dBc
- Operating Frequency: Up to 5,500 MHz
- VSWR: ≤ 1.10:1 up to 5,500 MHz
- Available in silver or white bronze (tri-metal) plating
- Non-magnetic
- Stainless steel (SS) hex nuts on certain adapters

RoHS compliant

Low PIM 7-16 DIN Adapters

Male to Male Barrel

White Bronze (tri-metal) Plating
SS Coupling Nut
P2RFD-1650-SS

Silver Plating
RFD-1650-2

Male to Female Right Angle

White Bronze (tri-metal) Plating
SS Coupling Nut
P2RFD-1652-SS

White Bronze (tri-metal) Plating
RFD-1652-4
Silver Plating
RFD-1652-2

Female to Female Barrel

White Bronze (tri-metal) Plating
P2RFD-1653-4

Silver Plating
RFD-1653-2

Male to Female Barrel

White Bronze (tri-metal) Plating
SS Coupling Nut
P2RFD-1660-SS

White Bronze (tri-metal) Plating
RFD-1660-4
Silver Plating
RFD-1660-2

Female to Female Bulkhead

White Bronze Plating
P2RFD-1654-4

Low PIM N to 7-16 DIN Adapters

N Male to 7-16 DIN Male Barrel

White Bronze (tri-metal) Plating
SS Coupling Nut
P2RFD-1670-SS

Silver Plating
RFD-1670-2

N Female to 7-16 DIN Male Barrel

White Bronze (tri-metal) Plating
SS Coupling Nut
P2RFD-1671-SS

Silver Plating
RFD-1671-2

N Male to 7-16 DIN Female Barrel

White Bronze (tri-metal) Plating
SS Coupling Nut
P2RFD-1672-SS

Silver Plating
RFD-1672-2

N Female to 7-16 DIN Female Barrel

White Bronze (tri-metal) Plating
P2RFD-1673-4

Silver Plating
RFD-1673-2

Manufactured by

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RF Connectors
Division of RF Industries
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www.rfcoaxconnectors.com
rfi@rfindustries.com

RF INDUSTRIES
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Low PIM Coax Adapters

QMA and 4.1-9.5 (Mini) DIN

QMA Adapter Features

- Low PIM: ≤ -140 dBc
- Operating Frequency: up to 6 GHz
- Non-magnetic
- Non-tarnish white bronze (tri-metal) plating

4.1-9.5 (Mini) DIN Adapter Features

- Low PIM: ≤ -160 dBc
- Operating Frequency: up to 7.5 GHz
- Low VSWR: ≤ 1.20:1 up to 3 GHz
- Non-magnetic
- Non-tarnish white bronze (tri-metal) plating

RoHS compliant

QMA to SMA and N Adapter

QMA Female
to N Male
RQA-5478

QMA Male
to SMA Female
RQA-5405

Low PIM 4.1-9.5 (Mini) DIN to 4.1-9.5 (Mini) DIN Adapters

4.1-9.5 Male
to 4.1-9.5 Female
RFD-4195-1950

4.1-9.5 Female
to 4.1-9.5 Male
RFD-4195-1952

4.1-9.5 Female
to 4.1-9.5 Female
RFD-4195-1953

Low PIM 4.1-9.5 (Mini) DIN to N Adapters

4.1-9.5 Male
to N Female
RFN-1046-4

4.1-9.5 Female
to N Female
RFN-1047-4

4.1-9.5 Male
to N Male
RFN-1045-4

4.1-9.5 Female
to N Male
RFN-1048-4

Low PIM 4.1-9.5 (Mini) DIN to 7-16 DIN Adapters

4.1-9.5 Male
to 7-16 Female
RFD-1681-4

4.1-9.5 Female
to 7-16 Female
RFD-1683-4

4.1-9.5 Male
to 7-16 Male
RFD-1682-4

4.1-9.5 Female
to 7-16 Male
RFD-1684-4

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rfi@rfindustries.com

INDUSTRIES
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Low PIM Coax Adapter Kits

Kit Features

- Adapter protection
- Die-cut foam
- Zippered leatherette case
- Stands upright for compact storage

7-16 DIN Kit
P2RFA-4013-SS
shown

(All adapters sold separately. See previous pages.)	**4.1-9.5 (Mini) DIN to N** (6 Piece)	**4.1-9.5 (Mini) DIN to 7-16 DIN** (6 Piece)	**4.1-9.5 (Mini) DIN to N** (7 Piece)	**4.1-9.5 (Mini) DIN to 7-16 DIN** (7 Piece)	**7-16 DIN to N** (6 Piece)	**7-16 DIN to N** (6 Piece)
	White bronze (tri-metal) plating and stainless steel hex nuts					**Silver Plated with knurling**
Part Number	**RFA-4195-01**	**RFA-4195-02**	**RFA-4195-03**	**RFA-4195-04**	**P2RFA-4013-SS**	**RFA-4013**
In-Series Adapters	4.1-9.5 Male to 4.1-9.5 Female	4.1-9.5 Male to 4.1-9.5 Female	4.1-9.5 Male to 4.1-9.5 Female	4.1-9.5 Male to 4.1-9.5 Female	7-16 Female to 7-16 Female barrel	7-16 Female to 7-16 Female barrel
	4.1-9.5 Male to 4.1-9.5 Female Right Angle	4.1-9.5 Male to 4.1-9.5 Female Right Angle	4.1-9.5 Male to 4.1-9.5 Female Right Angle	4.1-9.5 Male to 4.1-9.5 Female Right Angle	7-16 Male to 7-16 Female Right Angle	7-16 Male to 7-16 Female Right Angle
	na	na	4.1-9.5 Female to 4.1-9.5 Female	4.1-9.5 Female to 4.1-9.5 Female	na	na
Between-Series Adapters	4.1-9.5 Male to N Female	4.1-9.5 Male to 7-16 Female	4.1-9.5 Male to N Female	4.1-9.5 Male to 7-16 Female	7-16 Male to N Female	7-16 Male to N Female
	4.1-9.5 Male to N Male	4.1-9.5 Male to 7-16 Male	4.1-9.5 Male to N Male	4.1-9.5 Male to 7-16 Male	7-16 Male to N Male	7-16 Male to N Male
	4.1-9.5 Female to N Female	4.1-9.5 Female to 7-16 Female	4.1-9.5 Female to N Female	4.1-9.5 Female to 7-16 Female	7-16 Female to N Female	7-16 Female to N Female
	4.1-9.5 Female to N Male	4.1-9.5 Female to 7-16 Male	4.1-9.5 Female to N Male	4.1-9.5 Female to 7-16 Male	7-16 Female to N Male	7-16 Female to N Male

RoHS compliant

4.1-9.5 (Mini) DIN Kit
RFA-4195-03
shown

Manufactured by

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Division of RF Industries
(800) 233-1728 (858) 549-6340
www.rfcoaxconnectors.com
rfi@rfindustries.com

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RF Industries

RF Industries (NASDAQ: RFIL) has been a leading provider of wireless and wired solutions for the telecom and biomedical markets since 1979.

Please check our websites for our latest product offerings.

RF Connectors
Division of RF Industries
7610 Miramar Road
San Diego, CA 92126
(800) 233-1728
(858) 549-6340
www.rfcoaxconnectors.com
rfi@rfindustries.com

RF Cable Assembly
Division of RF Industries
7610 Miramar Road
San Diego, CA 92126
(800) 233-1728
(858) 549-6340
www.rfcables.com
rfi@rfindustries.com

Cables Unlimited
Division of RF Industries
3 Old Dock Road
Yaphank, NY 11980
(800) 590-9965
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www.cables-unlimited.com
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