GR874® General-Purpose Coaxial Components

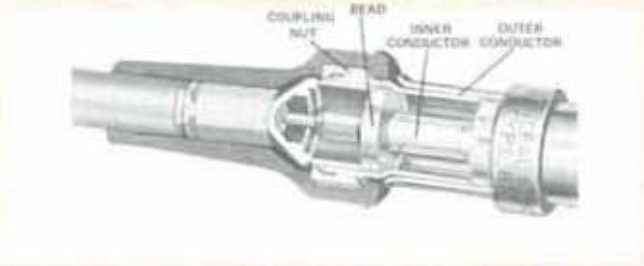
Over 24 years of design refinement General Radio entered the coaxial component field over 24 years ago with the introduction of the GR874® connector. This connector offered not only excellent electrical performance but a major convenience feature — any two, although identical, could be mated. The hermaphrodite, quick-connect GR874 connector was soon joined by a family of circuit elements and adaptors using it. GR874-equipped instruments were added to solve the special measurement problems of vhf and uhf and the availability of these precise measuring instruments in turn made possible a continuous refinement of the basic connector.

A universal choice The GR874 connector has gained wide popularity; highly respected instrument manufacturers have put the electrical and physical advantages of these connectors to good use on their products.

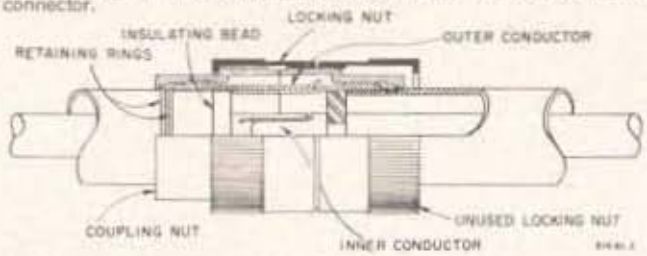
Based on the GR874 connector is a full line of coaxial components and instruments so that a user of the GR874-equipped laboratory need seldom turn to other connector types for a needed element. If he does, there are GR874 adaptors to fit most other common types of connector.

Locking connectors The GR874 connector is available in both the common nonlocking version and a high-performance locking version. The locking version has a threaded coupling nut that permits the two connectors to be mechanically locked together in a stable, semi-permanent union for better electrical repeatability, lower leakage, and less chance of accidental disconnection. The quick-connect/disconnect feature is retained if the coupling nut is not engaged.

Electrical characteristics The GR874 connector has truly outstanding reflection characteristics among standard, general-purpose coaxial connectors in the dc-to-9 GHz frequency range. Its SWR performance is typically superior to that of the type N connector, for example. Its low level of reflections at high frequencies makes the connector of particular value in pulse applications and in time-domain reflectometry. GR874 cable connectors, in fact, offer SWR performance superior to that of any cable with which they can be used and therefore add no significant reflections when used in cabled measurement set-ups. They also provide very low contact resistance, an important requirement to minimize intermodulation in multichannel communications systems.

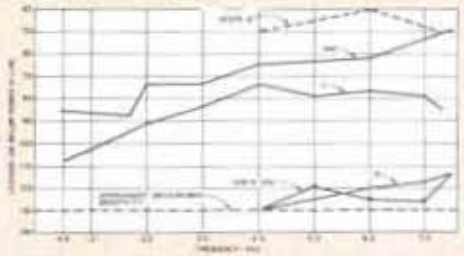


Cutaway view of GR874 basic connector mated with GR874 cable connector.



Mechanical characteristics The elements of a GR874 connector include an inner conductor, an outer conductor, a supporting polystyrene bead, a phosphor-bronze retaining ring, and a threaded coupling nut. All metal parts are machined and formed to very close tolerances; all are made of hard-drawn brass, except for the center conductor which is heat-treated beryllium copper to ensure good gripping capability and long wear. A bright-alloy finish on all surfaces produces good conductivity for low loss and gives long-lasting protection against tarnish.

Inner and outer conductors are similar in principle; each is a tube with four longitudinal slots in one end, with two opposite quadrants displaced inward. When two connectors are joined, the undisplaced quadrants of one overlap the displaced quadrants of the other.



Leakage — note advantage of locking version (874-BBL).

GR874® 50-Ohm Connectors

Basic Connectors

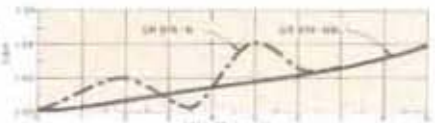
For use on rigid, 14-mm, air-dielectric 50-Ω coaxial lines or with capacitance, inductance, and resistance standards.

Frequency: Dc to 9 GHz.
Electrical: IMPEDANCE: 50 Ω. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.
Mechanical: DIMENSIONS: Non-locking, 1.19 in. (30 mm) x 0.813 in. (21 mm) dia; locking, same length x 1 in. (25 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

Description	Catalog Number
Basic 50-Ω Connector	
874-B, non-locking	0874-9400
874-BBL, locking	0874-9403

non-locking

locking



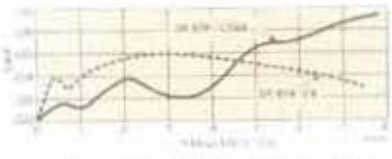
Typical SWR of pairs of connectors

Cable Connectors

For use with more than 40 different RG types of coaxial cable. Each cable connector consists of a basic connector, plus inner and outer transition pieces, a soft copper ferrule, a heat disk, and a flexible cable guard. The transition pieces maintain the 50-ohm characteristic impedance of the connector throughout the reduction to the cable diameter. The cable inner conductor is soldered to the inner transition piece; the cable braid and jacket are crimped to the outer transition by the specially perforated ferrule. Braid and jacket are thus securely fastened, to minimize reflections and leakage. A neoprene cable guard serves as a protective handle. Sized to grip the cable securely without compressing it, the cable guard adds to the quick-connect/disconnect convenience of the connector.

Frequency: Dc to 7.5 GHz.
Electrical: IMPEDANCE: 50 Ω. INPUT VOLTAGE, peak: For A (874-CA, -CLA, -C8A, -CL8A): Up to 1000 V; for B (874-C58A, -CL58A, -C62A, -CL62A): Up to 500 V; for C (874-C174A, -CL174A): Up to 300 V. POWER, average into 50-Ω load: For A, up to 20 kW, dc to 100 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz; for B, up to 5 kW, dc to 500 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz; for C, up to 1.8 kW, dc to 300 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 80 MHz.
Mechanical: DIMENSIONS: 2.69 in. (68 mm) long x 1 in. (25 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


non-locking locking


Average SWR of single connector on infinite length of 50-ohm cable.

Description	Catalog Number
50-Ω Cable Connectors:	
For GR 874-A2 Cable:	
874-CA, non-locking	**0874-9410**
874-CLA, locking	**0874-9411**
For 50-Ω cable including RG-8A/U, -9B/U, -10A/U, -87A/U, -116/U, -156/U, -165/U, -166/U, 213/U, -214/U, 215/U, -225/U, -227/U, and non-50-Ω cable including RG-11A/U, -12A/U, -13A/U, -63B/U, -79B/U, -89/U, -144/U, -146/U, -149/U, -216/U:	
874-C8A, non-locking	**0874-9412**
874-CL8A, locking	**0874-9413**
For 50-Ω cable including GR 874-A3, RG-29/U, -55/U series, -58A/U series, -141A/U, -142A/U, -159/U, -223/U:	
874-C58A, non-locking	**0874-9414**
874-CL58A, locking	**0874-9415**
For non-50-Ω cable including RG59/U, -62/U series, -71B/U, -140/U, -210/U:	
874-C62A, non-locking	**0874-9416**
874-CL62A, locking	**0874-9417**
For 50-Ω cable including RG-174/U, -188/U, -316/U, and non-50-Ω cable including RG-161/U, -187/U, -179/U:	
874-C174A, non-locking	**0874-9418**
874-CL174A, locking	**0874-9419**

Panel Connectors

For use on equipment panels. Connectors are available to fit the five popular cable sizes and wire leads. They are mounted to a panel by means of a flange and four screws; the non-locking connector can be mounted either front or back. The recessed connectors protrude forward only 0.13 in. (3.2 mm), for space saving and neatness.

Electrical: IMPEDANCE: 50 Ω. INPUT VOLTAGE, peak: For A (874-PB8, -PLA, -PRLA, -PB8A, -PL8A, -PRL8A): Up to 1000 V; for B (874-PB58A, -PL58A, -PRL58A, -PB62A, -PL62A, -PRL-62A): Up to 500 V; for C (874-PB174A, -PL174A, PRL174A): Up to 300 V; for D (874-PLT, -PRLT): Up to 1500 V. POWER, average into 50-Ω load: For A, up to 20 kW, dc to 100 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz; for B, up to 5 kW, dc to 500 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz; for C, up to 1.8 kW, dc to 300 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 80 MHz; for D, up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

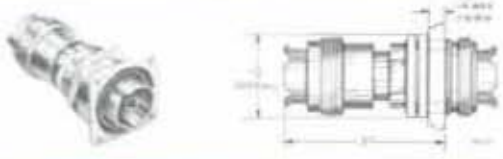

non-locking locking recessed

50-Ω Panel Connectors:	
For GR 874-A2 Cable:	
874-PB8, non-locking	**0874-9440**
874-PLA, locking	**0874-9441**
874-PRLA, recessed locking	**0874-9461**
For 50-Ω Cable including RG-8A/U, -9B/U, -10A/U, -87A/U, -116/U, -156/U, -165/U, -166/U, -213/U, -214/U, -215/U, -225/U, -227/U, and non-50-Ω cable including RG-11A/U, -12A/U, -13A/U, -63B/U, -79B/U, -89/U, -144/U, -149/U, -216/U:	
874-PB8A, non-locking	**0874-9442**
874-PL8A, locking	**0874-9443**
874-PRL8A, recessed locking	**0874-9463**
For 50-Ω cable including GR 874-A3, RG-29/U, -55/U series, -58/U series, -141A/U, -142/U, -159/U, -223/U:	
874-PB58A, non-locking	**0874-9444**
874-PL58A, locking	**0874-9445**
874-PRL58A, recessed locking	**0874-9465**
For non-50-Ω cable including RG59/U, -62/U series, -71B/U, -140/U, -210/U:	
874-PB62A, non-locking	**0874-9446**
874-PL62A, locking	**0874-9447**
874-PRL62A, recessed locking	**0874-9467**
For 50-Ω cable including RG-174/U, -188/U, -316/U, and non-50-Ω cable including RG-161/U, -187/U, -179/U:	
874-PB174A, non-locking	**0874-9448**
874-PL174A, locking	**0874-9449**
874-PRL174A, recessed locking	**0874-9469**
For Wire Leads:	
874-PLT, locking	**0874-9459**
874-PRLT, recessed locking	**0874-9479**

Panel Feedthrough Connector

Mates any pair of GR874 connectors directly through a panel or wall. Can be mounted as recessed or nonrecessed panel locking connector. Can be mounted through thick bulkheads 0.25 to 2 inches (51 mm), or more, in thickness by counterboring.

Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.



874-PFL Panel Feedthrough Connector	**0874-9451**

GR874® 50-Ohm Adaptors

Conversion These adaptors provide easy conversion from the GR874® connector to most popular military and industrial coaxial connectors. Many of the adaptors are available with locking GR874 connectors to allow semi-permanent attachment of the adaptor while ensuring stable electrical performance.

Without degradation GR874 adaptors extend the usefulness of GR874 connectors without sacrificing electrical performance. The SWR of the combination of GR874 connector and GR874 adaptor is actually comparable to that of the "other series" connector alone.

Excellent for OEM applications Original-equipment manufacturers recognize the possibilities of these adaptors in combination with the GR874 recessed panel connector. An instrument originally equipped with these connectors can be quickly converted by means of appropriate GR874 adaptors to almost any coaxial connector series; the resulting panel connector protrudes less than an inch in front of the panel.

Replace countless adaptors Because any two GR874 adaptors mate, a few of them can perform a cross-connection task that would otherwise involve a costly collection of direct adaptors. For example, interconnection of types BNC, C, Microdot, N, TNC, and UHF plugs and jacks would require 72 direct adaptors, whereas only 12 GR874 adaptors are needed to do the same job.

50-Ohm Adaptor Kit

- **fifteen adaptors in one neat package provide the answer to the connector dilemma**

Tame the connector menagerie Your device is fitted with type N connectors, your test equipment with UHF, and your patch cords with BNC — is that what plagues you? Or have you just wasted ten minutes trying to force one SMA plug onto another? Frustrating as these experiences may be, they're inevitable because of the multitude of connector types available to manufacturers. There is a bright side, however, and it comes in the form of a small gray box from General Radio. The box contains 15 different adaptor types that allow you to connect to any of 9 popular commercial and military connector types — conveniently and with a minimum of the usual fumbling.

With a double approach All adaptors in the kit have one connector type in common, the GR874. These connectors are hermaphroditic; i.e., any two, although identical, can be plugged together — no more worrying about whether you need a jack or a plug or whatever.

One approach to the problem is simply to connect the appropriate adaptor to each end of a GR874® patch cord and then connect it from one device to the other.

Equally simple is a second approach. Connect one adaptor to another, with the second adaptor appropriate to whatever type of patch cord you have available.

Supplied: In addition to the adaptors listed below, the kit also includes one 874-T tee connector to connect stubs and other elements in shunt with a coaxial line, one 874-EL 90° ell right-angle line section, and one 874-R33 three-foot 50-Ω cable terminated on one end with a GR874 connector and on the other with banana plugs.

Qty	Contains GR874 and	GR Type	Qty	Contains GR874 and	GR Type
2	**BNC** jack	874-QBJA	1	**SMA** jack	874-QMMJ
2	**BNC** plug	874-QBPA	1	**SMA** plug	874-QMMP
1	**C** jack	874-QCJA	1	**TNC** jack	874-QTNJ
1	**C** plug	874-QCP	1	**TNC** plug	874-QTNP
1	**HN** jack	874-QHJA	2	**UHF** jack	874-QUJ
1	**HN** plug	874-QHPA	2	**UHF** plug	874-QUP
3	**N** jack	874-QNJA	1	**banana** jacks	874-Q2
3	**N** plug	874-QNP	(See also preceding paragraph.)		

Mechanical: All components housed in a rugged steel case with piano hinge, 2 clasps, and carrying handle. DIMENSIONS: (wxhxd): 18.5x4x7 in. (470x102x178 mm). WEIGHT: 4.5 lb (2.1 kg) net, 6 lb (2.8 kg) shipping.

Description	Catalog Number
874-9099 Adaptor Kit	**0874-9099**

GR874® 50-Ohm Adaptors (Refer also to Types 274, 776, and 777.)

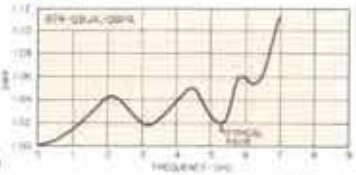
Adaptors to BNC

Four adaptors are available; two include a BNC jack with either a non-locking or a locking GR874 connector, and two include a BNC plug with either a non-locking or a locking GR874 connector.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 500 V pk. POWER, average into 50-Ω load: Up to 5 kW, dc to 500 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QBJA


874-QBPA



Description	Catalog Number
50-Ω Adaptors to BNC	
874-QBJA, BNC jack, non-locking GR874 connector ⊛	**0874-9700**
874-QBJL, BNC jack, locking GR874 connector ⊛	**0874-9701**
874-QBPA, BNC plug, non-locking GR874 connector ⊛	**0874-9800**
874-QBPAL, BNC plug, locking GR874 connector	**0874-9801**

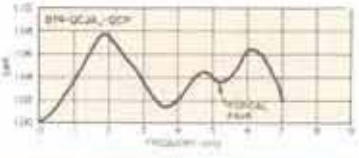
Adaptors to C

Three adaptors are available; two include a type C jack with either a non-locking or a locking GR874 connector, and one includes a type C plug with a non-locking GR874 connector.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 20 kW, dc to 100 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QCJA


874-QCP



50-Ω Adaptors to C	
874-QCJA, C jack, non-locking GR874 connector ⊛	**0874-9702**
874-QCJL, C jack, locking GR874 connector	**0874-9703**
874-QCP, C plug, non-locking GR874 connector ⊛	**0874-9802**

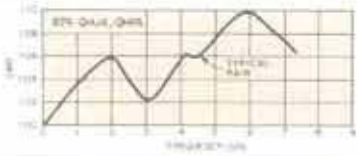
Adaptors to HN

Two adaptors are available; one includes a type HN jack and the other includes a type HN plug. Each uses a GR874 non-locking connector on the other end.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


QHJA


QHPA



50-Ω Adaptors to HN	
874-QHJA, HN jack, non-locking GR874 connector ⊛	**0874-9704**
874-QHPA, HN plug, non-locking GR874 connector ⊛	**0874-9804**

Adaptors to Microdot

Three adaptors are available; two include a Microdot jack with either a non-locking or a locking GR874 connector, and one includes a Microdot plug with a non-locking GR874 connector.

Frequency: Dc to 4 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 300 V pk. POWER, average into 50-Ω load: Up to 1.8 kW, dc to 300 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 80 MHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QMDJ


874-QMDP

50-Ω Adaptors to Microdot	
874-QMDJ, Microdot jack, non-locking GR874 connector	**0874-9720**
874-QMDJL, Microdot jack, locking GR874 connector	**0874-9721**
874-QMDP, Microdot plug, non-locking GR874 connector ⊛	**0874-9820**

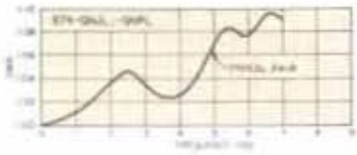
⊛ Federal stock numbers are listed before the Index.

Adaptors to N

Four adaptors are available; two include a type N jack with either a non-locking or a locking GR874 connector, and two include a type N plug with either a non-locking or a locking GR874 connector.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 20 kW, dc to 100 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QNJL 874-QNPL



Description	Catalog Number
50-Ω Adaptors to N	
874-QNJA, N jack, non-locking GR874 connector ⊛	**0874-9710**
874-QNJL, N jack, locking GR874 connector ⊛	**0874-9711**
874-QNP, N plug, non-locking GR874 connector ⊛	**0874-9810**
874-QNPL, N plug, locking GR874 connector	**0874-9811**

Adaptors to SMA

Four adaptors are available; two include an SMA jack with either a non-locking or a locking GR874 connector, and two include an SMA plug with either a non-locking or a locking GR874 connector. These adaptors also mate with NPM, STM, and others.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 300 V pk. POWER, average into 50-Ω load: Up to 1.8 kW, dc to 300 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 80 MHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QMMJ 874-QMMP

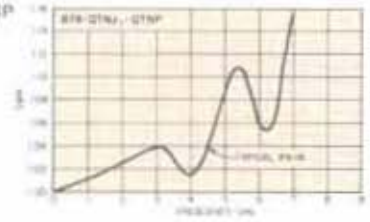
50-Ω Adaptors to SMA	
874-QMMJ, SMA jack, non-locking GR874 connector	**0874-9722**
874-QMMJL, SMA jack, locking GR874 connector	**0874-9723**
874-QMMP, SMA plug, non-locking GR874 connector	**0874-9822**
874-QMMPL, SMA plug, locking GR874 connector	**0874-9823**

Adaptors to TNC

Three adaptors are available; two include a TNC jack with either a non-locking or locking GR874 connector, and one includes a TNC plug with a non-locking GR874 connector.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 500 V pk. POWER, average into 50-Ω load: Up to 5 kW, dc to 500 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QTNJ 874-QTNP



Description	Catalog Number
50-Ω Adaptors to TNC	
874-QTNJ, TNC jack, non-locking GR874 connector ⊛	**0874-9716**
874-QTNJL, TNC jack, locking GR874 connector ⊛	**0874-9717**
874-QTNP, TNC plug, non-locking GR874 connector ⊛	**0874-9816**

Adaptors to UHF

Three adaptors are available; two include a UHF jack with either a non-locking or a locking GR874 connector, and one includes a UHF plug with a non-locking GR874 connector.

Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 500 V pk. POWER, average into 50-Ω load: Up to 5 kW, dc to 500 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QUJ 874-QUP

50-Ω Adaptors to UHF	
874-QUJ, UHF jack, non-locking GR874 connector ⊛	**0874-9718**
874-QUJL, UHF jack, locking GR874 connector	**0874-9719**
874-QUP, UHF plug, non-locking GR874 connector ⊛	**0874-9818**

Adaptor to 7-mm Precision

One adaptor is available and includes an Amphenol APC-7, 7-mm precision, connector on one end and a locking GR874 connector on the other end.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 20 kW, dc to 100 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.


874-QAP7L

50-Ω Adaptor to 7-mm Precision	
874-QAP7L, Amphenol APC-7, locking GR874-connector ⊛	**0874-9791**

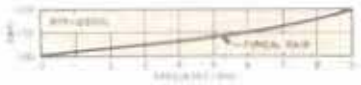
⊛ Federal stock numbers are listed before the Index.

Adaptor to GR900® Connector

One adaptor is available and includes a GR900 precision connector on one end and a locking GR874 connector on the other end.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

874-Q900L



Description	Catalog Number
50-Ω Adaptor to GR900	
874-Q900L, GR900 and locking GR874 Connectors	0874-9709

Adaptor to Binding Posts

One adaptor is available and includes a pair of 0.75-in.-spaced binding posts on one end and a non-locking GR874 connector on the other end. Mates with banana plugs. (Note: A single post is also available, on the 874-MB Coupling Probe.)

Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

874-Q2

50-Ω Adaptor to binding post	
874-Q2, jacks, non-locking GR874 connector	0874-9870

Adaptors to Banana Plugs

Two adaptors are available; each includes a pair of 0.75-in.-spaced banana plugs and a non-locking GR874 connector on the other end. One adaptor is completely shielded; the other has unshielded banana plugs.

Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

777-Q3

874-Q10

50-Ω Adaptors to banana plugs	
777-Q3, shielded plugs	0777-9703
874-Q10, unshielded plugs	0874-9876

Balun

This is a tuned coaxial 4:1 transformer that matches 50-Ω coaxial line to 200-Ω balanced line and thus extends the usefulness of generally available coaxial instruments to balanced devices. Used with a slotted line, network analyzer, admittance meter, or transfer-function and immittance bridge, the balun permits measurements on balanced components over a frequency range from 54 MHz to 1 GHz without appreciable insertion loss or transformation error.

Tuning: 54 MHz to 1 GHz with following accessories (not supplied):

Frequency	Tuning Elements Required
54 to 88 MHz	Two 874-VCL and two 874-XL
88 to 140 MHz	Two 874-VCL and two 874-L30
140 to 174 MHz	Two 874-VCL and two 874-L20
174 to 216 MHz	Two 874-VCL and two 874-L10
170 to 280 MHz	Two 874-D50L and two 874-L30
225 to 280 MHz	Two 874-D20L and two 874-L30
275 to 380 MHz	Two 874-D20L and two 874-L20
350 to 525 MHz	Two 874-D20L and two 874-L10
470 to 1000 MHz	Two 874-D20L

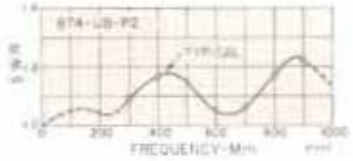
Supplied: 874-UB-P1 300-Ω Terminal, 874-WN3 Short-Circuit Termination, 874-W03 Open-Circuit Termination.

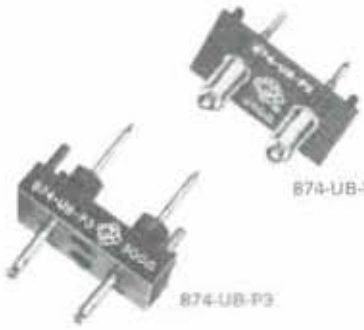
Recommended: 874-LK20L Adjustable Line (for use with 1602-B UHF Admittance Meter), one 874-Z Stand, and appropriate tuning elements as listed in the table.

874-UB-P2 200-Ohm Terminal Unit: Connects balun directly to 200-Ω transmission line or to balanced components via screw terminals. FREQUENCY: Dc to 1 GHz. IMPEDANCE: 200 Ω. SWR: 1.2 to 300 MHz, 1.3 to 1 GHz. TRANSMISSION LINE: RG-85/U recommended.

874-UB-P3 300-Ohm Terminal Pad: Converts the 200-Ω balanced output impedance, characteristic of the balun, to 300 Ω. Facilitates power and voltage measurements on balanced 300-Ω systems with signal generators and detectors designed for use with 50-Ω coaxial circuits.

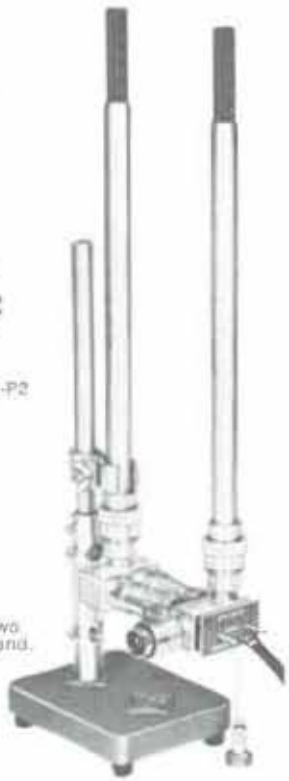
Mechanical: DIMENSIONS (wxhxd): **-UBL,** 3.13x3.38x2.38 in. (79x86x60 mm); **-P2 or -P3,** 1x1.75x2.2 in. (25x44x56 mm). NET WEIGHT: **-UBL,** 1.3 lb (0.6 kg); **-P2 or -P3,** 0.6 oz (17 g).





874-UB-P2

874-UB-P3



874-UBL Balun with two Stubs and one 874-Z Stand.

874-UBL Balun	0874-9921
874-UB-P2 200-Ohm Terminal Unit	0874-9923
874-UB-P3 300 Ohm Terminal Pad	0874-9924

GR874® Terminations and Attenuators for 50-Ohm Systems

Short-Circuit Terminations

Short-circuit terminations are useful in establishing initial coaxial line-length conditions for impedance measurements. Each termination consists of a fixed short-circuit mounted in a GR874 connector. Each of three versions has a counterpart open-circuit termination.

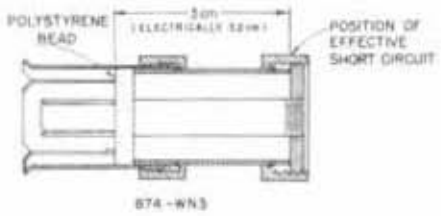
Frequency: Dc to 7 GHz; to 9 GHz if connector is locked.
Plane Position: Short-circuit plane is effectively 0 to 0.07 cm toward load from the generator face of bead, except in -WN3 where it is 3.2 cm (see drawing). (3.2 cm correspond to the bead-to-reference-plane distance in 874-ML Component Mount and 874-UBL Balun).

Description		Catalog Number
Short-Circuit Terminations for 50-Ω Lines		
874-WN, non-locking GR874 connector	⊕	**0874-9970**
874-WNL, locking GR874 connector		**0874-9971**
874-WN3, non-locking GR874 connector	⊕	**0874-9972**

Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

874-WNL

874-WN3



Open-Circuit Terminations

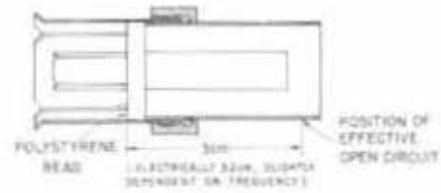
Open-circuit terminations are useful in establishing initial coaxial line-length conditions for impedance measurements and as a shielding cap for open-circuited lines.

Frequency: Dc to 7 GHz; to 9 GHz if locked.
Plane Position (effective position of open-circuit plane, measured from generator face of bead, toward load): 0 to 0.05 cm, for 874-WO; 0 to 0.10 cm, for -WOL, see curve; 3.2 cm, for -WO3, see drawing. The latter position corresponds to that of the short-circuit plane in the 874-WN3 (3.2 cm also correspond to the bead-to-reference-plane distance in 874-ML Component Mount and 874-UBL Balun).
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

Open-Circuit Terminations for 50-Ω Lines		
874-WO, non-locking GR874 connector	⊕	**0874-9980**
874-WOL, locking GR874 connector		**0874-9981**
874-WO3, non-locking GR874 connector	⊕	**0874-9982**

874-WOL

874-WO3



Resistive Terminations

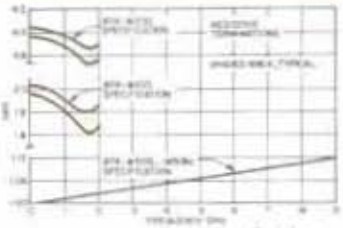
Resistive terminations are useful in slotted-line measurements and for checking accuracy of network analyzers, directional couplers, bridges, and admittance meters. The known location of a purely resistive termination permits the production of many known complex impedances through the addition of sections of 874-L Air Line, fixed or adjustable.

Frequency: Dc to 9 GHz for -W50B and -W50BL; dc to 2 GHz for -W100 and -W200.
Dc Resistance: 50 Ω ± 0.5% for -W50B and -W50BL; 100 Ω ± 1% for -W100; 200Ω ± 1% for -W200.
Electrical: POWER, max continuous: 2 W for -W50B and -W50BL, 0.35W for -W100, 0.25 W for -W200. SWR: < 1.005 + 0.013 f_{GHz} for -W50B and -W50BL; also see curves.
Mechanical: WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

874-W50B

874-W100

874-W200



Description		Catalog Number
Resistive Terminations for 50-Ω Lines		
874-W50B, 50 Ω, non-locking GR874 connector	⊕	**0874-9954**
874-W50BL, 50 Ω, locking GR874 connector	⊕	**0874-9955**
874-W100, 100 Ω, non-locking GR874 connector		**0874-9956**
874-W200, 200 Ω, non-locking GR874 connector		**0874-9958**

Adjustable Stubs

For matching or tuning, for use as adjustable short-circuit terminations, and as reactive elements. With an external indicator, the stub can function as a reaction-type wavemeter. Stub consists of a coaxial line with a sliding short circuit of the multiple-spring-finger type.

Frequency: Dc to 8.5 GHz.
Length: 874-D20L: 20 cm max travel, calibrated in electrical distance from junction in 874-T tee to plane of short circuit. 874-D50L: 50 cm max travel, not calibrated but has an adjustable reference marker.

Electrical: IMPEDANCE: 50 Ω, nominal.
Mechanical: NET WEIGHT: 874-D20L, 0.5 lb (0.2 kg); 874-D50L, 0.9 lb (0.4 kg).

Adjustable Stubs for 50-Ω Lines		
874-D20L, 20 cm, locking GR874 connector	⊕	**0874-9511**
874-D50L, 50 cm, locking GR874 connector	⊕	**0874-9513**

⊕ Federal stock numbers are listed before the Index.

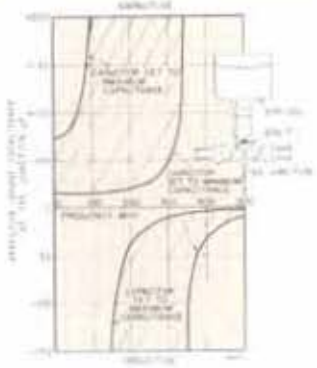
Variable Capacitor

Tuning element for resonant-line circuits, matching transformers, and baluns at low frequencies where line-type elements are awkward to use. Well shielded, Rexolite* insulation, precision ball bearings. Linear capacitance variation.

Frequency: <500 MHz, typical.
Capacitance at low frequencies: 14 to 70 pF at connector, 16.5 to 72.5 pF at junction of 874-T Tee. Refer to graph.
Mechanical: DIMENSIONS: 5.25 in. (133 mm) long x 2.5 in. (64 mm) dia. WEIGHT: 0.8 lb (0.4 kg) net.

* Registered trademark of Brand Rex Division, American Enka Corporation.

Description	Catalog Number
874-VCL Variable Capacitor, with locking GR874 connector	0874-9931



Fixed Attenuators

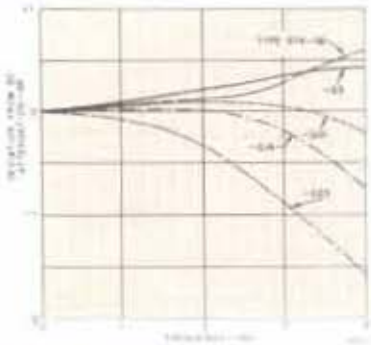
Single-section, F type resistance pads, for insertion of fixed attenuation in 50-ohm systems and for isolation and matching to 50 ohms over a broad frequency range. Each attenuator consists of one disk and two cylindrical resistors, as shunt and series elements respectively. The 6-, 14-, and 20-dB attenuators are particularly convenient in pulse applications as voltage dividers.

Frequency: Dc to 4 GHz.
Attenuation Accuracy (relative to correction curves shown): ± 0.2 dB, dc to 1 GHz; ± 0.4 dB, to 2 GHz; ± 0.6 dB, to 4 GHz. TEMPERATURE COEFFICIENT: <0.0003 dB/°C/dB.
Electrical: DC RESISTANCE: 50 Ω ± 1% when terminated in 50 Ω. INPUT POWER, max: 1 W cw or average; 2 kW peak, pulsed.
Mechanical: DIMENSIONS: 3.5 in. (89 mm) long. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

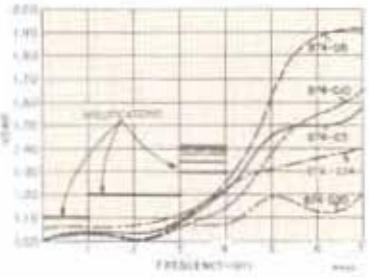
50-Ω Fixed Attenuators*		
874-G3, 3 dB ± 0.045 dB, non-locking	⊕	0874-9564
874-G3L, 3 dB ± 0.045 dB, locking		0874-9565
874-G6, 6 dB ± 0.09 dB (X2), non-locking	⊕	0874-9568
874-G6L, 6 dB ± 0.09 dB (X2), locking		0874-9569
874-G10, 10 dB ± 0.15 dB, non-locking	⊕	0874-9570
874-G10L, 10 dB ± 0.15 dB, locking	⊕	0874-9571
874-G14, 14 dB ± 0.21 dB (X5), non-locking		0874-9560
874-G14L, 14 dB ± 0.21 dB (X5), locking		0874-9561
874-G20, 20 dB ± 0.30 dB (X10), non-locking	⊕	0874-9572
874-G20L, 20 dB ± 0.30 dB (X10), locking		0874-9573

* Connector on each end; locking or non-locking, as noted.

874-G, non-locking



Correction factor



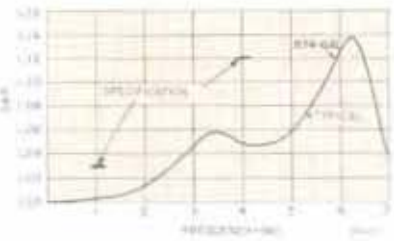
Typical and specified SWR

Adjustable Attenuator

A waveguide-below-cutoff type, useful as a calibrated attenuator or as a sampling device. Calibrated in decibels, on a micrometer-type scale. Absolute attenuation is the sum of insertion loss and scale reading. Phase shift is essentially constant as the attenuation is varied. The main line is a short coaxial section with locking GR874 connectors, one end for source, the other for load. It introduces minimal discontinuity when inserted in a 50-ohm line. The loop output is brought out through 3 feet of 50-ohm cable with a locking GR874 connector. If a source is connected to this output port, signals with relative phases of 0° and 180° are produced at the main line connectors.

Frequency: 100 MHz to 4 GHz.
Relative Attenuation: RANGE: 120 dB, with main line terminated in 50 Ω; 129 dB, with main line terminated in adjustable stub, set to minimize electric field at the coupling point. MICROMETER SCALE: −9 to 120 dB. ACCURACY: For 50-Ω terminated input, ± (0.015 x difference in scale readings + 0.2) dB, when corrected; correction chart is supplied. For stub-terminated input, ± (0.01 x difference in scale readings + 0.2) dB, direct reading.
Insertion Loss from input connector to end of output cable at 1 GHz, when signal source impedance is 50 Ω: For 50-Ω terminated main line, 30.4 ± 2 dB with scale set at 0 dB; 17 ± 2 dB with scale set at −9 dB (settings below 0 dB not accurate). For stub-terminated unit (that extends range over which calibration is accurate to the −9 dB scale setting), 19 ± 2 dB min. Insertion loss is approx proportional to 1/f, up to 1 GHz. Insertion loss directly through main line is negligible.
SWR: MAIN LINE: < 1.03 at 1 GHz, < 1.12 from 1 to 4 GHz. OUTPUT: < 4 at 1 GHz, < 5 from 1 to 4 GHz.
Electrical: INPUT POWER, max: 300 W at 1 GHz; proportional $1/\sqrt{f}$. OUTPUT, max: 0.5 W.
Mechanical: WEIGHT: 1.3 lb (0.6 kg) net.

SWR introduced into line



Description	Catalog Number
874-GAL 50-Ω Adjustable Attenuator ⊕	0874-9577

⊕ Federal stock numbers are listed before the Index.

The manual-remote model offers manual control and a cabinet for bench use.

The remote-only model offers small size and reduced cost for systems use.

1452 Programmable Attenuator

New Since Catalog U

- **all solid-state — no relays**
- **10 kHz to 500 MHz**
- **0 to 80 dB in 1-dB steps**
- **high accuracy**
- **fast switching, < 500 μs**
- **precision metal-film resistors ensure long-term stability**

80-dB, no waiting The 1452 provides any attenuation from 0 to 80 dB for any signal from 10 kHz to 500 MHz in less than half a millisecond! Signals up to a half watt are accommodated at most frequencies; insertion loss and SWR are minimal.

Reliable and adaptable There are no life-limited relays in the 1452; all switching is accomplished by solid-state devices. The accuracy is achieved by precision metal-film resistors with long-term stability, and careful design of the attenuator networks preserves their 50-ohm characteristic impedance.

Two models are offered. One allows manual, as well as remote, control of the attenuator. It includes a cabinet for bench use which can also be adapted for installation in a standard rack. The other saves money and space in systems applications by excluding manual control and instrument cabinet.

— See **GR Experimentor** for October-December 1970

SPECIFICATIONS

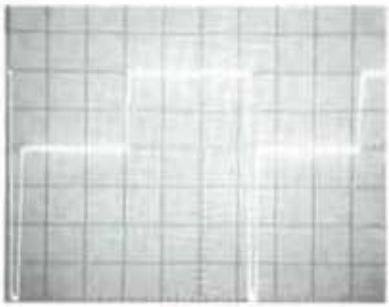
Frequency: 10 kHz to 500 MHz.

Impedance: 50 Ω.

Attenuation: 0 to 80 dB with 1-dB resolution. Controlled by two in-line-readout panel rotary switches (0 to 79 dB) on manual-remote model or remotely (0 to 80 dB) by 40-20-10-8-4-2-1 BCD signal at standard DTL and TTL levels (negative true, logic "1" = ± 1 V at 0.7 mA, logic "0" = +3.5 to +5 V at 0 mA) applied to rear 14-pin type 57 connector on manual-remote and remote-only models. SWITCHING TIME: <500 μs including settling time at max rate of 2000 changes/s for 1-dB steps, 400 for 10-dB steps, 300 for 20-dB steps, and 200 for 40-dB steps.

	10 kHz	1 MHz	10 MHz	100 MHz	300 MHz	500 MHz
Attenuation Accuracy*	±(1% +0.4 dB)		±(0.5% +0.2 dB)	±(1% +0.4 dB)	±(1% +0.7 dB)	
SWR†	< 1.4/1.1			< 1.6/1.3	< 1.8/1.5	
Insertion Loss	≤ 2 dB				≤ 2.8 dB	
Maximum Input	0.02 W, 1 V	0.1 W, 2.2 V		0.5 W, 5 V		

* Accuracy as % of attenuation setting. † Max/typical.



Typical switching transition 0 to 20-dB attenuation at 30 MHz; 1 ms/div horizontal, 10 dB/div vertical.

Environment: TEMPERATURE: 0 to +55°C operating, −40 to +75°C non-operating. HUMIDITY: 95% RH and +40°C. VIBRATION: 0.03 in. from 10 to 55 Hz for manual-remote model, 10 to 41 Hz for remote-only model. BENCH HANDLING: 4 in. or 45° (MIL STD-810A-VI). SHOCK: 30 G, 11 ms. DROP: 30 in.

Power: 100 to 125 and 200 to 250 V, 50 to 400 Hz, 21 W max.

Mechanical: Manual-remote and remote-only models. DIMENSIONS (wxhxd): Manual-remote, 8.5x3.47x13.39 in. (216x88x340 mm); remote-only, 9.13x3.47x10.64 in. (232x88x270 mm). WEIGHT: Manual-remote, 8 lb (3.7 kg) net, 11 lb (5 kg) shipping; remote-only, 5.5 lb (2.5 kg) net, 8.5 lb (3.9 kg) shipping.

Rear view of manual-remote model.

Description	Catalog Number
1452 Programmable Attenuator	
Manual-Remote, Bench Model	**1452-9700**
Manual-Remote, Rack Model	**1452-9701**
Remote-Only Model	**1452-9702**
Rack Adaptor Set, for manual-remote model	**0480-9722**

GR874® 50-Ohm Air Lines

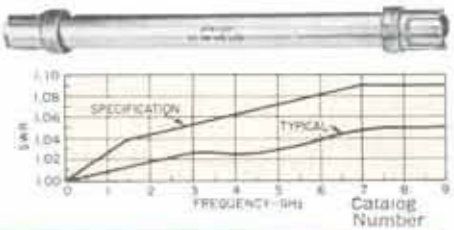
Fixed Air Lines

For use as spacing interconnecting elements of a coaxial system, as time-delay elements, and as absolute impedance references in time-domain reflectometry. Each air line consists of a length of 50-Ω, air-dielectric coaxial line with a GR874 connector at each end.

Frequency: Dc to 7 GHz; to 9 GHz if connectors are locked.
Electrical: IMPEDANCE: 50 Ω INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.

Length:	ELECTRICAL	DELAY TIME
874-L10, -L10L	10.086 ± 0.06 cm	0.3366 ± 0.0018 ns
874-L20, -L20L	20.096 ± 0.06 cm	0.6706 ± 0.0018 ns
874-L30, -L30L	30.111 ± 0.06 cm	1.0047 ± 0.0018 ns

874-L, non-locking



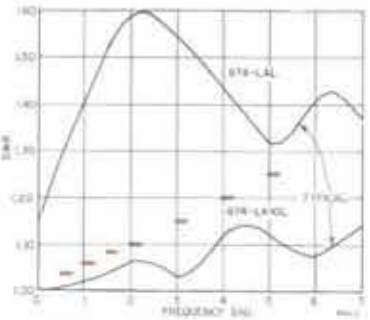
Description	Catalog Number
50-Ω Fixed Rigid Air Lines	
874-L10, 10 cm, non-locking GR874 connectors ⊛	**0874-9604**
874-L10L, 10 cm, locking GR874 connectors	**0874-9605**
874-L20, 20 cm, non-locking GR874 connectors ⊛	**0874-9608**
874-L20L, 20 cm, locking GR874 connectors	**0874-9609**
874-L30, 30 cm, non-locking GR874 connectors ⊛	**0874-9612**
874-L30L, 30 cm, locking GR874 connectors	**0874-9613**

Adjustable Air Line

An air-dielectric coaxial line that can be telescoped to change its length. For use in matching networks, as a phase shifter, and as a variable line-delay element. Contacts are made by multiple-spring fingers and connectors are locking GR874.

Frequency: Dc to 7 GHz.
Length of Adjustment: 25 cm (half wavelength at 600 MHz).
Electrical: IMPEDANCE: = 50 Ω when fully collapsed, = 57 Ω when fully extended. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 30 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz.
Mechanical: LENGTH: 13 to 23 in. (33 to 58 cm).

Typical SWR curves (solid lines) and 874-LK10L specifications (colored dashes).



50-Ω Adjustable Air Line	
874-LAL, 25 cm, locking GR874 connectors ⊛	**0874-9621**

Constant-Impedance Adjustable Air Lines

Line stretchers with a very low SWR and a uniform characteristic impedance of 50 Ω. Especially useful for eliminating the usual Smith-chart corrections for length of line between unknown and impedance-measuring device. Also useful as impedance-matching transformers and phase-adjustment elements in coaxial systems. Most useful at frequencies above that for which the length of adjustment is a half wavelength.

Frequency: Dc to 7 GHz.

	874-LK10L	874-LK20L
Length of Adjustment	10 cm	22 cm
HALF WAVELENGTH	at 1.5 GHz	at 680 MHz
SWR, also see curve above	< 1.03 at 500 MHz, < 1.06 at 1 GHz, < 1.08 at 1.5 GHz, < 1.10 at 2 GHz	
	< 1.15 at 3 GHz, < 1.2 at 4 GHz, < 1.25 at 5 GHz	

Electrical: IMPEDANCE: 50 Ω. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 30 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz.
Mechanical: LENGTH (min): -LK10L, 14 in. (35 cm); -LK20L, 23 in. (58 cm).

50-Ω Constant-Impedance Adjustable Air Lines	
874-LK10L, 10 cm, locking GR874 connectors	**0874-9627**
874-LK20L, 20 cm, locking GR874 connectors	**0874-9631**

Trombone Constant-Impedance Adjustable Air Line

Used to vary the length of a 50-Ω transmission line between two fixed terminals without moving the terminals or using flexible cables. Consists of two 874-LK20L Adjustable Lines joined at one end by a U-shaped section to form a rigid assembly. Can be plugged into two adjacent GR874 coaxial connectors or inserted in a line by means of two ells (not included) and installed vertically to save bench space. Low SWR. An excellent phase shifter and variable delay line.

Frequency: Dc to 2 GHz (874-LK10L recommended above 2 GHz).
Length of Adjustment, electrical: 44 cm (half wavelength at 340 MHz).

SWR: < 1.10 to GHz, < 1.25 to 2 GHz.
Electrical: IMPEDANCE: 50 Ω.
Mechanical: LENGTH: 24 to 33 in. (61 to 83 cm). SPACING between centers: 1.1875 in. (30 mm). WEIGHT: 2.5 lb (1.2 kg) net.

50-Ω Trombone Constant-Impedance Adjustable Air Line	
874-LTL, 44 cm, locking GR874 connectors ⊛	**0874-9645**

⊛ Federal stock numbers are listed before the Index.

GR874® 50-Ohm Coupling Elements

Tee

For connecting stubs and other elements in shunt with a coaxial line.

Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.

Mechanical: DIMENSIONS: 3.38 in. (86 mm) long x 2.25 in. (57 mm) wide. WEIGHT: 0.4 lb (0.2 kg) net.

Description	Catalog Number
50-Ω Tees	
874-T, non-locking GR874 connectors ⊕	**0874-9910**
874-TL, locking GR874 connectors	**0874-9911**

Power Divider

A coaxial tee with a 16.67-Ω resistor in each leg, connected so the tee is matched at any port when the other two ports are terminated in 50-Ω loads. The match holds throughout the wide frequency range. There is 0° phase difference between the outputs. The use of stable deposited-carbon-film resistors and the linear SWR-frequency relationship make these power dividers particularly valuable for pulse work and in network-analyzer applications.

Frequency: Dc to 7 GHz; to 9 GHz if connectors are locked.

Power Division: Equal within 0.3 dB when symmetrically fed.

Electrical: IMPEDANCE: 50 Ω, nominal. INSERTION LOSS: 6 dB (+2, −0.5 dB), input to each output. INPUT POWER: 2 W max continuous.

Mechanical: DIMENSIONS: 4 in. (102 mm) long x 2.38 in. (50 mm) wide.

50-Ω Power Divider	
874-TPD, non-locking GR874 connectors	**0874-9912**
874-TPDL, locking GR874 connectors	**0874-9913**

90° Ell

Convenient right-angle line section.

SWR: <1.06 at 2 GHz, <1.15 at 4 GHz.

Electrical: IMPEDANCE: 50 Ω, nominal. ELECTRICAL LENGTH: ≈ 7 cm. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 40 kW, dc to 50 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 10 GHz.

Mechanical: DIMENSIONS: 2.25 in. (57 mm) long x 2.25 in. (57 mm) wide.

50-Ω 90° Ell	
874-EL, non-locking GR874 connectors ⊕	**0874-9526**
874-EL-L, locking GR874 connectors ⊕	**0874-9527**

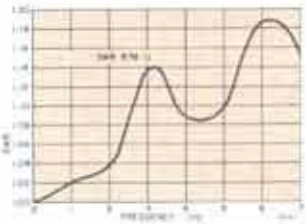
U-Line Section

A coaxial line section in the shape of a U that is useful in many coaxial setups.

Frequency: Dc to 7 GHz.

Electrical: IMPEDANCE: 50 Ω, nominal.

Mechanical: DIMENSIONS (wxhxd): 2.25x2x0.88 in. (57x51x 22 mm). WEIGHT: 0.5 lb (0.3 kg) net.



Description	Catalog Number
874-U, U-Line Section, non-locking GR874 connectors	**0874-9526**

Rotary Joint

Used when one part of a coaxial system must be rotated with respect to another part. Not for motor-driven applications.

Frequency: Dc to 4 GHz.

SWR: <1.06 at 1 GHz, <1.3 at 4 GHz.

Electrical: IMPEDANCE: 50 Ω, nominal.

Mechanical: LENGTH: 2.5 in. (64 mm).

874-JR Rotary Joint, 50 Ω, non-locking GR874 connectors **0874-9590**

Mixer

A broadband mixer of improved design for use in general applications and, with the 1236 I-F Amplifier, as a heterodyne detector. It offers wider frequency range, lower SWR, lower leakage connectors; it requires less local-oscillator power.

Frequency: 10 MHz to 9 GHz. MAX I-F: 60 MHz.

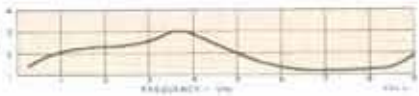
Sensitivity: <6 μV, typical, input behind 50 Ω will increase output of I-F amplifier (30-MHz I-F, 0.5-MHz bandwidth, 2-dB noise figure) by 3 dB, for mixer current of 0.5 mA.

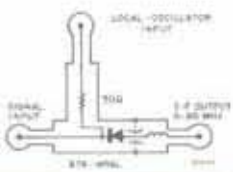
Input: < 6 mW typically required from local oscillator for 0.2-mA rectified current (signal and l-o source impedances, each 50 Ω).

Electrical: IMPEDANCE: 50 Ω, input; 400 Ω avg // 7 pF, output. DIODE: 1N23C.

Mechanical: DIMENSIONS: 4.63 in. (117 mm) long x 2.5 in. (64 mm) wide. WEIGHT: 0.5 lb (0.3 kg) net.

Typical SWR (mixer current = 0.5 mA):





874-MRAL Mixer, locking GR874 connectors **0874-9947**

⊕ Federal stock numbers are listed before the Index.

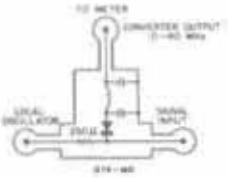
Mixer Rectifiers

A broadband rf mixer for use as a heterodyne detector with an i-f amplifier.

Frequency: 40 MHz to 5 GHz, less sensitive at lower and higher frequencies. MAX I-F: 30 MHz.
Sensitivity: < 5 μV typical (equivalent to ≈ 10 μV behind 50 Ω to increase output of i-f amplifier by 3 dB).
Input: 2 V max required from local oscillator.
Electrical: IMPEDANCE: 50-Ω input, ≈ 400-Ω output. DIODE: 1N21B.
Mechanical: DIMENSIONS: 3.75 in. (95 mm) long x 3.5 in. (89 mm) wide.

Description	Catalog Number
50-Ω Mixer Rectifiers	
874-MR, non-locking GR874 connectors ⊕	**0874-9944**
874-MRL, locking GR874 connectors ⊕	**0874-9945**

locking



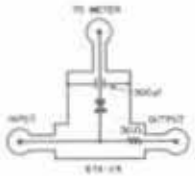
Voltmeter Rectifiers

Used to monitor the voltage in a coaxial system. Similar to 874-VQ but includes a 50-Ω resistor in series with the output-port center conductor. In combination with a signal source and a properly calibrated indicator, it can simulate a 50-Ω generator with known open-circuit voltage and thus be used in an oscillator amplitude-regulating system.

Frequency: 15 MHz to 2.5 GHz when used as a calibrated voltmeter.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: 2 V max. BYPASS CAPACITANCE: ≈ 300 pF. DIODE: 1N23B.
Mechanical: DIMENSIONS: 3.75 in. (95 mm) long x 2.5 in. (64 mm) wide. WEIGHT: 0.4 lb (0.2 kg) net.

50-Ω Voltmeter Rectifiers	
874-VR, non-locking GR874 connectors ⊕	**0874-9942**
874-VRL, locking GR874 connectors	**0874-9943**

locking



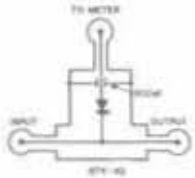
Voltmeter Detectors

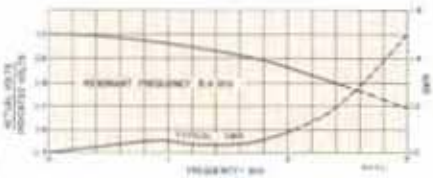
For use as a general-purpose rf-level detector with a dc indicator or as a modulated-signal detector with a sensitive amplifier. It can be inserted into a 50-Ω line without introducing appreciable discontinuity or, with a GR874 50-Ω termination, it can be used as a matched detector to terminate a line.

Frequency: 500 kHz to 2 GHz when used as a matched detector.
SWR: <1.1 at 1 GHz, <1.2 at 2 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: 2 V max. BYPASS CAPACITANCE: ≈ 300 pF. DIODE: 1N23B.
Mechanical: DIMENSIONS: 3.75 in. (95 mm) long x 2.5 in. (64 mm) wide. WEIGHT: 0.4 lb (0.2 kg) net.

50-Ω Voltmeter Detectors	
874-VQ, non-locking GR874 connectors ⊕	**0874-9940**
874-VQL, locking GR874 connectors	**0874-9941**

locking





Typical SWR and correction factor for 874-VQ.

Low-Pass Filters

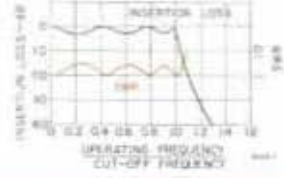
Recommended for use in immittance- or voltage-measuring systems to reduce harmonics, and especially in systems that contain nonlinear elements or sections that might resonate at a harmonic. Also useful in slotted-line measurements. Uses Chebyshev-type filters that produce a very steep cutoff characteristic at the expense of passband flatness. Spurious responses in the stopband are very small.

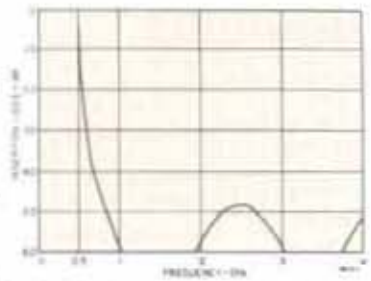
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 200 V pk. POWER, average into 50-Ω load: Up to 0.8 kW, dc to 20 MHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz.
Mechanical: LENGTH: **-F185L,** 17.63 in. (448 mm); **-F500L,** 10.19 in. (259 mm); **-F1000L,** 7.13 in. (181 mm); **-F2000L,** 4.38 in. (111 mm).

50-Ω Low-Pass Filters	
874-F185L, 185 MHz, locking GR874 connectors	**0874-9533**
874-F500L, 500 MHz, locking GR874 connectors ⊕	**0874-9537**
874-F1000L, 1 GHz, locking GR874 connectors ⊕	**0874-9541**
874-F2000L, 2 GHz, locking GR874 connectors ⊕	**0874-9545**

874-F2000L

Typical insertion loss and SWR:





Typical stop-band response of 874-F500L.

⊕ Federal stock numbers are listed before the index.

Coupling Capacitor

A short length of coaxial line with a disk capacitor in series with the inner conductor. High frequencies are transmitted with small reflections, but dc and low audio frequencies are blocked.

Frequency: To 4 GHz.
Capacitance: 4700 pF, −20 + 50%, series.
SWR: <1.06 at 1 GHz, <1.15 at 2 GHz, <1.3 from 2 to 4 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: Up to 500 V pk. POWER, average into 50-Ω load: Up to 5 kW up to 500 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz.
Mechanical: LENGTH: 3 in. (76 mm).

Description	Catalog Number
50-Ω Coupling Capacitors	
874-K, non-locking GR874 connectors ⊛	0874-9596
874-KL, locking GR874 connectors	0874-9597

Series Inductor

Used as a general-purpose tuning element in resonant-line circuits, matching transformers, and baluns at low frequencies.

Frequency: To 300 MHz.
Inductance: 0.226 μH ± 5% at 1 kHz, series.
Electrical: IMPEDANCE: 50 Ω, nominal.
Mechanical: WEIGHT: 0.25 lb (0.1 kg) net.

874-XL Series Inductor, non-locking GR874 connectors **0874-9998**

Insertion Unit

Small components, pads, vhf transformers, filters, or other networks mounted within the 2-inch long, 9/16-inch diameter space can be conveniently inserted into a 50-Ω coaxial system with minimum leakage and discontinuity.

Electrical: IMPEDANCE: 50 Ω, nominal.
Mechanical: LENGTH: 4.38 in. (111 mm).

Description	Catalog Number
874-X Insertion Unit, non-locking GR874 connectors ⊛	0874-9990

Component Mount

A shielded enclosure for convenient mounting of small components to be measured. Use of mount minimizes stray-capacitance variation in impedance measurements of circuit elements. Includes two accessories, an 874-WN3 Short-Circuit Termination and an 874-WO3 Open-Circuit Termination. For use with 1602-B UHF Admittance Meter, an 874-LK20L Constant-Impedance Adjustable Line is also recommended.

Frequency: Dc to 5 GHz.
Electrical: IMPEDANCE: 50 Ω, nominal.
Mechanical: DIAMETER: 3 in. (76 mm). WEIGHT: 0.7 lb (0.4 kg) net.

874-ML Component Mount, locking GR874 connector **0874-9663**

Coupling Probe

Electrostatic probe consisting of a binding post mounted on a GR874 connector. (Note: A pair of posts is also available, the 874-Q2 Adaptor.)

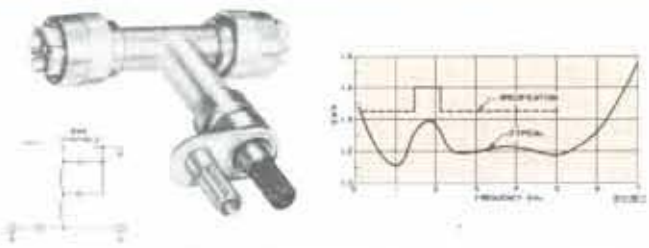
Electrical: IMPEDANCE: 50 Ω, nominal.
Mechanical: LENGTH: 2.08 in. (53 mm).

874-MB Coupling Probe, non-locking GR874 connector ⊛ **0874-9666**

Bias Insertion Unit

Used with slotted lines, the 1602-B Admittance Meter, and 1609 UHF Admittance Bridge for immittance and similar measurements when bias is to be applied to diodes, transistors, and other solid-state devices. It comprises a blocking capacitor in series with the line, an isolating choke, and a low-pass filter. In slotted-line measurements, the unit is inserted at the source end of the line and therefore introduces no reflections at the measurement terminals.

Frequency: Dc to 5 MHz, in bias circuit.
Electrical: IMPEDANCE: 50 Ω, nominal. BIAS, max: 400 V or 2.5 A. INSERTION LOSS: <1.7 dB typical from 300 MHz to 3 GHz, <0.8 dB typical from 3 to 5 GHz.
Mechanical: DIMENSIONS: 4.38 in. (111 mm) long x 3.88 in. (98 mm) wide. WEIGHT: 0.5 lb (0.3 kg) net.



874-FBL Bias Insertion Unit, with locking GR874 connectors **0874-9759**

⊛ Federal stock numbers are listed before the Index.

GR874® Cable and Patch Cords

50-Ohm Coaxial Cable

Low-loss 874-A2 This flexible, double-shielded, low-loss coaxial cable consists of No. 14 stranded inner conductor centered in solid polyethylene dielectric (OD: 0.244 in.) sheathed by 2 tinned-copper braids and covered with a gray, noncontaminating polyvinyl-chloride jacket.

General-purpose 874-A3 This cable is more flexible than the 874-A2 but with somewhat higher losses; it is the same as RG-58A/U but with double braided shielding. The inner conductor is 19 strands of 0.0071-in. tinned soft-copper wire, centered in solid polyethylene dielectric (OD: 0.115 in.) sheathed by 2 tinned-copper braids. The jacket is black, noncontaminating polyvinyl chloride. This cable is recommended for most general-purpose applications.

	Capacitance, nominal	Attenuation/100 ft 100 MHz	1 GHz	3 GHz	Use Connectors GR874-
874-A2	30.8 pF/ft	2.6 dB	10.5 dB		-CA, -CLA, -PBA, -PLA, -PRLA
874-A3	29 pF/ft	5.3 dB	22 dB	15 dB	-C58A, -CL58A, -PB58A, -PL58A, -PRL58

Electrical: IMPEDANCE: 50 Ω ± 5%. PROPAGATION VELOCITY FACTOR: 66%.

Mechanical: OUTER DIAMETER: **-A2,** 0.375 in. (9.5 mm); **-A3,** 0.206 in. (5.3 mm). WEIGHT: **-A2,** 3 lb per 25 ft (0.18 kg/m) net; **-A3,** 1 lb per 25 ft (0.06 kg/m), net.

874-A2

Description	Catalog Number
50-Ω Coaxial Cable	
874-A2, low-loss (100-foot length)	**0874-9862**
874-A3, general-purpose, (100-foot length)	**0874-9863**

50-, 72-, and 75-Ohm Coaxial Patch Cords

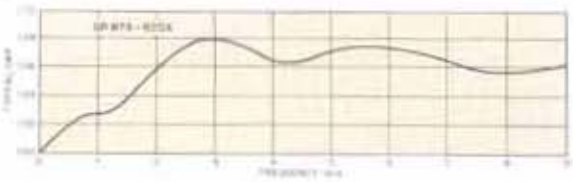
874-R20A

874-R22LA

874-R33

874-R34

874-R20 and -R22 These cords (50 Ω or 75 Ω) feature low SWR to 9 GHz and convenient GR874 connectors at each end.



874-R33 This cord (72 Ω) terminates in a pair of banana plugs, one connected to the center conductor and the other to the braid through a 5-in. pigtail. These plugs mate directly with GR 274 and 938 Jacks and 938 Binding Posts. The other end has a GR874 connector.

874-R34 This cord (50 Ω) terminates in a 274-NK Shielded Double Plug. The other end has a GR874 connector.

Electrical Rating: INPUT VOLTAGE: -R20, up to 1000 V pk; -R22, up to 500 V pk. POWER, average into 50-Ω load: -R20, up to 20 kW, dc to 100 kHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 5 GHz; -R22, up to 5 kW, dc to 500 MHz, decreasing as $1/\sqrt{f}$ to 0.1 kW at 1 GHz.

50-Ω Coaxial Patch Cords, 3 ft long		
Low-loss 874-A2 cable, GR874 connectors		
874-R20A, non-locking	†	**0874-9680**
874-R20LA, locking		**0874-9681**
General-purpose 874-A3 cable, GR874 connectors		
874-R22A, non-locking	†	**0874-9682**
874-R22LA, locking	†	**0874-9683**
General-purpose RG-58C/U cable		
874-R34, with shielded double banana plug	†	**0874-9692**
72-Ω Coaxial Patch Cord, 3 ft long		
Low-capacitance cable		
874-R33, with pair of banana plugs	†	**0874-9690**
75-Ω Coaxial Patch Cord, 3 ft long		
Low-loss cable, GR874 75-Ω connectors		
874-R20L (75 Ω)		**0874-9757**
General-purpose cable, GR874 75 Ω connectors		
874-R22L (75 Ω)		**0874-9758**

† Federal stock numbers are listed before the Index.

GR874® 75-Ohm Components

New

New versatility A new series of GR874 general-purpose coaxial components extends the versatility of the line to the field of 75-ohm transmission-line measurements. The series includes matching pads and adaptors to permit direct conversion of existing 50-ohm systems to the 75-ohm capability.

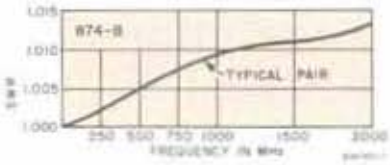
The GR874 75-ohm components use a connector similar to their 50-ohm counterparts except a new inner conductor and insulating bead are used to achieve the 75-ohm characteristic impedance. Although the GR874 50-ohm and 75-ohm connectors will mate with one another, the combination is not recommended because the inner conductors do not join snugly. A black outer ring is used on the 75-Ω connectors; bright metal, on the 50-Ω ones, ensures distinction.

Frequency response for the new series is specified from dc to 2 GHz although the units are often satisfactory at higher frequencies. Locking connectors are standard in the series; nonlocking 75-Ω connectors are available in OEM quantities.

Basic Connector

For use on rigid 14-mm, air-dielectric, 75-Ω coaxial lines or with capacitance, inductance, and resistance standards.

Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal. INPUT: 1.5 kV max, 4 kW max to 1 MHz, 4 kW/$\sqrt{f_{MHz}}$ max above 1 MHz. LEAKAGE: > 120 dB below signal.
Mechanical: DIMENSIONS: 1.13 in. (29 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.



Description	Catalog Number
874-B (75-Ω) Basic Connector	**0874-9730**

Cable Connectors

For use with flexible cable such as RG-11, RG-59, and RG-187.

Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal. INPUT: 1 kV for 0874-9742; 500 V for 0874-9743; 300 V for 0874-9744. LEAKAGE: > 120 dB below signal at GR874 (75 Ω) junction only.
Mechanical: DIMENSIONS: 3.27 in. (83 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

Description	Catalog Number
75-Ω Cable Connector	
874-C11 (75-Ω), for RG-11 A/U, -12 A/U, -216/U cable	**0874-9742**
874-C59 (75-Ω), for RG-59 B/U, -140/U cable	**0874-9743**
874-C187 (75-Ω), for RG-187 A/U, -179 B/U cable	**0874-9744**

Panel Connectors

For use on equipment panels.

Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal. INPUT: 1 kV for 0874-9745, 500 V for 0874-9746, 300 V for 0874-9747. LEAKAGE: > 120 dB below signal at GR874 (75 Ω) junction only.
Mechanical: DIMENSIONS: 0874-9745 2.08 in. (53 mm) long; 0874-9746 2.23 in. (57 mm) long; 0874-9747 2.53 in. (64 mm) long; ALL 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

75-Ω Panel Connector	
874-P11 (75-Ω), for RG-11 A/U, -12A/U, -216/U cable	**0874-9745**
874-P59 (75-Ω), for RG-59 B/U, -140/U cable	**0874-9746**
874-P187 (75-Ω), for RG-187 A/U, -179 B/U cable	**0874-9747**

Adaptors to BNC

Two adaptors are available; one includes a 75-Ω BNC jack and the other includes a 75-Ω BNC plug. Each uses a locking GR874 (75-Ω) connector on the other end.

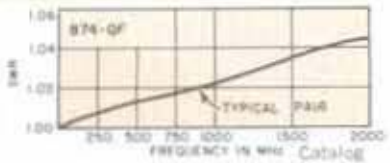
Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal. INPUT: 500 V max; 3 kW max to 1 MHz, 3 kW/$\sqrt{f_{MHz}}$ max above 1 MHz.
Mechanical: DIMENSIONS: 0874-9750 1.5 in. (39 mm) long; 0874-9751 1.81 in. (46 mm) long; ALL 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

75-Ω Adaptors to BNC	
874-QBJ (75-Ω), with BNC jack	**0874-9750**
874-QBP (75-Ω), with BNC plug	**0874-9751**

Adaptors to Type F

Two adaptors are available; one includes a type F jack and the other includes a type F plug. Each uses a locking GR874 (75-Ω) connector on the other end. Type F jacks are designed for use with 0.023-in. dia. (0.58 mm) wire.

Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal.
Mechanical: DIMENSIONS: 0874-9748 2.1 in. (52 mm) long; 0874-9749 1.87 in. (48 mm) long; ALL 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

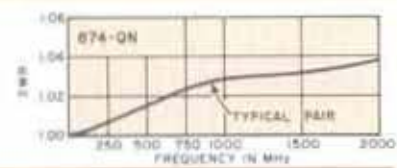


Description	Catalog Number
75-Ω Adaptors to F	
874-QFJ (75-Ω), with type F jack	**0874-9748**
874-QFP (75-Ω), with type F plug	**0874-9749**

Adaptors to Type N

Two adaptors are available; one includes a (75-Ω) type N jack and the other includes a 75-Ω type N plug. Each uses a locking GR874 (75-Ω) connector on the other end.

Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal. INPUT: 1 kV max; 4 kW to 1 MHz, 4 kW/$\sqrt{f_{MHz}}$ max above 1 MHz.
Mechanical: DIMENSIONS: 0874-9754 1.62 in. (41 mm) long; 0874-9755 1.95 in. (50 mm) long; ALL 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

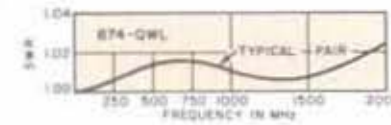


75-Ω Adaptors to N	
874-QNJ (75-Ω), with type N jack	**0874-9754**
874-QNP (75-Ω), with type N plug	**0874-9755**

Adaptors to Large WE

Two adaptors are available; one includes a large Western Electric jack and the other includes a large Western Electric plug. Each uses a locking GR874 (75-Ω) connector on the other end.

Frequency: Dc to 1 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal.
Mechanical: DIMENSIONS: 0874-9740 3.52 in. (89 mm) long; 0874-9741 3.02 in. (77 mm) long; ALL 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

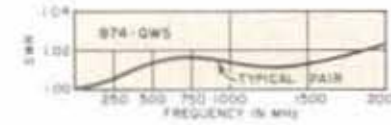


Description	Catalog Number
75-Ω Adaptors to Western Electric, large	
874-QWJL (75-Ω), with large WE jack	**0874-9740**
874-QWPL (75-Ω), with large WE plug	**0874-9741**

Adaptors to Small WE

Two adaptors are available; one includes a small Western Electric jack and the other includes a small Western Electric plug. Each uses a locking GR874 (75 Ω) connector on the other end.

Frequency: Dc to 1 GHz.
Electrical: IMPEDANCE: 75 Ω, nominal.
Mechanical: DIMENSIONS: 0874-9738 3 in. (76 mm) long; 0874-9739 2.75 in. (70 mm) long; ALL 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

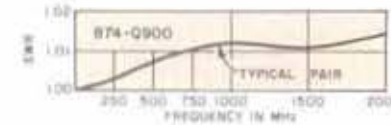


75-Ω Adaptors to Western Electric, small	
874-QWJS (75-Ω), with small WE jack	**0874-9738**
874-QWPS (75-Ω), with small WE plug	**0874-9739**

Adaptor to GR900 (75 Ω)

Includes a GR900 (75-Ω) connector on one end and a locking GR874 (75-Ω) connector on the other end.

Frequency: Dc to 2 GHz.
Electrical: IMPEDANCE: 75 Ω ± 0.4%. INPUT: 1.5 kV max; 4 kW max to 1 MHz, 4 kW/$\sqrt{f_{MHz}}$ max above 1 MHz. LEAKAGE: > 120 dB below signal.
Mechanical: DIMENSIONS: 2.88 in. (73 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

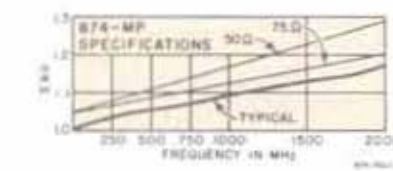


874-Q900 Adaptor, GR874 (75-Ω) to GR900 (75-Ω) — **0874-9733**

75- to 50-Ohm Matching Pad

A two-port minimum-loss network to match 50-ohm GR874-equipped devices to similarly equipped 75-ohm devices.

Frequency: Dc to 2 GHz.
SWR: 1.05 + 0.12 f_{GHz} for 50-Ω side; 1.05 + 0.08 f_{GHz} for 75-Ω side; also see curve.
Electrical: IMPEDANCE: 50 Ω and 75 Ω. INPUT: 0.5 W max continuous. INSERTION LOSS: 5.72 dB nominal. LEAKAGE: > 120 dB below signal.
Mechanical: DIMENSIONS: 3.5 in. (90 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

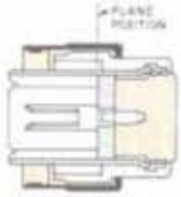


874-MP Matching Pad, 75-Ω to 50-Ω — **0874-9736**

Short-Circuit Termination

A fixed short circuit mounted in a locking GR874 (75-Ω) connector for establishing reference conditions in coaxial lines.

Frequency: Dc to 2 GHz.
Plane Position: Short-circuit is effectively 0 to 0.10 cm toward load from face of bead.
Mechanical: DIMENSIONS: 1.19 in. (30 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.



Description	Catalog Number
874-WN (75-Ω) Short-Circuit Termination	0874-9732

Open-Circuit Termination

A fixed open circuit mounted in a locking GR874 (75-Ω) connector for establishing reference conditions in coaxial lines; also useful as a shielding cap for open-circuited lines.

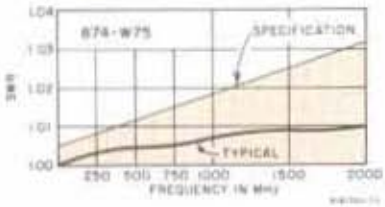
Frequency: Dc to 2 GHz.
Plane Position: Open-circuit plane is 0 to 0.10 cm toward load from nominal position of face of bead, to match the short-circuit plane in 874-WN Short-Circuit Termination above.
Mechanical: DIMENSIONS: 1.89 in. (30 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

Description	Catalog Number
874-WO (75-Ω) Open-Circuit Termination	0874-9752

75-Ohm Termination

A fixed 75-Ω resistor mounted in a locking GR874 (75-Ω) connector for establishing reference conditions in coaxial lines, for impedance matching, and for use as a termination.

Frequency: Dc to 2 GHz.
Dc Resistance: 75 Ω ± 0.5%. TEMPERATURE COEFFICIENT: < 150 ppm/ °C.
SWR: < 1.005 + 0.013 f_{GHz} to 2 GHz, also see curve.
Electrical: IMPEDANCE: 75 Ω, nominal. INPUT: 1 W with negligible change, 5 W max.
Mechanical: DIMENSIONS: 1.95 in. (50 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

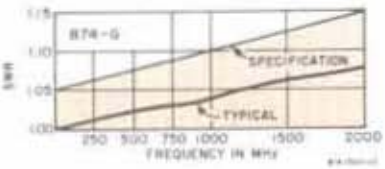


874-W75 (75-Ω) 75-Ω Termination	0874-9737

Fixed Attenuators

Single-section, T-type, resistance pads for attenuation, isolation, or matching in 75-ohm coaxial systems.

Frequency: Dc to 2 GHz.
Attenuation: 0874-9731 is 6 ± 0.5 dB; 0874-9734 is 10 ± 0.5 dB. TEMPERATURE COEFFICIENT: < 0.0005 dB/ °C/dB.
SWR: < 1.05 + 0.05 f_{GHz}, also see curve.
Electrical: IMPEDANCE: 75 Ω, nominal. DC RESISTANCE: 75 Ω ± 1% when terminated in 75 Ω. DC ATTENUATION: 0874-9731 is 6 ± 0.1 dB; 0874-9734 is 10 ± 0.1 dB. INPUT: 0.5 W max continuous cw; 500 W max peak; 0.5 W max average.
Mechanical: DIMENSIONS: 3.5 in. (89 mm) long x 1.02 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

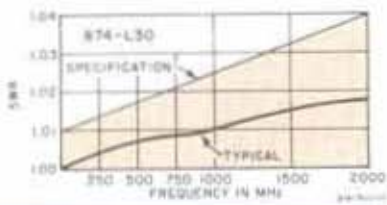


75-Ω Fixed Attenuators	
874-G6 (75-Ω), 6-dB attenuation	0874-9731
874-G10 (75-Ω), 10-dB attenuation	0874-9734

Air Line

For use as a spacing stub or other element of a coaxial system or as a time-delay element or impedance standard in a time-domain reflectometer.

Frequency: Dc to 2 GHz.
Length: ELECTRICAL: 30.111 ± 0.06 cm. TIME DELAY: 1.0036 ± 0.0018 ns.
SWR: < 1.01 + 1.015 f_{GHz} to 2 GHz, also see curve.
Electrical: IMPEDANCE: 75 Ω ± 0.4%. INPUT: 1.5 kV max peak; 4 kW max to 1 MHz; $4kW/\sqrt{f_{GHz}}$ max above 1 MHz.
Mechanical: DIMENSIONS: 12 in. (305 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.4 lb (0.2 kg) net, 2 lb (1 kg) shipping.



874-L30 (75-Ω) Rigid Air line	0874-9735

GR874® Miscellany

50-Ohm Transistor and Component Mounts

These mounts permit three-terminal measurements of a variety of devices with instruments such as the 1710 RF Network Analyser. Using the recommended short- and open-circuit terminations, you can precisely establish a phase reference plane at the transistor socket or other appropriate surface. By this means, the effects of coaxial line lengths and of the mount itself between unknown and instrument are eliminated.

In each transistor mount, the leads are inserted into hollow contact tubes that are the center conductors of small coaxial lines. Thus, all but about 1/32 inch of the leads at the header are completely shielded; small bends, various lengths, or other irregularities of the leads have no effect and the discontinuity at the transistor-to-mount connection is minimized. Additional advantages include complete accessibility to the socket, provisions for bolting a heat sink to the mount, and a fourth lead in the mount socket that is dc ground.

Frequency: Dc to 5 GHz.

Electrical: IMPEDANCE: 50 Ω, nominal. LEADS: 4. Each mount includes 2 damper resistors (10 and 50 Ω) to control oscillators in the measurement of wide-band, high-gain transistors.

Mechanical: WEIGHT: Mount, 0.8 lb (0.4 kg) net, 2 lb (1 kg) shipping; termination kit, 1 lb (0.5 kg) net, 2.5 lb (1.2 kg) shipping.

Transistor Mounts (2-inch max lead length)

Termination Kit

Description	Grounded Connection	Pin Circle	Catalog Number
50-Ω Transistor Mounts, require 1607-P40 Termination Kit			
For TO5, 9, 11, 12, 16, 26, 31, 33, 37, 38, 39, 43; MD-14; MM-4, 8; MT-13, 20, 28, 37; RO-2, 3, 4, 5, 10, 24, 30, 33, 34, 46, 49, 50, 61, 62, 79, etc. transistor, diode, and tube packages:			
1607-P41	base	0.2 in. dia	**1607-9641**
1607-P42	emitter or collector	0.2 in. dia	**1607-9642**
For TO-18, 28, 52; MT-30, 38; RO-44, 48, 51, 64, 65, 66, 70, 73, 78; U-3; X-8, etc. transistor, diode, and tube packages:			
1607-P43	base	0.1 in. dia	**1607-9643**
1607-P44	emitter or collector	0.1 in. dia	**1607-9644**
50-Ω Termination Kit, includes 874-U10 U-Line Section, 874-WN10 Short-Circuit, and 874-WO10 Open-Circuit			
1607-P40 Kit			**1607-9640**

Stand

A solid, stable support for components of coaxial systems. Consists of a heavy cast-iron base with rubber feet, 22-inch and 8-inch stainless-steel rods, and three universal clamps. The vertical rod can be used to hold long tuning stubs. The horizontal rod can be moved longitudinally or can be clamped to two bases to support a long horizontal run of coaxial parts. Clamps fit a range of diameters. Base can be bolted to bench top.

Mechanical: DIMENSIONS: Base, 3.5x4.44 in. (89x113 mm); rods, 8 and 22 in. (203 and 559 mm). WEIGHT: 5.5 lb (2.5 kg) net.

Description	Catalog Number
874-Z Stand	**0874-9996**
874-ZC Extra Clamp	**0874-9997**

Tools

These tools ensure quick assembly, neat, uniform appearance, and best electrical and mechanical performance of GR874 connectors (50 and 75 Ω).

The 874-TOK Tool Kit consists of an inner-conductor wrench to install the insulating bead and hold the inner conductor, an outer-conductor wrench to install the outer conductor, and a third wrench to tighten the coupling nut. The other tools are useful for installation of retaining rings.

The 874-TO58 or -TO8 Crimping Tool assures a neat, fast crimp of the ferrule that clamps the shield braid and outer jacket of the cable to a cable connector.

Crimping Dimensions, across flats of hexagonal crimp: For -TO8, 0.389 and 0.411 in. (9.88, 10.45 mm); for -TO58, 0.215, 0.250, and 0.375 in. (5.46, 6.35, 9.53 mm).

874-TOK Tool Kit, for all GR874 cable connectors	**0874-9902**
874-TO8 Crimping Tool, for GR874-( )8A cable connectors	**0874-9900**
874-TO58 Crimping Tool, for all other GR874 cable connectors	**0874-9901**

874-TOK

1. Outer-conductor wrench
2. Inner-conductor wrench
3. Coupling-nut wrench
4. Front-ring expander (red)
5. Keeper for ring expanders
6. Back-ring expander (green)
7. Ring pusher

874-TO58 874-TO8

Air-Line Tube and Rod

Used to fabricate custom-length 14-mm air lines and components in conjunction with GR874, GR 880, and GR900® connectors.

Outer-Conductor Tube (50 and 75 Ω)

Mechanical: Bright-alloy-plated brass; ends grooved and slotted to accept 874-B, -BBL, 890-BT, 900-AB, -AC, -AP, -BT, and -BT (75 Ω) connectors. DIMENSIONS: 15.88 in. (403 mm) long x 0.624 + 0.000 − 0.002 in. OD.

50-Ω Inner-Conductor Rod

Electrical: IMPEDANCE: 50 ± 0.1875 Ω (± 0.375%) when centered in the outer-conductor tube.

Mechanical: High-conductivity silver-plated brass; ends tapped to accept 874-B, -BBL, 890-BT, 900-AB, -AC, -AP, -BT and -BT (75 Ω) connectors. DIMENSIONS: 15.88 in. (403 mm) long x 0.24425 ± 0.00025 in. dia.

75-Ω Inner-Conductor Rod NEW

Electrical: IMPEDANCE: 75 ± 0.25 Ω (± 0.375%) when centered in the outer-conductor tube.

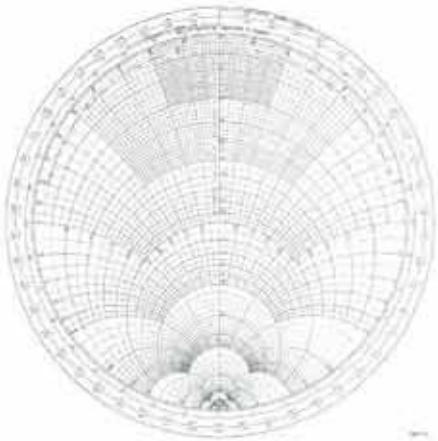
Mechanical: High-conductivity gold-plated brass; ends tapped to accept 874-B (75 Ω) and 900-BT (75 Ω) connectors. DIMENSIONS: 15.88 in. (403 mm) long x 0.24425 ± 0.00025 in. dia.

Description	Catalog Number
Outer-Conductor Tube (50 and 75 Ω)	**0874-9509**
Inter-Conductor Rod	
50-Ω	**0874-9508**
75-Ω	**0874-9550**

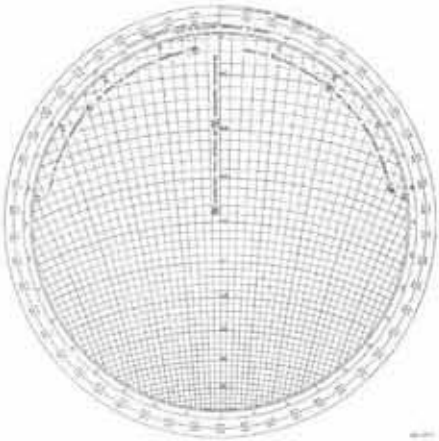
Smith Charts

Measurements made with slotted lines are facilitated by the use of Smith Charts; you can use them to determine the impedance that corresponds to any SWR and to convert from impedance to admittance and vice versa. Charts with normalized coordinates are for use with lines of any impedance. Charts with 50-Ω characteristic impedance (20-mʊ characteristic admittance) are directly applicable to all GR 50-Ω coaxial equipment.

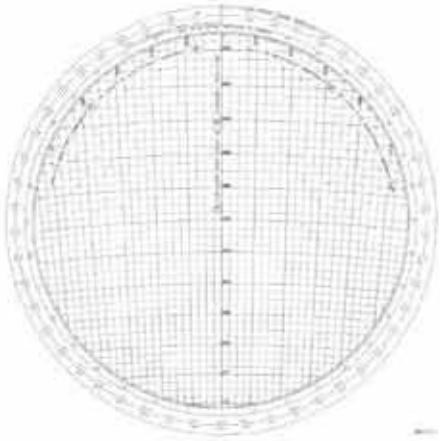
Smith Charts	
NORMALIZED COORDINATES	
Type NX, 22.5x35 in. (571x889 mm), pad of 75 charts	**5301-7563**
Type N, 8.5x11 in. (216x279 mm), 50 charts	**5301-7560**
Type NE, expanded (for use when SWR ≤ 1.58), 8.5x11 in., 50 charts	**5301-7561**
Type HE, highly expanded (for use when SWR ≤ 1.12), 8.5x11 in., 50 charts	**5301-7562**
50-OHM COORDINATES	
Type Z, 8.5x11 in., 50 charts	**5301-7569**
20-MILLIMHO ADMITTANCE COORDINATES	
Type Y, 8.5x11 in., 50 charts	**5301-7568**



NX, N, Y, Z



NE



HE

RF Bridges

- broad range — 400 kHz to 500 MHz
- high directivity — 40 dB
- low-cost 50-ohm or 75-ohm models

New

These bridges combine small size and low price with high performance. They are excellent for use in general-purpose or specialized SWR- or reflection-measurement systems in research, calibration, standards, and maintenance applications.

Both the standard and unknown ports of these bridges are accessible. Normally, the standard port is terminated in an 874-W50 50-ohm or an 874-W75 (75Ω) termination so that no degradation in directivity is encountered. For applications where structural return loss is important, a variable termination can be connected to the standard port. All ports are GR874® connectors and accept a wide variety of GR components to adapt the bridges to specific uses or measurement applications.

Frequency: 400 kHz to 500 MHz.
Directivity: 40 dB from 1 MHz to 500 MHz; 45 dB, 3 MHz to 450 MHz.
Electrical: IMPEDANCE: 50 or 75 Ω. INSERTION LOSS: 6 dB from load port (standard or unknown) to detector port, 6 to 10 dB from source port to load port.

Mechanical: DIMENSIONS: 3.75x6.25x1 in. (95x159x25 mm). WEIGHT: 0.8 lb (0.4 kg) net, 2 lb (1 kg) shipping.

RF Bridges	
874-BR (50 Ω)	**0874-9453**
874-BR (75 Ω)	**0874-9756**

High-Frequency GR900® Precision Coaxial Components

The GR900® line of precision coaxial components consists of:

50-Ohm Connectors
Basic, cable, and panel connectors and connector kits

50-Ohm Adaptors
Adaptors to most popular connector types

50-Ohm Terminations and Attenuators
Short-circuit, open-circuit, and resistive terminations
Tuners
Fixed attenuators

50-Ohm Air Lines
Fixed air lines

75-Ohm Components NEW
Connectors, adaptors, and terminations

Miscellaneous
Ells, tools, cleaning kit, tube and rod

GR900® Precision Coaxial Components

The first precision series For many years it was difficult to improve the design of highly accurate high-frequency measuring equipment since any improvements were obscured by connector difficulties. This fact spurred General Radio, with its long experience in coaxial-connector development, to design the first commercial coaxial connector that could honestly be called "precision" — the GR900® connector.

A versatile choice The successful development of the GR900® connector signaled the initiation of an entire line of precision coaxial components and instruments. These, together with connector kits and precision rod and tubing, can bring GR900 precision to every corner of your laboratory.

Electrical characteristics One of the most important characteristics of a connector is standing-wave ratio and in the GR 900-BT connector SWR $< (1.001 + 0.001\ f_{GHz})$. Of ever greater importance in many applications is connector repeatability because this sets the limit of measurement accuracy. The GR 900-BT connector offers repeatability of ± 0.002 dB in insertion loss, ± 0.008° in insertion phase, and 0.05% in SWR.

Leakage of the GR900 connector is better than 130 dB below signal level — lower than that of any other commonly used coaxial connector. This remarkable characteristic is due to the triple shielding action of the butt contact between outer conductors, the interlocking and overlapping of the centering gear rings, the threaded engagement of the outer locking nut, and the precise machining of the mating surfaces. Insertion loss is extremely small, due to the unique design of the contacts and the use of very low-loss materials — Teflon* for the bead and solid-silver alloys for both inner and outer conductors.

Electrical length of a connector pair is 3.50 cm and is virtually independent of frequency. Dc resistance is typically 0.4 mΩ for the inner conductors and 0.04 mΩ for the outer conductors of a mated pair.

The 900-BT connector meets all specifications contained in Part III, Section 1 of the IEEE Standard for Precision Coaxial Connectors, No. 287. The connectors are available in pairs, each with a calibration certificate that verifies the combined SWR of the pair to be within the limits specified in the IEEE document.

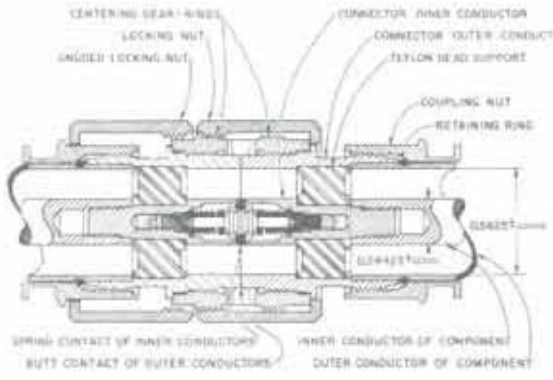
Mechanical characteristics The spring contact and inner conductor are made of gold-plated solid-silver alloy; the bead support, Teflon; the centering gear ring, stainless steel; the outer conductor, gold-plated coin silver; the retaining ring, phosphor bronze; and the coupling and locking nuts, chrome-plated brass.

When the parts are assembled onto an air line, the coupling nut and retaining ring attach the outer conductor of the connector to the outer conductor of the line. The inner conductor is threaded into the center conductor of the air line and is supported by the Teflon bead.

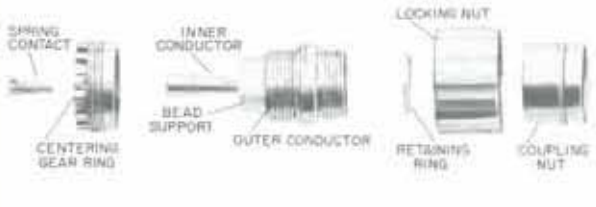
When two connectors are mated, the centering gear rings interlock and overlap to center the connectors with respect to each other. The interlocking also prevents the connectors from rotating against each other (with possible impairment of repeatability and reliability). The front surfaces of the outer conductors meet at a common reference plane, where they butt firmly together under the pressure of the locking nut.

The front surface of the inner conductor is recessed 0.001 inch with respect to the reference plane of the outer conductor, to ensure outer-conductor contact. Inner-conductor contact is made by a springy center contact assembly that projects slightly beyond the reference plane of the outer conductor until the connector is mated. The spring contact assembly consists of six independently sprung segments that are forced back and together upon mating, thereby making a wiping contact with both the inside of the inner conductor and the mating face of the other center contact. This connector structure is free from the reflections that would be caused by slots in the inner and outer conductors. It will give you exceptionally long life, with excellent repeatability, in part because micro-abrasion of the rubbing surfaces cannot affect the electrically critical conductor diameters.

* Registered trademark of the E. I. du Pont de Nemours and Company.



Cross-section view of mated 900-BT Precision Coaxial Connectors.



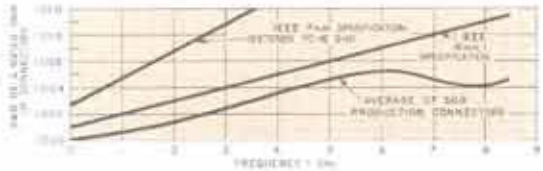
Exploded view of 900-BT Precision Coaxial Connector.

GR900® 50-Ohm Connectors

Basic Precision Connector

For use on rigid, 14-mm, air-dielectric 50-Ω coaxial lines (principal dimensions of 0.5625 in. and 0.24425 in.). The basic connectors are available as single connectors or as a pair of connectors with calibration certificate; the same SWR specification applies to either. These limits are those approved in the IEEE Recommended Practice for Precision Coaxial Connectors in the 14-mm general precision connector class. 900-BT Connectors are 100% tested at six frequencies. The 900-TOK Tool Kit is recommended for proper assembly.

Frequency: Dc to 8.5 GHz.
SWR: ≤(1.001 + 0.001 f_{GHz}) applies to single connectors and pairs.
Repeatability: SWR: Within 0.05%. INSERTION LOSS: ±0.001 dB to 30 MHz, ±0.002 dB to 1 GHz, ±0.0025 dB to 8.5 GHz. PHASE: Within 0.008° at 1 GHz, 0.015° at 2 GHz, 0.05° at 6 GHz.
Electrical: IMPEDANCE: 50 Ω ± 0.1% at frequencies where skin depth is negligible. INPUT VOLTAGE: Up to 3000 V pk. POWER average into 50-Ω load: Up to 20 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. INSERTION LOSS: < (0.003 $\sqrt{f_{GHz}}$) dB per pair. LEAKAGE: > 130 dB below signal. ELECTRICAL LENGTH: 3.500 ± 0.005 cm per pair; 1.750 ± 0.0025 cm for single connector. DC CONTACT RESISTANCE: <0.07 mΩ for outer conductor, <0.5 mΩ for inner conductor.
Mechanical: DIMENSIONS: 1.19 in. (30 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net.



Typical and specified SWR of single and certified pairs of 900-BT Precision Coaxial Connectors. Specified SWR is identical to that given as IEEE Recommended Practice.

Description	Catalog Number
50-Ω Basic Precision Coaxial Connectors	
900-BT, single *	**0900-9405**
900-BT, pair, with calibration certificate	**0900-9407**

Low-Cost Basic Precision Connector

For use on rigid, 14-mm, air-dielectric 50-Ω coaxial lines (principal dimension of 0.5625 in. and 0.24425 in.). The GR890 is a low-cost version of the GR900® precision coaxial connector and is intended for use when the lowest SWR is not required. Below 500 MHz, the difference in SWR, compared with the GR900, is insignificant; above 500 MHz, the SWR specification is somewhat degraded. For example, at 8 GHz the SWR specification is 1.019, compared with 1.009 for the GR900.

The GR 890 connector is generally used at lower frequencies on capacitance, inductance, or resistance standards, and at higher (microwave) frequencies where the SWR of the device is much greater than that of the connector. The other useful properties of the GR900 series, such as repeatability, well-defined reference plane, and low contact resistance, are retained. Grooves in the 890-BT locking nut distinguish the low-cost version from the 900-BT connector, but they mate without restriction.

Frequency: Dc to 8.5 GHz.
SWR: < (1.003 + 0.002 f_{GHz}) per connector. For mated connectors, add SWR specs, i.e., double this spec for pair of 890 connectors.

Repeatability: SWR: ≤ ±0.0005 or ±0.05%. INSERTION LOSS: ±0.001 dB to 30 MHz, ±0.002 dB to 1 GHz, ±0.0025 dB to 8.5 GHz. PHASE: ≤0.008° at 1 GHz, 0.015° at 2 GHz, 0.05° at 6 GHz.
Electrical: IMPEDANCE: 50 Ω ± 0.3% at frequencies where skin depth is insignificant. INPUT VOLTAGE: Up to 3000 V pk. POWER, average into 50-Ω load: Up to 20 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. INSERTION LOSS: < (0.004 $\sqrt{f_{GHz}}$) dB per pair. LEAKAGE: > 130 dB below signal. ELECTRICAL LENGTH: (3.500 + 0.005 − 0.01) cm per pair; (1.750 + 0.0025 − 0.005) cm for single connector. DC CONTACT RESISTANCE: <0.07 mΩ for outer conductor, <0.5 mΩ for inner conductor.
Mechanical: DIMENSIONS: 1.19 in. (30 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net.

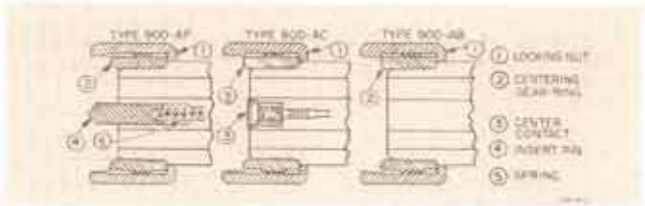
50-Ω Low-Cost Basic Precision Coaxial Connector	
890-BT, single	**0890-9405**

Basic Precision Connector Kits

For custom fabrication of rigid, 14-mm, air-dielectric 50-Ω coaxial lines and terminations compatible with the GR900® connector. Rigid air lines can be made from GR900 Precision Rod (0900-9507) and Tube (0900-9509) to serve as precision capacitance or time-delay standards, as well defined reactance standards, and as dielectric sample holders for dielectric-constant and loss measurements with the slotted line. The connectors formed by these three kits are beadless.

900-AP for unsupported inner conductor The 900-AP is for use on elements that have unsupported inner conductors. A reference air line can be assembled from a pair of these kits and appropriate lengths of precision rod and tube. The kit consists of locking nut, centering gear ring, and a spring-loaded centering pin that allows the inner conductor of the resulting beadless air line to derive its support from the mating 900-BT Connector.

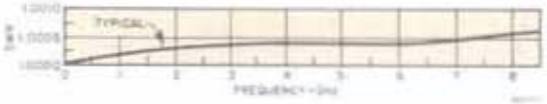
900-AC for supported inner conductor The 900-AC can be used in place of the 900-BT on any component whose inner conductor is supported within the component itself. The kit consists of locking nut, centering gear ring, and center contact of a standard GR900 connector. Since it includes only those parts necessary for its particular application, this kit



* Federal stock numbers are listed before the Index.

offers superior electrical performance at a considerable savings in cost.

900-AB for supported inner conductor, less center contact. The 900-AB can be used to fabricate an air line to be mated with a 900-BT Connector, but it cannot mate with a 900-LZ Reference Air Line or with another 900-AB or 900-AP Connector. The 900-AB is like the -AC in appearance and function, except it does not contain the center contact. Repeatability is specified in %; example: if SWR varies from 1.00012 to 1.00016 (for a pair mated successivley), the repeatability is ±0.00002 or ±0.002%.



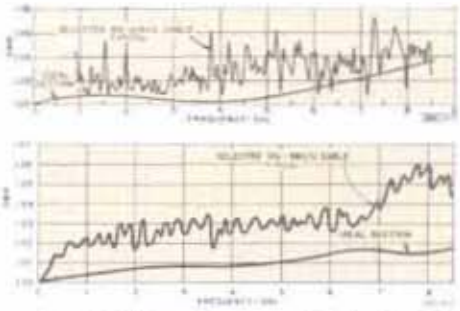
Description	Catalog Number
50-Ω Laboratory Precision Connector Kits	
900-AP, repeatability within ±(0.010 + 0.003 f_{GHz})%	0900-9406
900-AC, repeatability within ±0.05%	0900-9404
900-AB, repeatability within ±(0.010 + 0.003 f_{GHz})%	0900-9402

Cable Precision Connectors

For use with more than 20 different RG types of coaxial cable. The SWR of these connectors is much lower than that of even the best-made cables. The braid retention system does not compress the cable, yet it has good pull and torque resistance. The usual distortion and flow of cable dielectric during inner-conductor soldering have been virtually eliminated by means of a Teflon spacer and a special, low-temperature solder supplied with every connector. All inner-conductor parts are captive and supported by a bead.

SWR of connector itself is represented by "ideal section" data (see curves) measured with precision coaxial line in place of cable.

Frequency: Dc to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω. INPUT VOLTAGE: Up to 1500 V pk for -C9; 500 V pk for -C58. INSERTION LOSS: <(0.006 f_{GHz}) dB per pair for -C9; <(0.010 $\sqrt{f_{GHz}}$) dB per pair for -C58.

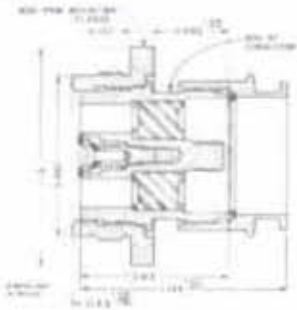


Typical SWR performance of a single Type 900-C9 Connector on an "infinite" length of RG-214/U cable and on an "ideal" section with the same diameters.

50-Ω Coaxial Cable Precision Connectors	
For RG-9B/U and RG-214/U cable; can be used, with some sacrifice in performance or mechanical reliability, with RG-8/U, -8A/U, -10A/U, -87A/U, -116/U, -156/U, -165/U, -166/U, -213/U, -215/U, -225/U, and -222/U:	
900-C9	0900-9421
For GR 874-A3 and RG-58/U cable; has limited application with RG-29/U, -55/U, -141A/U, -142A/U, -159/U, and -233/U:	
900-C58	0900-9431

Panel Mounting Kits

Used to mount standard GR 890 and GR900 connectors on a panel. Kit includes a threaded flange that accepts the outer conductor, mounting hardware, and a gear ring that, for the rotatable version, can be turned to permit any desired angular orientation of the mating connector.



Description	Catalog Number
Panel Mounting Kits	
900-PKM, non-rotatable	0900-9498
900-PKMR, rotatable	0900-9500

Rotatable Centering Ring

Permits proper mating with another GR 890 or GR900 connector in any orientation. Threads onto the connector in place of the regular centering gear ring.

Rotatable Centering Ring	0900-9499

Adaptor Flange

To connect GR900 components to instruments (like some bridges) that terminate in a broad plane surface and to a variety of flange-type connectors. This flange threads onto a 900-BT Connector in place of the centering gear ring and locking nut.

Adaptor Flange	0900-9782

GR900® 50-Ohm Adaptors

Conversion plus precision The availability of precision adaptors from the GR900® connectors to other popular coaxial connectors means that the user of GR900 equipped instruments can convert to other series and still retain precision performance. For example, a 900-LB Precision Slotted Line equipped with a 900-QNJ or -QNP adaptor becomes a type N slotted line with an over-all residual SWR (line plus adaptor) of only 1.02 at 3 GHz. Conversely, users of instruments equipped with SMA, TNC, N, C, and GR874® connectors can, by means of adaptors, take advantage of the precision offered by GR900 tuners, airline standards, terminations, and other elements.

50-Ohm Precision Adaptor Kit

This set consists of the most commonly used GR900 precision adaptors including one each of the jack and plug versions of adaptors to BNC, C, N, SC, SMA, and TNC, as well as adaptors to Amphenol APC-7, Precifix AA, and GR874® connectors. All components are supplied in an attractive mahogany storage case with recessed foam inserts.

Mechanical: WEIGHT: 8 lb (3.7 kg) net, 12 lb (5.5 kg) shipping.

Description	Catalog Number
GR900 Precision Adaptor Set	**0900-9451**
GR900 Storage Case	**0900-9450**

Precision Adaptors to BNC

Two versions: One includes a BNC jack and the other includes a BNC plug. Both use a GR900 precision connector on the other end.

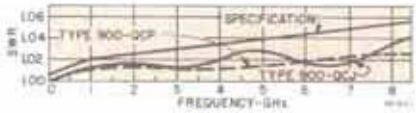
Frequency: Dc to 8.5 GHz.
SWR: $<(1.005 + 0.015\ f_{GHz})$ to 1 GHz, $<(1.015 + 0.005\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 500 V pk. POWER, average into 50-Ω load: Up to 3 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) shipping.

Description	Catalog Number
50-Ω Precision Adaptors to BNC	
900-QBJ, with BNC jack	**0900-9701**
900-QBP, with BNC plug	**0900-9801**

Precision Adaptors to C

Two versions: One includes a type C jack and the other includes a type C plug. Both use a GR900 precision connector on the other end.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.005 + 0.015\ f_{GHz})$ to 1 GHz, $<(0.015 + 0.005\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 7 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) shipping.

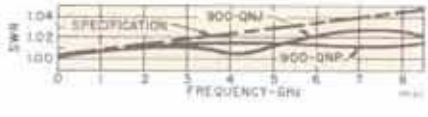


50-Ω Precision Adaptors to C	
900-QCJ, with C jack	**0900-9703**
900-QCP, with C plug	**0900-9803**

Precision Adaptors to N

Two versions: One includes a type N jack and the other includes a type N plug. Both use a GR900 precision connector on the other end.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.004 + 0.004\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 7 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) shipping.



50-Ω Precision Adaptors to N	
900-QNJ, with N jack ⊛	**0900-9711**
900-QNP, with N plug ⊛	**0900-9811**

⊛ Federal stock numbers are listed before the Index.

Precision Adaptors to TNC

Two versions: One includes a TNC jack and the other includes a TNC plug. Both use a GR900 precision connector on the other end.

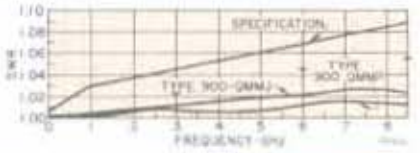
Frequency: Dc to 8.5 GHz.
SWR: $<(1.005 + 0.015\ f_{GHz})$ to 1 GHz, $<(1.015 + 0.005\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 500 V pk. POWER, average into 50-Ω load: Up to 3 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) shipping.

Description	Catalog Number
50-Ω Precision Adaptors to TNC	
900-QTNJ, with TNC jack	0900-9717
900-QTNP, with TNC plug	0900-9817

Precision Adaptors to SMA

Two versions: One includes an SMA jack and the other includes an SMA plug. Both use a GR900 precision connector on the other end.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.005 + 0.025\ f_{GHz})$ to 1 GHz, $<(1.022 + 0.008\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) ship.



50-Ω Precision Adaptors to SMA	
900-QMMJ, with SMA jack	0900-9723
900-QMMP, with SMA plug	0900-9823

Precision Adaptors to SC

Two versions: One includes an SC jack and the other includes an SC plug. Both use a GR900 precision connector on the other end.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.005 + 0.015\ f_{GHz})$ to 1 GHz, $<(1.015 + 0.005\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 7 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) ship.

50-Ω Precision Adaptors to SC	
900-QSCJ, with SC jack	0900-9713
900-QSCP, with SC plug	0900-9813

Precision Adaptors to 7-mm Precision

Includes an Amphenol APC-7 or R&S 7-mm connector on one end and a GR900 precision connector on the other.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.003 + 0.003\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 1000 V pk. POWER, average into 50-Ω load: Up to 6 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. ELECTRICAL LENGTH: 5.30 ± 0.02 cm.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) ship.

50-Ω Precision Adaptor to 7-mm Precision	
900-QAP7, with APC-7 connector +	0900-9791
900-QPF7, with R&S 7-mm connector	0900-9793

Precision Adaptor to GR874® Connector

Includes a locking GR874 connector on one end and a GR900 precision connector on the other end.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.00 + 0.015\ f_{GHz})$ to 1 GHz, $<(1.010 + 0.005\ f_{GHz})$ to 8.5 GHz.
Electrical: IMPEDANCE: 50 Ω nominal. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 10 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) ship.

50-Ω Precision Adaptor to GR874	
900-Q874, with locking GR874 connector +	0900-9883

Precision Adaptor to Binding Posts

One convertible version: Adapts binding posts (spaced on 0.75- to 1-in. centers) to GR900 connector and (after a simple mechanical modification) adapts GR900 connector to binding posts. Particularly useful for converting "unknown" terminals of bridges.

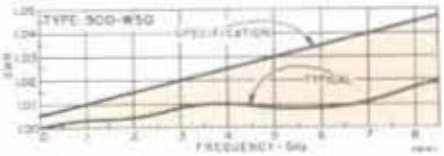
Electrical: RESIDUAL IMPEDANCE: When binding posts are adapted to GR900, ≈ 3.55 pF and ≈ 4.8 nH are added to terminals. When GR900 is adapted to binding posts, ≈ 5.2 pF and ≈ 11 nH are added at base and ≈ 20 nH at top of binding posts.
Mechanical: WEIGHT: 0.3 lb (0.2 kg) net; 1.3 lb (0.6 kg) ship.

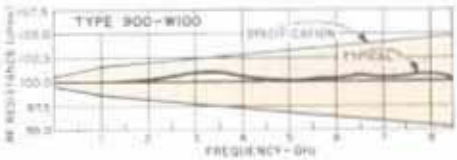
50-Ω Precision Adaptor to Binding Posts	
900-Q9	0900-9874

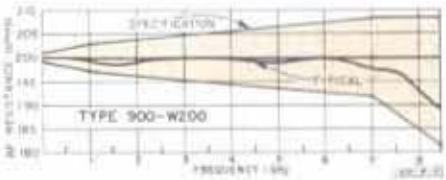
+ Federal stock numbers are listed before the Index.

GR900® 50-Ohm Precision Terminations and Attenuators

Precision Resistive Terminations and Mismatches

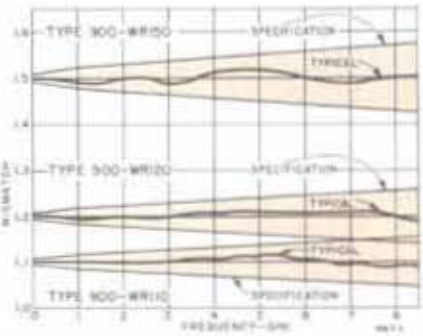






Standard terminations are useful for calibration of bridges, slotted lines, admittance bridges, network analyzers, and reflectometers. The 50-ohm 900-W50 termination can also be used as a precision dummy load or as a termination in measurements of networks with more than one port. This termination, together with the 900-WNC Short Circuit and 900-LZ Air Lines, can form a calibration set for computer correction of measuring instruments. With an appropriate GR900 adaptor, it can be used as a low-SWR, precision type-N termination, or BNC, or C, etc.

Standard mismatches introduce reflections of known SWR in a 50-ohm transmission line and are therefore useful in the calibration of reflectometers, network analyzers, and SWR-measuring instruments.



Frequency: Dc to 8.5 GHz.

900	-W50	-W100	-W200	-W110	-W120	-W150
Dc Resistance:	50 Ω	100 Ω	200 Ω	45.45 Ω	41.67 Ω	33.33 Ω
Accuracy:	±0.3%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
SWR, also see curves:	1.005 + 0.005 f_{GHz}	—	—	1.1 nom	1.2 nom	1.5 nom
Plane Position*:	—	4 cm nom	4 cm nom	—	—	—

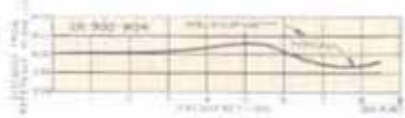
Electrical: INPUT POWER: <1 W with negligible change, <5 W without damage. TEMPERATURE COEFFICIENT: <150 ppm/°C.
Mechanical: DIMENSIONS: 2 in. (51 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net.

Description		Catalog Number
Precision Resistive Terminations		
900-W50	50-Ω Standard Termination	**0900-9953**
900-W100	100-Ω Standard Termination	**0900-9957**
900-W200	200-Ω Standard Termination	**0900-9959**
Precision Mismatches:		
900-WR110	Standard Mismatch, SWR 1.1	**0900-9961**
900-WR120	Standard Mismatch, SWR 1.2	**0900-9963**
900-WR150	Standard Mismatch, SWR 1.5	**0900-9965**

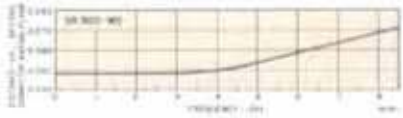
Open-Circuit Terminations

Open-circuit terminations are useful in establishing initial conditions of line length and signal phase, as shielding caps for open-circuited lines, and, at low frequencies, as capacitance standards.

900-WO4



900-WO



Frequency: Dc to 8.5 GHz.
Plane Position:* For 900-WO, typically 0.26 cm, but varies with frequency within ± 0.012 cm of value shown on graph. For -WO4, 4.00 ± 0.01 cm (corresponds to 4-cm offset in 900-W100 and -W200 Standard Terminations).
Electrical: CAPACITANCE: 0.172 ± 0.008 pF for -WO, at low frequencies; 2.670 pF ± 0.25% for -WO4, below 70 MHz.

Precision Open-Circuit Terminations	
900-WO, plane at 2.6 mm	**0900-9981**
900-WO4, plane at 4 cm	**0900-9985**

* Location of effective position of termination, measured toward "load", from reference plane of connector (where outer conductors butt together).

Precision Short-Circuit Terminations

Short-circuit terminations are useful in establishing initial conditions of line length and signal phase in, for example, impedance measurements. An s-c termination consists of a precision-machined, silver-plated disk, mounted in a centering gear ring and locking-nut assembly, to produce a fixed short circuit. The 900-WNC, -WNE, and -WN4 each includes a support for one end of the inner conductor of a 900-LZ Reference Air Line, which is beadless.


900-WN


900-WNE


900-WNC

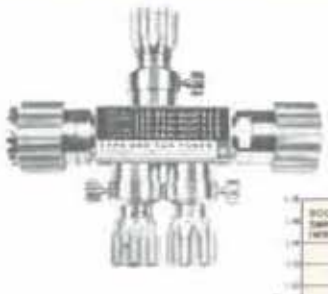

900-WN4

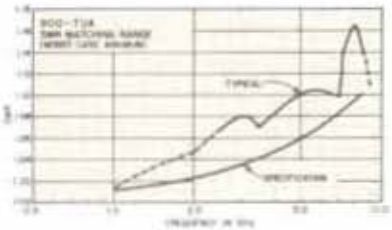
Frequency: Dc to 8.5 GHz.
Plane Position:* For 900-WN and -WNC, 0.00 cm; for 900-WNE, 0.26 ± 0.005 cm (corresponding open circuit is 900-WO); for 900-WN4, 4.00 ± 0.01 cm (corresponding resistive terminations are 900-W100 and -W200).
Reflection Coefficients: >0.999 for -WN and -WNC, >0.998 for -WNE, >0.996 for -WN4; all to 8.5 GHz.

Description	Catalog Number
50-Ω Precision Short-Circuit Terminations	
900-WN, without support, plane at 0.00 cm ⊕	**0900-9971**
900-WNC, with support, plane at 0.00 cm	**0900-9977**
900-WNE, with support, plane at 2.6 mm	**0900-9979**
900-WN4, with support, plane at 4 cm	**0900-9975**

Precision Tuner

Used to match out small residual reflections in low-SWR measuring instruments and devices. The tuner has three smoothly adjustable tuning screws that are used in pairs to tune out reflections of any phase throughout the tuner's frequency range. Each screw has a "neutral" setting, independent of frequency, at which it is effectively out of the circuit. Screws can be locked at any setting to enhance the excellent SWR resettability and to protect against accidental disturbance. They can be partially clamped for the desired friction.





Frequency: 1 to 8.5 GHz.
SWR Matching Range: 1.00 to 1.00 + 0.012 f_{GHz}, worst-case minimum. RESETTABILITY: <(1.0005 + 0.0003 f_{GHz}).
Repeatability: 0.05% (limited by connector).
Electrical: IMPEDANCE: 50 Ω nominal. INSERTION LOSS: <0.1 dB to 4 GHz, <0.3 dB to 8.5 GHz. ELECTRICAL LENGTH: 12.0 cm.
Mechanical: DIMENSIONS: 4.5x3.5x1 in. (114x89x25mm). WEIGHT: 1 lb (0.5 kg) net, 3 lb (1.4 kg) shipping.

900-TUA Tuner	**0900-9635**

Precision Fixed Attenuators

GR900 attenuators permit greatly improved accuracy in the measurement of insertion loss, impedance, power, or phase, which requires precise impedance matching of the source and detector. In particular, they are ideal for swept measurements of these quantities. In point-by-point measurements, they reduce or eliminate the need to tune out residual reflections from source or detector.

The SWR characteristic of these attenuators is much lower than was previously available, and they exhibit uniform attenuation over a wide frequency range. They display a high degree of repeatability in SWR, contact resistance, and insertion loss, factors that contribute to their value in substitution measurements. The high repeatability and low SWR also permit them to be accurately calibrated for use as attenuation standards.

Frequency: Dc to 8.5 GHz.
Attenuation Accuracy: ±0.04 dB at dc, ±0.2 dB to 5 GHz, ±0.3 dB to 8.5 GHz. TEMPERATURE COEFFICIENT: <0.0001 dB/°C/dB.
SWR: <(1.005 + 0.005 f_{GHz}).

Electrical: IMPEDANCE: 50.0 Ω. INPUT POWER: <1 W continuous, or <500 W peak with <1 W average. DC RESISTANCE: 50.0 Ω ±0.3% when terminated in 50.0 Ω.
Mechanical: DIMENSIONS: 3.75 in. (95 mm) long. WEIGHT: 0.7 lb (0.4 kg) net.

Description	Catalog Number
50-Ω Precision Fixed Attenuators:	
900-G6, 6 dB	**0900-9850**
900-G10, 10 dB	**0900-9851**

⊕ Federal stock numbers are listed before the index.
* Location of effective position of termination, measured toward "load", from reference plane of connector (where outer conductors butt together).

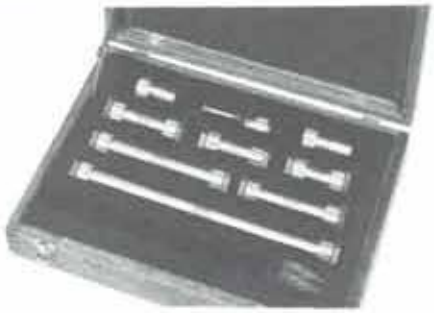
GR900® 50-Ohm Precision Air Lines

Reference-Air-Line Set

This set consists of one each of the seven lengths of 900-LZ Reference Air Lines, a 900-WN4 short circuit, and a 900-WO4 open circuit. All components are supplied in an attractive mahogany storage case, with recessed foam insets, which also can be supplied separately.

Mechanical: WEIGHT: 8 lb (3.7 kg) net, 13 lb (6 kg) shipping.

Description	Catalog Number
GR900 Reference-Air-Line Set	**0900-9452**
GR900 Storage Case	**0900-9450**



Reference Air Lines

For use in calibrations, especially in substitution measurements, as precision capacitance or time-delay standards, as well defined reactance standards, as dielectric sample holders for dielectric-constant and loss measurements with slotted lines and network analyzers, and as absolute impedance references in time-domain reflectometry. The 900-LZ series are beadless, virtually reflectionless coaxial air lines, with spring-loaded supporting tips on the ends of the inner conductor to mate with GR900 connectors; microfinished outer-conductor ends make butt contact with the mating connectors.

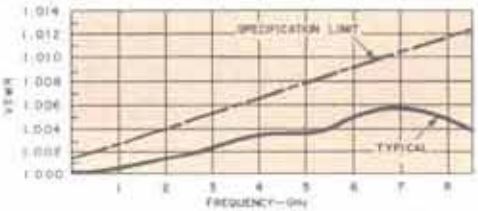
Frequency: Dc to 8.5 GHz.
SWR: $<(1.0005 + 0.0002\ f_{GHz})$; calibration data supplied.
Repeatability: SWR: Within $(0.010 + 0.003\ f_{GHz})$%.
Electrical: IMPEDANCE: 50 Ω ± 0.05% at 23°C and where skin depth is negligible. Additional skin-effect error is calculable.[1] INPUT VOLTAGE: Up to 3000 V pk. POWER, average into 50-Ω load: Up to 20 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. INSERTION LOSS: $<(0.0008\sqrt{f_{GHz}})$ dB/cm. LEAKAGE: >130 dB below signal. DC CONTACT RESISTANCE each end, when mated with GR900 connector: <0.07 mΩ for outer conductor, <0.5 mΩ for inner conductor.

50-Ω Reference Air Lines

Type	Electrical Length (±0.002 cm) cm	Capacitance (±0.07%) pF	Time Delay (±0.1 ps) ps	Odd λ/4 Frequencies* GHz	Catalog Number
900-LZ3	2.998	2.0000	100.0	(2n+1) 2.50	**0900-9603**
900-LZ5	4.997	3.3333	166.7	(2n+1) 1.50	**0900-9600**
900-LZ6	5.996	4.0000	200.0	(2n+1) 1.25	**0900-9601**
900-LZ7H	7.495	5.0000	250.0	(2n+1) 1.00	**0900-9602**
900-LZ10	9.993	6.6667	333.3	(2n+1) 0.75	**0900-9604**
900-LZ15	14.990	10.0000	500.0	(2n+1) 0.50	**0900-9606**
900-LZ30	29.979	20.0000	1000.0	(2n+1) 0.25	**0900-9612**

* Frequencies at which air-line section is an odd multiple of a quarter wavelength, where n is zero or any integer).

Precision Air Lines



Useful as low-SWR line extenders, as 50-ohm impedance standards at frequencies at which the electrical length is an odd multiple of a quarter wavelength, as capacitance and time-delay standards, and as absolute impedance standards in time-domain reflectometry. Each line consists of a short section of precision 50-ohm air line with a GR900 connector at each end.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.0013 + 0.0013\ f_{GHz})$.
Electrical: IMPEDANCE: 50 Ω ± 0.065%. Additional skin-effect error is calculable.[1] INPUT VOLTAGE: Up to 3000 V pk. POWER, average into 50-Ω load: Up to 20 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. DC CONTACT RESISTANCE each end, when mated with GR900 connector: <0.07 mΩ for outer conductor, <0.5 mΩ for inner conductor.

50-Ω Precision Air Lines

Type	Electrical Length (±0.02 cm) cm	Capacitance pF	Time Delay (± 1 ps) ps	Insertion Loss dB	Catalog Number
900-L3	3	2.0000	100	$<0.005\sqrt{f_{GHz}}$	**0900-9608**
900-L10	10	6.6667	333	$<0.012\sqrt{f_{GHz}}$	**0900-9605**
900-L15	15	10.000	500	$<0.016\sqrt{f_{GHz}}$	**0900-9607**
900-L30	30	20.000	1000	$<0.028\sqrt{f_{GHz}}$	**0900-9613**

[1] J. Zorzy, "Skin-Effect Corrections in Standards," *IEEE Transactions on Instrumentation and Measurement*, Vol. IM-15 No. 4, December 1966, p. 358 (GR Reprint A-134).

GR900® 75-Ohm Components

New Since Catalog U

New versatility. A new series of GR900® general-purpose coaxial components extends the versatility of the line to the field of 75-ohm transmission-line measurements. The series includes matching pads and adaptors to permit direct conversion of existing 50-ohm systems to the 75-ohm capability.

The GR900 75-ohm components use a connector similar to the 50-ohm counterpart except for an identifying black coupling nut and modified inner conductor and insulating bead. Performance for the new components is specified up to 1 GHz but they are useful to 8.5 GHz or higher.

Basic Precision Connector

For use on rigid, 14-mm, air-dielectric, 75-Ω coaxial lines or with capacitance, inductance, and resistance standards.

Frequency: Dc to 1 GHz, usable to 9 GHz.
SWR: $<(1.0015 + 0.0015\ f_{GHz})$.
Repeatability: SWR: ±0.0006 (±0.06%). INSERTION LOSS: ±0.001 dB to 30 MHz, ±0.002 dB to 1 GHz. PHASE: 0.01° at 1 GHz.
Electrical: IMPEDANCE: 75 Ω ± 0.3%. INPUT VOLTAGE: Up to 3000 V pk. POWER, average into matched load: Up to 18 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. INSERTION LOSS: $< 0.004\sqrt{f_{GHz}}$ per pair. LEAKAGE: > 130 dB below signal. ELECTRICAL LENGTH: Nom 1.75 cm (3.5 cm, mated pair); exactly 1.7488 ± 0.0038 cm (3.4976 ± 0.0076 cm). DC CONTACT RESISTANCE: < 0.07 mΩ for outer conductor, < 0.5 mΩ for inner conductor.

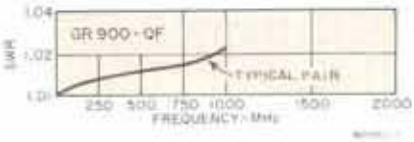
Mechanical: DIMENSIONS: 1.19 in. (30 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

Description	Catalog Number
900-BT (75-Ω) Precision Coaxial Connector	**0900-9730**

Precision Adaptors to Type F

Two adaptors are available; one includes a type F jack and the other includes a type F plug. Each uses a GR900 (75-Ω) connector on the other end. Type F jacks are designed for use with 0.023-in. dia (0.58 mm) wire.

Frequency: Dc to 1 GHz.
Electrical: IMPEDANCE: 75 Ω nominal.
Mechanical: DIMENSIONS: 0900-9738 1.92 in. (49 mm) long; 0900-9739 1.75 in. (44 mm) long; either, 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

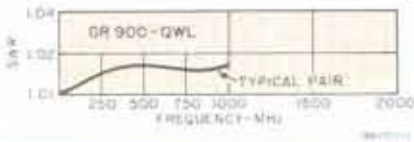


Description	Catalog Number
75-Ω Adaptors to F	
900-QFJ (75-Ω), with type F jack	**0900-9738**
900-QFP (75-Ω), with type F plug	**0900-9739**

Precision Adaptors to Large WE

Two adaptors are available; one includes a large Western Electric jack and the other includes a large Western Electric plug. Each uses a GR900 (75 Ω) locking connector on the other end.

Frequency: Dc to 1 GHz.
Electrical: IMPEDANCE: 75 Ω nominal.
Mechanical: DIMENSIONS: 0900-9736 3.4 in. (86 mm) long; 0900-9737 2.9 in. (74 mm) long; either, 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

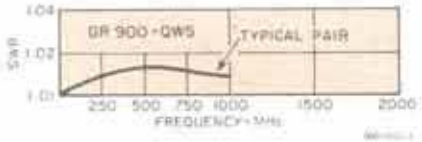


Description	Catalog Number
75-Ω Adaptors to Western Electric, large	
900-QWJL (75-Ω), with large WE jack	**0900-9736**
900-QWPL (75-Ω), with large WE plug	**0900-9737**

Precision Adaptors to Small WE

Two adaptors are available; one includes a small Western Electric jack and the other includes a small Western Electric plug. Each uses a GR900 (75-Ω) locking connector on the other end.

Frequency: Dc to 1 GHz.
Electrical: IMPEDANCE: 75 Ω nominal.
Mechanical: DIMENSIONS: 0900-9734 2.89 in. (73 mm) long; 0900-9735 2.62 in. (67 mm) long; either, 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.



Description	Catalog Number
75-Ω Adaptors to Western Electric, small	
900-QWJS (75-Ω), with small WE jack	**0900-9734**
900-QWPS (75-Ω), with small WE plug	**0900-9735**

Precision Adaptor, 75- to 50-Ohm GR900

Includes a GR900 (50-Ω) connector on one end and a GR900 (75-Ω) connector on the other end. It is a mechanical adaptor for the conversion from GR900 50-ohm connectors to GR900 75-ohm connectors (it is not an impedance transformer; see 900-MP below).

Frequency: Dc to 1 GHz, usable to 8.5 GHz.

Electrical: IMPEDANCE: 50 Ω ± 0.3% for 50-Ω side; 75 Ω ± 0.5% for 75-Ω side. LEAKAGE: > 130 dB below signal. ELECTRICAL LENGTH: 4 ± 0.01 cm for 50-Ω side; 0.24 ± 0.005 cm for 75-Ω side.

Mechanical: DIMENSIONS: 1.66 in. (42 mm) long x 1.06 in. (26 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

Description	Catalog Number
900-Q75 Precision Adaptor, 50 to 75-Ω	**0900-9731**

75- to 50-Ohm Precision Matching Pad

A two-port minimum-loss network to match 50-ohm GR900-equipped devices to similarly equipped 75-ohm devices. It features low SWR, low leakage, and the excellent repeatability inherent in GR900 connectors.

Frequency: Dc to 1 GHz, usable to 8.5 GHz.

SWR: Better than $1.003 + 0.003\ f_{GHz}$ for 50-Ω side, $1.01 + 0.012\ f_{GHz}$ for 75-Ω side.

Electrical: IMPEDANCE: 50 Ω and 75 Ω. INPUT: 1 W max continuous. INSERTION LOSS: 5.72 dB nominal. LEAKAGE: > 130 dB below signal.

Mechanical: DIMENSIONS: 3.75 in. (95 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.6 lb (0.3 kg) net, 2 lb (1 kg) shipping.

900-MP 50 to 75-Ω Precision Matching Pad	**0900-9732**

Precision 75-Ohm Termination

A fixed 75-Ω resistor mounted in a GR900 (75 Ω) connector for establishing reference conditions in coaxial lines, for impedance matching, for use as a termination, for the calibration of bridges, slotted lines, and reflectometers, and for use as a dummy load in network measurements.

Frequency: Dc to 1 GHz, usable to 9 GHz.
SWR: $< (1.005 \pm 0.005\ f_{GHz})$.
Electrical: IMPEDANCE: 75 Ω ± 0.3%, temperature coefficient < 150 ppm/°C. INPUT: 1 W with negligible change, 5 W without damage.

Mechanical: DIMENSIONS: 1.83 in. (47 mm) long x 1.06 in. (27 mm) dia. WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.

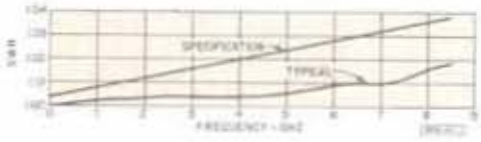
900-W75 (75-Ω) Precision Standard Termination	**0900-9733**

GR900® Miscellaneous

50-Ohm Precision 90° Ell

Permits coaxial devices, such as vertical liquid-dielectric sample holders, to be physically oriented as required, with better electrical performance than could be obtained with flexible cable.

Frequency: Dc to 8.5 GHz.
SWR: $<(1.004 + 0.004\ f_{GHz})$.
Electrical: IMPEDANCE: 50 Ω ± 0.4% at frequencies where skin depth is small. INPUT VOLTAGE: Up to 1500 V pk. POWER, average into 50-Ω load: Up to 10 kW, dc to 1 MHz, decreasing as $1/\sqrt{f}$ at higher f. INSERTION LOSS: $(0.017\sqrt{f_{GHz}})$ dB. ELECTRICAL LENGTH: $[10.00 + 0.0014\ (f_{GHz})^2 \pm 0.02]$ cm.
Mechanical: Gear rings rotatable, for proper mating in any orientation. MATING DIMENSIONS: 2.066 in. (5.246 mm) from center line of one connector to reference plane of other connector. OVER-ALL DIMENSIONS: 2.69x2.69x0.88 in. (68x 68x22 mm). WEIGHT: 0.7 lb (0.3 kg) net.



Description	Catalog Number
900-EL Precision 90° Ell	**0900-9527**

Tool Kit

Nine-piece tool kit in fitted case for convenient installation of 890-BT, 900-BT, 900-C58, and 900-C9 50-ohm precision coaxial connectors. With 0900-9904 accessory tools, the kit can also be used for 900-BT (75Ω) connectors. Complete instructions are included.

Mechanical: WEIGHT: 7 lb (3.2 kg) shipping.

Description	Catalog Number
900-TOK Tool Kit	**0900-9902**
Accessory Tools, for use with 900-TOK on 900-BT (75Ω) connectors	**0900-9904**

Storage Case and Cleaning Kit

Storage Case

An attractive mahogany case with firm, foamed plastic inserts having molded recesses designed to hold various types of GR900® precision coaxial components. An excellent way to keep together a set of adaptors, air lines, terminations, and the like and to carry or store them with minimum exposure to dirt or damage to the precision machined surfaces.

Mechanical: WEIGHT: 8 lb (3.7 kg) shipping.

Cleaning Kit

For cleaning both 50-ohm and 75-ohm GR900 connectors. Solvent supplied in 16-oz aerosol will not affect insulator nor any metal surface in these connectors. Kit also includes two brushes and 24 lint-free wiping pads.

GR900 Storage Case	**0900-9450**
900-TOC Cleaning Kit	**0900-9610**

Precision Tube and Rod

Used to fabricate custom-length 14-mm air lines and components in conjunction with GR900 connectors and connector kits. Machining instructions are furnished.

Precision Outer-Conductor Tube
Mechanical: Precision-forged, silver-lined brass; stress relieved to minimize dimensional changes during machining; for use with 890-BT, 900-AB, -AC, -AP, -BT, and -BT (75Ω) connectors. DIMENSIONS (diameters specified at 23°C): 27 in. (690 mm) long, 0.830 in. nominal OD, 0.5625 in. ± 220 μin. ID with straightness of 0.005 in./ft and inner-surface finish of 30 μin. max, 0.134 in. nominal wall thickness.

50-Ω Precision Inner-Conductor Rod
Electrical: IMPEDANCE: 50 ± 0.035 Ω (± 0.07%) when centered in 0900-9509 tube.

Mechanical: Supplied in pairs; centerless-ground, silver-layered brass rod; for use with 890-BT, 900-AB, -AC, -AP, and -BT connectors. DIMENSIONS (diameters specified at 23°C): 13 ± 0.0312 in. (330 mm) long with straightness of 0.0015 in./ft; 0.24425 in. ± 65 μin. dia with uniformity of ±25 μin. and surface finish of 20 μin. max.

Precision Outer-Conductor Tube	**0900-9509**
50-Ω Precision Inner-Conductor Rod	**0900-9507**