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# GR874®
# Broad-Band Coaxial Components

The GR874® general-purpose line of coaxial components, for dc to microwaves, consists of

**50-Ohm Connectors**
Basic, cable, panel, and feedthrough connectors

**50-Ohm Adaptors**
Adaptors to most popular connector types
Balun

**Terminations and Attenuators for 50-Ω Systems**
Short-circuit, open-circuit, and resistive terminations
Adjustable stubs and variable capacitors
Fixed and adjustable attenuators

**50-Ohm Air Lines**
Fixed and adjustable air lines

**50-Ohm Coupling Elements**
Tees, dividers, slits, U-line sections, and rotary joints
Mixers, voltmeter-rectifiers and detectors
Low-pass filters, coupling capacitors, series inductor, and component mounts

**50-, 72- and 75-Ohm Cable**
Cable and patch cords

**75-Ohm Components**
Connectors, adaptors, terminations, attenuators, and air lines

**Transistor and Component Mounts**

**Miscellaneous**
Stand, tools, tube and rod, Smith Charts



# GR874® General-Purpose Coaxial Components

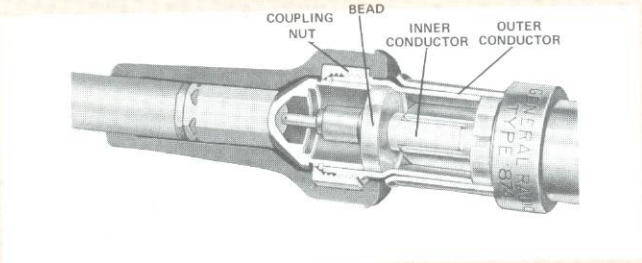
**Over 24 years of design refinement** General Radio entered the coaxial component field over 24 years ago with the introduction of the GR874® connector. This connector offered not only excellent electrical performance but a major convenience feature — any two, although identical, could be mated. The 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.

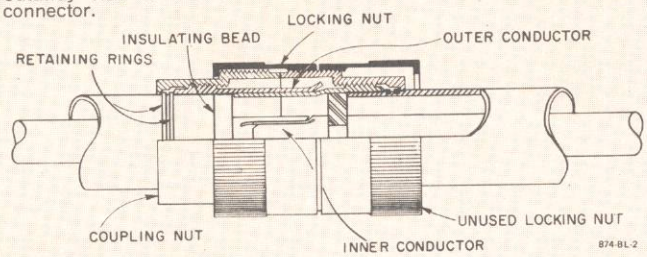
Based on the GR874 connector is a full line of coaxial components and instruments so that a user of the GR874-equipped laboratory need seldom turn to other connector types for a needed element. If he does, there are GR874 adaptors to fit most other common types of connector.

**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.

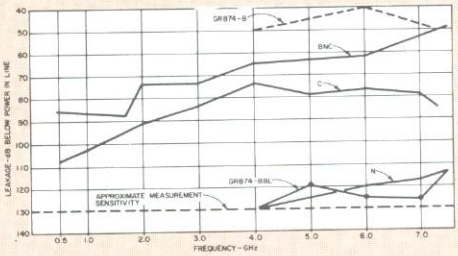



Cutaway view of GR874 basic connector mated with GR874 cable connector.




**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.

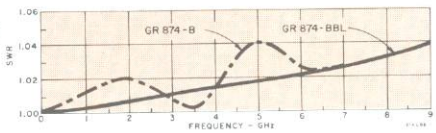
| Description | Catalog Number |
|---|---|
| **Basic 50-Ω Connector** | |
| **874-B,** non-locking | **0874-9400** |
| **874-BBL,** locking | **0874-9403** |



non-locking



locking



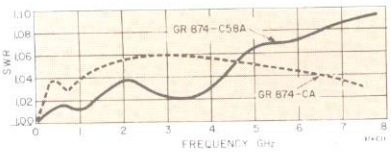

Typical SWR of pairs of connectors

## 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, -638/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, -23/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.

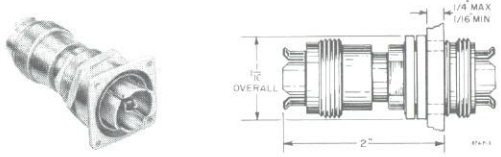

non-locking locking recessed

| | |
|---|---|
| **50-Ω Panel Connectors:** | |
| For GR 874-A2 Cable: | |
| **874-PBA,** 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.

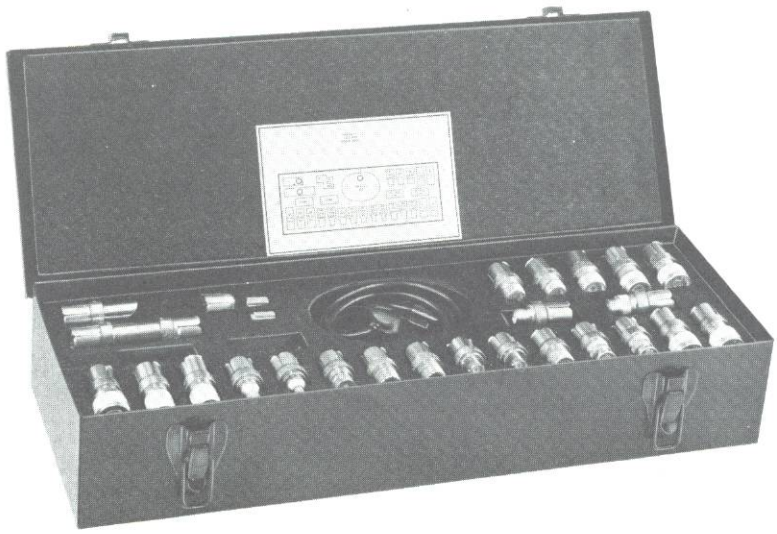
Equally simple is a second approach. Connect one adaptor to another, with the second adaptor appropriate to whatever type of patch cord you have available.

**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** |

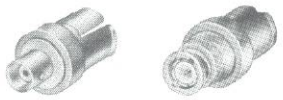


# GR874® 50-Ohm Adaptors (Refer also to Types 274, 776, and 777.)

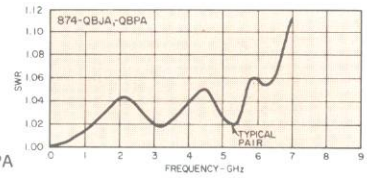
## Adaptors to BNC

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** |

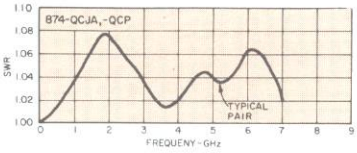
## Adaptors to C

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**

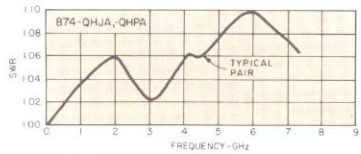
## Adaptors to HN

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**

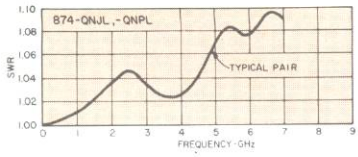
◈ Federal stock numbers are listed before the Index.

## 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

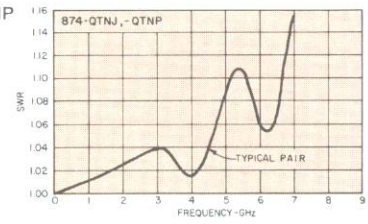
| | |
|---|---|
| **50-Ω Adaptors to SMA** | |
| **874-QMMJ,** SMA jack, non-locking GR874 connector | **0874-9722** |
| **874-QMMJL,** SMA jack, locking GR874 connector | **0874-9723** |
| **874-QMMP,** SMA plug, non-locking GR874 connector | **0874-9822** |
| **874-QMMPL,** SMA plug, locking GR874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

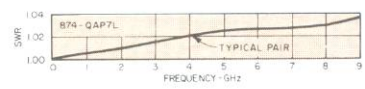
| | |
|---|---|
| **50-Ω Adaptors to UHF** | |
| **874-QUJ,** UHF jack, non-locking GR874 connector ◈ | **0874-9718** |
| **874-QUJL,** UHF jack, locking GR874 connector | **0874-9719** |
| **874-QUP,** UHF plug, non-locking GR874 connector ◈ | **0874-9818** |

## 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.

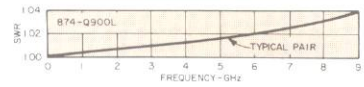
## Adaptor to GR900® Connector

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

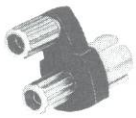



| Description | Catalog Number |
|---|---|
| **50-Ω Adaptor to GR900** | |
| **874-Q900L,** GR900 and locking GR874 Connectors | **0874-9709** |

## 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.



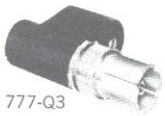
874-Q2

| | |
|---|---|
| **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 |

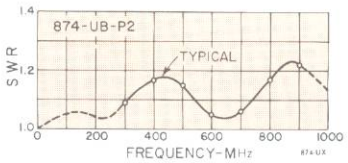
**Supplied:** 874-UB-P1 300-Ω Terminal, 874-WN3 Short-Circuit Termination, 874-WO3 Open-Circuit Termination.

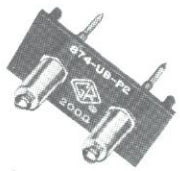
**Recommended:** 874-LK20L Adjustable Line (for use with 1602-B UHF Admittance Meter), one 874-Z Stand, and appropriate tuning elements as listed in the table.

**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.

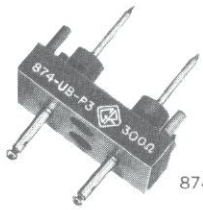
**874-UB-P3 300-Ohm Terminal Pad:** Converts the 200-Ω balanced output impedance, characteristic of the balun, to 300 Ω. Facilitates power and voltage measurements on balanced 300-Ω systems with signal generators and detectors designed for use with 50-Ω coaxial circuits.

**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).

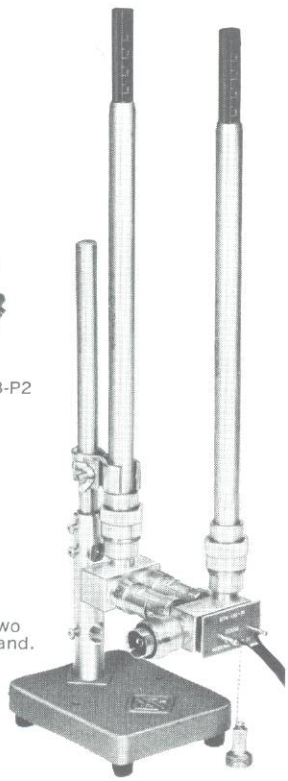



874-UB-P2




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).

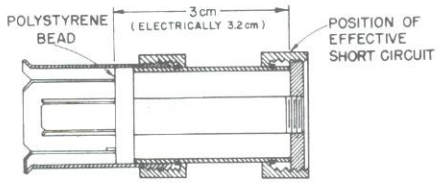
**Mechanical:** WEIGHT: 0.2 lb (0.1 kg) net, 1 lb (0.5 kg) shipping.



874-WNL



874-WN3




874-WN3

| 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** |

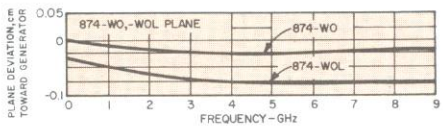
## Open-Circuit Terminations

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.

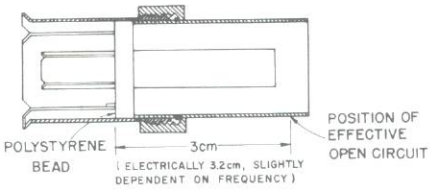


874-WOL






874-WO3




874-WO3

| Description | | Catalog Number |
|---|---|---|
| **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** |

## 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.



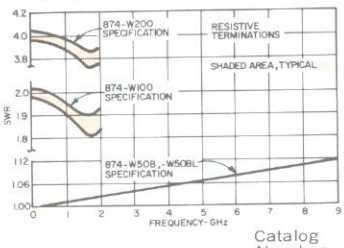
874-W50B



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

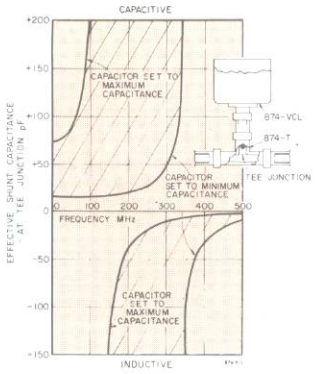
Tuning element for resonant-line circuits, matching transformers, and baluns at low frequencies where line-type elements are awkward to use. Well shielded, Rexolite* insulation, precision ball bearings. Linear capacitance variation.

**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** |





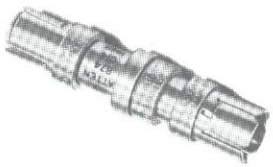

## Fixed Attenuators

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.

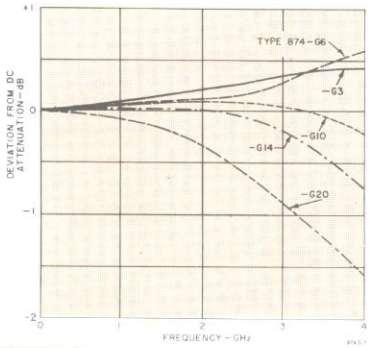
**Frequency:** Dc to 4 GHz.
**Attenuation Accuracy** (relative to correction curves shown): ± 0.2 dB, dc to 1 GHz; ± 0.4 dB, to 2 GHz; ± 0.6 dB, to 4 GHz. TEMPERATURE COEFFICIENT: <0.0003 dB/°C/dB.
**Electrical:** DC RESISTANCE: 50 Ω ± 1% when terminated in 50 Ω. INPUT POWER, max: 1 W cw or average; 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** |

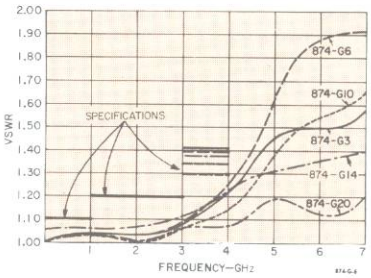
* Connector on each end; locking or non-locking, as noted.



874-G, non-locking




Correction factor



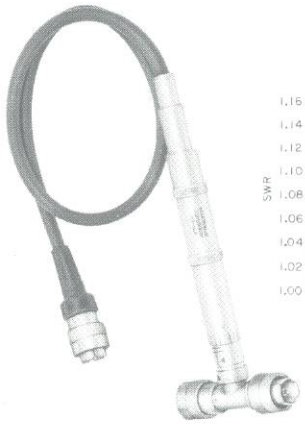

Typical and specified SWR

## Adjustable Attenuator

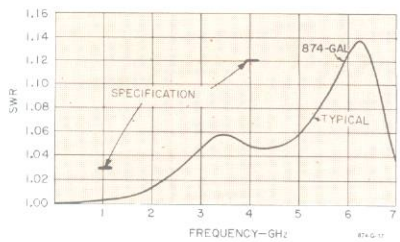
A waveguide-below-cutoff type, useful as a calibrated attenuator or as a sampling device. Calibrated in decibels, on a micrometer-type scale. Absolute attenuation is the sum of insertion loss and scale reading. Phase shift is essentially constant as the attenuation is varied. The main line is a short 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.

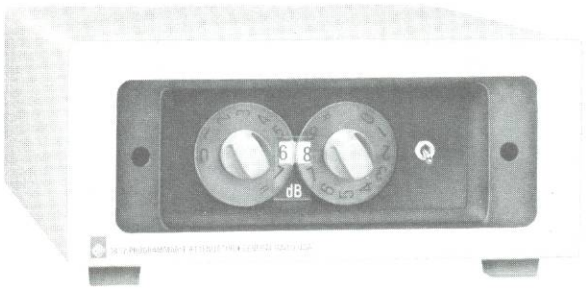


SWR introduced into line

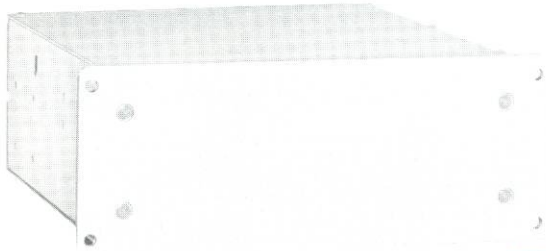



| Description | Catalog Number |
|---|---|
| **874-GAL 50-Ω Adjustable Attenuator** ◈ | **0874-9577** |

◈ 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 $\mu$s**
- **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 Experimenter** for October-December 1970

## SPECIFICATIONS

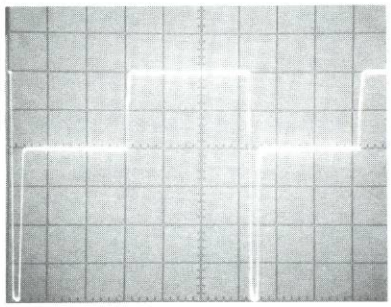
**Frequency:** 10 kHz to 500 MHz.

**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 $\mu$s 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.



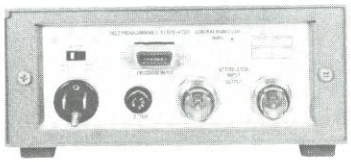
Typical switching transition 0 to 20-dB attenuation at 30 MHz; 1 ms/div horizontal, 10 dB/div vertical.

**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.

| 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** |



Rear view of manual-remote model.

# GR874® 50-Ohm Air Lines

## Fixed Air Lines

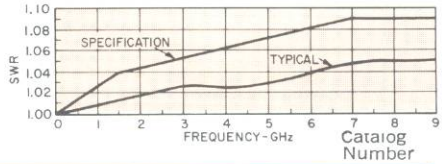
For use as spacing interconnecting elements of a coaxial system, as time-delay elements, and as absolute impedance references in time-domain reflectometry. Each air line consists of a length of 50-Ω, air-dielectric coaxial line with a GR874 connector at each end.

**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** |

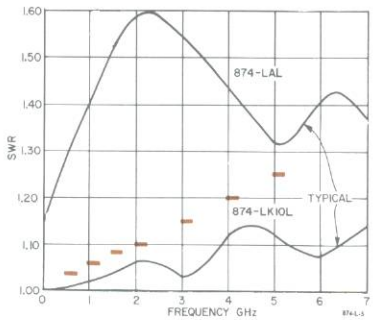
## Adjustable Air Line

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** HALF WAVELENGTH | 10 cm at 1.5 GHz | 22 cm 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.

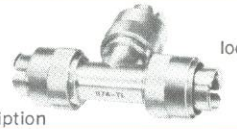
# GR874® 50-Ohm Coupling Elements

## 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

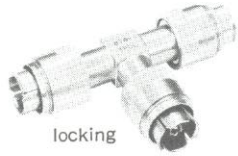
A coaxial tee with a 16.67-Ω resistor in each leg, connected so the tee is matched at any port when the other two ports are terminated in 50-Ω loads. The match holds throughout the wide frequency range. There is 0° phase difference between the outputs. The use of stable deposited-carbon-film resistors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

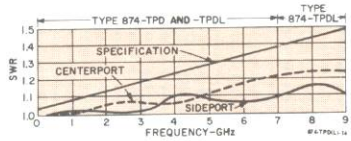
**Frequency:** Dc to 7 GHz; to 9 GHz if connectors are locked.

**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.



locking

**50-Ω 90° Ell**

| | |
|---|---|
| **874-EL,** non-locking GR874 connectors ◈ | **0874-9526** |
| **874-EL-L,** locking GR874 connectors ◈ | **0874-9527** |

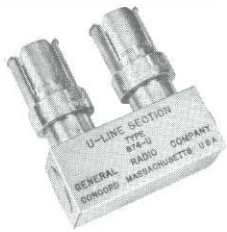
## U-Line Section

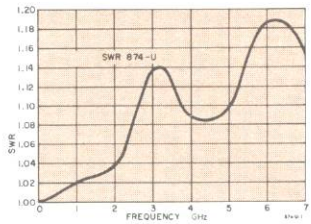
A coaxial line section in the shape of a U that is useful in many coaxial setups.

**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 | **0874-9528** |

## 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.

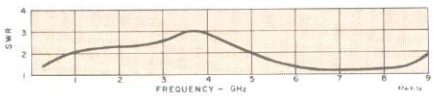
**Sensitivity:** <6 μV, typical, input behind 50 Ω will increase output of i-f amplifier (30-MHz i-f, 0.5-MHz bandwidth, 2-dB noise figure) by 3 dB, for mixer current of 0.5 mA.

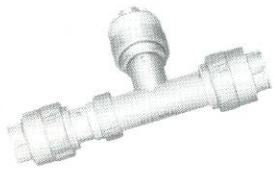
**Input:** < 6 mW typically required from local oscillator for 0.2-mA rectified current (signal and l-o source impedances, each 50 Ω).

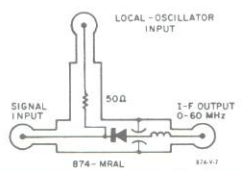
**Electrical:** IMPEDANCE: 50 Ω, input; 400 Ω avg//7 pF, output. DIODE: 1N23C.

**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

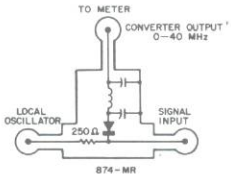
A broadband rf mixer for use as a heterodyne detector with an i-f amplifier.

**Frequency:** 40 MHz to 5 GHz, less sensitive at lower and higher frequencies. MAX I-F: 30 MHz.
**Sensitivity:** $< 5\mu$V typical (equivalent to $\approx 10\ \mu$V 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

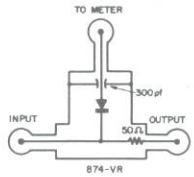
Used to monitor the voltage in a coaxial system. Similar to 874-VQ but includes a 50-Ω resistor in series with the output-port center conductor. In combination with a signal source and a properly calibrated indicator, it can simulate a 50-Ω generator with known open-circuit voltage and thus be used in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

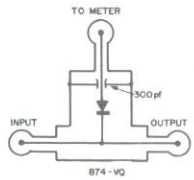
For use as a general-purpose rf-level detector with a dc indicator or as a modulated-signal detector with a sensitive amplifier. It can be inserted into a 50-Ω line without introducing appreciable discontinuity or, with a GR874 50-Ω termination, it can be used as a matched detector to terminate a line.

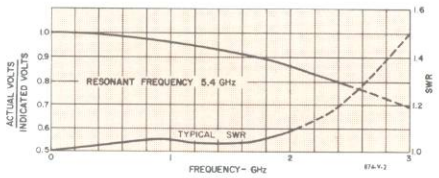
**Frequency:** 500 kHz to 2 GHz when used as a matched detector.
**SWR:** <1.1 at 1 GHz, <1.2 at 2 GHz.
**Electrical:** IMPEDANCE: 50 Ω, nominal. INPUT VOLTAGE: 2 V max. BYPASS CAPACITANCE: ≈ 300 pF. DIODE: 1N23B.
**Mechanical:** DIMENSIONS: 3.75 in. (95 mm) long x 2.5 in. (64 mm) wide. WEIGHT: 0.4 lb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

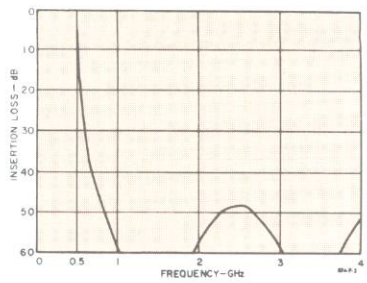
| | | |
|---|---|---|
| **50-Ω Low-Pass Filters** | | |
| **874-F185L,** 185 MHz, locking GR874 connectors | | **0874-9533** |
| **874-F500L,** 500 MHz, locking GR874 connectors | ◈ | **0874-9537** |
| **874-F1000L,** 1 GHz, locking GR874 connectors | ◈ | **0874-9541** |
| **874-F2000L,** 2 GHz, locking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

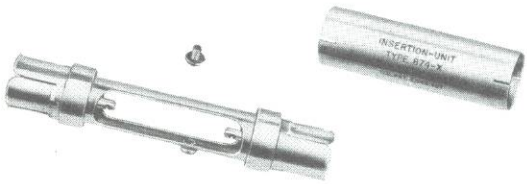



**874-XL Series Inductor,** non-locking GR874 connectors **0874-9998**

## 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).

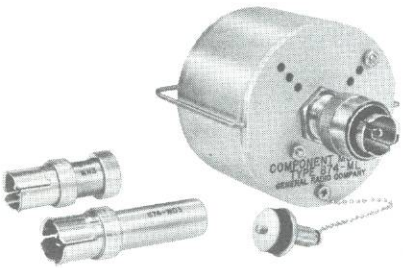



| Description | Catalog Number |
|---|---|
| **874-X Insertion Unit,** non-locking GR874 connectors ◈ | **0874-9990** |

## 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).

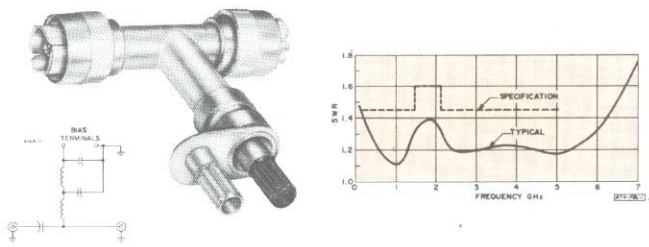


**874-MB Coupling Probe,** non-locking GR874 connector ◈ **0874-9666**

## 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

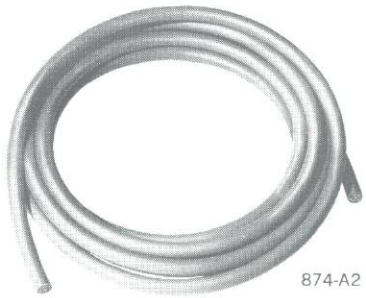
**Low-loss 874-A2** This flexible, double-shielded, low-loss coaxial cable consists of No. 14 stranded inner conductor centered in solid polyethylene dielectric (OD: 0.244 in.) sheathed by 2 tinned-copper braids and covered with a gray, noncontaminating polyvinyl-chloride jacket.

**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

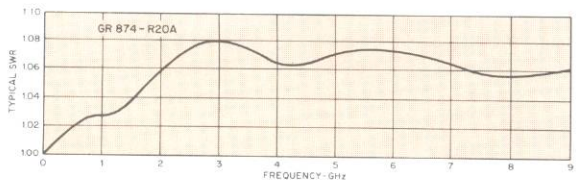


874-R33



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.

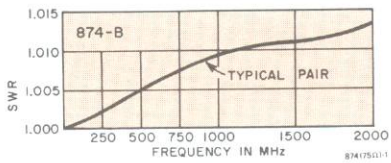
Frequency response for the new series is specified from dc to 2 GHz although the units are often satisfactory at higher frequencies. Locking connectors are standard in the series; nonlocking 75-Ω connectors are available in OEM quantities.

## 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.



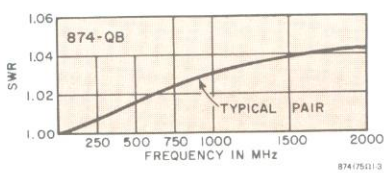
| | |
|---|---|
| **75-Ω Panel Connector** | |
| **874-P11 (75-Ω),** for RG-11 A/U, -12A/U, -216/U cable | **0874-9745** |
| **874-P59 (75-Ω),** for RG-59 B/U, -140/U cable | **0874-9746** |
| **874-P187 (75-Ω),** for RG-187 A/U, -179 B/U cable | **0874-9747** |

## 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.





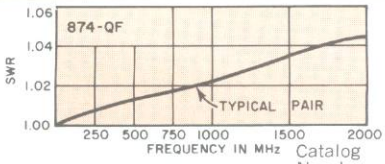

| | |
|---|---|
| **75-Ω Adaptors to BNC** | |
| **874-QBJ (75-Ω),** with BNC jack | **0874-9750** |
| **874-QBP (75-Ω),** with BNC plug | **0874-9751** |

## 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.





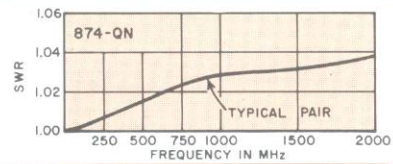

| Description | Catalog Number |
|---|---|
| **75-Ω Adaptors to F** | |
| **874-QFJ (75-Ω),** with type F jack | **0874-9748** |
| **874-QFP (75-Ω),** with type F plug | **0874-9749** |

## 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.





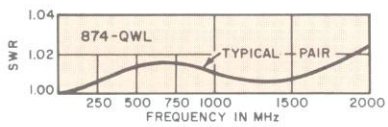

| | |
|---|---|
| **75-Ω Adaptors to N** | |
| **874-QNJ (75-Ω),** with type N jack | **0874-9754** |
| **874-QNP (75-Ω),** with type N plug | **0874-9755** |

## 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.





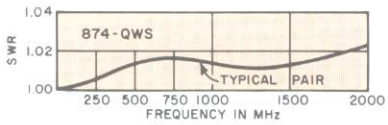

| Description | Catalog Number |
|---|---|
| **75-Ω Adaptors to Western Electric,** large | |
| **874-QWJL (75-Ω),** with large WE jack | **0874-9740** |
| **874-QWPL (75-Ω),** with large WE plug | **0874-9741** |

## 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.





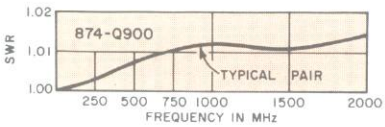

| | |
|---|---|
| **75-Ω Adaptors to Western Electric,** small | |
| **874-QWJS (75-Ω),** with small WE jack | **0874-9738** |
| **874-QWPS (75-Ω),** with small WE plug | **0874-9739** |

## 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.





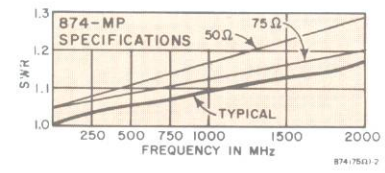

| | |
|---|---|
| **874-Q900 Adaptor,** GR874 (75-Ω) to GR900 (75-Ω) | **0874-9733** |

## 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.





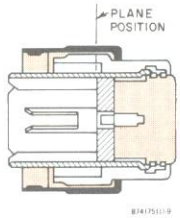

| | |
|---|---|
| **874-MP Matching Pad,** 75-Ω to 50-Ω | **0874-9736** |

## 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.



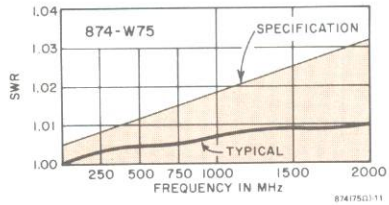
| Description | Catalog Number |
|---|---|
| **874-WO (75-Ω) Open-Circuit Termination** | **0874-9752** |

## 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.





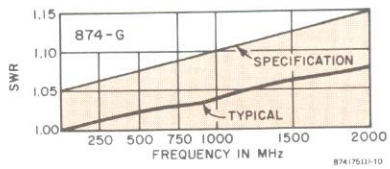

| | |
|---|---|
| **874-W75 (75-Ω) 75-Ω Termination** | **0874-9737** |

## 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.





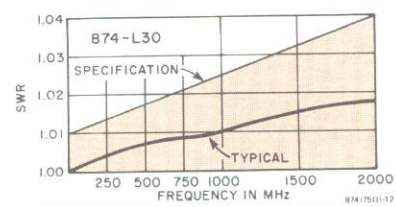

| | |
|---|---|
| **75-Ω Fixed Attenuators** | |
| **874-G6 (75-Ω),** 6-dB attenuation | **0874-9731** |
| **874-G10 (75-Ω),** 10-dB attenuation | **0874-9734** |

## 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, $4\text{kW}/\sqrt{f_{GHz}}$ 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

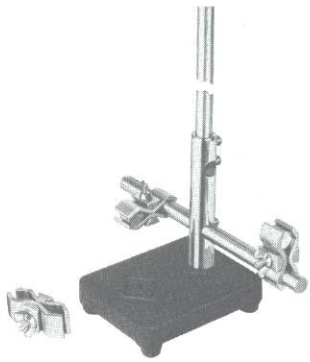
| Description | Grounded Connection | Pin Circle | Catalog Number |
|---|---|---|---|
| **50-Ω Transistor Mounts,** require 1607-P40 Termination Kit | | | |
| For TO5, 9, 11, 12, 16, 26, 31, 33, 37, 38, 39, 43; MD-14; MM-4, 8; MT-13, 20, 28, 37; RO-2, 3, 4, 5, 10, 24, 30, 33, 34, 46, 49, 50, 61, 62, 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

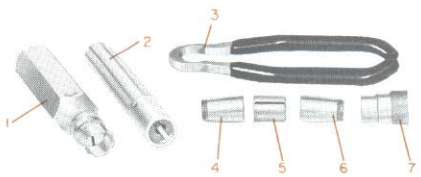
These tools ensure quick assembly, neat, uniform appearance, and best electrical and mechanical performance of GR874 connectors (50 and 75 Ω).

**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.

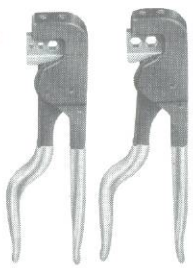
**Crimping Dimensions,** across flats of hexagonal crimp: For -TO8, 0.389 and 0.411 in. (9.88, 10.45 mm); for -TO58, 0.215, 0.250, and 0.375 in. (5.46, 6.35, 9.53 mm).

| | |
|---|---|
| **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.

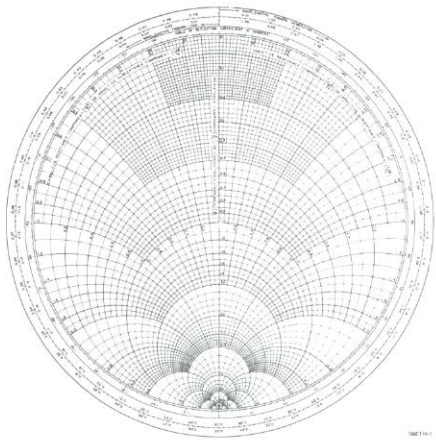


| Description | Catalog Number |
|---|---|
| **Outer-Conductor Tube** (50 and 75 Ω) | **0874-9509** |
| **Inter-Conductor Rod** | |
| 50-Ω | **0874-9508** |
| 75-Ω | **0874-9550** |

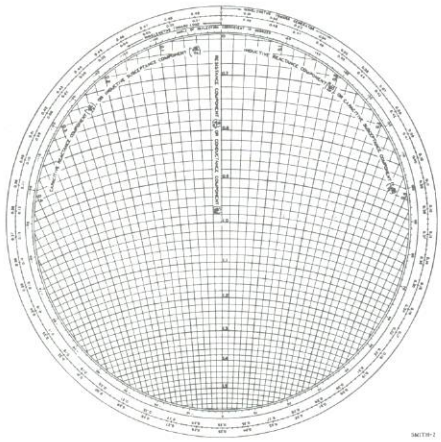
## Smith Charts

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.

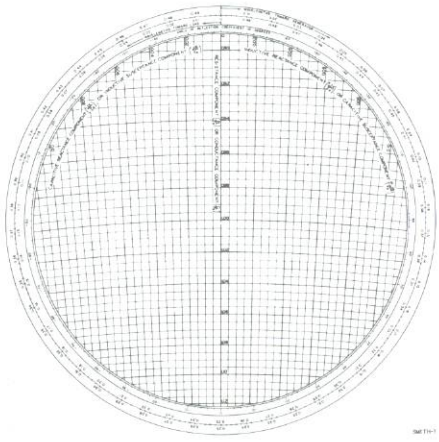
| **Smith Charts** | |
|---|---|
| NORMALIZED COORDINATES | |
| Type NX, 22.5x35 in. (571x889 mm), pad of 75 charts | **5301-7563** |
| Type N, 8.5x11 in. (216x279 mm), 50 charts | **5301-7560** |
| Type NE, expanded (for use when SWR ⩽ 1.58), 8.5x11 in., 50 charts | **5301-7561** |
| Type HE, highly 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

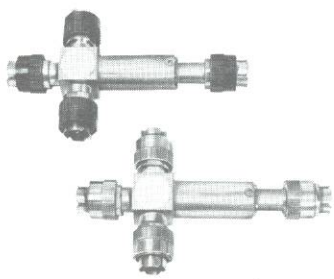
**New**

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** |

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