Instructions

Tektronix

AMT75
75 to 50 Ohm Impedance Adapter

070-9479-00

There are no current European directives that apply to this product. This product provides cable and test lead connections to a test object of electronic measuring and test equipment.

Printed in the U.S.A.

Tektronix, Inc., P.O. Box 1000, Wilsonville, OR 97070–1000

WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Service Assurance

If you have not already purchased Service Assurance for this product, you may do so at any time during the product's warranty period. Service Assurance provides Repair Protection and Calibration Services to meet your needs.

Repair Protection extends priority repair services beyond the product's warranty period; you may purchase up to three years of Repair Protection.

Calibration Services provide annual calibration of your product, standards compliance and required audit documentation, recall assurance, and reminder notification of scheduled calibration. Coverage begins upon registration; you may purchase up to five years of Calibration Services.

Service Assurance Advantages

- Priced well below the cost of a single repair or calibration
- Avoid delays for service by eliminating the need for separate purchase authorizations from your company
- Eliminates unexpected service expenses

For Information and Ordering

For more information or to order Service Assurance, contact your Tektronix representative and provide the information below. Service Assurance may not be available in locations outside the United States of America.

Name	VISA or Master Card number and expiration
Company	date or purchase order number
Address	Repair Protection (1,2, or 3 years)
City, State, Postal code	Calibration Services (1,2,3,4, or 5 years)
Country	Instrument model and serial number
Phone	Instrument purchase date

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

To Avoid Fire or Personal Injury

Ground the Product. This product is indirectly grounded through the grounding conductor of the mainframe power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

The common terminal is at ground potential. Do not connect the common terminal to elevated voltages.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Contacting Tektronix

Product Support	For application-oriented questions about a Tektronix measurement product, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time Or contact us by e-mail: tm_app_supp@tek.com For product support outside of North America, contact your local Tektronix distributor or sales office.
Service Support	Contact your local Tektronix distributor or sales office. Or visit our web site for a listing of worldwide service locations. http://www.tek.com
For other information	In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.
To write us	Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000

AMT75 Impedance Adapter

The AMT75 (Figure 1) is a 75 to 50 Ω impedance adapter with low VSWR (voltage standing-wave ratio). The adapter allows you to connect video and communication signals from a 75 Ω coax cable to the 50 Ω input of an oscilloscope while minimizing aberrations and reflections. The AMT75 adapter fully complies with ANSI T1.102 and ITU-T G.703

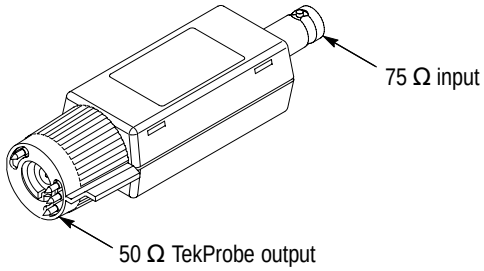


Figure 1: AMT75 Adapter

CAUTION. *The AMT75 adapter contains components that are sensitive to electrostatic discharge (ESD). To avoid electrostatic damage, observe ESD precautions when handling the adapter.*

Oscilloscope Connections

As shown in Figure 2a, the output of the AMT75 adapter connects directly to the TekProbe II interface on Tektronix TDS Series oscilloscopes. With the addition of optional accessories, the AMT75 adapter connects to any instrument with a 50 Ω BNC or 50 Ω SMA input. The shell of the input on all oscilloscopes must connect to earth ground.

Instruments with TekProbe II

When you connect the adapter to instruments with the TekProbe II interface, the instrument automatically adjusts the scale factor and sets the oscilloscope input impedance to 50 Ω.

NOTE. *TDS 400 and TDS 400A series oscilloscopes always interpret the attenuation of the AFTDS adapter as ÷ 10. The attenuation of the adapter is actually ÷ 5. When you use this adapter on these oscilloscopes, divide the measurement (or scale factor) by 2 to obtain the correct value.*

Instruments without TekProbe II

When you connect the adapter to instruments that *do not* have the TekProbe II interface, make the settings and calculate the amplitude as follows:

- Set the oscilloscope input impedance to 50 Ω or use an external 50 Ω termination.
- Correct your measurements for the 5X attenuation factor of the AMT75 adapter.

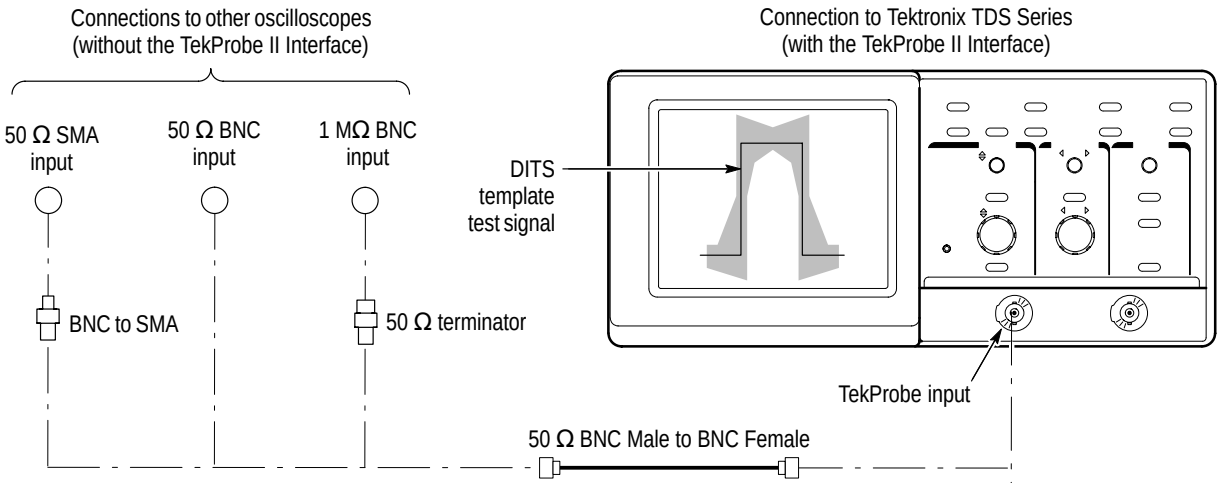
  Displayed Amplitude × 5 = Actual Amplitude

Input Signal Connections

The female BNC input of the AMT75 adapter accepts a male BNC connector. The signal input cable (source) must be 75 Ω. See Figure 2b.

CAUTION. *To avoid damaging the 75 Ω input connector, use accessories that are specifically designed for 75 Ω connections. Using 50 Ω connectors on the 75 Ω input can damage the 75 Ω connector and degrade the VSWR of the AMT75 adapter.*

a) 50 Ω Oscilloscope connections



b) 75 Ω Input signal connections

Impedance	Standard	Data Rate (Mb/s)
75 Ω	D-1	270
	D-2	143
	DS-3	44.736
	DS-4	139.264
	STS-1	51.84
	STS-3/STM-1	155.51
	E-2	8.448
	E-3	34.368
	E-4	139.264

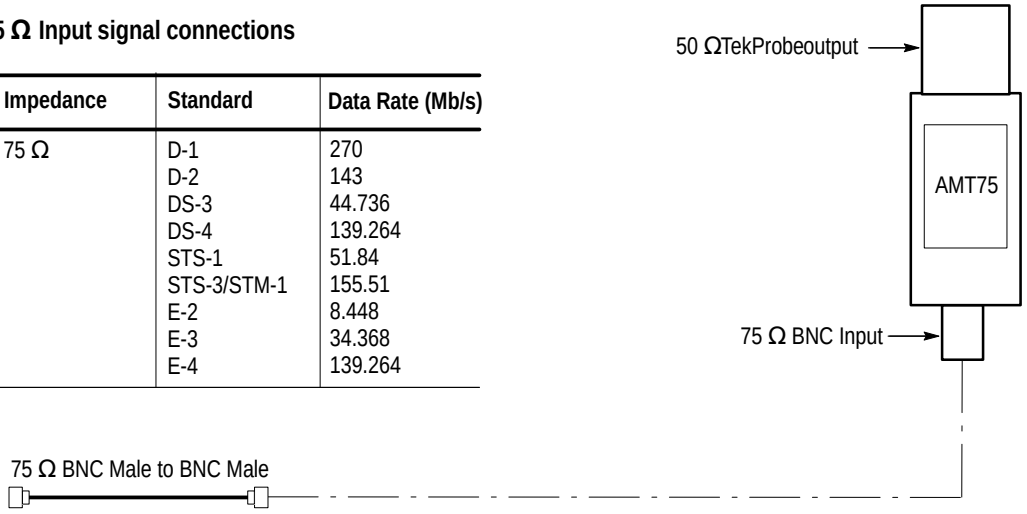


Figure 2: Connecting the AMT75 adapter

Specifications

This section contains the specifications and compliances for the AMT75 Impedance Adapter. All specifications are guaranteed unless noted as "typical." Typical specifications are provided for your convenience but are not guaranteed. Specifications that are marked with the ✓ symbol are checked in the *Performance Verification* on page 8.

Specification/compliance	Description
Communication and video standards	D-1 (270 Mb/s) D-2 (143 Mb/s) DS-3 (44.736 Mb/s) DS-4 (139.264 Mb/s) STS-1 (51.84 Mb/s) STS-3/STM-1 (155.51 Mb/s) E-2 (8.448 Mb/s) E-3 (34.368 Mb/s) E-4 (139.264 Mb/s)
Compliance with industry standards	ANSI T1.102 and ITU-T G.703
✓ Input impedance	75 Ω ± 1.5% at DC
Input VSWR (return loss), typical	≤ 1.1:1 (≥ 26.45 dB) to 1 GHz (see Figure 3)
✓ Output impedance	50 Ω ± 1.5% at DC
✓ Attenuation accuracy	5X (–14 dB) ± 1.5% at DC
Bandwidth, (–3dB) typical	≥ 1.0 GHz
Rise time, typical	< 350 ps (calculated from the formula .35/bandwidth = rise time)
Rated input voltage (Power)	≤ 5 VDC or VAC_{RMS} (333 mW)
Temperature Operating Nonoperating	Class 5 Limits 0° C to + 50° C –55° C to + 75° C
Humidity Operating Nonoperating	Class 5 Limits +30° C to + 50° C, 90 to 95% RH –55° C to + 75° C, 90 to 95% RH
EC Compliance	There are no current European Directives that apply to this product.
Pollution Degree 2	Do not operate in environments where conductive pollutants may be present.

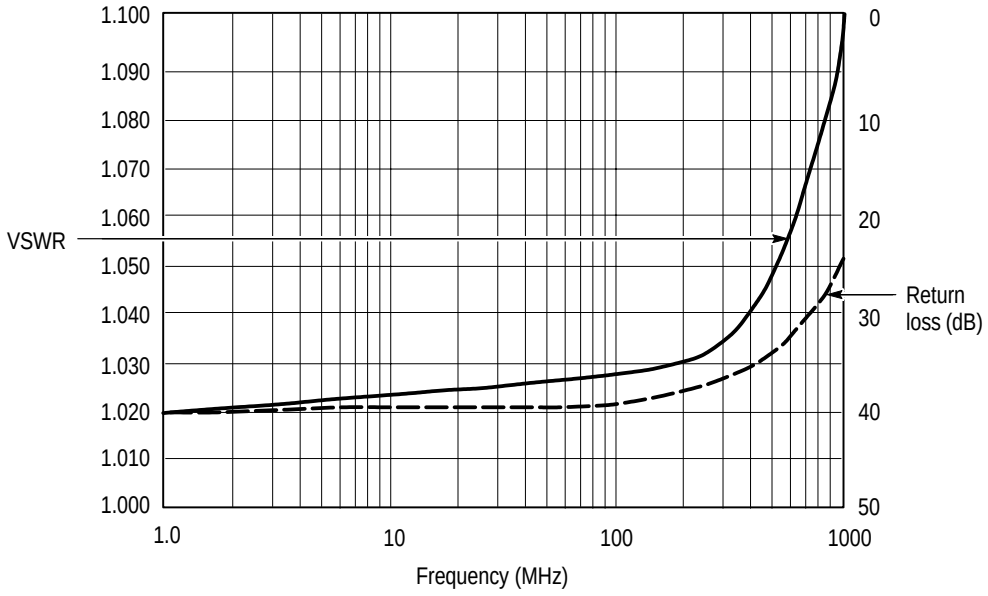


Figure 3: Typical VSWR and return loss

Performance Verification

Use the following procedures to verify the warranted specifications of the AMT75 adapter. Before beginning these procedures, photocopy the test record on page 13 and use it to record the performance test results for your AMT75 adapter. The recommended calibration interval is one year.

These procedures are for use by qualified service personnel only.

Test Equipment

Table 1 itemizes the equipment required, provides an example or part number of the equipment, and explains the purpose of the equipment.

Table 1: Test equipment

Description	Minimum requirements	Example product
Power supply (1)	1 VDC out across 75 Ω with < 0.5 mV resolution	Wavetek 9100
Digital multimeter (1)	5 1/2 digit with sense, Ω 4 wire, 50 Ω and 75 Ω ± 0.1%, DCV: 1 V and 200 mV ± 0.1%	Kiethley 2000 Fluke 884X
75 Ω terminator (1)	75 Ω ± 0.1%, 3 V_{RMS}, BNC	011-0103-02
50 Ω terminator (1)	50 Ω ± 0.1%, 2W, BNC	011-0123-00
BNC banana adapter (3)	BNC female to dual banana plug	103-0090-00
BNC male connector (1)	1 male to 1 male	103-0029-00
50 Ω BNC cable (2)	2 foot BNC male	012-1342-00
50 Ω BNC “T” adapter (3)	2 female to 1 male BNC	103-0030-00
75 Ω BNC cable (3)	2 foot BNC male	012-1339-00
75 Ω BNC “T” adapter (2)	2 female to 1 male	Pasternack Model# PE9365
50 Ω BNC adapter (1)	1 female to 1 female	103-0028-00

Output Impedance

1. Set up the DMM as follows:

DMM	Setting
Mode	Ω 4 Wire
Range	100 Ω

2. Connect the AMT75 adapter as shown in Figure 4.

NOTE*. Connect the input and sense of the DMM to the output of the AMT75 adapter with a 50 Ω BNC T adapter, two 50 Ω BNC cables, and two BNC banana adapters.*

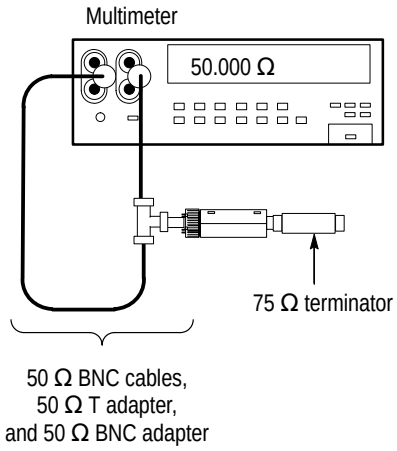


Figure 4: Test setup for output impedance

3. Check that the DMM reads 50 Ω ± 1.5% (49.25 to 50.75).

4. Disconnect 50 Ω BNC T adapter, AMT75 adapter, and 75 Ω terminator from the setup.

Input Impedance

1. Connect the AMT75 adapter as shown in Figure 5.

CAUTION. *To avoid damaging the 75 Ω input, use only 75 Ω connectors and 75 Ω cables on the 75 Ω input.*

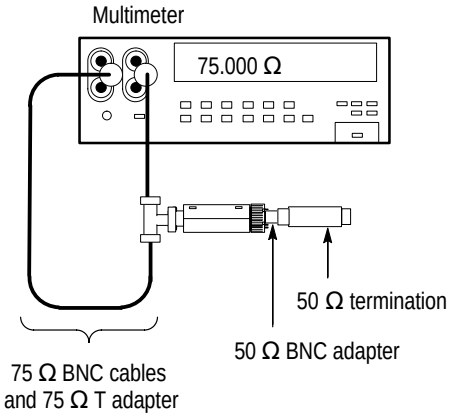


Figure 5: Test setup for input impedance

2. Check that the DMM reads 75 Ω ± 1.5% (73.875 to 76.125).

3. Disconnect setup.

Attenuation Accuracy

1. Set up the equipment as follows:

DMM	Setting
Mode	DCV
Range	10 V
Power Supply	**Setting**
DCV	1.000 V

2. Connect the equipment as shown in Figure 6.

CAUTION. *To avoid damaging the 75 Ω input, use only 75 Ω connectors and 75 Ω cables on the 75 Ω input.*

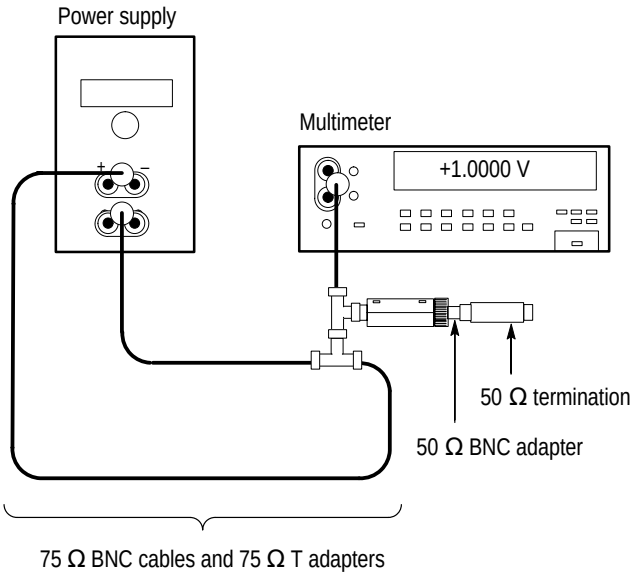


Figure 6: Measuring the power supply output voltage

3. Activate the power supply and adjust the output until the DMM reads 1.000 V.

4. Deactivate the power supply but do not change the output setting.

5. Connect the equipment as shown in Figure 7.

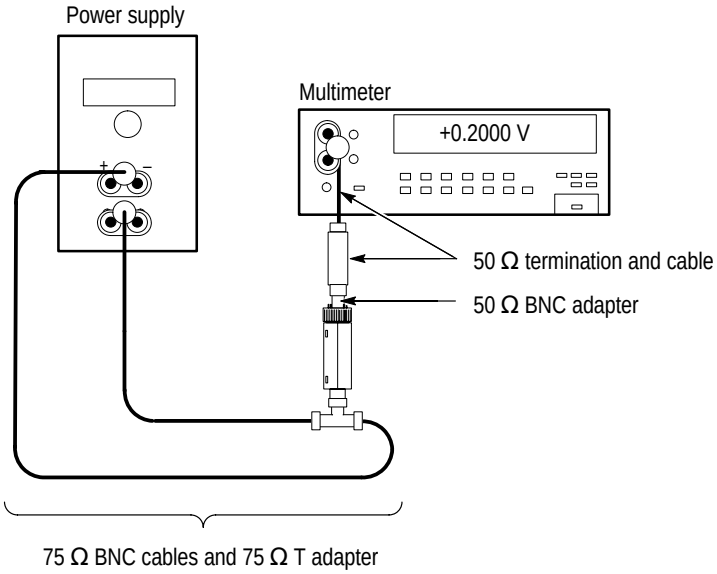


Figure 7: Measuring the attenuation accuracy

6. Change the DMM range as follows:

DMM	Setting
Range	1 V

7. Activate the power supply.

8. Check that the voltage is attenuated by 5X ± 1.5% (the DMM reads 0.197 to 0.203).

9. Deactivate the power supply and disconnect the test setup.

AMT75 Test Record

Photocopy this page and use it to record the performance test results for your AMT75 adapter.

AMT75 Test Record

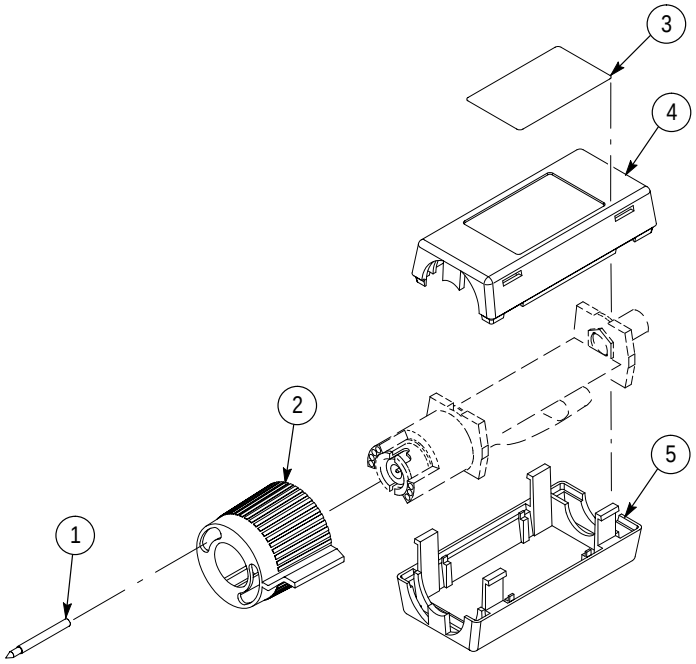
Instrument Serial Number: _____ Certificate Number: _____

Temperature: _____ RH %: _____

Date of Calibration: _____ Technician: _____

AMT75 Performance Test	Minimum	Incoming	Outgoing	Maximum
Output Impedance: 50 Ω ± 1.5%	49.25	_____	_____	50.75
Input impedance: 75 Ω ± 1.5%	73.875	_____	_____	76.125
Attenuation accuracy: 5X (–14 dB) ± 1.5% (measured with 2.500 V on the input)				
Input voltage	N/A	1.000	1.000	N/A
Output voltage	0.197	÷ _____	÷ _____	0.203
Input ÷ output = attenuation factor	4.925	= _____	= _____	5.075

Replaceable Parts



NOTE: Parts illustrated with dashed lines are not replaceable

Figure 8: Replaceable parts

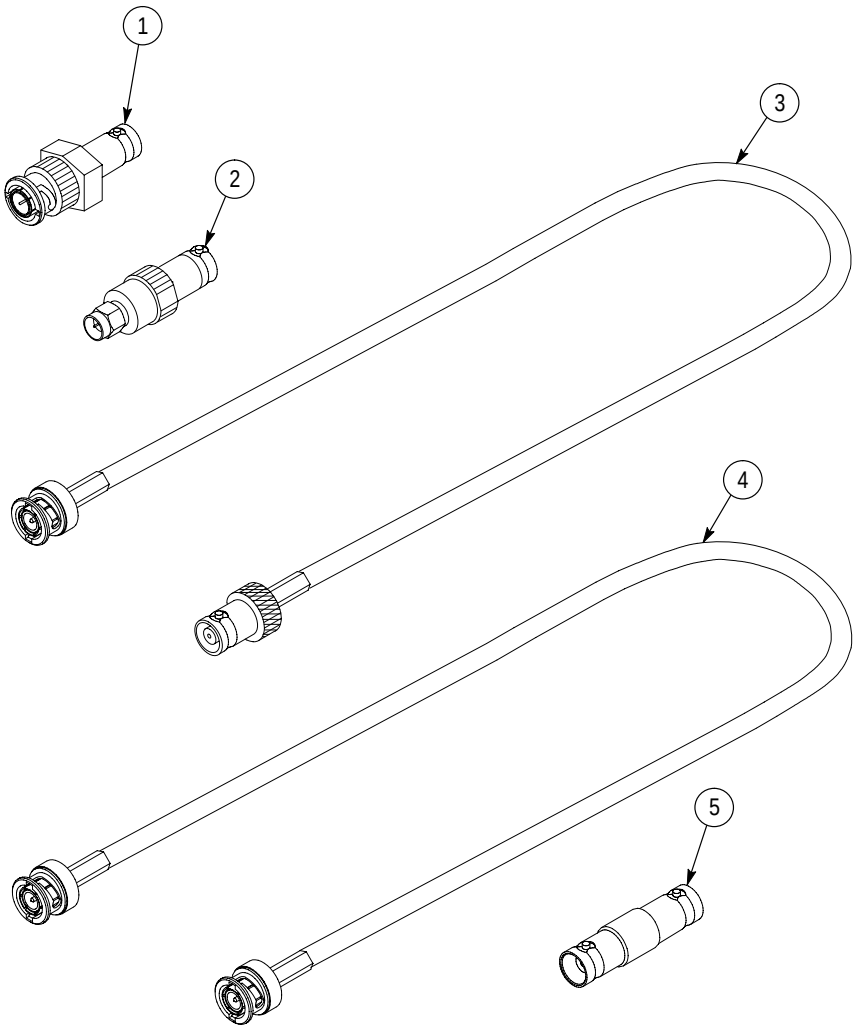


Figure 9: Optional accessories

Replaceable parts list

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
8–					Adapter:AMT75		
–1	131–3627–01			1	CONTACT,ELEC:GOLD PLATED TIP	18359	P–6158–1
–2	205–0191–00			1	SHELL,ELEC CONN:BNC,ABS,DOVE GRAY	80009	205–0191–00
–3	334–9320–00			1	MARKER,IDENT:INSTRUMENT LABEL, AMT75	80009	334–9320–00
–4	206–0473–00			1	COMP BOX:COMP BOX,TOP,FLINT,AMT75	TK2565	206–0473–00 OBD
–5	206–0474–00			1	COMP BOX:COMP BOX,BOTTOM,FLINT,AMT75	TK2565	206–0474–00 OBD
					Standard Accessories		
	070–9479–00			1	MANUAL,TECH:INSTRUCTIONS,XBS,AMT75,DP	TK2548	070–9479–00
					Optional Accessories		
9–1	011–0049–01			1	TERMN,COAXIAL:50 OHM,2W,BNC	24931	28A123–1
–2	015–0554–00			1	ADPTR,SMA,ELEC:FEMALE BNC TO MALE SMA	24931	29JP170–1
–3	012–0104–00			1	CA ASSY,RF:COAXIAL,RFD,50 OHM,RG58/U,18.0 L,MALE,BNC X FEMALE,BNC,	74868	35001–1
–4	012–1339–00			1	CA ASSY,RF:COAXIAL,RFD,75 OHM,24 L, BNC,MALE,STR,BOTH ENDS,W/STRAIN RELIEF BOOT BOTH ENDS	80009	012–1339–00
–5	103–0028–00			1	ADAPTER,CONN:BNC,FEMALE TO FEMALE,1.3 L,GOLD/NICKEL	24931	28A100–2

Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
07416	NELSON NAME PLATE COMPANY	3191 CASITAS AVENUE	LOS ANGELES, CA 90039–2410
18359	PYLON CO. INC.	51 NEWCOMB ST	ATTLEBORO, MA 02703–1403
24931	BERG ELECTRONICS INC	BERG ELECTRONICS RF/COAXIAL DIV 2100 EARLYWOOD DR PO BOX 547	FRANKLIN, IN 46131
74868	AMPHENOL CORP	RF/MICROWAVE OPERATIONS 1 KENNEDY AVE	DANBURY, CT 06810–5803
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077–0001
TK2548	XEROX CORPORATION	14181 SW MILLIKAN WAY	BEAVERTON, OR 97005
TK2565	VISION PLASTICS INC	26000 SW PARKWAY CENTER DRIVE	WILSONVILLE, OR 97070