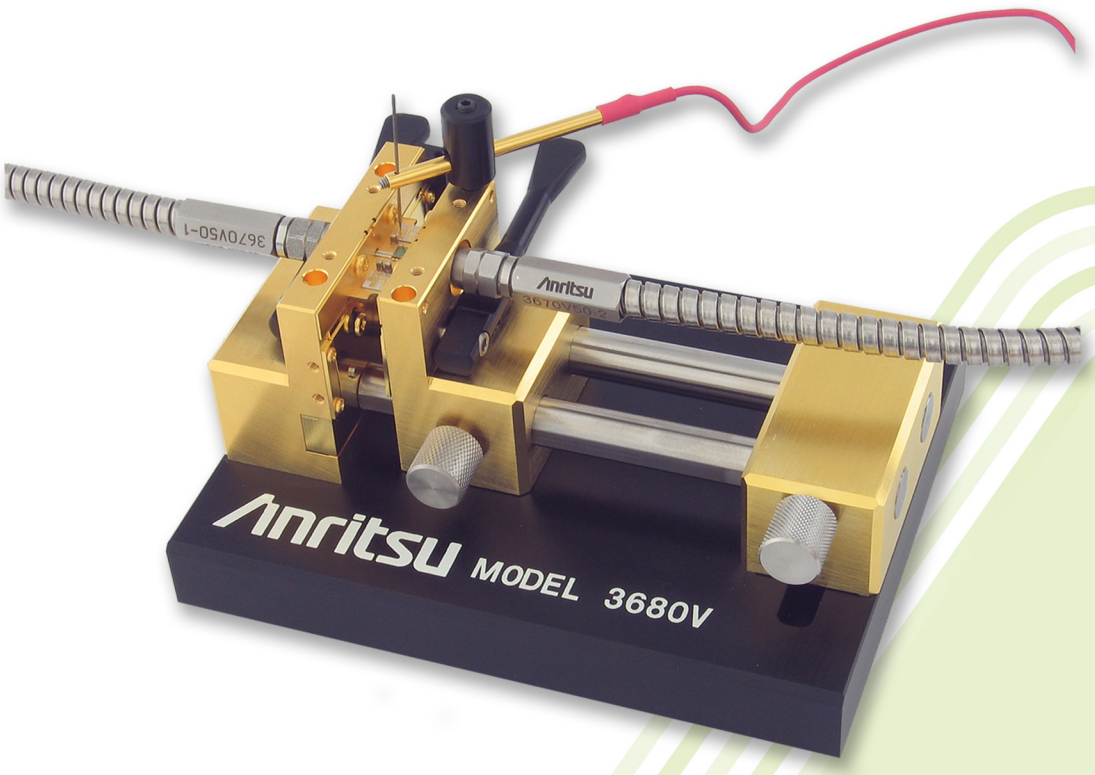
Anritsu Advancing beyond

Universal Test Fixture

3680 Series

Substrate Measurement Launching Fixture

3680-20: DC to 20 GHz
3680K: DC to 40 GHz
3680V: DC to 60 GHz



Introduction

Providing substrate measurement capability for your microstrip or coplanar waveguide designs, the 3680 Series Universal Test Fixtures allow accurate, repeatable transitions from coax to microstrip or coax to coplanar waveguide (CPW). Complete substrate measurement systems comprised of a Universal Test Fixture, a vector or scalar network analyzer, and a “substrate” calibration kit can fulfill your microstrip or CPW test needs. Anritsu provides the complete measurement solution, the test fixtures, the calibration kits, and the test equipment for measurements on substrate devices. Our total system responsibility ensures compatible system components, designed to work together properly. Guaranteed system specs provide assurance that your test results are accurate and verifiable.

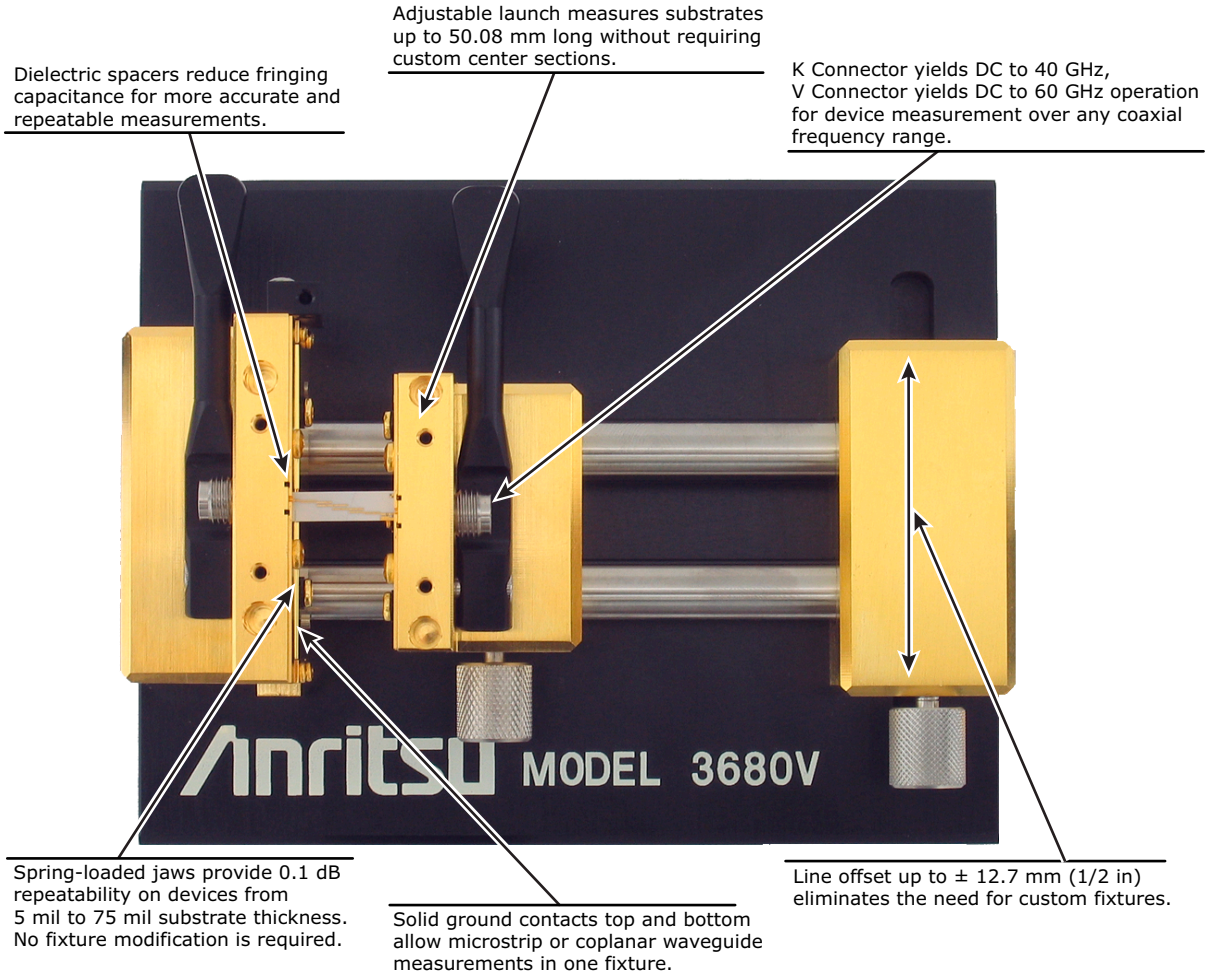
The most critical part of any substrate measurement system is the launching fixture. It must be simple yet flexible, easy to use, and most of all provide accurate, repeatable measurements. Our Universal Test Fixtures are designed to meet these requirements. Three versions of the 3680 Series Universal Test Fixture are available:

- 3680-20, DC to 20 GHz
- 3680K, DC to 40 GHz
- 3680V, DC to 60 GHz

With an Anritsu 3680 Series Universal Test Fixture, you can be sure your measurements are both accurate and repeatable.

General Features

The fixture consists of a fixed connector and a movable connector that can be positioned for substrates up to 50.08 mm (2 in) long. No center section is required. The substrate is held in place between spring loaded jaws. This allows the fixture to accommodate different devices without requiring a custom center section for each different length. The unique jaw action ensures solid, repeatable electrical contact. The jaw tension is defined by the force of a spring, independent of human judgment errors. This means the tension will always be the same, providing more repeatable measurements. Dielectric rods behind the jaws accurately position the substrate away from the launch to reduce fringing capacitance and contribute to the fixture’s excellent repeatability.



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Definitions

Specifications	All specifications and characteristics apply under the following conditions, unless otherwise stated:
Temperature Range	–20 °C to 70 °C.
Typical Performance	Typical specifications are not tested and not warranted. They are generally representative of characteristic performance. All specifications are typical.
Calibration/Verification Kit	Line lengths for 36804B-10M, 36804B-15M, 36804B-25M, 36804B-25C are provided in kit and are provided as physical lengths, not electrical lengths.
	All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

Microstrip or Coplanar Waveguide Measurements

The unique design of the 3680 provides measurement capability for either microstrip or coplanar waveguide (CPW) designs. All that is required is a simple jaw change. The 3680 does the job of two fixtures, saving you time and money. A substrate measurement system with an Anritsu VNA is the only measurement system capable of directly providing microstrip dispersion compensation. Microstrip is a dispersive media - phase shift is not linear with respect to frequency. Our Vector Network Analyzer's ability to compensate for this dispersion can dramatically improve vector measurement accuracy and provide you with the most accurate vector measurements possible.

Offset Measurements

With a 3680 based substrate measurement system, there is not need to force your designs into a straight line or leave your designs untested. The 3680 has the ability to offset lines by as much as ±½ inch. Many designs, such as filters, require parallel traces that are offset. In the past, designers were forced to add extra line lengths, create custom fixtures, or worse, not test offset designs. With the flexibility of the 3680, you can test offset or in-line designs with one setup. Formerly untestable designs can now be tested with ease.

Right-Angle Measurements

Testing designs with right-angle connections is made easy. The optional right-angle launcher adds a connection at 90° to the fixture. This lets you test devices with right-angle connections with precision and repeatability corresponding to an in-line measurement. The fixture is designed to fit your device; you don't have to design your device to fit the fixture. The right-angle launcher also provides another benefit - the ability to test multiport devices. With the addition of right-angle launchers, the 3680 can become a three port, or even four port launching fixture. An Anritsu VNA based microstrip measurement system with optional dual source control can interdependently control up to two sources and a receiver, for testing mixers or other frequency conversion devices. Now a microstrip or CPW mixer, converter, or other device can be tested, with the same convenience as a packaged device.

60 GHz Measurements

Anritsu was the first manufacturer to offer a coaxial VNA with continuous 0.04 GHz to 60 GHz measurement capability. With the 3680 Series Universal Test Fixtures, that measurement capability is extended onto the substrate. An Anritsu VNA based substrate measurement system is capable of measurements from 70 kHz to 60 GHz in one setup. And the optional 60 GHz time domain capability provides time or distance measurements with unsurpassed resolution. Discontinuities as close as 1.2 mm on alumina can be resolved. You can measure devices whose performance could previously only be theorized. The 3680V, thanks to the patented V Connector, has excellent return loss and insertion loss from DC to 60 GHz. In a substrate measurement system, that translates to improved accuracy and repeatability, for more accurate characterization of your microstrip or CPW designs.

Bias Capability

For active device measurements, the 3680 has bias capability either through the RF connection or through a bias probe. With optional multiple bias probes, you can inject bias into any point on your device under test. The bias probe provides infinite placement resolution and eliminates the need for external bias hardware. Alternately, if your active device is biased through an RF connection, bias tees can be used to combine bias and RF at any launch point. The 3680's flexible bias injection eliminates the need for multiple fixtures, saving you time and money. Up to four bias probes can be accommodated.

MMIC Measurements

With the optional MMIC attachment, you can test MMICs and very small components as conveniently as other devices. A MMIC attachment consists of a center carrier, with microstrip lines for launching, and cam-operated pressure rods. The MMIC component is placed on the center carrier between microstrip lines. (Machinable center carrier blocks are available for your custom designs.) Contact with the component is made with spring tabs, for reliability and damage protection. The unique design of the MMIC attachment assures solid, repeatable measurements on any small device. An Anritsu substrate measurement system can fulfill all your substrate measurement needs including, with a MMIC attachment, very small substrates and MMICs.

Calibration/Verification Kits

A full complement of calibration kits for microstrip or coplanar waveguide are available. Standard Open Short Load (OSL) and Line Reflect Line (LRL) calibration components are included. The substrates for these cal kits are carefully selected for proper impedance and consistency, to provide the most accurate measurements possible. Included with every cal kit is a Beatty standard (standard mismatch) and a 20 dB offset termination. Now you can verify, in the fixture, the quality of your calibrations. This verification ensures the validity of your device measurements.

Mechanical Specifications

3680 Series Universal Test Fixture

Substrate Types Supported	Microstrip or Coplanar Waveguide
Overall Size (WxLxH)	3680-20: 4.9 x 7 x 2.5 in (12.4 x 17.8 x 6.4 cm) 3680K and 3680V: 4 x 5 x 2.5 in (10.2 x 12.7 x 6.4 cm)
Substrate Length	3680-20: 0.2 in (0.5 cm) minimum, 4.0 in (10 cm) maximum 3680K and 3680V: 0.2 in (0.5 cm) minimum, 2.0 in (5 cm) maximum
Substrate Width	No limit on maximum width, 0.05 in (1.2 mm) minimum
Substrate Thickness	0.005 in (0.12 mm) minimum 0.075 in (1.9 mm) maximum
Line Offset	3680-20: ±1.0 in (2.5 cm) maximum 3680K and 3680V: ±0.5 in (1.2 cm) maximum
Input and Output Connectors	3680-20: 3.5 mm Female 3680K: K Connector Female 3680V: V Connector Female

36801 K and V Right-Angle Launcher

Distance from In-Line Connector, Axial	0.4 in (1 cm) minimum 1.7 in (4.3 cm) maximum
Distance from In-Line Connector, Offset	0.0 in minimum 1.0 in (2.54 cm) maximum

36802 MMIC Attachment

Substrate Thickness	Mounting blocks for 0.010, 0.015, or 0.025 inch substrates are supplied with the appropriate 36805 series launchers. (Mounting blocks can be modified for other thicknesses.)
Test Substrate Length	0.05 in (0.12 cm) minimum 0.46 in (1.17 cm) maximum
Line Offset	±0.5 in (1.2 cm) maximum

Electrical Specifications (all specifications typical)

Model	Universal Test Fixture			Right-Angle Launcher		MMIC Attachment
	3680-20	3680K	3680V	36801K	36801V	36802
Frequency Range (GHz)	DC to 20	DC to 40	DC to 60	DC to 40	DC to 60	DC to 60
Return Loss (Coax Calibration, dB)						
0.04 GHz to 20 GHz	> 17	> 17	> 17	> 16	> 16	> 12
20 GHz to 40 GHz		> 14	> 14	> 12	> 12	> 8
40 GHz to 60 GHz			> 8		> 7	> 6
Repeatability of Insertion Loss (dB)						
0.04 GHz to 20 GHz	< ±0.10	< ±0.10	< ±0.10	< ±0.15	< ±0.15	< ±0.20
20 GHz to 40 GHz		< ±0.20	< ±0.20	< ±0.25	< ±0.25	< ±0.40
40 GHz to 60 GHz			< ±0.30		< ±0.40	< ±0.60

Test Port Characteristics (When used with an Anritsu Vector Network Analyzer)

Test port characteristics apply after optimum 12-term calibration using an Anritsu 36804 calibration kit.

36804B-10M (0.04 to 50 GHz)

36804B-15M (0.04 to 30 GHz)

36804B-25M (0.04 to 15 GHz)

36804-25C (0.04 to 20 GHz)

Frequency (GHz)	Directivity (dB)	Source Match (dB)	Load Match (dB)
0.04	> 28	> 24	> 28
2.0	> 34	> 32	> 34
20	> 28	> 32	> 28
30	> 28	> 26	> 28
40	> 28	> 26	> 28
50	> 26	> 22	> 26

Ordering Information

Universal Test Fixtures

3680-20	20 GHz Universal Test Fixture
3680K	40 GHz Universal Test Fixture
3680V	60 GHz Universal Test Fixture

Included Accessories

Universal Test Fixture (Model 3680-20, 3680K, or 3680V)
Adjustment Block (for adjusting jaws)
Substrate Stop (includes locating pin and screw)
Connector Removal Tool
Screwdriver, Phillips (not included with Model 3680-20)
Wrenches, 5/16”, 2 each (not included with Model 3680-20)
Wooden Box (Plastic Box for Model 3680-20)

Optional Accessories

36801K	40 GHz Right-Angle Launcher
36801V	60 GHz Right-Angle Launcher
36802	MMIC Attachment
36803	Bias Probe
36805 Series Launchers	36805 series includes (4) substrate launchers for the 36802 MMIC attachment.
36805-10M	10 mil launchers
36805-15M	15 mil launchers
36805-25M	25 mil launchers

Calibration/Verification Kits

36804B-10M	10 mil Microstrip Calibration/Verification Kit, DC to 50 GHz[1]
36804B-15M	15 mil Microstrip Calibration/Verification Kit, DC to 30 GHz[1]
36804B-25M	25 mil Microstrip Calibration/Verification Kit, DC to 15 GHz[1]
36804-25C	25 mil CPW Calibration/Verification Kit, DC to 20 GHz (Includes CPW jaws)

1. 36804 series calibration/verification kits come with individual calibration coefficients printed on a label that is located inside the top cover under the foam padding. Contact Anritsu sales for calibration related questions.

Notes

Training at Anritsu

Anritsu has designed courses to help you stay up to date with technologies important to your job. For available training courses, visit: www.anritsu.com/training

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