

Picoprobe®

BY GGB INDUSTRIES INC.



(Can be mounted on any micropositioner for use with any probing system.)

Picoprobe® Model 7 was designed as a companion probe to Picoprobe® Models 12C and 18C for driving integrated circuit lines so the Models 12C or 18C can be used to measure the response of adjacent nodes. The Model 7 consists of a flexible six foot, 50 ohm coaxial cable accurately terminated to 50 ohms in order to avoid undesirable reflections. A special miniature connector receives replacement coaxial probe tips that provide a shielded environment to within three millimeters of the fine tungsten probe point, thus minimizing capacitive coupling to other parts of the circuit. The replaceable coaxial probe tips are offered in various point sizes and can also be bent to any shape in order to accommodate a variety of probing geometries.

Picoprobe® Model 7A, an unterminated version, can be used for capacitance and resistance measurements or in low to medium speed signal applications where a 50 ohm termination is not required. A flexible coaxial cable of six feet in length is standard on the Model 7A; however, when used for capacitance measurements GGB Industries, Inc., recommends using a shorter three foot cable. If the shorter coaxial cable length is desired for capacitance measurements, please specify it as Model 7A-3ft when ordering.

HIGH TEMPERATURE OPTION

For elevated temperature applications up to 200 degrees C, GGB Industries, Inc. offers Picoprobe® Models 7-HT and 7A-HT. The Models 7-HT and 7A-HT use special temperature resistant probe tips that provide accurate test results under such extreme conditions.

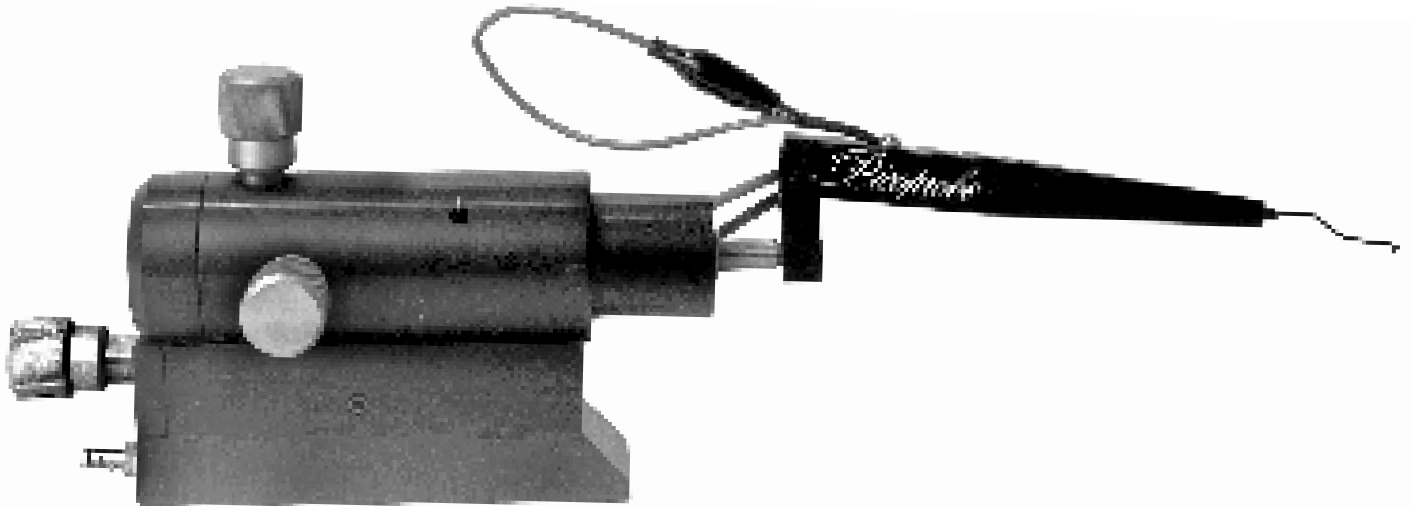
MODEL 7 & MODEL 7A REPLACEMENT TIPS

Part #	Tungsten Probing Wire Shaft Diameter	Point Radius
7-10	10 micron	<0.2 micron
7-22	22 micron	<1.0 micron
7-35	35 micron	<2.0 micron
7-60	60 micron	<3.0 micron
7-125	125 micron	<5.0 micron
7-175	175 micron	<5.0 micron

* Specify high temperature tips by adding an "HT" suffix to the Model 7 & 7A replacement tip part number.

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(Shapes available for any micropositioner for use with any probe station.)

Picoprobe® Model 12C is a high speed, high input impedance active probe for measuring the internal node voltage of integrated circuits. The input is 1 megohm shunted by 0.1 pf and the rise/fall times are 0.8ns. This instrument has full dc capability and can be used with any oscilloscope. The **Model 12C** was specially designed so that when used in conjunction with a high input impedance oscilloscope signal attenuation is 10:1 and with a 50 Ohm input signal attenuation is 20:1.




Rugged, dependable, and high speed the **Model 12C** presents a very modest load to the integrated circuit. It can be used to troubleshoot high speed bipolar, NMOS and CMOS circuits-even some short holding time dynamic nodes. Each amplifier is individually optimized during manufacture for peak performance and reliability. The **Model 12C** will withstand large input overvoltages. The only known failure mode is the accidental breaking or crushing of the probe tip which can be easily replaced. A large selection of probe tips are available to accommodate a variety of probing needs.

SPECIFICATIONS:

Input Capacitance	0.1pf
Input Resistance	1.0 megohm
Rise/Fall Time	0.8ns
Bandwidth	dc to 500 MHz
Linearity	0.5%
Voltage Range	-10 to +20V*
Gain Accuracy	±3%
Signal Attenuation	(High input impedance oscilloscope) 10 to 1 (50 ohm input) 20 to 1

* Special order Model 12C Picoprobes® are available for -15V.

Picoprobe® Model 12C REPLACEMENT TIPS

Part Number	Tungsten Wire Shaft Diameter	Point Diameter	Probe Tip Housing Shape
12C-1-10	10 micron	< 0.2 micron	
12C-1-22	22 micron	< 1.0 micron	
12C-1-35	35 micron	< 2.0 micron	
12C-1-60	60 micron	< 3.0 micron	
12C-1-125	125 micron	< 5.0 micron	
12C-2-10	10 micron	< 0.2 micron	
12C-2-22	22 micron	< 1.0 micron	
12C-2-35	35 micron	< 2.0 micron	
12C-2-60	60 micron	< 3.0 micron	
12C-2-125	125 micron	< 5.0 micron	
12C-4-10	10 micron	< 0.2 micron	
12C-4-22	22 micron	< 1.0 micron	
12C-4-35	35 micron	< 2.0 micron	
12C-4-60	60 micron	< 3.0 micron	
12C-4-125	125 micron	< 5.0 micron	

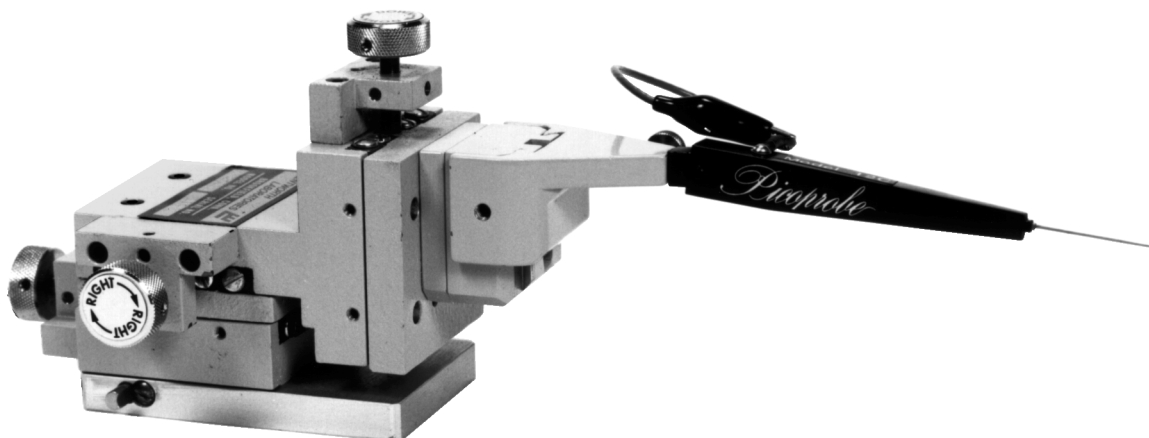
Model 12C tips slide easily in and out of the Model 12C probe body. They consist of a housing, a precision resistor/capacitor combination, and a 22 micron tungsten probing wire that is tapered to a fine point of less than one micron. The 22 micron tungsten wire allows ample flexing so the probe point and the circuit tend to remain in contact even in the presence of probe table vibrations. In addition, flexing reduces the damage to the circuit and to the probe point. In most cases if a probe wire becomes bent accidentally, it can be mechanically straightened with no adverse effects on performance. Probe points that have become soiled or dulled can be cleaned and sharpened by shipping the tips back to GGB Industries, Inc.

In addition to the 22 micron tungsten wire with a one micron point, Model 12C tips are available with 10, 35, 60 and 125 micron wires which are sharpened as indicated in the accompanying table.

When ordering a Model 12C Picoprobe,® simply state the make and model number of your probe station and micropositioner. A Picoprobe® with the proper shape will be supplied. For custom stations, please contact our business office for special instructions.

Picoprobe®

BY GGB INDUSTRIES INC.



(Shapes available for use on any micropositioner with any probing system)

PICOPROBE® MODEL 18C & PICOPROBE® MODEL 19C combine the most advanced MOS and bipolar technologies with special, low capacitance packaging techniques to achieve truly remarkable electronic measurement capabilities. While being manufactured each instrument is individually optimized for the best possible performance. The extremely low input capacitance and almost negligible input leakage current permits the direct probing of even the most sensitive MOS dynamic nodes. At the same time, the full dc capability of the probe coupled with the high speed capability permits the full characterization of even the fastest circuits.

The 20 micron tungsten probe wire is tapered to an extremely fine point to allow the probing of lines less than 1 micron. The fine probe wire flexes when in contact with the circuit, so that damage to the circuit and probe point is minimized. Also the flexing tends to keep the probe point in contact with the circuit even in the presence of probe table vibrations. MODEL 18C & MODEL 19C probe tips are also available with a 50 micron tungsten probe wire sharpened to approximately 3 microns.




The circuitry located in the MODEL 18C & MODEL 19C Picoprobe® body is very rugged; however, the unprotected MOS input in each probe tip is subject to destruction by electrostatic discharge. Should the probe tip become damaged, it can easily be removed and replaced.

SPECIFICATIONS:

	MODEL 18C	MODEL 19C
Input Capacitance*	0.02pf	0.02pf
Input Leakage	10 ⁻¹⁴ A	10 ⁻¹⁴ A
Rise/Fall Time	1.2 ns	1.2 ns
Frequency Response	dc to 350 Mhz	dc to 350 Mhz
Operating Range	0 to +10V	-7 to +3V
Linearity	0.2% 5V range 2% 10V range	0.2% ± 3V range 2% -7 to +3 range
Gain Accuracy	±5%	±5%
Signal Attenuation	(High input impedance oscilloscope) 10 to 1 (50 ohm input) 20 to 1	(High input impedance oscilloscope) 10 to 1 (50 ohm input) 20 to 1

*For 3ns or longer rise and fall signals. Speed limitations of the capacitance cancelling circuitry results in approximately 0.06pf input capacitance for 1 ns or shorter rise or fall inputs.

PICOPROBE® Model 18C & Model 19C REPLACEMENT TIPS

Part Number	Tungsten Wire Shaft Diameter	Point Diameter	Probe Tip Housing Shape
18C-1-10	10 micron	<0.1 micron	
18C-1-20	20 micron	<1.0 micron	
18C-1-50	50 micron	<3.0 micron	
18C-2-10	10 micron	<0.1 micron	
18C-2-20	20 micron	<1.0 micron	
18C-2-50	50 micron	<3.0 micron	
18C-4-10	10 micron	<0.1 micron	
18C-4-20	20 micron	<1.0 micron	
18C-4-50	50 micron	<3.0 micron	

When ordering simply state the make and the model of your probe station and micropositioners. A Picoprobe® and tip with the proper shape will be supplied. For home built stations please contact our business office for special instructions.

PICOPROBE® MODEL 19, Model 19C and Model 18B use PICOPROBE® MODEL 18C tips.

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(Can be mounted on any micropositioner for use with any probing system.)

PICOPROBE® MODELS 28 & 29 have been designed to serve the needs of integrated circuit engineers working in the most advanced high speed, submicron, MOS technology. These high frequency instruments include the attractive features of their sister probes, the MODELS 18B & 19, which encompass full dc capability, negligible dc current drain, and extremely low input capacitance. In addition the frequency range of the MODELS 28 & 29 have been extended to a full 1 GHz.

The MODELS 28 & 29 utilize their own special probe tips developed by GGB Industries, Inc. Probe tips can be ordered with 10, 20, or 50 micron diameter tungsten probe wires that are electrochemically sharpened to a point radius of less than 0.2, 1.0 and 3.0 microns respectively. The 10 and 20 micron wires flex when in contact with the circuit so that the potential for damage to the circuit and probe point is minimized. The flexible tip tends to keep the probe point in contact with the circuit even in the presence of probe table vibrations. The heavier 50 micron probe wire can be used when a stronger contact force is required.

The circuitry located in the MODEL 28 & MODEL 29 Picoprobe® body is very rugged; however, the unprotected MOS/SOS (metal on sapphire/silicone on sapphire) input built into each replaceable probe tip is subject to damage by accidental electrostatic discharge. Should the MOS/SOS input or probe point become damaged, the probe tip can easily be removed and replaced at minimal cost.


SPECIFICATIONS:

	MODEL 28	MODEL 29
Input Capacitance.....	0.04pF.....	0.04pF
Input Leakage.....	10 ⁻¹⁴ A.....	10 ⁻¹⁴ A
Rise/Fall Time.....	350ps (+5V pulse or less).....	350ps (±2.5V pulse or less)
Frequency Response.....	dc to 1 GHz (-3dB).....	dc to 1 GHz (-3dB)
Operating Range.....	-3 to +10V.....	-7 to +6V
Linearity.....	0.5% (-1 to +4V range).....	0.5% (-2 to +2V range)
	2.0% (+3 to +10V range).....	2.0% (-7 to +6V range)
Gain Accuracy.....	± 3%.....	± 3%
Signal Attenuation.....	20 to 1 (50 ohm oscilloscope input).....	20 to 1 (50 ohm oscilloscope input)

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PICOPROBE® Model 28 & Model 29 REPLACEMENT TIPS

Part Number	Tungsten Wire Shaft Diameter	Point Radius	Probe Tip Housing Shape
28-5-10	10 micron	<0.1 micron	 (Can be bent to any shape desired)
28-5-20	20 micron	<1.0 micron	
28-5-50	50 micron	<3.0 micron	

In most cases if a probe tip becomes bent accidentally, it can be mechanically straightened with no adverse effects on performance. Probe points that have become soiled or dulled can be cleaned and resharpened by shipping the tips back to GGB Industries, Inc.

When ordering a Model 28 or Model 29 Picoprobe®, simply state the make and the model of your probe station and micropositioner. A Picoprobe® and tip with the proper shape will be supplied. For custom built stations, please contact our business office for special instructions.

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(Shapes available for use on any micropositioner with any probing system.)

The Picoprobe® Model 34A has been engineered to meet the stringent demands of advanced high frequency circuit designers. This probe combines full DC capability, rise/fall times of 120 ps, and a nominal loading input impedance of 10 MΩ shunted by 0.1 pf. Signal attenuation is 20:1 with a 50 ohm oscilloscope input. Like our other active probes, the Model 34A achieves its bandwidth using just one probe point, which greatly simplifies internal node testing without sacrificing performance. An assortment of user replaceable probe tips are available for a variety of probing needs. The Model 34A is powered by our standard Picoprobe® power supply.

Specifications:

Input Capacitance.....	0.1 pf
Input Resistance.....	10.0 MΩ
Rise / Fall Time.....	120 ps (5 V pulse)
Frequency Response.....	DC to 3 GHz (-3 dB)
Operating Range.....	-7V to +10V
Linearity.....	0.5 %
Gain Accuracy.....	±3.0 %
Signal Attenuation.....	20 : 1

Replacement Tips:

Part #	Tungsten Probing Wire Shaft Diameter	Point Radius	Probe Tip Housing Shape
34A-4-10	10 micron	< 0.1 micron	
34A-4-22	22 micron	< 1.0 micron	
34A-4-35	35 micron	< 2.0 micron	
34A-4-60	60 micron	< 3.0 micron	
34A-4-125	125 micron	< 5.0 micron	

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(Shapes available for use on any micropositioner with any probing system.)

The Picoprobe® Model 35 has been engineered to meet the stringent demands of advanced high frequency circuit designers. This probe combines full DC capability, rise/fall times of 14 ps, and a nominal loading input impedance of 1.25 megohms shunted by 0.05 pf. Signal attenuation is 10:1 with a 50 ohm oscilloscope input. Like our other active probes, the Model 35 achieves its bandwidth using just one probe point, which greatly simplifies internal node testing without sacrificing performance. An assortment of user replaceable probe tips are available for a variety of probing needs. The Model 35 is powered by our new PS-3 power supply.

Specifications:

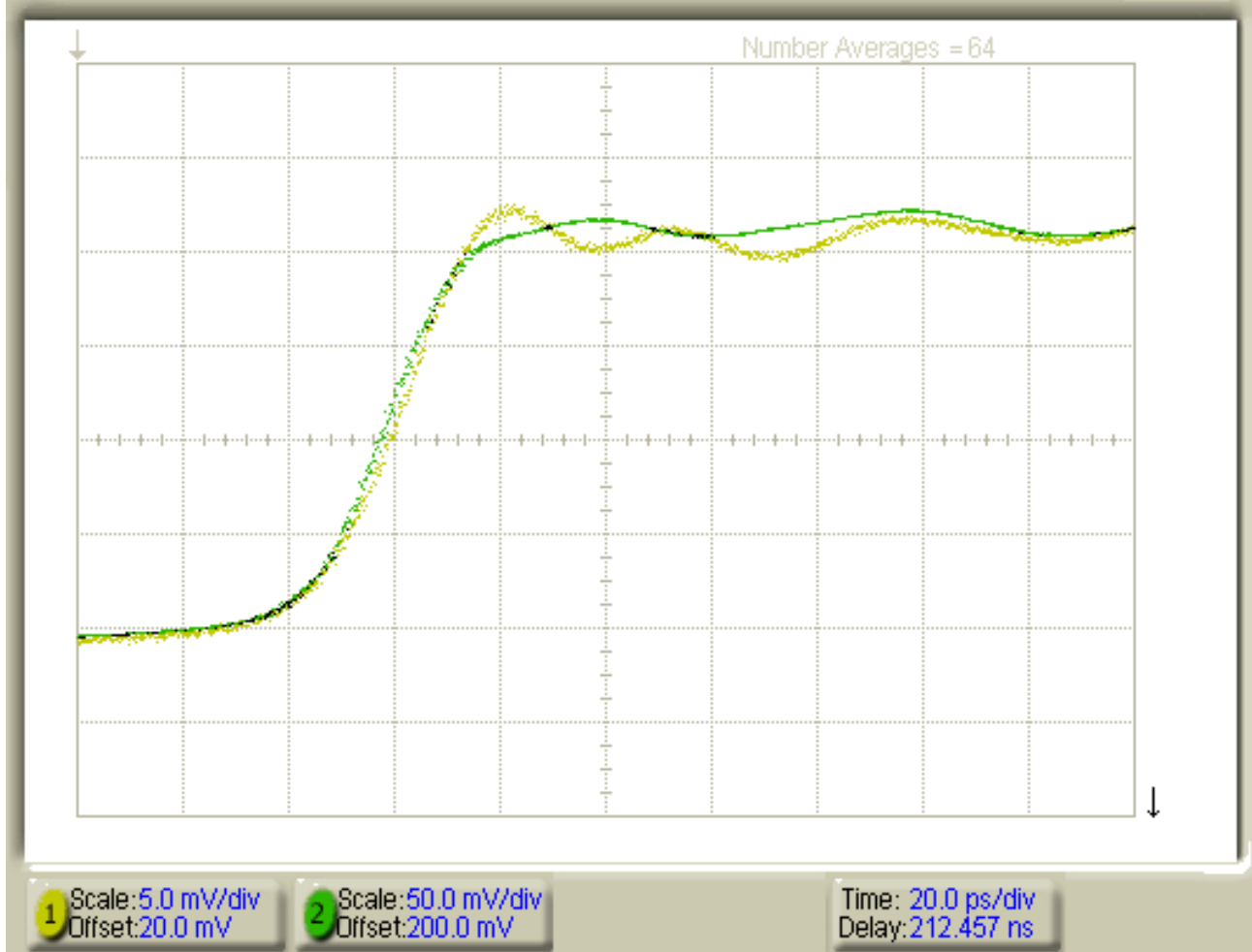
Input Capacitance.....	0.05pf
DC Input Resistance.....	1.25 megohms
Rise / Fall Time.....	14 ps (3 V pulse)
Frequency Response.....	DC to 26.0 GHz
Operating Range.....	-6V to +6V
Linearity.....	2.0 % (+/- 3V)
Signal Attenuation.....	10 : 1

Replacement Tips:

Part #	Tungsten Probing Wire Shaft Diameter	Point Radius
35-1-10	10 micron	< 0.1 micron
35-1-22	22 micron	< 1.0 micron
35-1-35	35 micron	< 2.0 micron

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This plot shows the response of the Model 35 Picoprobe to a 0.25 volt, 25 picosecond rise time input pulse. Both the input pulse(Channel 2) and the Model 35 response (Channel 1) are displayed simultaneously on a dual channel 20 GHz sampling oscilloscope. The Model 35 probe tip was contacted to a 50 ohm impedance strip line that carried the input signal. The Model 35 used only a single contact and did not require a short ground connection.