

Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analyzers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 2 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, covering the cost of warranty returns BOTH ways (plus supplying a loan unit, if available) and supplying a free business tool with every order.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based near Heathrow Airport in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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SYNTHESIZED SWEEP SIGNAL GENERATOR

68C, 69B series

0.1 Hz to 65 GHz

Microwave Synthesizer for Any Application

NEW



CE GPIB

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A microwave synthesizer for any application

You need a synthesizer that precisely fits your current needs yet can be upgraded, at a reasonable cost, to satisfy your future needs without shattering your test equipment budget. The 68C/69B family of synthesizers offers 42 models to fit any stimulus application including models with the lowest SSB phase noise and broadest frequency range available today. And the economical upgrades will continue to please your engineers and technicians... and your cost accounting department!

Anritsu offers CW generators, signal generators, and high-performance/signal generators ideally suited to bench top or A.T.E. applications.

Features

- 42 models for perfect fit to any application
- Ultra-low SSB phase noise; -107 dBc at 10 kHz offset from 10 GHz
- 0.1 Hz to 65 GHz frequency coverage in a single coaxial output
- Waveguide extensions to 110 GHz
- Economical upgrades
- $+17$ dBm maximum power, -125 dBm minimum power
- Internal AM, FM, ϕ M, pulse modulation
- User down-loaded arbitrary modulation

Applications

• CW stimulus

The 69000B/68000C Synthesized CW Generators feature 10 MHz to 65 GHz frequency coverage. CW or step sweep, low SSB phase noise and spurious signals, output levels to $+17$ dBm, and optional 0.1 Hz resolution combine to make these sources ideal for local os-

cillator replacement applications. To meet requirements that expand over time, economical upgrades are available to any higher performing model. For the most demanding CW requirements, the 69000B and 68000C provide the ultimate in performance.

• Swept measurements

The 69100B/68100C Synthesized Signal Generators feature 10 MHz to 65 GHz analog, step, and manual sweep capability. The 69100B/68100C also provide AM/FM/pulse modulation via external modulating signals. Output levels to $+17$ dBm and optional 0.1 Hz resolution are available at prices comparable to CW-only sources. To meet requirements that expand over time, economical upgrades are available to any higher performing model. Features, performance, and value combine to make the 69100B and 68100C the optimum sources for your network analysis and swept A.T.E. source applications.

• Complete synthesized modulation and sweep capabilities for any signal requirement

The 69300B/68300C Synthesized High Performance Signal Generators provide, in a single package, all the capabilities of our CW and signal generators, plus they contain an internal AM/FM/pulse modulation generator. The internal generators offer 7 modulating waveforms, including Gaussian noise, as well as user-defined arbitrary waveforms. Pulse modulation parameters can be set externally or by the internal pulse generator. Doublet, triplet, or quadruplet pulses make RADAR blind spot testing easy. The Swept Delay feature enables moving target simulation. Simultaneous synchronized modulations let you set complex signal scenarios across the entire 10 MHz to 65 GHz frequency range. The 69300B is the highest performance universal synthesized signal generator available today.

68C/69B synthesizers product selection table

Model	68000C	69000B	68100C	69100B	68300C	69300B
Ultra low ϕ noise		✓		✓		✓
Step sweep	✓	✓	✓	✓	✓	✓
Analog sweep			✓	✓	✓	✓
Power sweep	✓	✓	✓	✓	✓	✓
Alternate sweep	✓	✓	✓	✓	✓	✓
Master/slave	✓	✓	✓	✓	✓	✓
AM			Ext	Ext	Int/Ext	Int/Ext
FM			Ext	Ext	Int/Ext	Int/Ext
ϕ M					Opt. 6	Opt. 6
Pulse modulation			Ext	Ext	Int/Ext	Int/Ext
AM scan (1 to 20 GHz)					Opt. 20	
Internal power meter					Opt. 8	Opt. 8

68C/69B synthesizers model summary

Frequency range	CW Generators		Signal Generators		High Performance Signal Generators	
0.01 to 8.4 GHz*	68017C	69017B	68117C	69117B	68317C	69317B
2 to 20 GHz	68037C	69037B	68137C	69137B	68337C	69337B
0.01 to 20 GHz*	68047C	69047B	68147C	69147B	68347C	69347B
0.01 to 40 GHz*	68067C	69067B	68167C	69167B	68367C	69367B
0.01 to 50 GHz*	68077C	69077B	68177C	69177B	68377C	69377B
0.01 to 60 GHz*	68087C	69087B	68187C	69187B	68387C	69387B
0.01 to 65 GHz*	68097C	69097B	68197C	69197B	68397C	69397B

*Optional frequency extension down to 0.1 Hz is available

Specifications

Frequency	CW mode	Output	Twenty independent, presettable CW frequencies (F0 to F9 and M0 to M9)
		Accuracy	Same as internal or external 10 MHz time base
		Internal time base stability	With aging: $<2 \times 10^{-8}/\text{day}$ ($<5 \times 10^{-10}/\text{day}$ with Option 16) With temperature: $<2 \times 10^{-8}/^\circ\text{C}$ over 0°C ($<2 \times 10^{-10}/^\circ\text{C}$ with Option 16)
		Resolution	1 kHz (0.1 Hz with Option 11)
		Switching time (typical maximum)	Units with maximum frequency of ≥ 20 GHz: <40 ms to be within 1 kHz of final frequency Units with maximum frequency of 8.4 GHz: <15 ms to be within 1 kHz of final frequency
	Analog sweep mode (68100C, 68300C, 69100B, 69300B)	Sweep width	Independently selected from 1 MHz to full range continuous sweep For 691XXB and 693XXB minimum frequency for analog sweep is 500 MHz
		Accuracy	The lesser of ± 30 MHz or (± 2 MHz widths) for sweep speeds of ≤ 50 MHz/ms
		Sweep time range	30 ms to 99 seconds
	Phase-locked step sweep mode	Sweep width	Independently selected, 1 kHz (0.1 Hz with Option 11) to full range
		Accuracy	Same as internal or external 10 MHz time base
		Resolution (min. step size)	1 kHz (0.1 Hz with Option 11)
		Linear/log sweep	User-selectable linear or log sweep. In log sweep, step size logarithmically increases with frequency.
		Number of steps	Variable from 1 to 10,000
		Step size	1 kHz (0.1 Hz with Option 11) to the full frequency range of the instrument. (If the step size does not divide into the selected frequency range, the last step is truncated.)
		Step time	Step sweep: Variable from 1 ms/step to 99 seconds/steps. Dwell time begins after phase lock. Fixed rate step sweep: Variable from 20 ms/step to 99 seconds/step. Dwell time includes phase lock time.
		Switching time (typical maximum)	Units having a high-end frequency of ≥ 20 GHz: <15 ms + 1 ms/GHz step size or <40 ms, whichever is less Units having a high-end frequency of 8.4 GHz: <7 ms
	Alternate sweep mode		Sweeps alternately between any two sweep ranges. Each sweep range may be associated with a different power level.
	Manual sweep mode		Provides stepped, phase-locked adjustment of frequency between sweep limits. User-selectable number of steps or step size.
	List sweep mode	Tables	Under GPIB control or via the front panel, up to 4 tables with 2000 non-sequential frequencies/power sets can be stored and then addressed as a phase-locked step sweep. One table of 2000 points is stored in non-volatile memory, all other tables are stored in volatile memory.
		Switching time (typical maximum)	Units having a high-end frequency of ≥ 20 GHz: <25 ms to be within 1 kHz of final frequency Units having a high-end frequency of 8.4 GHz: <5 ms to be within 1 kHz of final frequency
	Markers	Setting	Up to 20 independent, settable markers (F0 to F9 and M0 to M9)
		Video markers	+5 V or -5 V marker output, selectable. AUX I/O connector, rear panel.
		Intensity markers	Produces an intensified dot on trace, obtained by momentary dwell in RF sweep

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Spectral purity*1	Spurious signals	Harmonic and harmonic related (dBc)	Frequency range		Standard		With option 15	
			≥0.1 Hz to <10 MHz (option 22)		-30		-30	
			≥10 MHz to ≤50 MHz		-30		-30	
			>50 MHz to <2 GHz		-40		-40	
			≥2 GHz to ≤20 GHz		-60		-50	
			>20 GHz to ≤40 GHz		-40		-40	
			50 GHz units >40 GHz to ≤50 GHz		-40		X	
			60 GHz units >40 GHz to ≤60 GHz		-30		X	
			65 GHz units >40 GHz to ≤65 GHz		-25		X	
	Non-harmonic (dBc)	Frequency range		68XXXC		69XXXB		
		≥10 MHz to <2 GHz		-40		-40		
		≥2 GHz to ≤65 GHz		-60		-60		
		≥0.1 Hz to ≤10 MHz (option 22)		-30		-30		
	Single-sideband phase noise, 69XXXB (dBc/Hz)	Frequency range		Offset from carrier				
				100 Hz	1 kHz	10 kHz	100 kHz	
				0.1 Hz to <10 MHz (option 22)		-90	-120	-130
≥10 MHz to <2 GHz				-80	-100	-102	-102	
≥2 GHz to ≤6 GHz				-80	-107	-107	-107	
>6 GHz ≤10 GHz				-74	-104	-107	-107	
>10 GHz to ≤20 GHz				-66	-97	-100	-102	
>20 GHz to ≤40 GHz				-60	-91	-94	-96	
>40 GHz to ≤65 GHz				-54	-85	-88	-90	
Single-sideband phase noise, 68XXXC (dBc/Hz)		0.1 Hz to <10 MHz (option 22)		-90	-120	-130	-130	
		≥10 MHz to <2 GHz		-77	-88	-86	-100	
		≥2 GHz to ≤6 GHz		-78	-88	-86	-102	
		>6 GHz ≤10 GHz		-73	-86	-83	-102	
		>10 GHz to ≤20 GHz		-66	-78	-78	-100	
		>20 GHz to ≤40 GHz		-60	-75	-72	-94	
		>40 GHz to ≤65 GHz		-54	-69	-64	-88	

Maximum leveled output power*2	Standard units	Model number	Frequency range (GHz)	Output power (dBm)	Output power with with step attenuator (dBm)	Output power with electronic step attenuator (dBm)
		Option 22	≥0.1 Hz to <10 MHz	+13.0	+11.0	+9.0
		68X17C & 69X17B	≥0.1 to ≤8.4	+13.0	+11.0	+9.0
		68X37C & 69X37B	≥2 to ≤8.4 >8.4 to ≤20	+13.0 +13.0	+11.0 +11.0	+9.0 +3.0
		68X47C & 69X47B	≥0.01 to ≤8.4 >8.4 to ≤20	+13.0 +13.0	+11.0 +11.0	+9.0 +3.0
		68X67C & 69X67B	≥0.01 to <2 ≥2 to ≤20 >20 to ≤40	+13.0 +9.0 +6.0	+11.0 +7.0 +3.0	Not available
		68X77C & 69X77B	≥0.01 to <2 ≥2 to ≤20 >20 to ≤40 >40 to ≤50	+12.0 +10.0 +2.5 +2.5	+10.0 +8.5 0.0 -1.0	Not available
		68X87C & 69X87B	≥0.01 to <2 ≥2 to ≤20 >20 to ≤40 >40 to ≤50 >50 to ≤60	+12.0 +10.0 +2.5 +2.0 +2.0	+10.0 +8.5 0.0 -1.5 -2.0	Not available
		68X97C & 69X97B	≥0.01 to <2 ≥2 to ≤20 >20 to ≤40 >40 to ≤50 >50 to ≤65	+12.0 +10.0 +2.5 0.0 -2.0	Not available	Not available
		With Option 15 (high power) installed	Model number	Frequency range (GHz)	Output power (dBm)	Output power with with step attenuator (dBm)
	68X17C & 69X17B		≥0.01 to <2 ≥2 to ≤8.4	+13.0 +17.0	+11.0 +15.0	+9.0 +11.0
	68X37C & 69X37B		≥2 to ≤8.4 >8.4 to ≤20	+17.0 +17.0	+15.0 +15.0	+11.0 +7.0
	68X47C & 69X47B		≥0.01 to <2 ≥2 to ≤8.4 >8.4 to ≤20	+13.0 +17.0 +17.0	+11.0 +15.0 +15.0	+9.0 +11.0 +7.0
	68X67C & 69X67B		≥0.01 to ≤20 >20 to ≤40	+13.0 +6.0	+11.0 +3.0	Not available

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RF output	Leveled output power range	Standard units	Without an attenuator: Maximum leveled power to –20 dBm With an attenuator: Maximum leveled power to –120 dBm With an electronic attenuator: Maximum leveled power to –140 dBm					
		Units with option 15, high power	Without an attenuator: Maximum leveled power to –10 dBm With an attenuator: Maximum leveled power to –110 dBm With an electronic attenuator: Maximum leveled power to –110 dBm					
	Power level switching time (to within specified accuracy)	Without change in step attenuator	<3 ms typical					
		With change in step attenuator	<20 ms typical					
		With change in electronic step attenuator	<3 ms typical: Power level changes across the –70 dB step will result in 20 ms delay					
	Accuracy and flatness (step sweep and CW modes)	Accuracy	Attenuation below max power	0.01 to 20 GHz	20 to 40 GHz	40 to 50 GHz	50 to 60 GHz	60 to 65 GHz
			0 to 25 dB	±1.0 dB	±1.0 dB	±1.5 dB	±1.5 dB	±1.5 dB
			25 to 60 dB	±1.0 dB	±1.0 dB	±1.5 dB	±3.5 dB typ.	–
		Flatness	>60 dB	±1.0 dB	±1.0 dB	±2.5 dB typ.	±3.5 dB typ.	–
			0 to 25 dB	±0.8 dB	±0.8 dB	±1.1 dB	±1.1 dB	±1.1 dB
			25 to 60 dB	±0.8 dB	±0.8 dB	±1.1 dB	±3.1 dB typ.	–
	Output units		Output units may be selected as either dBm or mV. Selection of mV assumes 50 Ω load. All data entry and display are in selected units.					
	Output power resolution		0.01 dB (log) or 0.001 mV (linear)					
Level offset		Offsets the displayed power level to establish a new reference level						
CW power sweep	Range	Sweeps between any two power levels at a single CW frequency						
	Resolution	0.01 dB/step (log) or 0.001 mV (linear)						
	Accuracy	Same as CW power accuracy						
	Log/linear sweep	Power sweep selectable as either log or linear. Log sweep is in dB; linear sweep is in mV.						
	Step size	User-controlled, 0.01 dB (log) or 0.001 mV (linear) to the full power range of the instrument						
	Step dwell time	Variable from 1 ms to 99 seconds. If the sweep crosses a mechanical step attenuator setting, there will be a sweep dwell of approximately 20 ms to allow setting of the step attenuator.						
Sweep frequency/step power		A power level step occurs after each frequency sweep. Power level remains constant for length of time required to complete each sweep.						
69100B/68100C modulation	Amplitude modulation*6	External AM input	Log AM or linear AM input, front- or rear-panel BNC, 50 Ω or 600 Ω input impedance. All options selectable from modulation menu.					
		AM sensitivity	Log AM: Continuously variable from 0 to 25 dB/V Linear AM: Continuously variable from 0 to 100%/V					
		AM depth (typical)	0 to 90% linear, 20 dB log					
		AM bandwidth (3 dB)	DC to 50 kHz minimum (DC to 100 kHz typical)					
		Maximum input	±1 V					
	Frequency modulation	External FM input	Front- or rear-panel BNC, 50 Ω or 600 Ω input impedance All options selectable from modulation menu					
		External FM sensitivity*4	Continuously variable from ±10 kHz per volt to ±20 MHz per volt (locked and unlocked narrow modes), or ±100 kHz per volt to ±100 MHz per volt (unlocked wide mode)					
		Deviation*4	Unlocked wide: ±100 MHz, DC to 100 Hz rates Unlocked narrow: ±10 MHz, DC to 500 kHz rates Locked: The lesser of ±10 MHz or rate x 300, 1 kHz to 500 kHz rates					
		FM bandwidth (3 dB)	Unlocked wide: DC to 100 Hz Unlocked narrow: DC to 500 kHz Locked: 1 kHz to 500 kHz					
		Flatness	±1 dB (10 kHz to 500 kHz rates)					
		Accuracy	10% (5% typical, ±200 kHz deviation, 100 kHz rate)					
		Maximum input	±1 V					
	Square wave modulation*5	On/off ratio	>50 dB					
		Rise/fall time	<1 μs typical					
		Internal square wave generator	Four square wave signals (400 Hz, 1 kHz, 7.8125 kHz, and 27.8 kHz), selectable from modulation menu Accuracy: Same as internal or external 10 MHz time base Square wave symmetry: 50% ±5% at all power levels					
		External input	Front- or rear-panel BNC, selectable from modulation menu Drive level: TTL compatible input Minimum pulse width: >5 μs Input logic: Positive-true or negative-true BNC, selectable from modulation menu					

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69300B/68300C modulation	Amplitude modulation*6	External AM input	Log AM or linear AM input, front or rear-panel BNC, 50 Ω or 600 Ω input impedance. All options selectable from modulation menu.
		AM sensitivity	Log AM: Continuously variable from 0 to 25 dB per volt Linear AM: Continuously variable from 0 to 100% per volt
		AM depth (typical)	0 to 90% linear; 20 dB log
		AM bandwidth	DC to 50 kHz minimum (DC to 100 kHz typical)
		Flatness	± 0.3 dB (DC to 10 kHz rates)
		Accuracy	$\pm 5\%$
		Distortion	$< 5\%$ typical
		Maximum input	± 1 V
69300B/68300C modulation	Internal AM generator	Waveforms	Sinusoid, square, triangle, positive ramp, negative ramp, Gaussian noise, uniform noise, user-defined (Option 10)
		Rate	0.1 Hz to 1 MHz sinusoidal, 0.1 Hz to 100 kHz for other waveforms
		Resolution	0.1 Hz
		Accuracy	Same as instrument timebase
		Output	BNC connector, rear panel
	Frequency modulation	External FM input	Front- or rear-panel BNC, 50 Ω or 600 Ω input impedance All options selectable from modulation menu
		External FM sensitivity*4	Continuously variable from ± 10 kHz per volt to ± 20 MHz per volt (locked, locked low noise and unlocked narrow modes), or ± 100 kHz per volt to ± 100 MHz per volt (unlocked wide mode)
		Deviation*4	Unlocked wide: ± 100 MHz, DC to 100 Hz rates Unlocked narrow: ± 10 MHz, DC to 8 MHz rates Locked: The lesser of ± 10 MHz or rate $\times 300$, 1 kHz to 8 MHz rates Locked low noise: The lesser of ± 10 MHz or rate $\times 3$, 50 kHz to 8 MHz rates
		FM bandwidth (3 dB)	Unlocked wide: DC to 100 Hz Unlocked narrow: DC to 10 MHz Locked: 1 kHz to 10 MHz Locked low noise: 30 kHz to 10 MHz
		Flatness	± 1 dB (10 kHz to 1 MHz rates)
		Accuracy	10% (5% typical, ± 200 kHz deviation, 100 kHz rate)
		Maximum input	± 1 V
	Internal FM generator	Waveforms	Sinusoid, square, triangle, positive ramp, negative ramp, Gaussian noise, uniform noise, user-defined (Option 10)
		Rate	0.1 Hz to 1 MHz sinusoidal, 0.1 Hz to 100 kHz for other waveforms
		Resolution	0.1 Hz
		Accuracy	Same as instrument timebase
		Output	BNC connector, rear panel
	Phase modulation (ϕ M, Option 6)	ϕ M deviation*4	Narrow mode (DC to 8 MHz rates): The lesser of ± 3 radians or ± 5 MHz/rate Wide mode (DC to 1 MHz rates): The lesser of ± 400 radians or ± 10 MHz/rate.
		ϕ M bandwidth (3 dB, relative to 100 kHz rate)	Narrow mode: DC to 10 MHz Wide mode: DC to 1 MHz
		ϕ M flatness (relative to 100 kHz rate)	Narrow mode (DC to 1 MHz rates): ± 1 dB Wide mode (DC to 500 kHz rates): ± 1 dB
		ϕ M accuracy	10% (at 100 kHz sine wave)
		External ϕ M input	Front or rear panel BNC (shares the FM input), 50 Ω or 600 Ω input impedance. All options selectable from modulation menu. Shares connectors with FM.
		External ϕ M sensitivity*4	Continuously variable from ± 0.0025 to ± 5 radians per volt (narrow ϕ M mode) or ± 0.25 to ± 500 radians per volt (wide ϕ M mode), selectable from modulation menu
		External ϕ M maximum input	± 1 V
	Internal ϕ M generator (shares the internal FM generator)	Waveforms	Sine, square, triangle, positive ramp, negative ramp, Gaussian noise, uniform noise, user defined (option 10)
		Rate	0.1 Hz to 1 MHz for sine wave, 0.1 Hz to 100 kHz for other waveforms
		Resolution	0.1 Hz
		Accuracy	Same as instrument timebase
		Output	BNC connector, rear panel
	Pulse modulation*7	On/off ratio	> 80 dB
		Rise/fall time (10 to 90%)	10 MHz to 1.0 GHz: < 15 ns (< 10 ns typical) 1.0 GHz to 65 GHz: < 10 ns (< 5 ns typical)
		Minimum levelled pulse width	< 100 ns (≥ 2.2 GHz), < 1 μ s (< 2.2 GHz)
		Minimum unleveled pulse width	< 10 ns
		Pulse overshoot	$< 10\%$ (for 50, 60 and 65 GHz units, overshoot from 40 to 65 GHz is 20% typical)
		Level accuracy relative to CW	± 0.5 dB (≥ 1 μ s pulse width), ± 1.0 dB (< 1 μ s pulse width) 100 Hz to 1 MHz PRF
		PRF range	DC to 10 MHz unleveled, 100 Hz to 5 MHz leveled
		External input	Front- or rear-panel BNC, selectable from modulation menu Drive level: TTL compatible input Input logic: Positive-true or negative-true, selectable from modulation menu

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69300B modulation	Internal pulse generator	Frequency (selectable clock rate)	40 MHz	10 MHz
		Pulse width	25 ns to 419 ms	100 ns to 1.6 s
		Pulse period	250 ns to 419 ms	600 ns to 1.6 s
		Variable delay	Singlet	0 to 419 ms
			Doublet	100 ns to 419 ms
			Triplet	100 ns to 419 ms
			Quadruplet	100 ns to 419 ms
		Resolution	25 ns	100 ns
		Modes	Free-run, triggered, gated, delayed, singlet, doublet, triplet, quadruplet	
		Accuracy	10 ns (5 ns typical)	
		Outputs	Video pulse and sync out, rear-panel BNC connectors	
	SCAN modulator (Option 20, 6X337C and 6X347C only)	Frequency range	1 to 20 GHz	
		Attenuation range*8	0 to 60 dB	
		Flatness	±2 dB (0 to 40 dB), ±3.5 dB (40 to 60 dB)	
		Step response	<1 µs	
		Sensitivity	-10 dB/V	
		Insertion loss (when engaged)	<6 dB (1 to 18 GHz), <8 dB (18 to 20 GHz)	
		Input	Rear-panel BNC (f) connector	
Remote operation*9	GPIO address		Selectable from a system menu	
	IEEE-488 interface function subset		SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0, C1, C2, C3, C28, E2	
	Emulations		The instrument responds to the published GPIO commands and responses of the models 6XX00-series signal sources. When emulating another signal source, the instrument is limited to the capabilities, mnemonics, and parameter resolutions of the emulated instrument.	
General	Stored setups		Stores front-panel settings and nine additional front-panel setups in a non-volatile RAM. A system menu allows saving and recalling of instrument setups. Whenever the instrument is turned on, control settings come on at the same functions and values existing when the instrument was turned off.	
	Memory sequencing input		Accepts a TTL low-level signal to sequence through nine stored setups. AUX I/O connector, rear panel.	
	Self-test		Instrument self-test is performed when SELF TEST soft-key is selected. If an error is detected, an error message is displayed in a window on the LCD identifying the probable cause.	
	Secure mode		Disables all frequency, power level, and modulation state displays. Stored setups saved in secure mode remain secured when recalled. Mode selectable from a system menu and GPIO.	
	Reset		Returns instrument parameters to predefined default states or values. Any pending GPIO I/O is aborted. Selectable from the system menu.	
	Master/slave operation		Allows two 68xxxC or 69xxxB output signals to be swept with a user-selected frequency offset. One unit controls the other via AUX I/O and SERIAL I/O connections. Requires MASTER/SAVE interface cable set (part no. ND36329).	
	User level flatness correction		Allows user to calibrate out-path loss due to external switching and cables via entered power table from a GPIO power meter or calculated data. When user level correction is activated, entered power levels are delivered at the point where calibration was performed. Supported power meters are Anritsu ML4803A and HP437B, 438A, and 70100A. Five user tables are available at up to 801 points/table.	
	Power		90 to 132 Vac or 180 to 264 Vac, 49 to 440 Hz, ≤400 VA	
	Standby		With AC line power connected, unit is placed in standby when front-panel power switch is released from the OPERATE position	
	Dimensions and mass		429 (W) x 133 (H) x 597 (D) mm [5.25 (H) x 16.875 (W) x 23.5 (D) in.], ≤23 kg (50 lb)	
	RF output connector		Type K female (≤40 GHz models); Type V female (>40 GHz models)	

- *1: All specifications apply to the phase-locked CW and step sweep modes at the lesser of +10 dBm output or maximum specified leveled output power, unless otherwise noted.
- *2: Specifications apply at 25°C ±10°C.
- *3: >40 GHz units and units with Option 15 at maximum specified leveled output power.
- *4: For 69XXXB units, maximum sensitivity, maximum deviation, and maximum modulation are reduced.
- *5: The RF output can be pulse modulated via an external modulating signal or an internal square wave generator.
- *6: All amplitude modulation specifications apply at 50% depth, 1 kHz rate, with RF level set 6 dB below maximum specified leveled output power, unless otherwise noted.
- *7: All pulse modulation specifications apply at maximum specified leveled output power, unless otherwise noted.
- *8: Maximum attenuation = attenuation ±flatness.
- *9: All instrument functions, settings, and operating modes (except for power on/standby) are controllable using commands sent from an external computer via the GPIO (IEEE-488) interface bus.

Ordering Information

Please specify model/order number, name, and quantity when ordering.

Model/Order No.	Name
69017B	Main frame Ultra Low Noise Synthesized CW Generator (0.01 to 8.4 GHz)
69037B	Ultra Low Noise Synthesized CW Generator (2 to 20 GHz)
69047B	Ultra Low Noise Synthesized CW Generator (10 MHz to 20 GHz)
69067B	Ultra Low Noise Synthesized CW Generator (10 MHz to 40 GHz)
69077B	Ultra Low Noise Synthesized CW Generator (10 MHz to 50 GHz)
69087B	Ultra Low Noise Synthesized CW Generator (10 MHz to 60 GHz)
69097B	Ultra Low Noise Synthesized CW Generator (10 MHz to 65 GHz)
69117B	Ultra Low Noise Synthesized Signal Generator (0.01 to 8.4 GHz)
69137B	Ultra Low Noise Synthesized Signal Generator (2 to 20 GHz)
69147B	Ultra Low Noise Synthesized Signal Generator (10 MHz to 20 GHz)
69167B	Ultra Low Noise Synthesized Signal Generator (10 MHz to 40 GHz)
69177B	Ultra Low Noise Synthesized Signal Generator (10 MHz to 50 GHz)
69187B	Ultra Low Noise Synthesized Signal Generator (10 MHz to 60 GHz)
69197B	Ultra Low Noise Synthesized Signal Generator (10 MHz to 65 GHz)
69317B	Ultra Low Noise Synthesized High Performance Signal Generator (0.01 to 8.4 GHz)
69337B	Ultra Low Noise Synthesized High Performance Signal Generator (2 to 20 GHz)
69347B	Ultra Low Noise Synthesized High Performance Signal Generator (10 MHz to 20 GHz)
69367B	Ultra Low Noise Synthesized High Performance Signal Generator (10 MHz to 40 GHz)
69377B	Ultra Low Noise Synthesized High Performance Signal Generator (10 MHz to 50 GHz)
69387B	Ultra Low Noise Synthesized High Performance Signal Generator (10 MHz to 60 GHz)
69397B	Ultra Low Noise Synthesized High Performance Signal Generator (10 MHz to 65 GHz)
68017C	Synthesized CW Generator (0.01 to 8.4 GHz)
68037C	Synthesized CW Generator (2 to 20 GHz)
68047C	Synthesized CW Generator (10 MHz to 20 GHz)
68067C	Synthesized CW Generator (10 MHz to 40 GHz)
68077C	Synthesized CW Generator (10 MHz to 50 GHz)
68087C	Synthesized CW Generator (10 MHz to 60 GHz)
68097C	Synthesized CW Generator (10 MHz to 65 GHz)
68117C	Synthesized Signal Generator (0.01 to 8.4 GHz)
68137C	Synthesized Signal Generator (2 to 20 GHz)
68147C	Synthesized Signal Generator (10 MHz to 20 GHz)
68167C	Synthesized Signal Generator (10 MHz to 40 GHz)
68177C	Synthesized Signal Generator (10 MHz to 50 GHz)
68187C	Synthesized Signal Generator (10 MHz to 60 GHz)
68197C	Synthesized Signal Generator (10 MHz to 65 GHz)
68317C	Synthesized High Performance Signal Generator (0.01 to 8.4 GHz)
68337C	Synthesized High Performance Signal Generator (2 to 20 GHz)
68347C	Synthesized High Performance Signal Generator (10 MHz to 20 GHz)
68367C	Synthesized High Performance Signal Generator (10 MHz to 40 GHz)
68377C	Synthesized High Performance Signal Generator (10 MHz to 50 GHz)
68387C	Synthesized High Performance Signal Generator (10 MHz to 60 GHz)
68397C	Synthesized High Performance Signal Generator (10 MHz to 65 GHz)

Model/Order No.	Name
Option 1	Options Rack Mounting: Rack mount kit containing a set of track slides (90° tilt capability), mounting ears, and front-panel handles to let the instrument be mounted in a standard 19 inch equipment rack
Option 2A	110 dB Step Attenuator: Adds a 10 dB/step attenuator with 110 dB range for models having a high-end frequency of ≤26.5 GHz. Rated RF output power is reduced.
Option 2B	110 dB Step Attenuator: Adds a 10 dB/step attenuator with 110 dB range for models having a high-end frequency of ≤40 GHz. Rated RF output power is reduced.
Option 2C	90 dB Step Attenuator: Adds a 10 dB/step attenuator with 90 dB range for models having a high-end frequency of ≤50 GHz. Rated RF output power is reduced.
Option 2D	90 dB Step Attenuator: Adds a 10 dB/step attenuator with 90 dB range for models having a high-end frequency of ≤60 GHz. Rated RF output power is reduced.
Option 2E	120 dB Electronic Step Attenuator: Adds a 10 dB/step electronic attenuator with a 120 dB range for models having a high-end frequency of ≤8.4 GHz. Rated RF output power is reduced.
Option 2F	120 dB Electronic Step Attenuator: Adds a 10 dB/step electronic attenuator with a 120 dB range for models having a high-end frequency of ≤20 GHz. Rated RF output power is reduced.
Option 6	Phase Modulation (ΦM) (683xxC and 693xxB): Provides phase modulation capability. FM input, FM output and FM generator become FM/ΦM input, FM/ΦM output and FM/ΦM generator.
Option 7	Delete AM/FM Generators (683xxC and 693xxB): Deletes the internal AM and FM generators. External AM and FM capability remains unchanged. (Not available in combination with Option 8 or Option 20.)
Option 8	Internal Power Meter (683xxC and 693xxB): Adds an internal power meter that is compatible with Anritsu 560-7, 5400-71, or 6400-71 series detectors. (Not available in combination with Option 7.)
Option 9	Rear Panel RF Output: Moves RF output connector to the rear panel
Option 10	Complex Modulation Capability (683xxC and 693xxB): Provides user-defined waveform capability for complex modulation. Requires controller (not included). Includes cable and Windows® based software
Option 11	0.1 Hz Frequency Resolution: Provides frequency resolution of 0.1 Hz
Option 14	Rack mounting without chassis slides: Modifies rack mounting hardware to install unit in a console that has mounting shelves
Option 15A	High Power Output (683xxC and 693xxB): Adds high-power RF components to the instrument in the 2–20 GHz frequency range
Option 15B	High Power Output (683xxC and 693xxB): Adds high-power RF components to the instrument in the 2–20 GHz frequency range
Option 16	High Stability Time Base: Adds an ovenized, 10 MHz crystal oscillator as a high-stability time base
Option 17A	Delete Front Panel (691xxB and 693xxB): Deletes the front panel for use in remote control applications where a front-panel display and keyboard control are not needed
Option 17B	Delete Front Panel (690xxB): Deletes the front panel for use in remote control applications where a front-panel display and keyboard control are not needed
Option 18	mmWave Bias Output: Adds rear-panel bias output to drive 54000-xWRxx millimeter wave source modules. BNC Twinax connector. (Not available in combination with Option 20.)
Option 19	SCPI Programmability: Adds GPIB command mnemonics complying with Standard Commands for Programmable Instruments (SCPI), Version 1993.0. SCPI programming complies with IEEE 488.2–1987.
Option 20	SCAN Modulator: Adds an internal SCAN modulator for simulating high-depth amplitude modulated signals in models 68337C, 68345C, and 68347C only. Requires an external modulating signal input. (Not available in combination with Option 7, Option 18, or Option 22.)
Option 22	0.1 Hz to 10 MHz Audio Frequency: Adds CW and step sweep frequency coverage below 10 MHz for models having a low-end frequency of 10 MHz. (Not available with Option 20.)

Continued on next page

Model/Order No.	Name
	Accessories
34RKNF50	DC to 20 GHz, Ruggedized K-to-Type N female adapter
34RVNF50	DC to 20 GHz, Ruggedized V-to-Type N female adapter
34VKF50	DC to 46 GHz, V male-to-K female Precision Adapter
ND36329	MASTER/SLAVE interface cable set
D37178-2	Protective front panel cover
760-177	Transit case
2300-218	Anritsu Power Tools: Provides comprehensive interface dll's to be used as drivers for any Windows® based application. Includes driver for National Instruments LabView®
806-90	Aux I/O interface cable
	Millimeter wave accessories
54000-4WR15	50 to 75 GHz, V Band X4 Multiplier-Source Module (includes A36599 power cable and 3 filters)
54000-5WR15	50 to 75 GHz, V Band X4 Multiplier-Source Module with internal reference coupler/detector (includes A36599 power cable, 3 filters, and 560-10BX-2 detector adapter cable)
54000-4WR10	75-110 GHz, W Band X6 Multiplier-Source Module with internal reference coupler/detector (includes A36599 power cable and 3 filters)
54000-5WR10	75-110 GHz, W Band X6 Multiplier-Source Module with internal reference coupler/detector (includes A36599 power cable, 3 filters, and 560-10BX-2 detector adapter cable)
N120-6	Semi-rigid cable, N (m) to N (m), 6 inches long, connects synthesizer's RF output to multiplier's RF input. (Also requires 34RKNF50 or 34RVNF50 Adapter.)
	Upgrades
	Economical upgrades are available to upgrade any model to any higher performing model or to upgrade 68xxxC synthesizers to 69xxxB synthesizers. Consult Anritsu for details.

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