

SYNTHESIZERS 56 MHz to 6010 MHz

Let the Mini-Circuits design team create a custom frequency synthesizer tailored to your requirements. We will review your requirements and, following technical discussions between your engineers and Mini-Circuits designers, we will work closely with you to create final specifications that meet or exceed your requirements. To ensure high yields, we will factor in component tolerances and even variations in manufacturing processes. You will have full access to performance data from sample units, and can even evaluate sample units in your system to ensure that final production units fulfill your performance requirements.

To meet the needs of a wide range of systems and applications, Mini-Circuits offers seven different types of custom frequency synthesizers:

1 Fixed Frequency

For applications requiring a highly stable single frequency, Mini-Circuits engineering team can customize a low-noise synthesized source for any frequency from 56 MHz to 6010 MHz. Fixed-frequency synthesizers feature low phase noise with spurious performance of -90 dBc or better. They operate with low power consumption and are supplied in compact surface-mount or connectorized packages.

- Settling times of typically 100 ms or better
- Harmonics of -20 dBc or better

2 Tunable Narrow Bandwidth

For applications requiring tunable bandwidths of center frequency $\pm 10\%$ (or less), Mini-Circuits custom narrowband frequency synthesizers can be specified to 6010 MHz with low phase noise, low harmonics, and spurious levels of -85 dBc or better. Available with customer-specified step sizes, these high-performance synthesizers are housed in compact surface-mount or connectorized packages.

- Typical settling times of 30 ms or less
- Harmonics of -20 dBc or better

3 Tunable Medium Bandwidth

Mini-Circuits medium-bandwidth frequency synthesizers can be specified for center frequency $\pm 10\%$ to $\pm 30\%$ over a frequency range of 56 MHz to 6010 MHz. They offer spurious performance of -90 dBc typical or better, with customer specified step sizes, low power consumption, and packaged in compact surface-mount or connectorized housings.

- Typical settling times of 25 ms or less
- Harmonics of -20 dBc or better

4 Tunable Wide Bandwidth

For tuning bandwidths of center frequency $\pm 30\%$ to $\pm 50\%$ Mini-Circuits wide-bandwidth frequency synthesizers can be specified from 56 MHz to 6010 MHz with custom step sizes. They feature outstanding spurious performance of -80 dBc or better with output levels to +9 dBm or more. Mini-Circuits wide-bandwidth frequency synthesizers are supplied in surface-mount or connectorized packages.

- Bandwidths greater than 500 MHz
- Typical settling times of 25 ms or less
- Harmonics of -20 dBc or better

5 Tunable Very Wide Bandwidth

For extremely wide tuning bandwidths up to 6 octave ex; 700 MHz to 4000 MHz, achieved in one model, Mini-Circuits very-wide-bandwidth frequency synthesizers can be specified with customer-specified step sizes. These broadband synthesizers boast output levels of +8 dBm typical spurious performance of -80 dBc or better, and low phase noise. Very-wide-bandwidth frequency synthesizers can be supplied in surface-mount or connectorized packages.

- Typical settling times of 15 μ s or less
- Harmonics of -20 dBc or better
- Frequency 700 to 4000 MHz

6 Tunable Fast Settling Time

Fast switching speed alone is not enough. Mini-Circuits custom fast-settling-time frequency synthesizers provide fast switching speed while also settling to a stable, new frequency quickly. Fast-settling-time frequency synthesizers settle within ± 5.4 deg. of a new tuned frequency steps in microseconds even for large frequency steps.

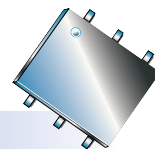
- Settling time of 25 μ s or less
- Typical spurious of -65 dBc or better
- Frequency 714 to 1618 MHz

7 Dual Frequency

For savings in cost and system real estate, Mini-Circuits can customize a single package containing two discrete, single frequency synthesizers, with any two frequencies. Both synthesizers are characterized by low phase noise and spurious levels of -90 dBc or less. These dual-frequency synthesizers can be supplied in compact surface-mount or connectorized packages.

- Harmonics of -20 dBc or better
- Typical phase noise of -92 dBc/Hz or better at 1 kHz offset
- Programmable





SOME EXAMPLES OF CUSTOM SYNTHESIZERS PROVIDED TO CUSTOMERS



KSN
0.800" x 0.584" x 0.154"
(20.32 x 14.83 x 3.91 mm)



DSN
1.25" x 1.00" x 0.20"
(31.75 x 25.40 x 5.08 mm)



RSN
0.91" x 0.91" x 0.252"
(23.11 x 23.11 x 6.40 mm)



SSN/SSND
0.60" x 0.60" x 0.138"
(15.24 x 15.24 x 3.50 mm)



WSN
1.75" x 1.25" x 0.22"
(44.45 x 31.75 x 5.99 mm)



ZSN
2.75" x 1.96" x 0.62"
(69.85 x 49.78 x 15.75 mm)

Model Package Style	Freq. Min. (MHz)	Freq. Max (MHz)	Ref. Freq. (MHz)	Step Size (kHz)	VCC PLL (V)	VCC VCO (V)	Output Power (dBm) Typ.	Harmonics (-dBc) Typ.	Reference Spurious (-dBc) Typ.	Comparison Spurious (-dBc) Typ.	Phase Noise 100 Hz (-dBc/Hz) Typ.	Phase Noise 1 K (-dBc/Hz) Typ.	Phase Noise 10 K (-dBc/Hz) Typ.	Phase Noise 100 K (-dBc/Hz) Typ.	Settling Time (mSec) Typ.	Case Style	Application
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Fixed Frequency Synthesizers (with internal microcontroller)

KSN	144	144	52	N/A	3	5	3	25	95	90	95	105	106	134	100	99-01-1251	WIMAX 2.5 GHz
KSN	675	675	27	N/A	3	5	3	20	85	85	97	92	110	134	30	DK1042	BROADBAND ACCESS
KSN	768	768	52	N/A	3	5	6	25	85	90	75	96	103	129	35	99-01-1251	WIMAX 3.5 GHz
KSN	1024	1024	10.24	N/A	5	5	0	27	95	78.5	74	78	104	131	10	DK1042	CATV
ZSN *	4950	4950	26	N/A	15	15	-3	35	102	86	60	80	84	112	27	99-01-1336	MILITARY

Tunable Narrow Band Synthesizers (center frequency $\pm 10\%$ or less)

KSN	620	660	30	20	3.3	5	-0.5	40	90	75	70	74	106	129	15	DK801	CDMA
KSN	900	960	8	100	5	5	3	20	85	85	82	75	100	125	5	DK1042	RFID READER
KSN	1150	1160	20	250	5	5	2	30	100	80	86	81	104	130	5	DK801	CATV
KSN	1850	1970	76.8	1280	5	5	5	50	95	95	88	86	95	125	10	DK1042	TD-SCDMA
KSN	2110	2170	10	200	5	5	2	35	100	90	67	81	108	129	10	DK801	W-CDMA
KSN	2110	2170	4.8	200	5	5	5	45	100	90	62	75	106	126	30	DK801	UMTS 2.5
KSN	2090	2190	12.8	100	5	5	1	40	105	95	68	73	104	124	5	DK801	UMTS
KSN	2027	2222	52	125	3	5	4	25	90	95	77	87	104	129	20	99-01-1251	WIMAX 2.5 GHz
KSN	2045	2310	14.4	50	5	5	6	25	100	80	50	69	94	115	15	DK801	REPEATER
SSN	2495	2690	52	250	3	5	3	30	80	95	77	88	95	123	25	99-01-1367	WIMAX 2.5 GHz
DSN	2300	2700	10	250	12.5	5	5	25	95	90	56	67	97	119	25	99-01-942	POINT TO MULTIPOINT
ZSN *	2536	2736	26	200	12	12	9.5	27	87	80	70	89	94	123	27	99-01-1336	MILITARY
SSN	2932	3132	52	250	3	5	3	20	80	80	82	88	95	118	10	99-01-1367	WIMAX 3.5 GHz

Tunable Medium Band Synthesizers (center frequency $\pm 10\%$ to $\pm 30\%$)

DSN	1100	1500	10	500	12	5	5	20	115	100	61	72	98	122	5	99-01-942	POINT TO MULTIPOINT
DSN	1200	2200	20	10000	22	10	9	20	75	75	84	97	99	106	0.5	99-01-1294	CABLE TV
DSN	1690	2310	10	250	12	5	5	25	100	95	58	68	97	121	10	99-01-942	POINT TO MULTIPOINT
DSN	1788	3019	10	100	15	5	2	11	85	75	51	60	81	106	20	99-01-942	RECEIVER
DSN	2700	3500	10	1000	16	5	3.5	25	92	85	83	84	85	105	0.22	99-01-1294	VSAT

Tunable Wide Band Synthesizer (center frequency $\pm 30\%$ to $\pm 50\%$)

DSN	900	2000	10	250	19	10	-2	20	100	80	80	84	80	107	3	99-01-1294	SATELLITE
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Tunable Very Wide Band Synthesizer (up to 6 octave)

WSN	700	4000	20	10000	22	10	8	30	97	82	89	101	101	100	0.015	99-01-1368	MILITARY
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Tunable Fast Settling Time Synthesizers (less than 30 micro Sec)

RSN	714	749	52	200	3.3	5.5	4	25	100	90	95	100	104	106	0.025	99-01-1228	GSM 850
RSN	760.6	795.4	52	200	3.3	5.5	5	25	90	65	92	102	104	105	0.025	99-01-1228	GSM 900
RSN	1543	1618	52	200	3.3	5.5	4.5	25	85	61	88	94	98	106	0.025	99-01-1228	GSM 1800

Dual Band Frequency Synthesizers

SSND	600	600	10	2000	2.5	3	-10	24	85	91	89	96	95	122	-	99-01-1373	GPS
	1390	1390	10	2000	2.5	3	3	29	76	91	84	91	90	122	-		
SSND	1000	1000	10	2000	2.5	3	-9.7	31	77	96	85	92	90	119	-	99-01-1373	GPS
	1440	1440	10	2000	2.5	3	3	31	102	97	82	89	89	119	-		

* Available with & without external reference.

See our web site for RoHS Compliance methodologies and qualifications.

RoHS compliant in accordance with EU Directive (2002/95/EC)

