

Mit viel Aufwand habe ich diese Zusammenstellung von einigen
Schaltungskomponenten und Details bearbeitet!

Diese sind nicht im „Netz“ verfügbar, sondern wurden aus
einem Film herauskopiert!

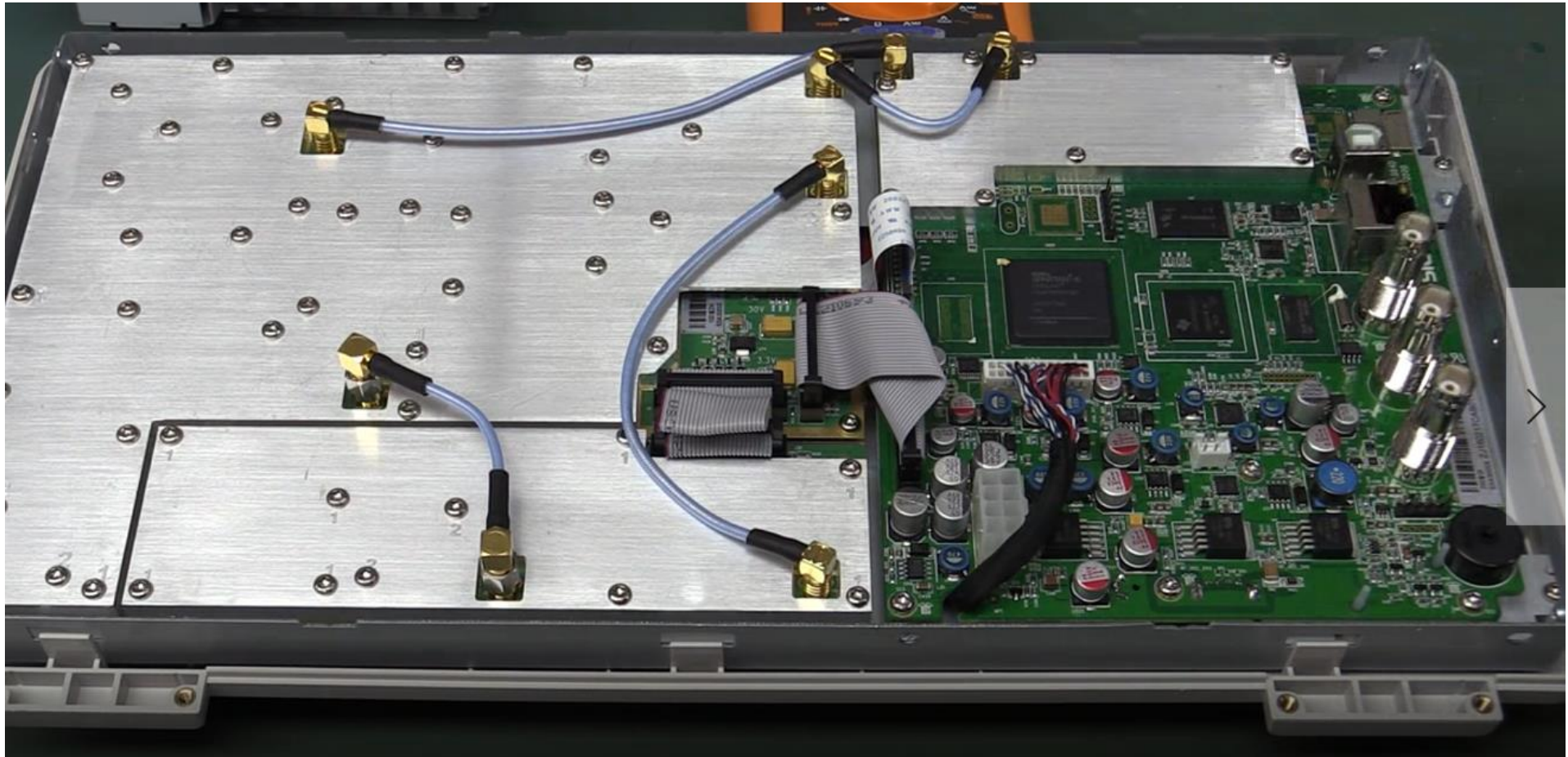
Viel Spaß

DK8AR Henri

Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT

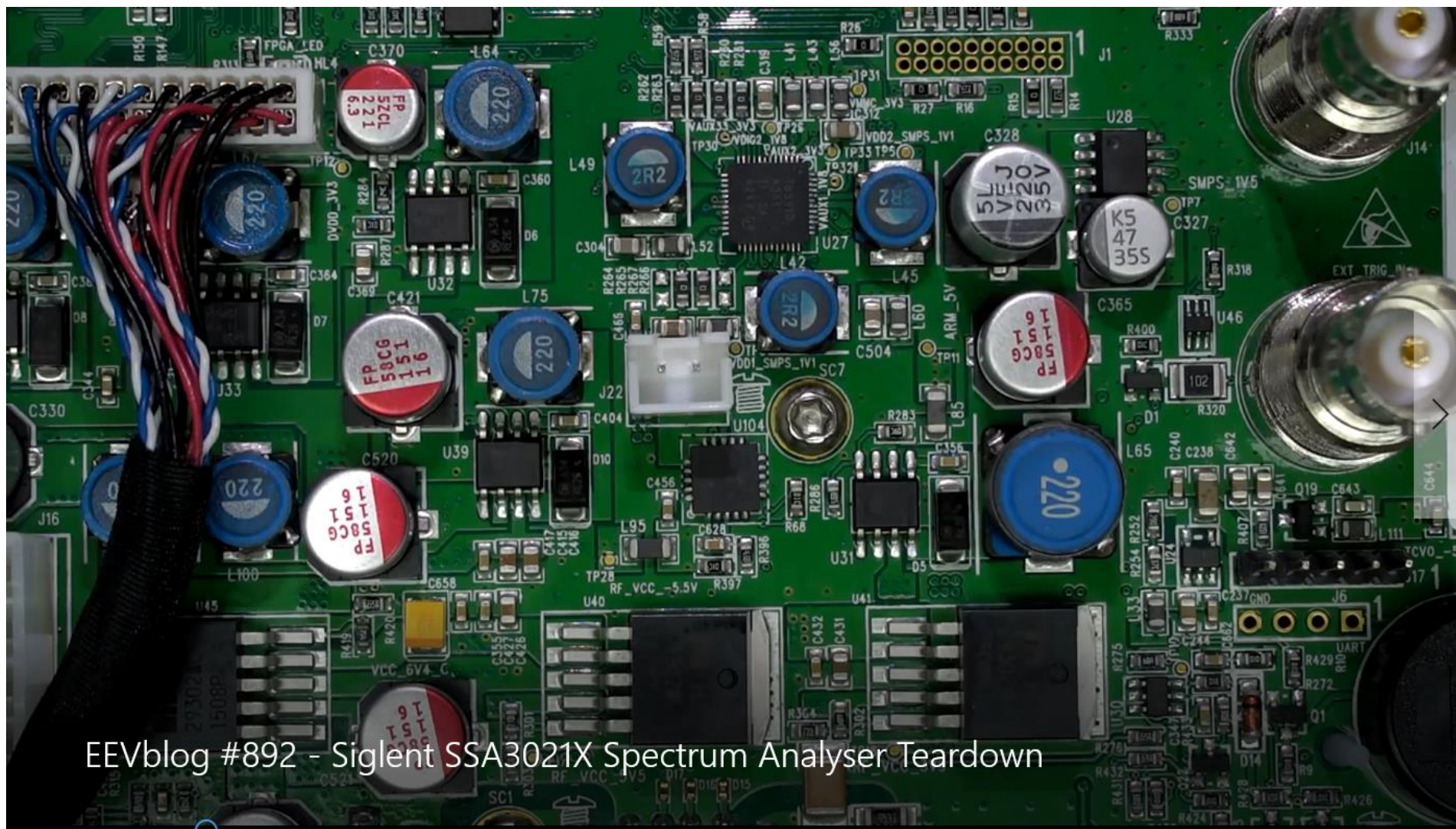


Spectrum Analyzer SSA 3021X by SIGLENT

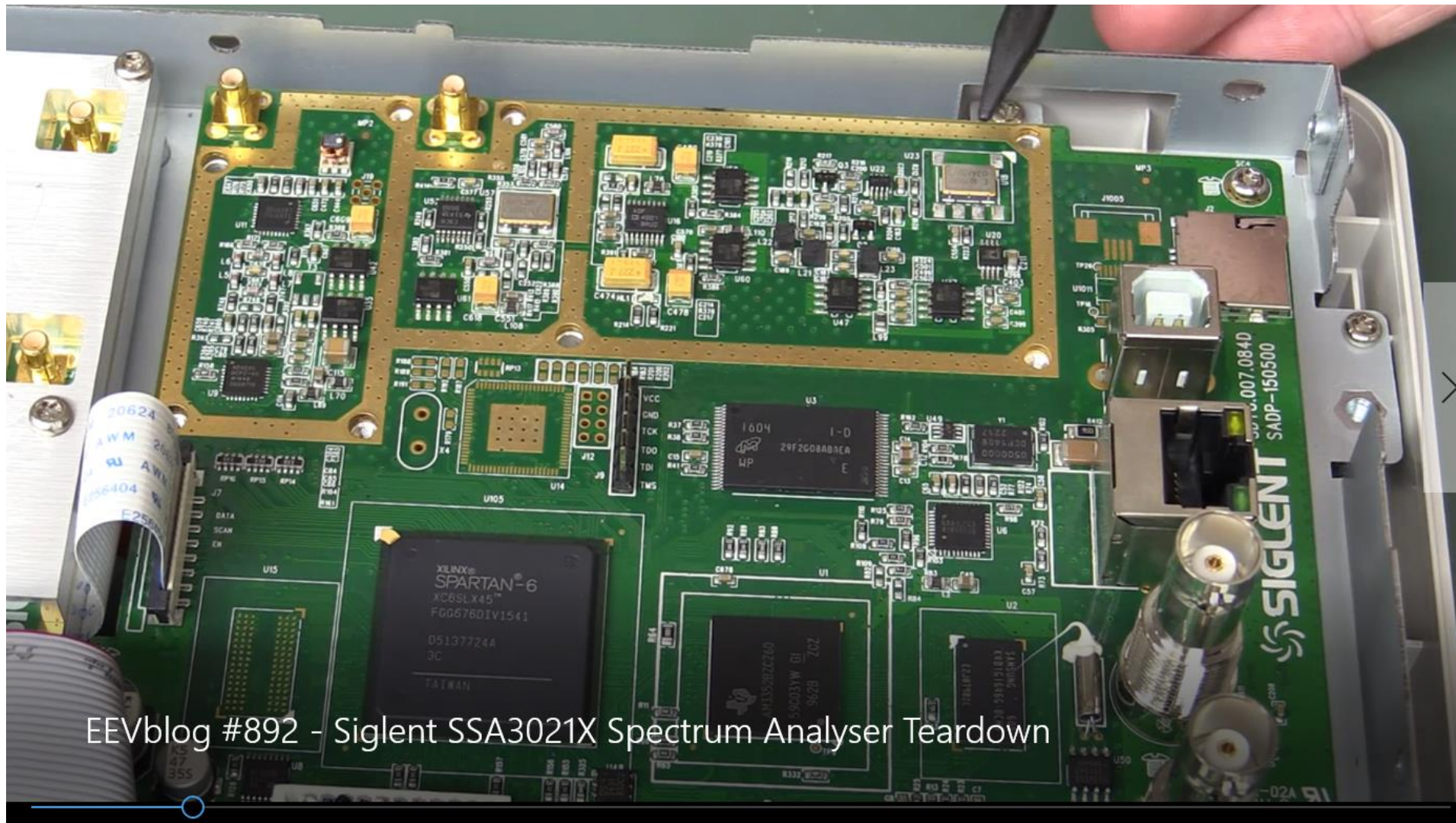


EEVblog #892 - Siglent SSA3021X Spectrum Analyser Teardown

Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT

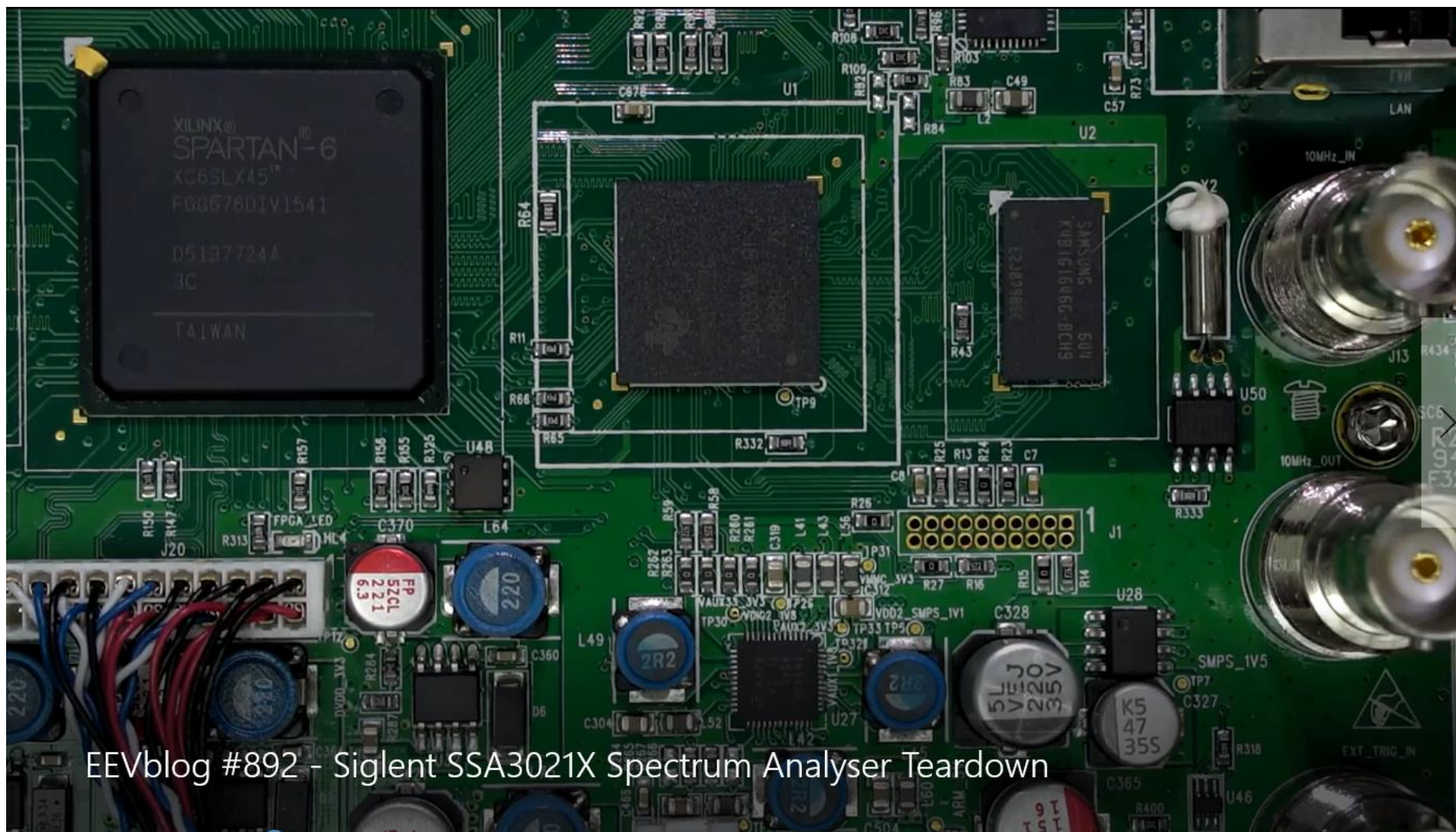


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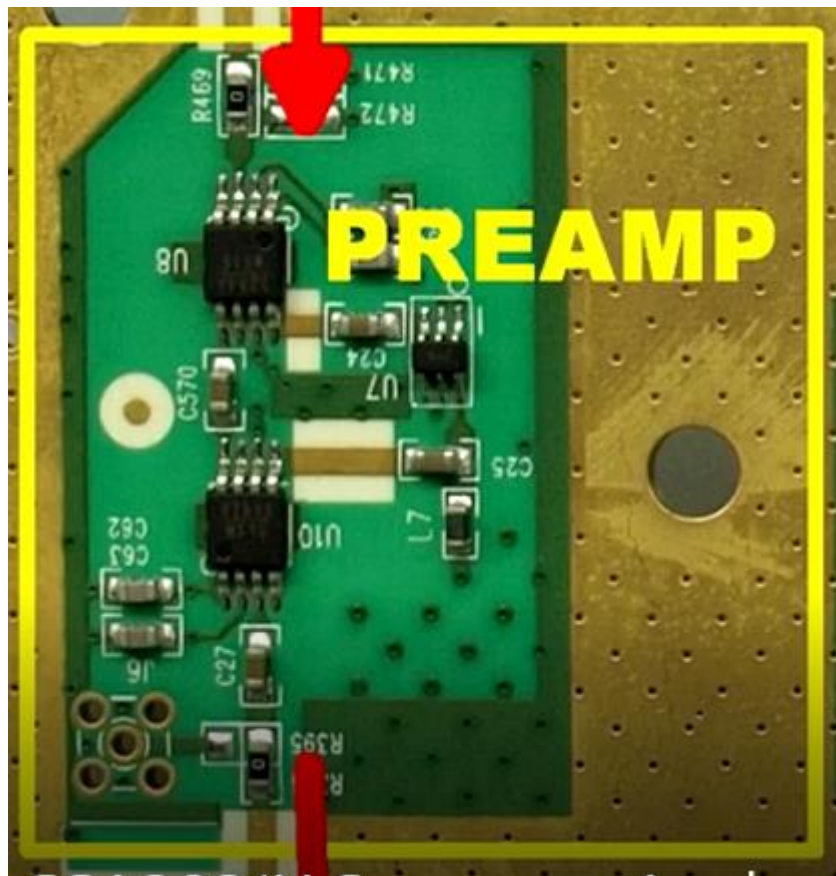
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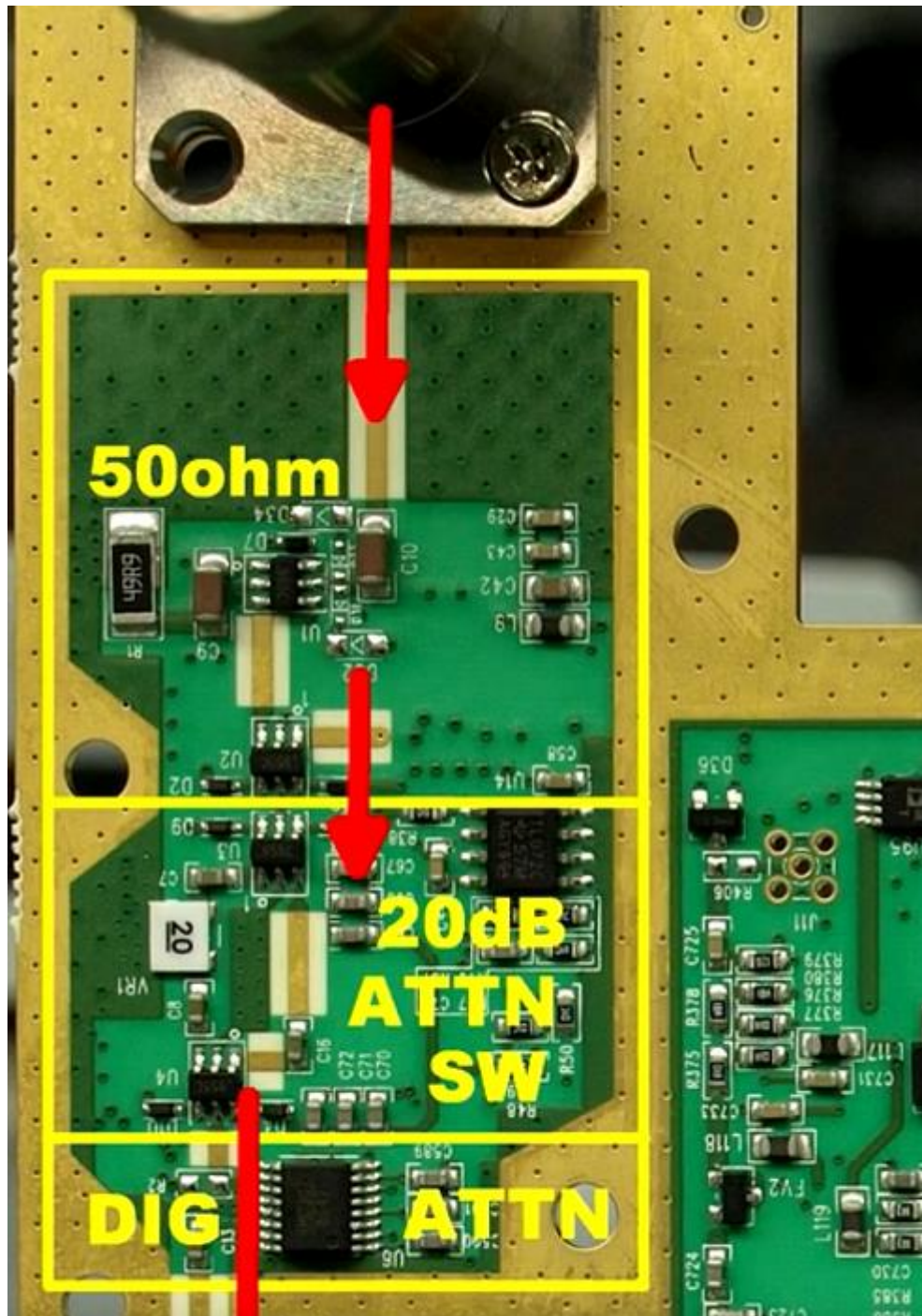
Spectrum Analyzer SSA 3021X by SIGLENT



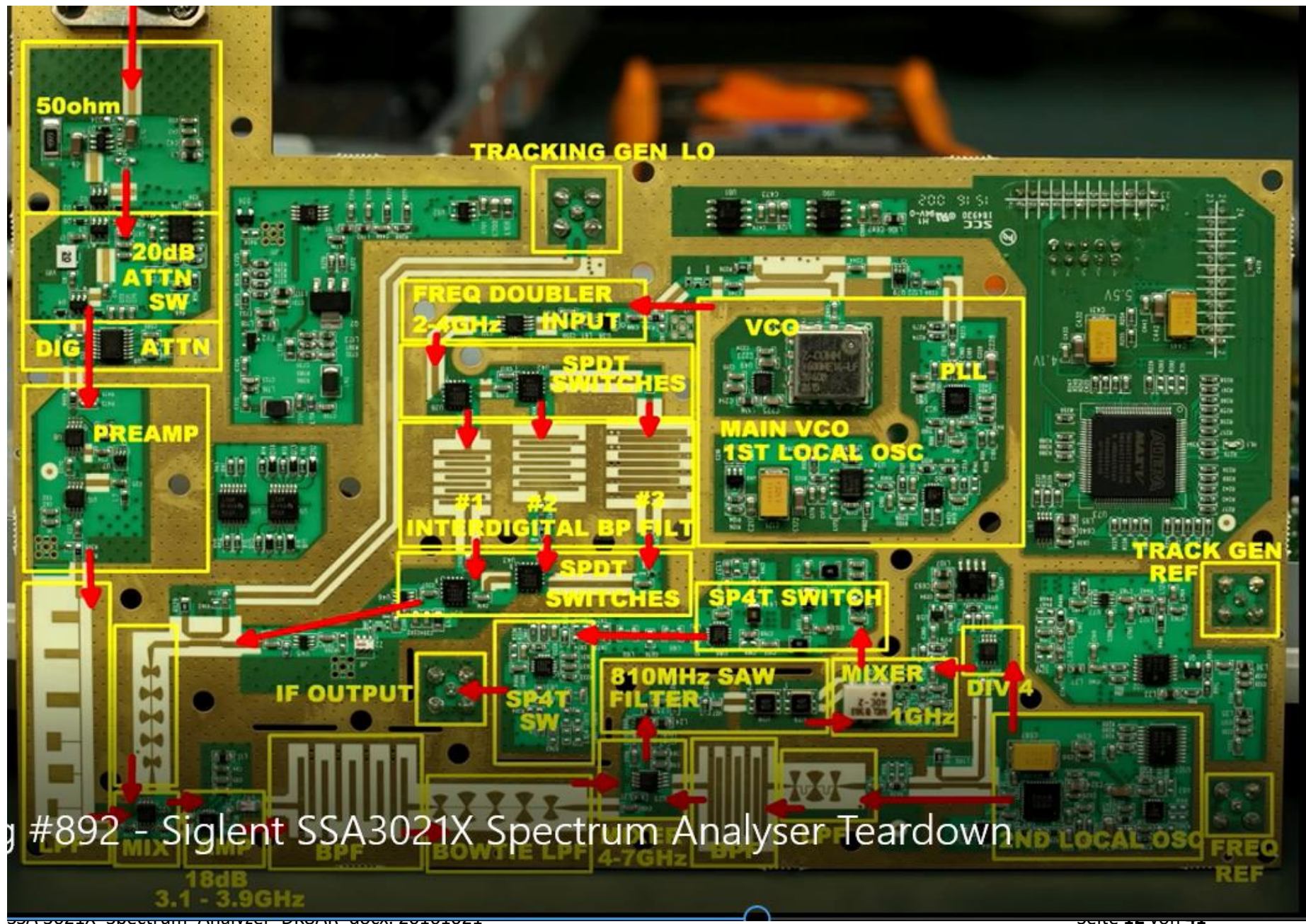
Spectrum Analyzer SSA 3021X by SIGLENT



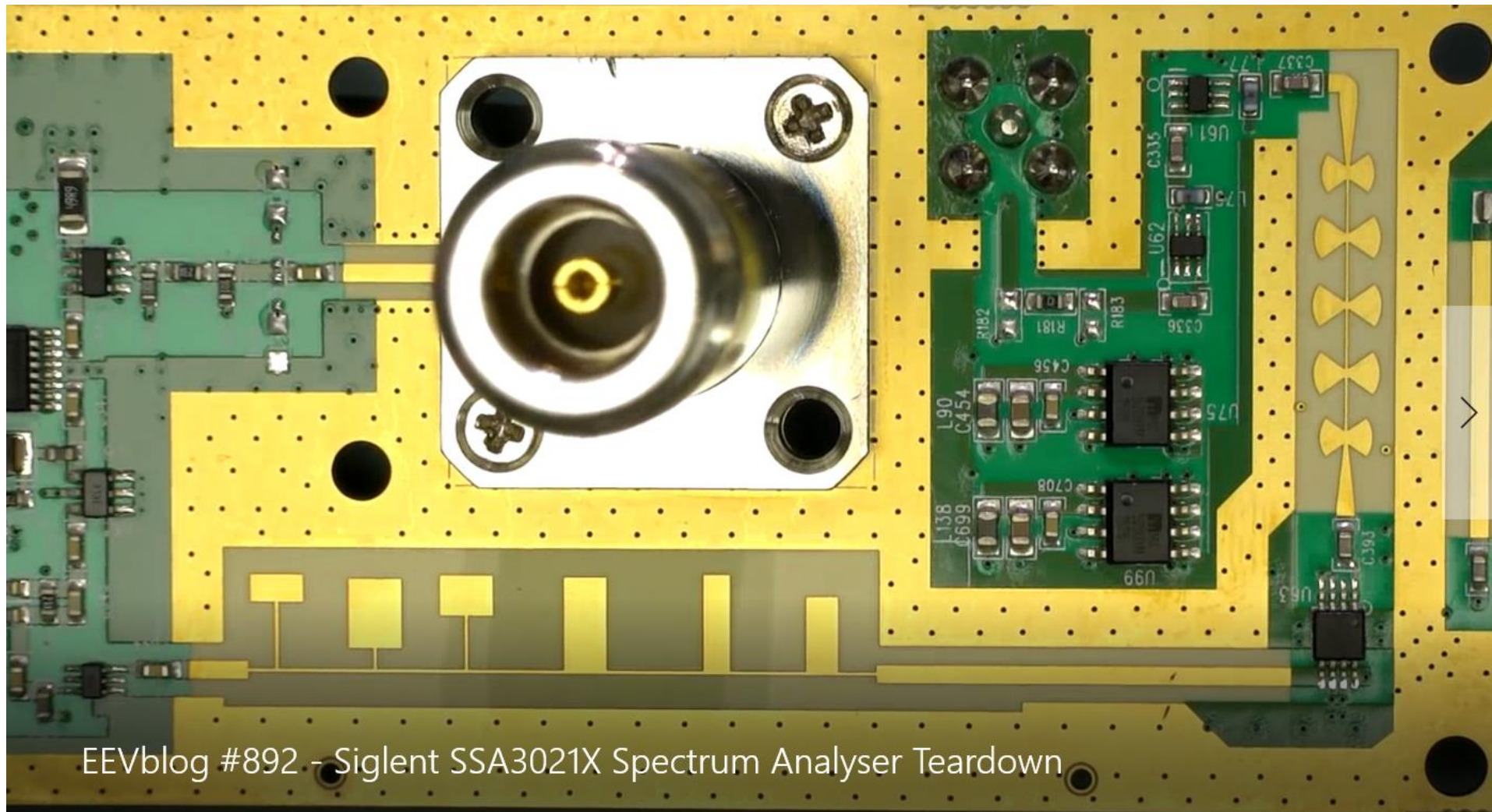
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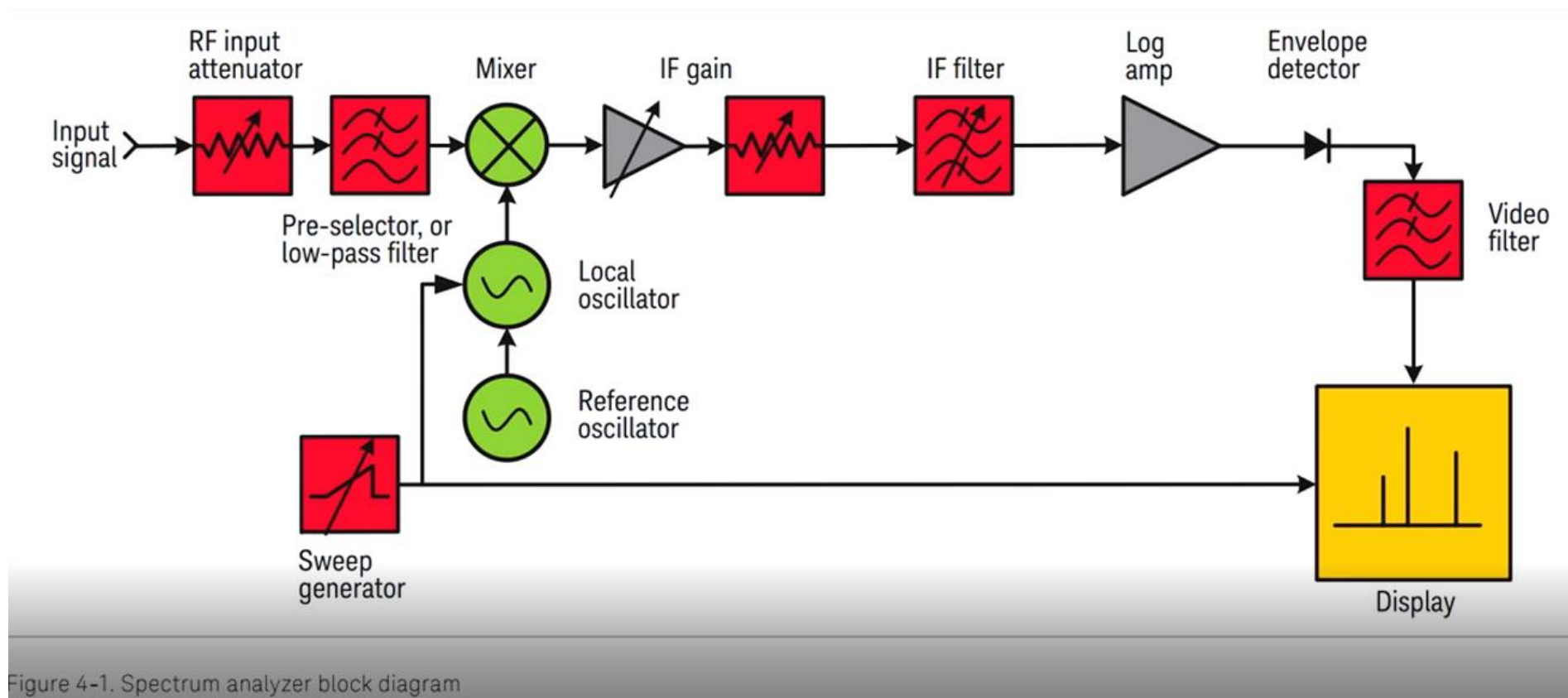
Spectrum Analyzer SSA 3021X by SIGLENT



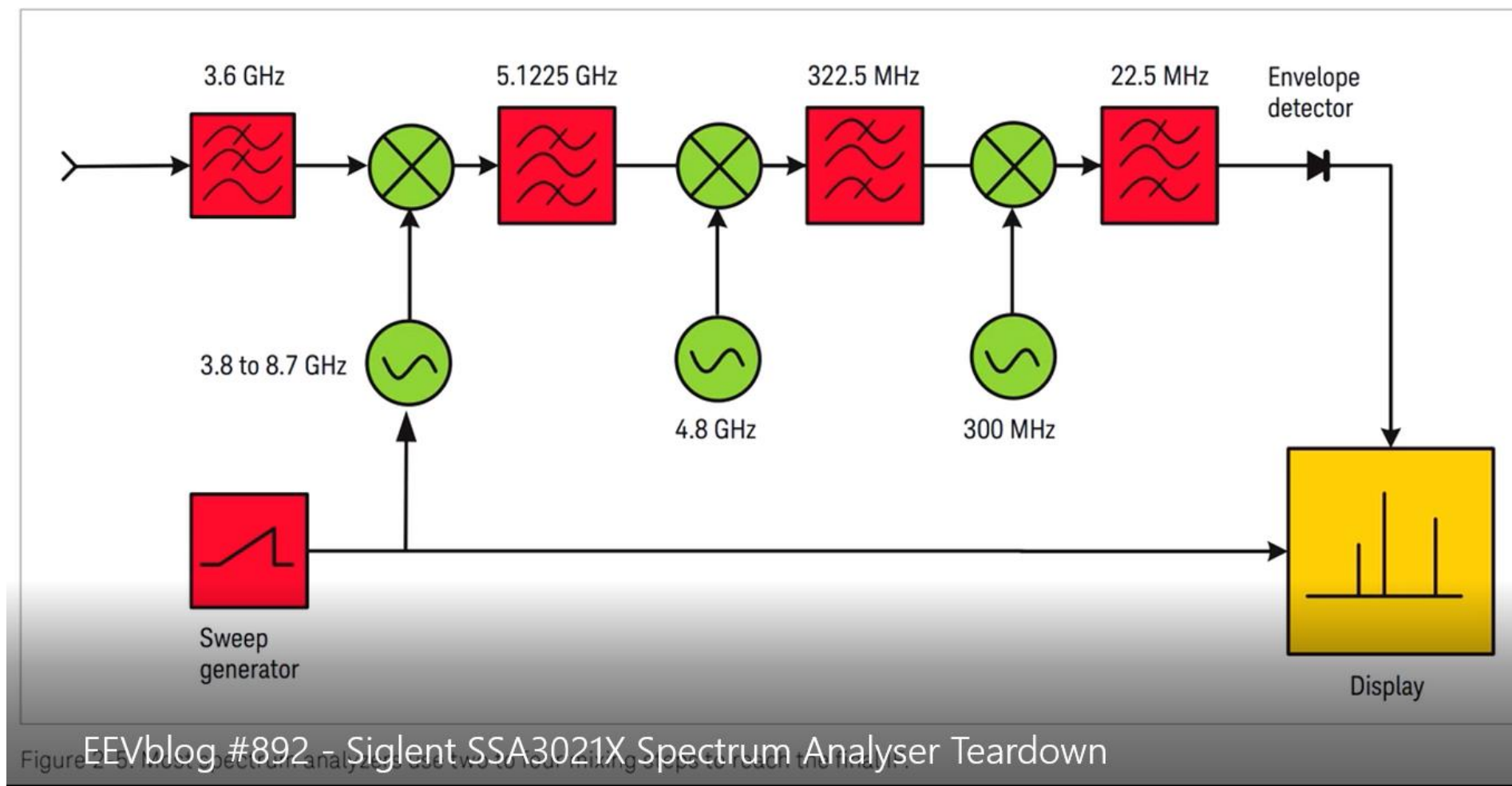
Spectrum Analyzer SSA 3021X by SIGLENT



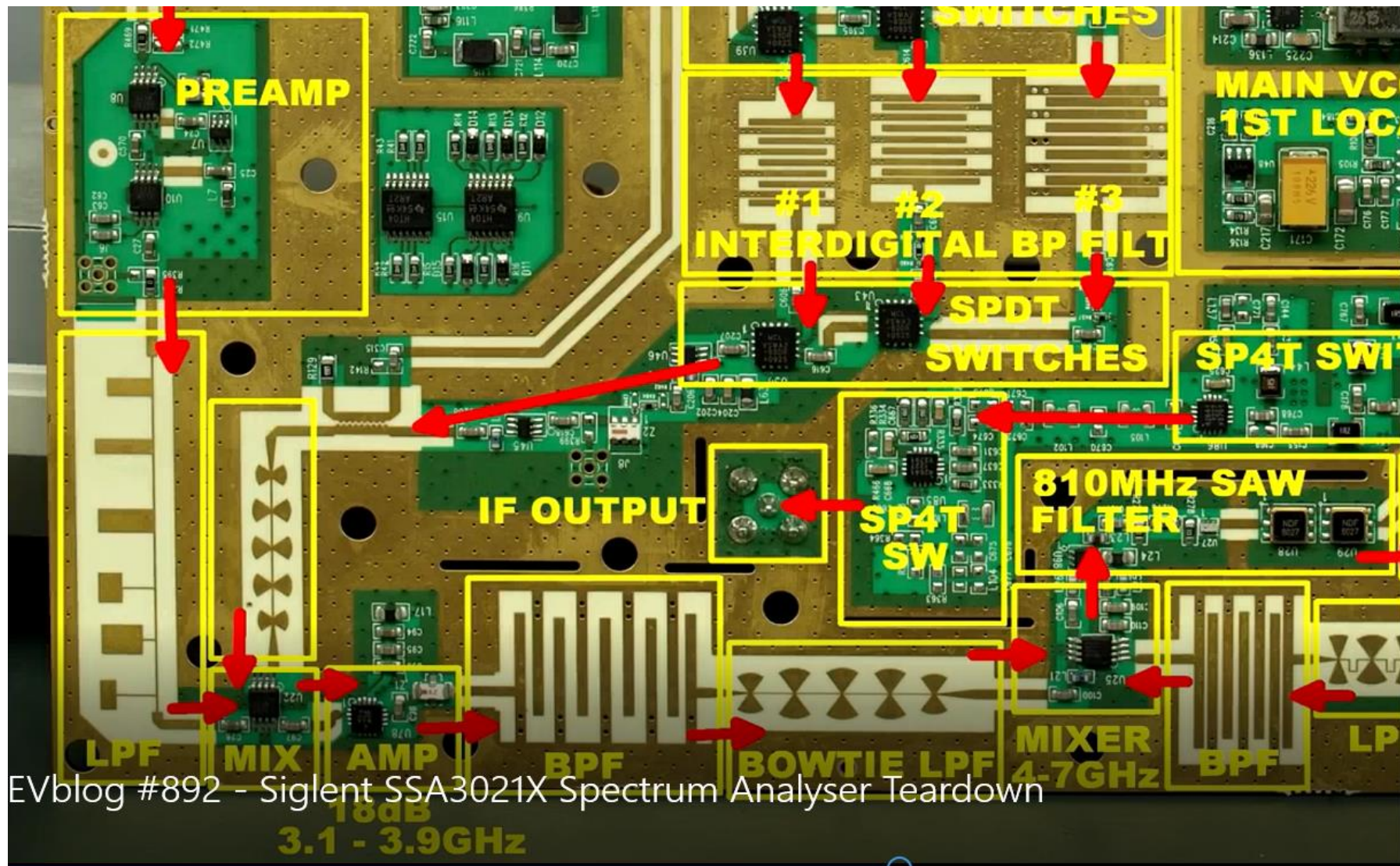
Spectrum Analyzer SSA 3021X by SIGLENT



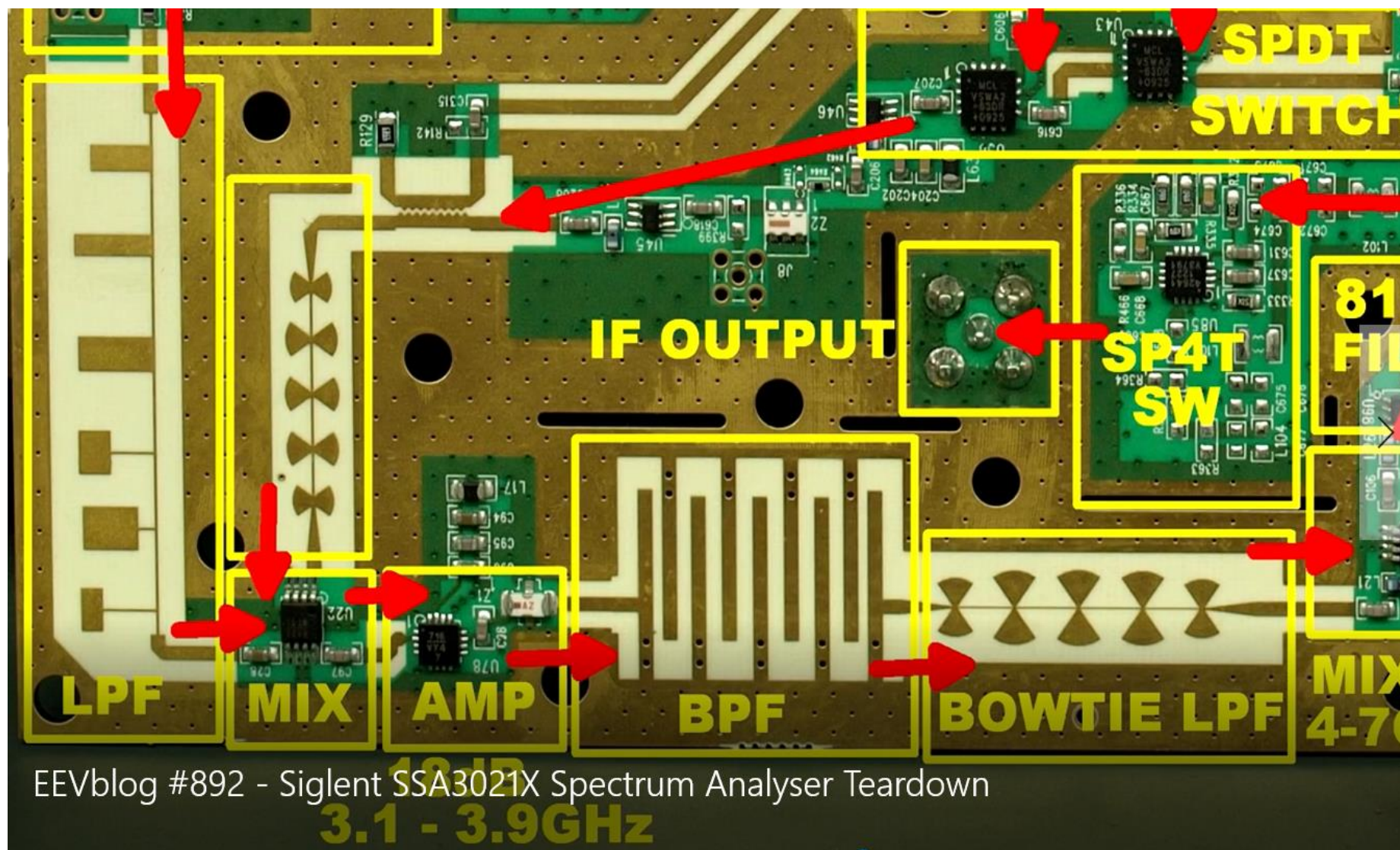
Spectrum Analyzer SSA 3021X by SIGLENT



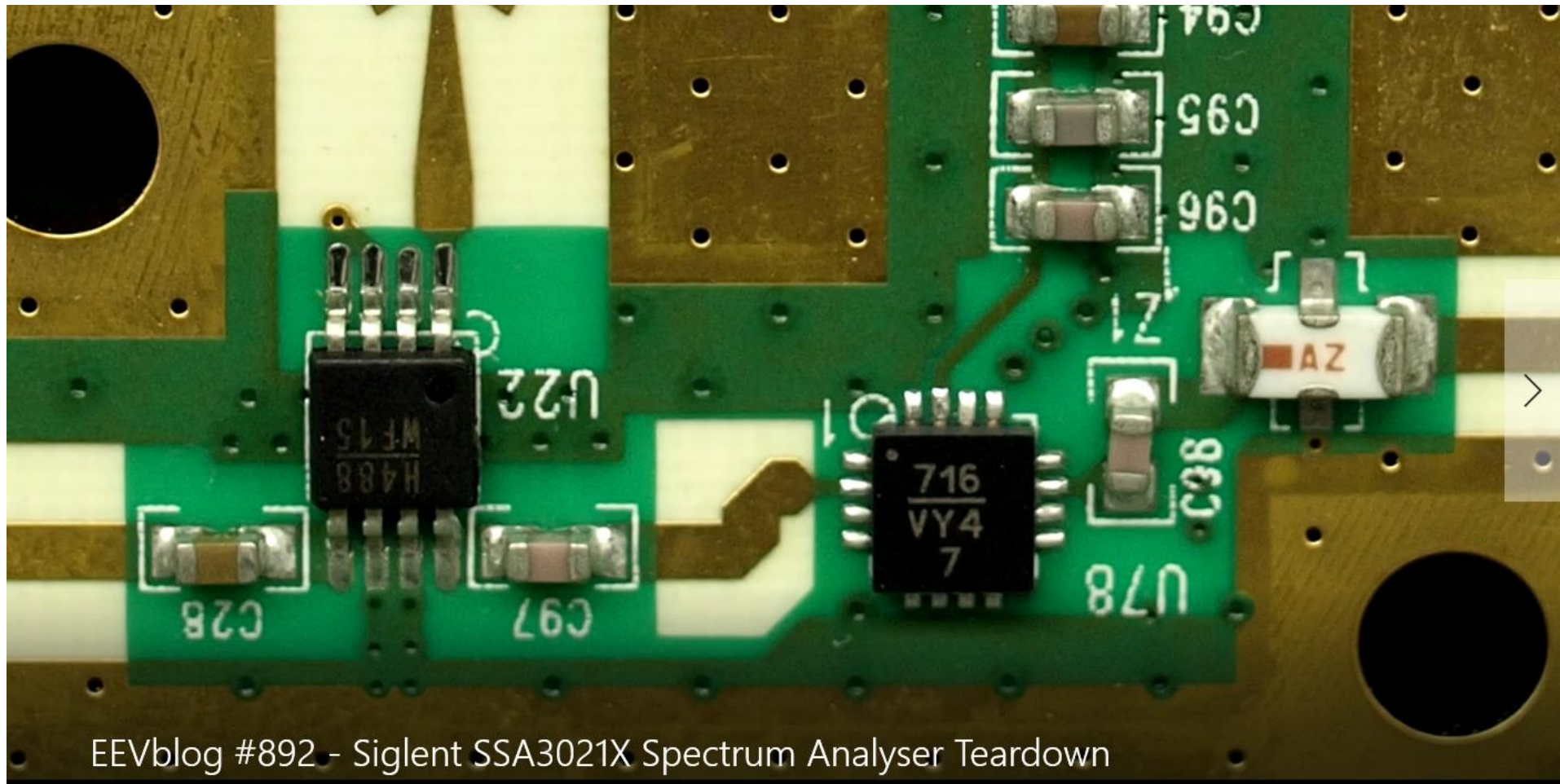
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Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT



MICROWAVE CORPORATION v03.0608

HMC488MS8G / 488MS8GE

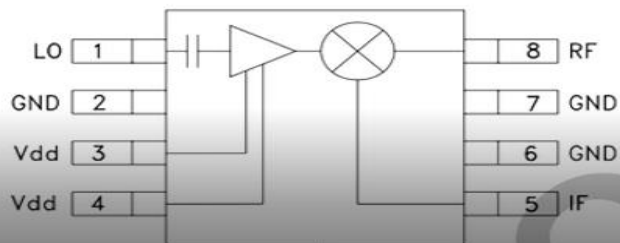
**GaAs MMIC MIXER W/ INTEGRATED
LO AMPLIFIER, 4 - 7 GHz**

Typical Applications

The HMC488MS8G / HMC488MS8GE is ideal for:

- Basestations & Repeaters
- Access Points & Subscribers
- UNII, ISM, WLAN & WiMAX
- Point to Point/Multi-Point Radios
- VSAT Radio

Functional Diagram



Features

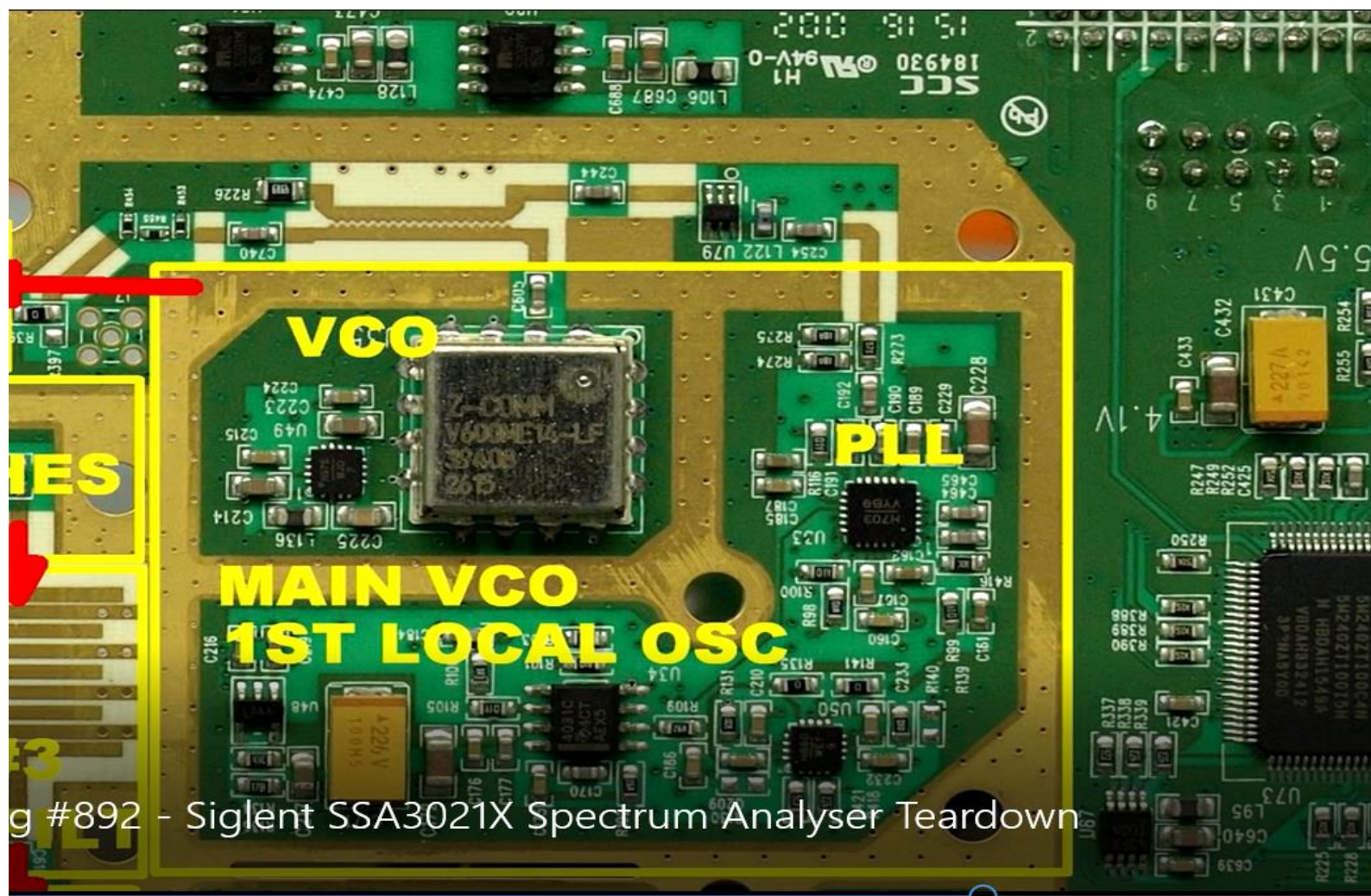
- Low Conversion Loss: 7 dB
- Double-Balanced Topology
- Integrated LO Amplifier: 0 to +6 dBm Drive
- Input IP3: +15 dBm
- Single Supply: +5V @ 46 mA
- MSOP8-G Package: 14.8 mm²

General Description

The HMC488MS8G(E) is an ultra miniature double-balanced mixer with integrated LO amplifier in an 8 lead plastic SMT MSOP8-G covering 4 - 7 GHz. This passive MMIC mixer integrates a GaAs Schottky diode quad, transformer baluns and a LO buffer on a single chip yielding a low conversion loss of 7 dB coupled with an input IP3 of +15 dBm. The LO buffer amplifier can be driven from 0 to +6 dBm and requires a single supply of +5V @ 46 mA. The device can be used as an upconverter, downconverter or bi-phase (de)modulator for a variety of point-to-point/multipoint, VSAT, telemetry or broadband WLAN applications.

SSA3021X Spectrum Analyser Teardown

Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT



14118 Stowe Drive, Suite B
Poway, CA 92064
TEL: (858) 621-2700 | FAX: (858) 486-1927
URL: www.zcomm.com
EMAIL: applications@zcomm.com

Voltage-Controlled Oscillator Surface Mount Module

Applications

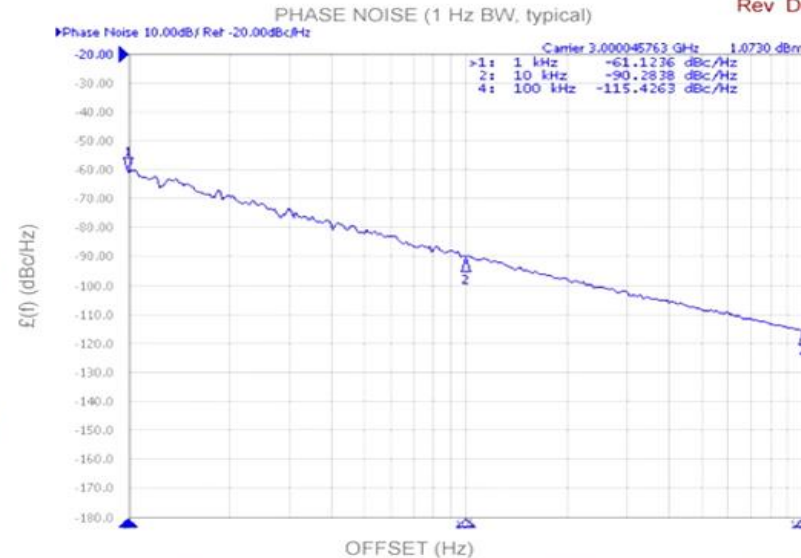
- Test Instrumentation
- CATV Headend Equipment
- Satellite Communication Systems

Application Notes

- AN-101: Mounting and Grounding
- AN-102: Output Loading
- AN-107: Manual Soldering

V600ME14-LF

Rev D4



Performance Specifications

	Min	Typ	Max	Units
Oscillation Frequency Range	2000		4000	MHz
Phase Noise @ 10 kHz offset (1 Hz BW)		-86		dBc/Hz
Harmonic Suppression (2nd)		-15	-6	dBc
Tuning Voltage	0		24	Vdc
Tuning Sensitivity (avg.)		100		MHz/V
Power Output	1	6	11	dBm
Load Impedance		50		Ω
Input Capacitance			50	pF
Pushing			10	MHz/V

Siglent SSA3021X Spectrum Analyser Teardown

Spectrum Analyzer SSA 3021X by SIGLENT

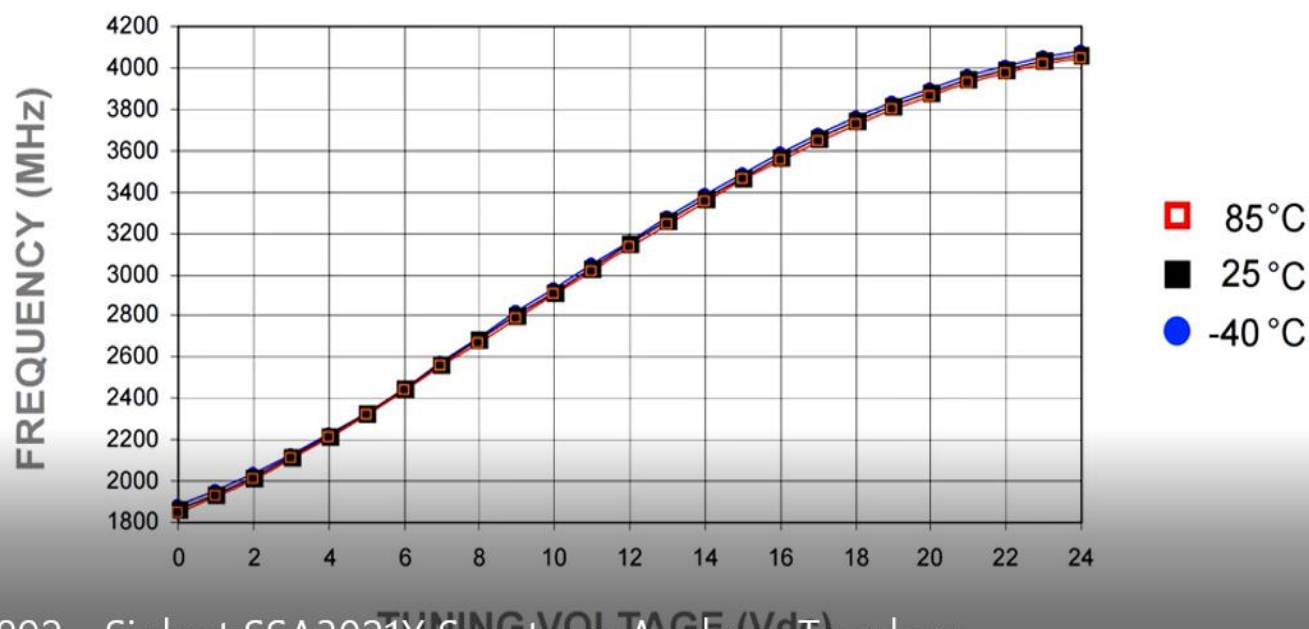


Voltage-Controlled Oscillator
Surface Mount Module

V600ME14-LF

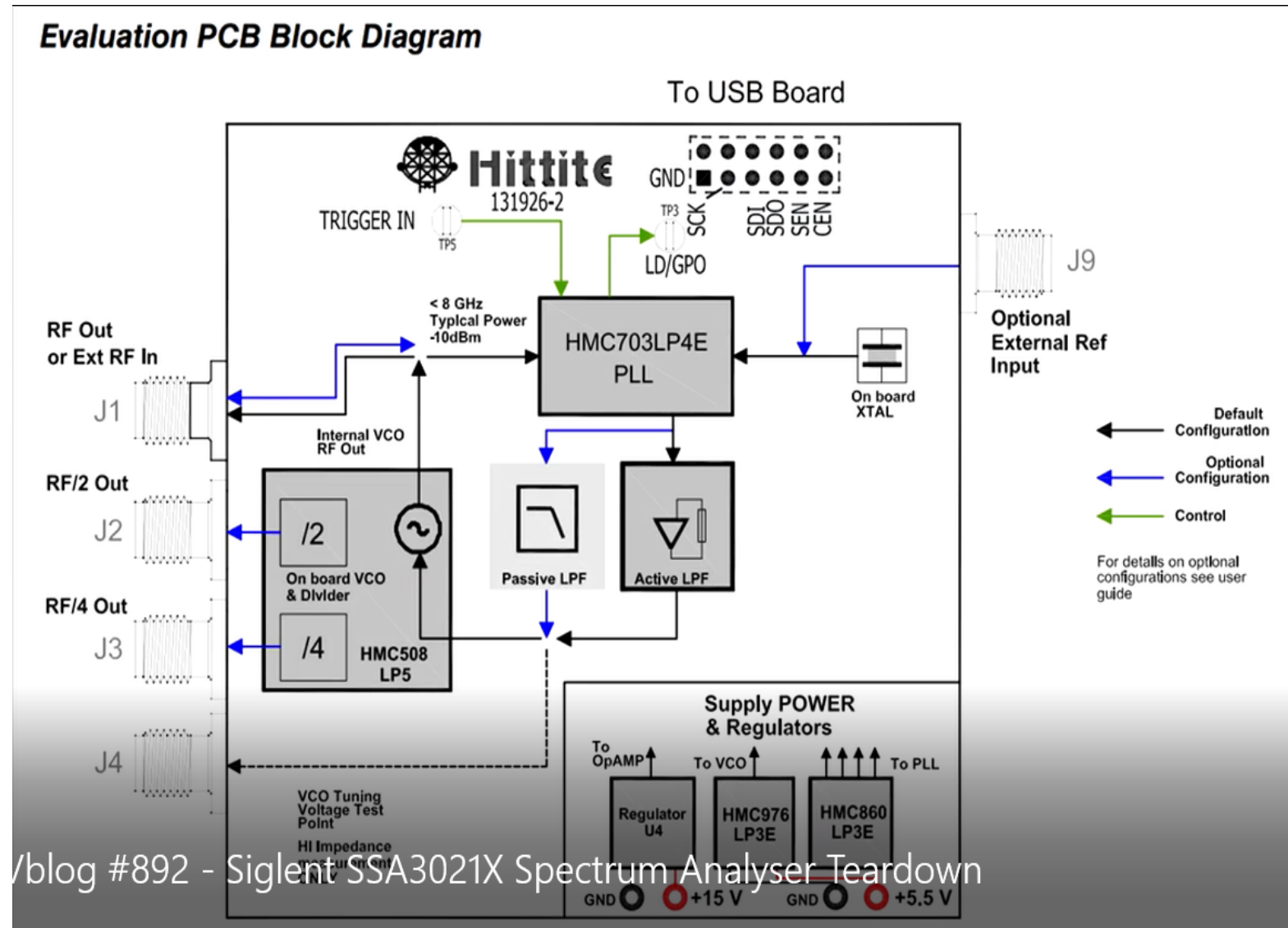
Rev D4

Tuning Curve, typ.



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Spectrum Analyzer SSA 3021X by SIGLENT



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Spectrum Analyzer SSA 3021X by SIGLENT



HMC703LP4E

8 GHz FRACTIONAL SYNTHESIZER

Typical Applications

The HMC703LP4E is ideal for:

- Microwave Point-to-Point Radios
- Base Stations for Mobile Radio (GSM, PCS, DCS, CDMA, WCDMA)
- Wireless LANs, WiMAX
- Communications Test Equipment
- CATV Equipment
- Automotive Sensors
- AESA - Phased Arrays
- FMCW Radar Systems

Features

Wide band: DC - 8 GHz RF Input

Best Phase Noise and Spurious in the Industry:
-112 dBc/Hz @ 8 GHz Fractional, 50 kHz Offset

Figure of Merit

-230 dBc/Hz Fractional Mode

-233 dBc/Hz Integer Mode

High PFD rate: 100 MHz

< 50 fs RMS jitter

Frequency and Phase Modulation

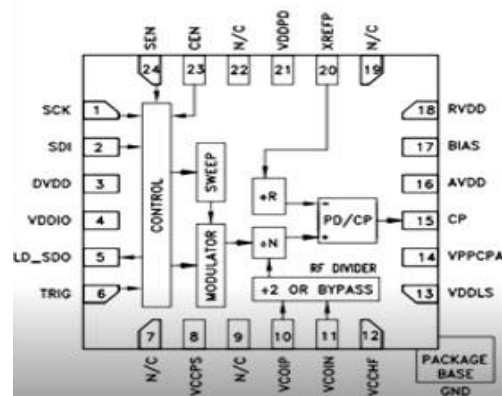
Integrated Frequency Sweeper

Triggered Frequency Hopping

External Triggering

24 Lead 4x4 mm SMT Package: 16 mm²

Functional Diagram



General Description

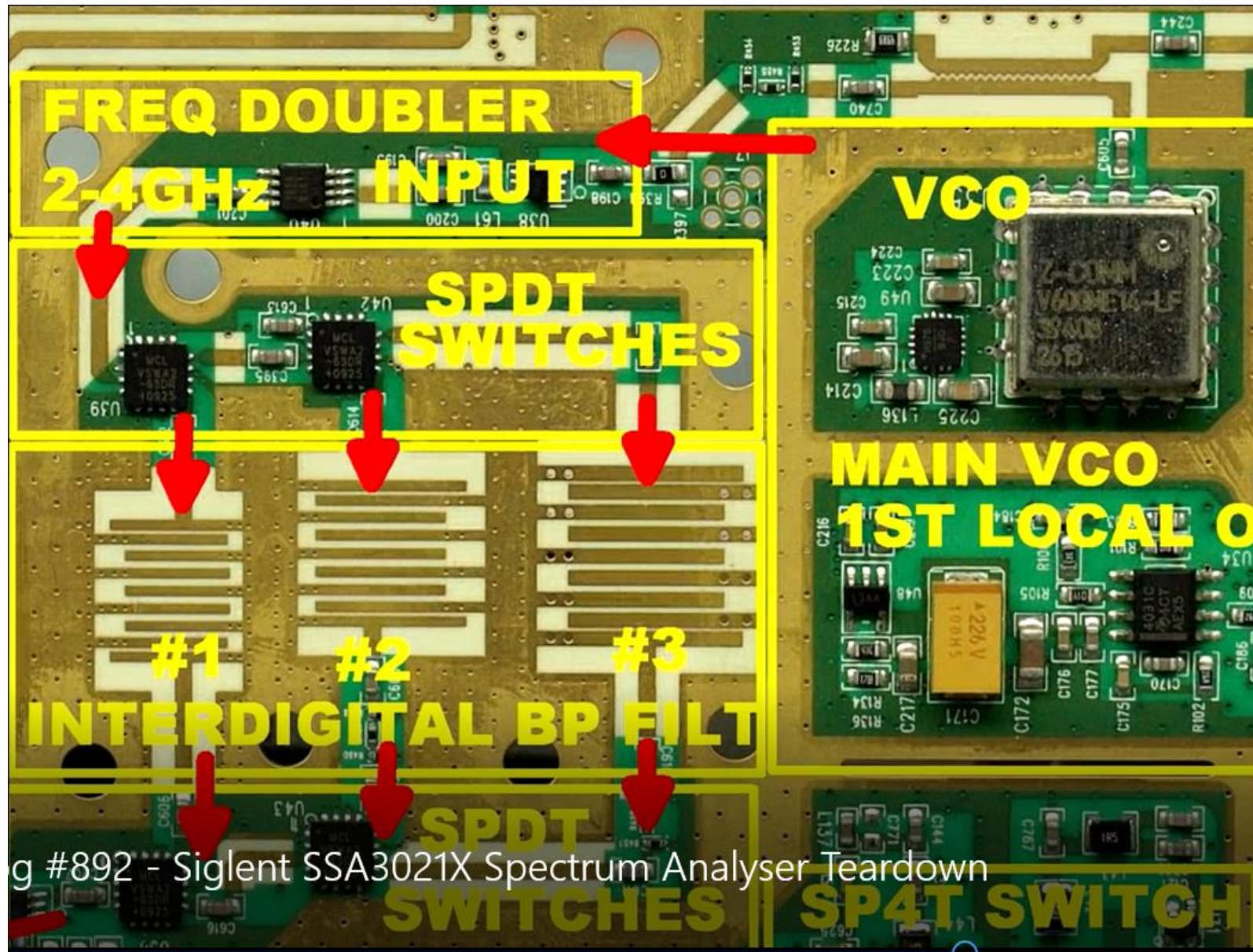
The HMC703LP4E fractional synthesizer is built upon the high performance PLL platform also contained in the HMC704LP4E and Hittite's latest generation of PLL+VCO products. This platform has the best phase-noise and spurious performance in the industry - enabling higher order modulation schemes while minimizing blocker effects in high performance radios.

In addition, the HMC703LP4E offers frequency sweep and modulation features, external triggering, double-buffering, exact frequency control, phase modulation and more - while maintaining pin compatibility with the HMC700LP4E PLL.

Exact frequency mode with a 24-bit fractional modulator provides the ability to generate fractional frequencies with zero frequency error and very low channel spurious, an important feature for Digital Pre-Distortion systems.

The serial interface offers read back capability and is compatible with a wide variety of protocols.

Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT



v03.0714



HMC189AMS8 / 189AMS8E

GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 2 - 4 GHz INPUT

Typical Applications

The HMC189AMS8(E) is suitable for:

- Wireless Local Loop
- LMDS, VSAT, and Point-to-Point Radios
- UNII & HiperLAN
- Test Equipment

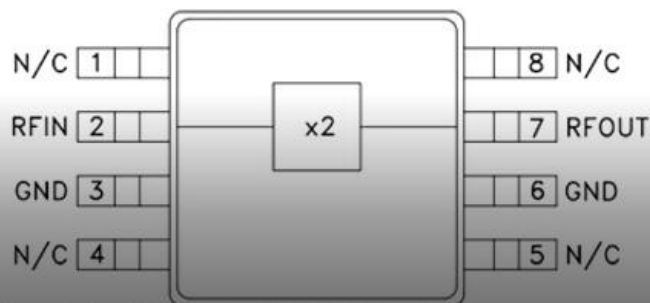
Features

Conversion Loss: 13 dB

Fo, 3Fo, 4Fo Isolation: 33 dB

Input Drive Level: +10 to +15 dBm

Functional Diagram

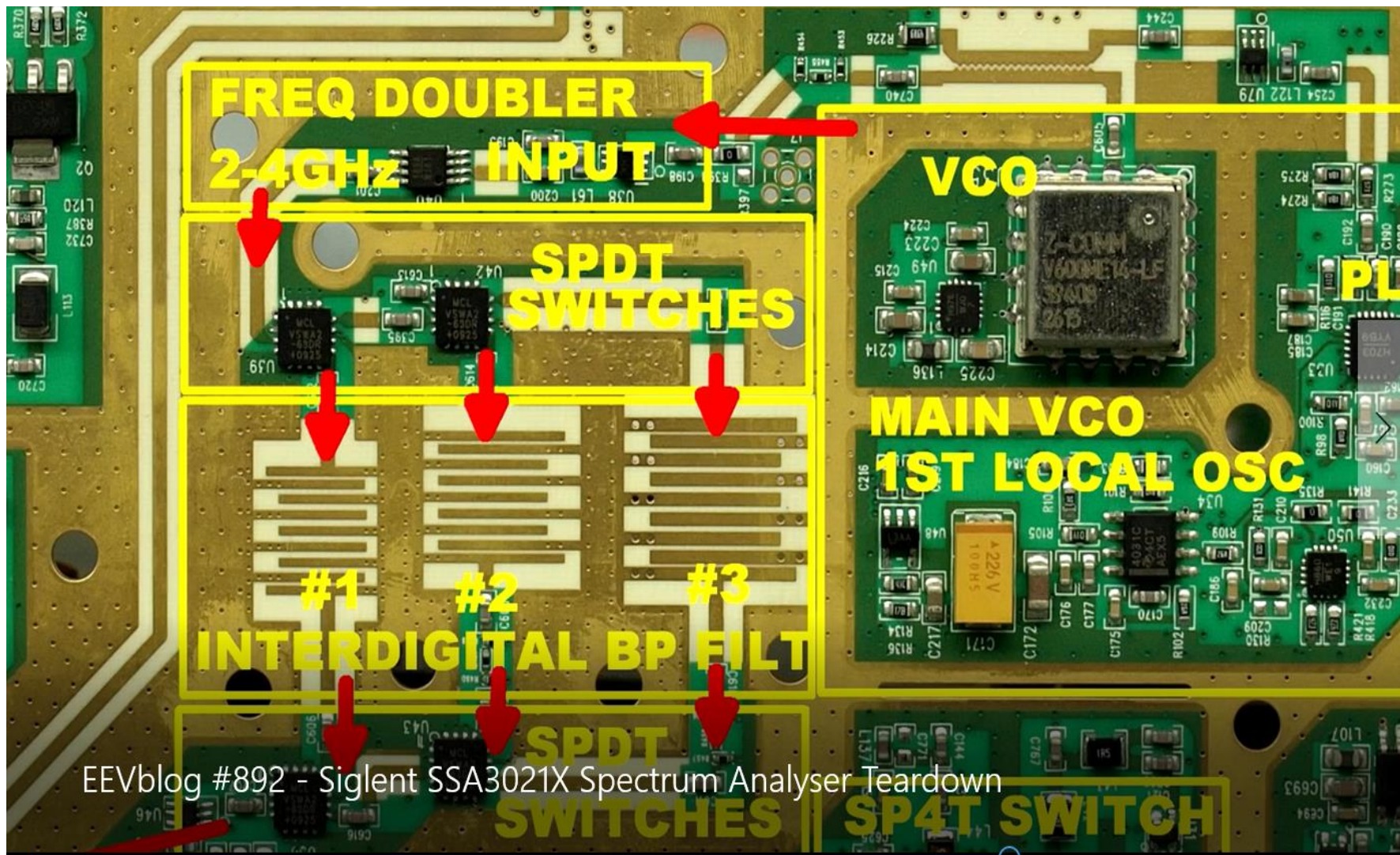


General Description

The HMC189AMS8(E) is a miniature passive frequency doublers in plastic 8-lead MSOP packages. The suppression of undesired fundamental and higher order harmonics is 33 dB typical with respect to input signal levels. The doubler uses the same diode/balun technology used in Hittite MMIC mixers. The doubler is ideal for high volume applications where frequency doubling of a lower frequency is more economical than directly generating a higher frequency. The passive Schottky diode doubler technology contributes no measurable additive phase noise onto the multiplied signal.

2 - Siglent SSA3021X Spectrum Analyser Teardown

Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT

SPDT RF Switch

50Ω 500-6000 MHz

Absorptive RF Switch with internal driver.
Single Supply Voltage, +3V to +5V

Product Features

- High Isolation, 65 dB typ. at 1 GHz
- Low insertion loss, 1.0 dB typ. at 1 GHz
- High IP3, 50 dBm typ. at 1 GHz
- Fast switching, Rise/fall time, 23 ns typ.
- Low current consumption, 12 μA typ.

Typical Applications

- Automated switching networks
- Cellular/ PCS
- ISM, WCDMA, WiMAX, LTE



VSWA2-63DR+

CASE STYLE: DG1235-1

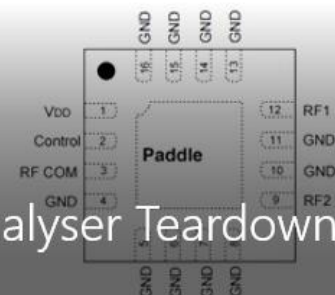
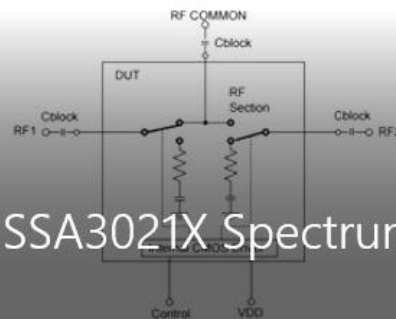
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

General Description

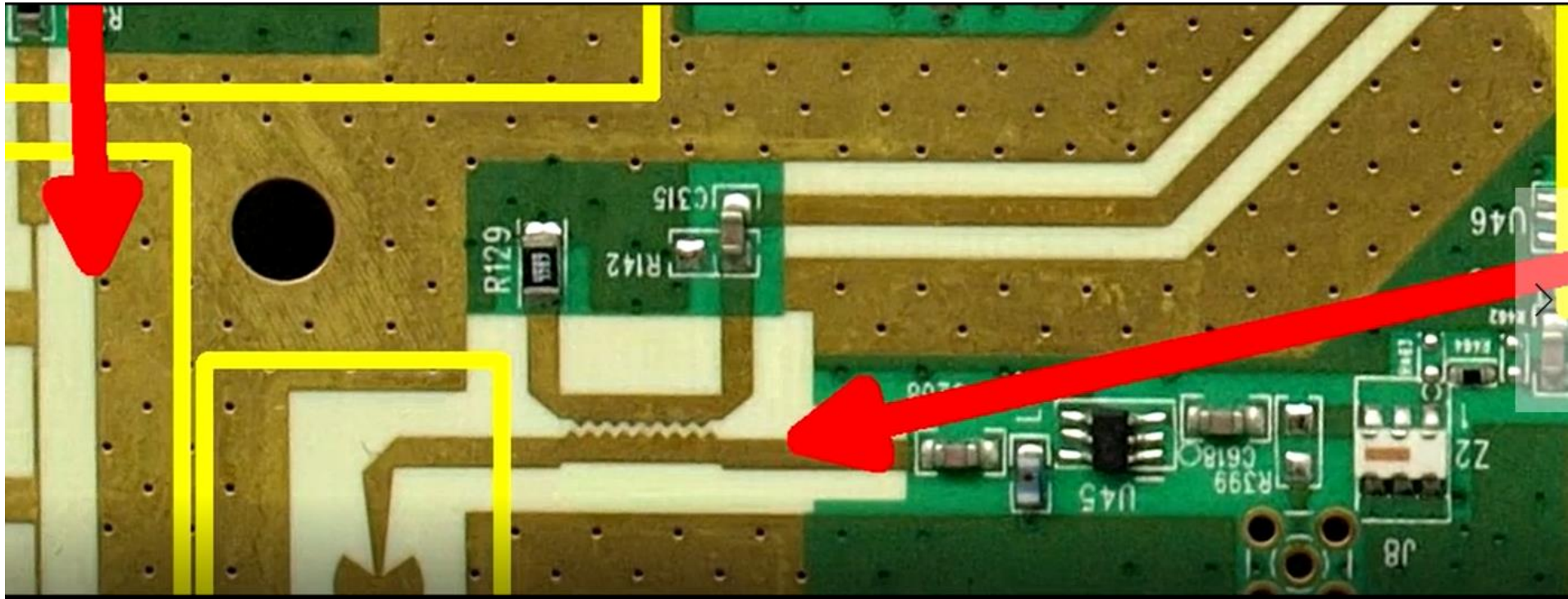
VSWA2-63DR+ is a high isolation absorptive SPDT switch with integral CMOS driver, operates with single positive supply voltage while consuming, 12μA typical. It has been designed for very wideband operation of 500-6000 MHz for 50Ω systems and yet is usable in 75Ω systems with degraded return loss. This switch is usable over an extended frequencies from 300 kHz to 500 MHz with reflective switch performance. It is packaged in a tiny 4mm x 4mm x 0.9mm package and is rated MSL1 and class 1A ESD.

Simplified Schematic and Pad Description

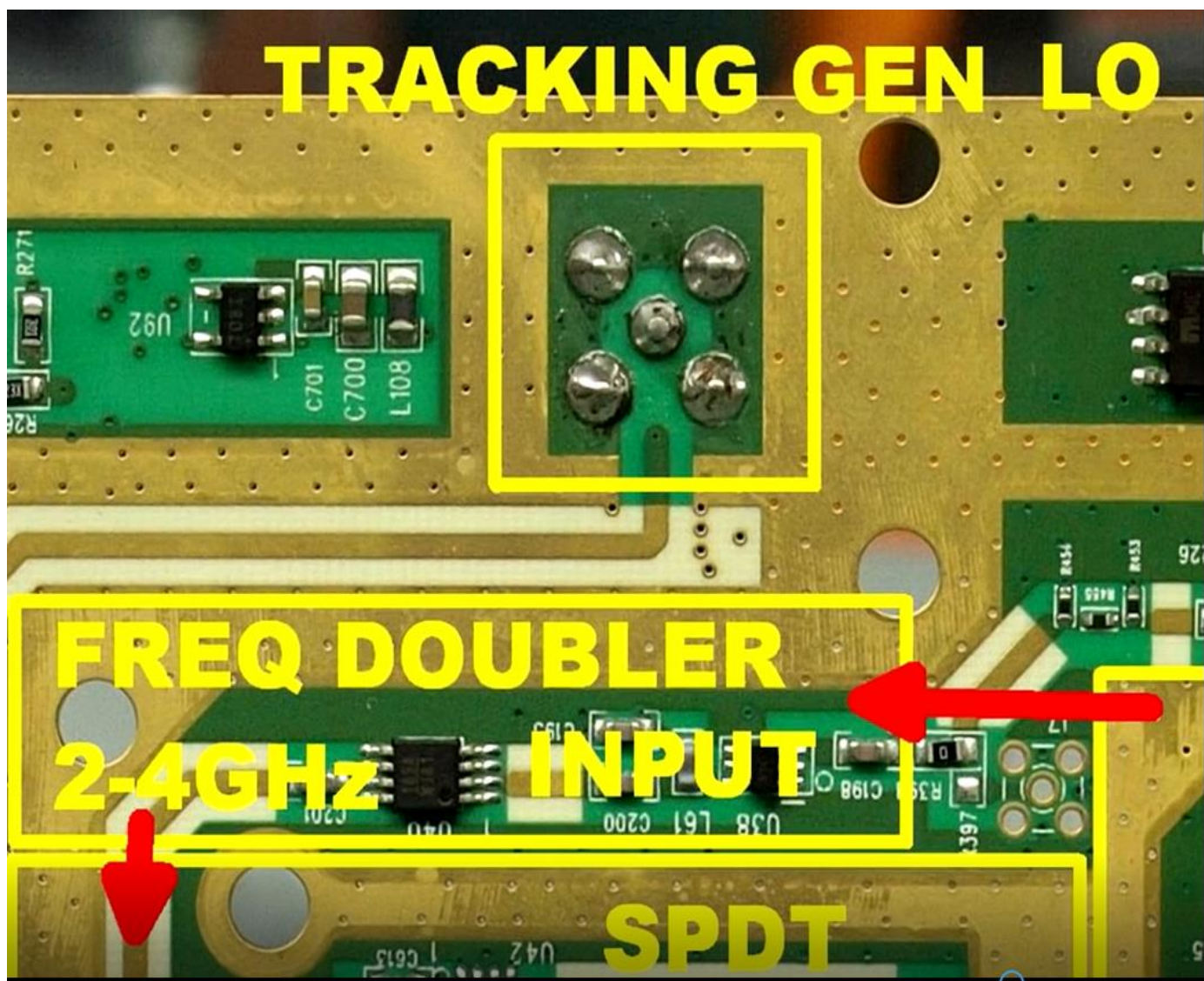


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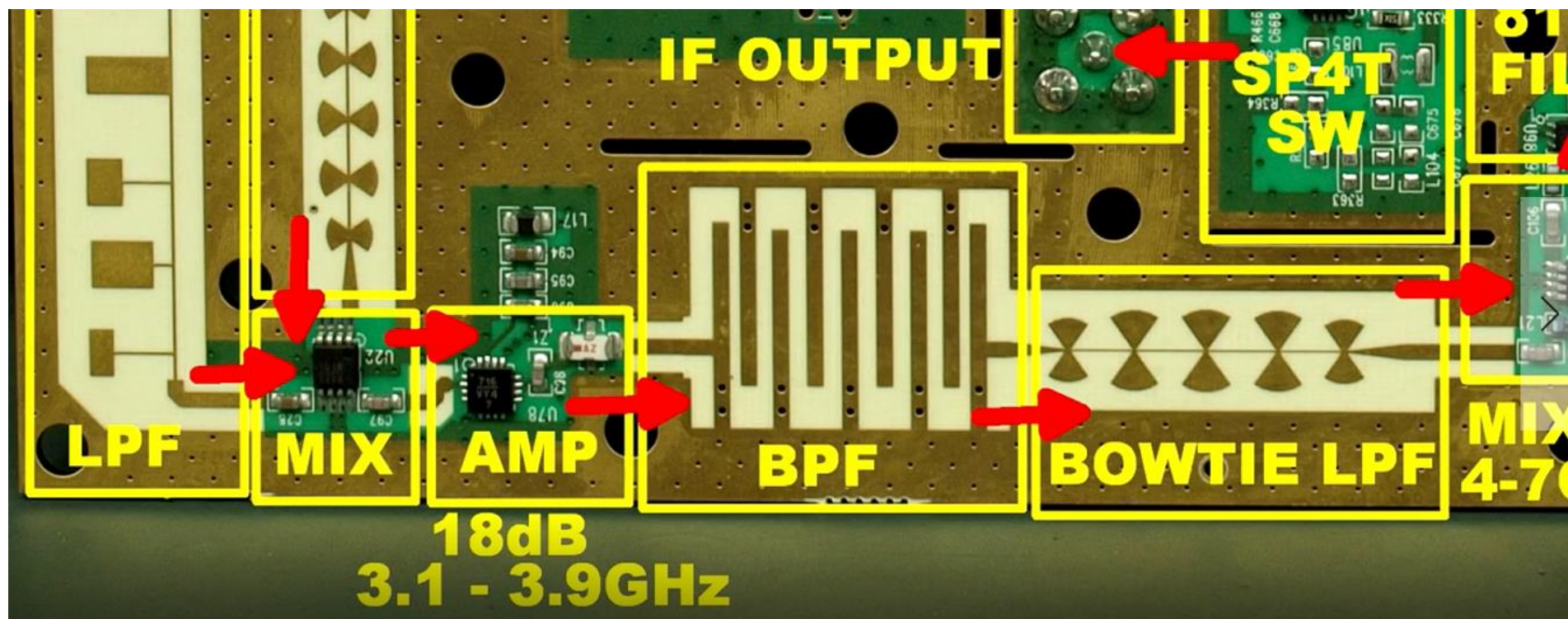
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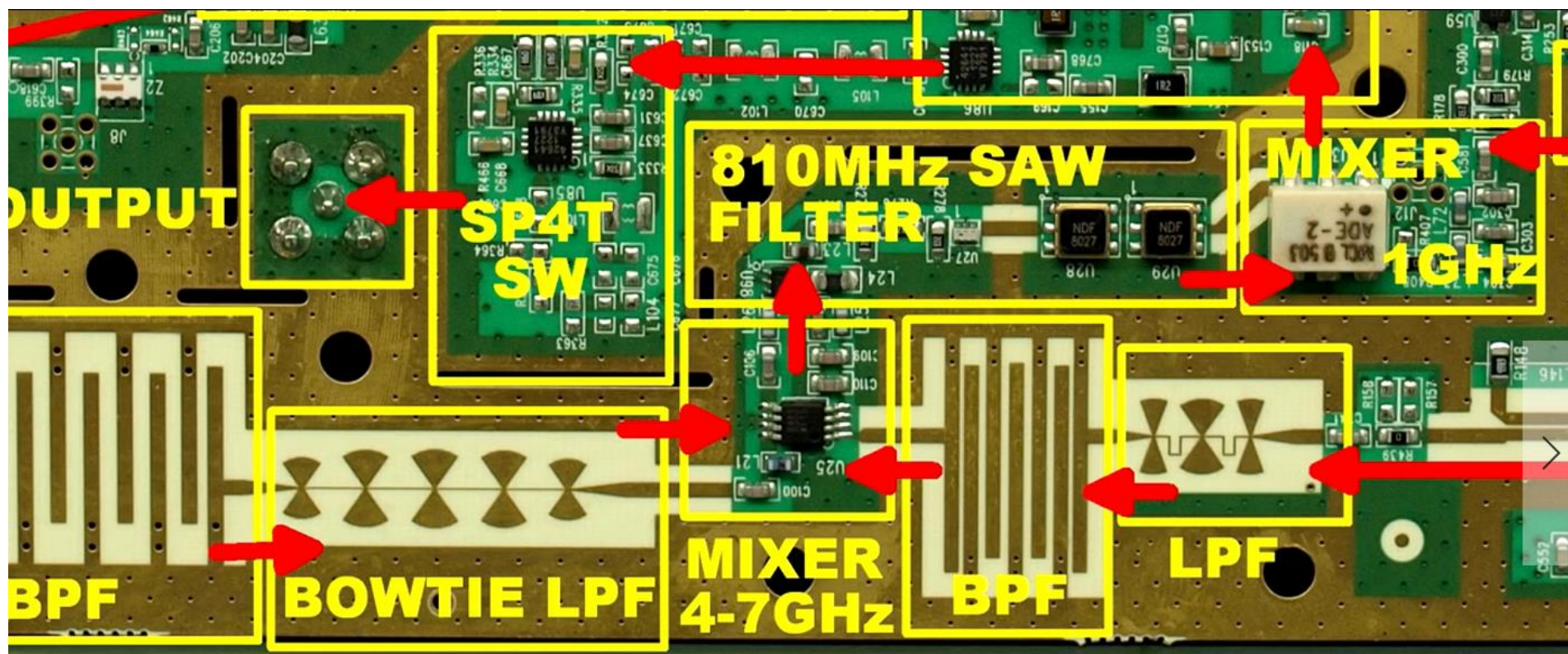
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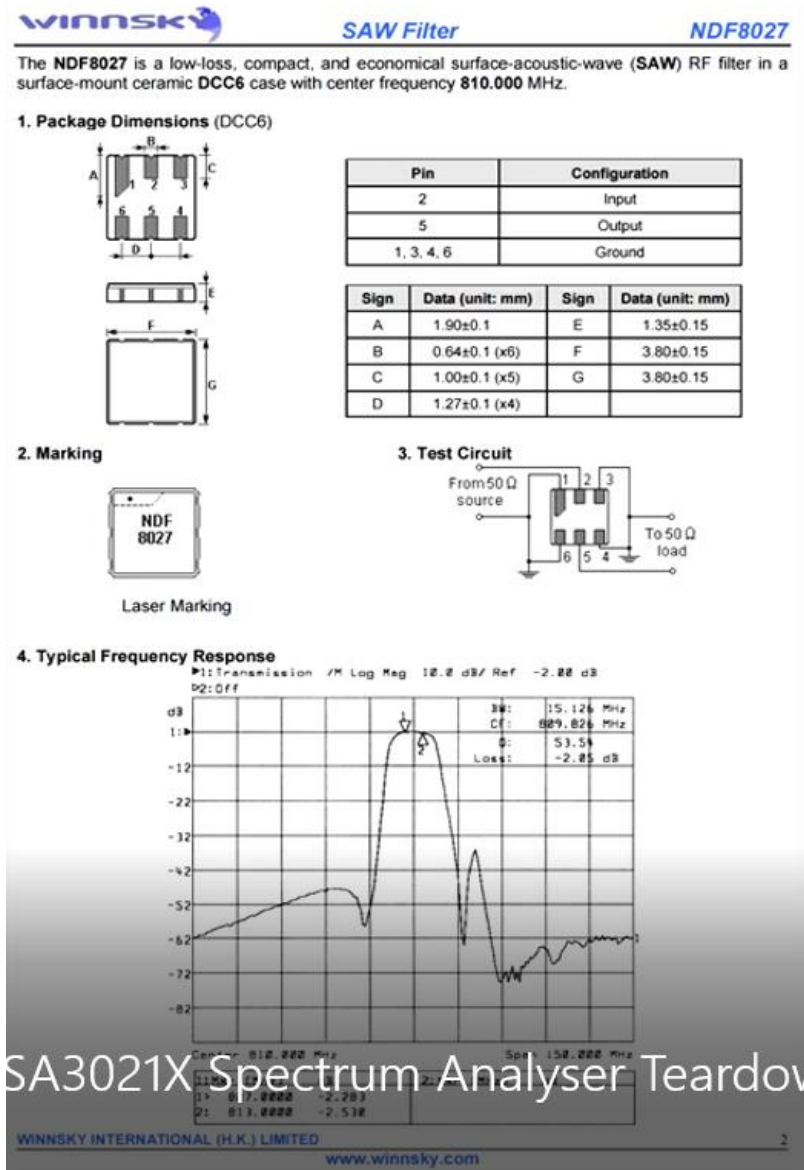
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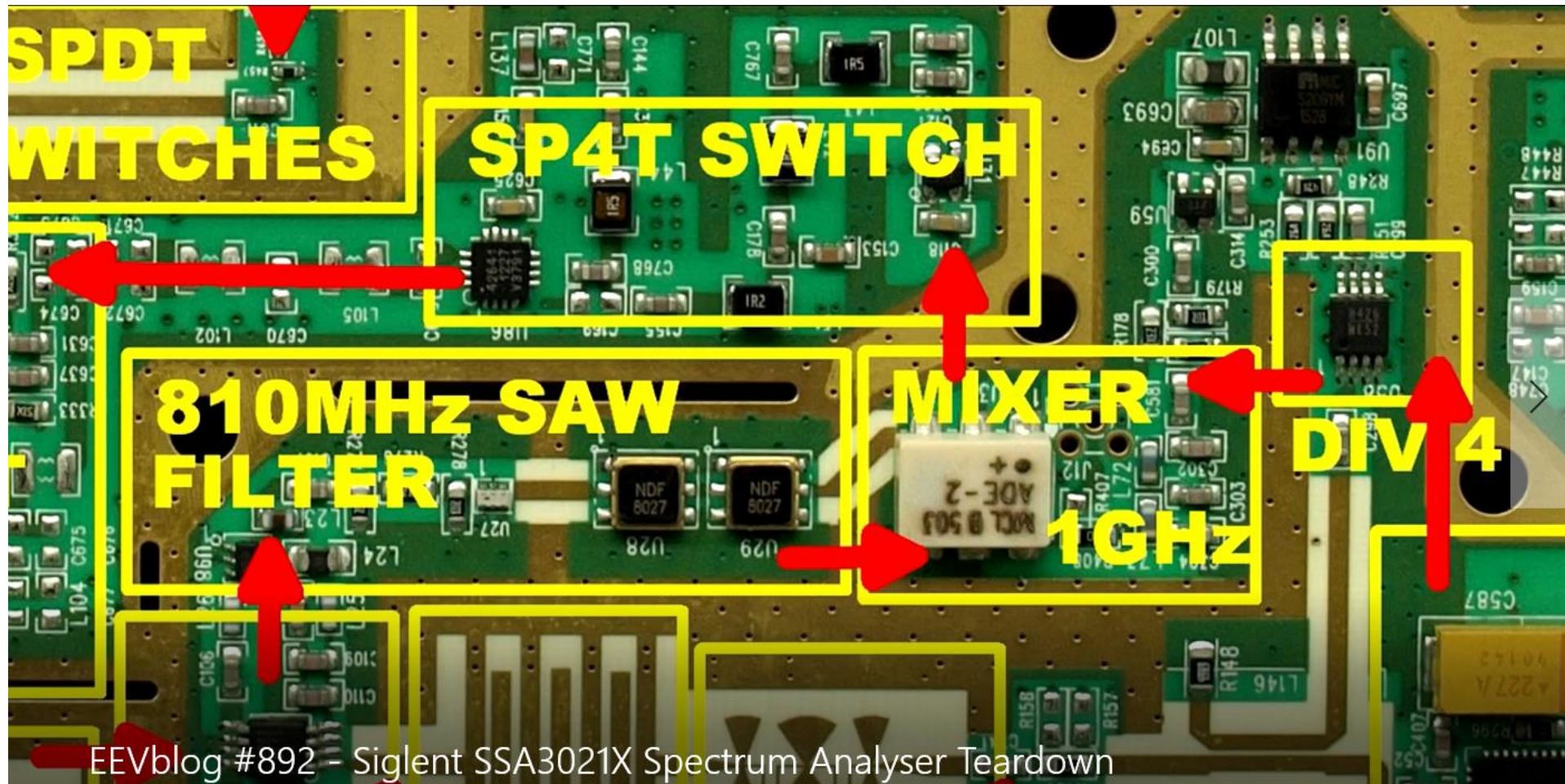
Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT



Spectrum Analyzer SSA 3021X by SIGLENT



Surface Mount Frequency Mixer

Level 7 (LO Power +7 dBm) 5 to 1000 MHz

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

Permanent damage may occur if any of these limits are exceeded.

Pin Connections

LO	6
RF	3
IF	2
GROUND	1,4,5

Features

- excellent L-R isolation, 47 dB typ.
- low profile package
- aqueous washable
- protected by U.S. Patent 6,133,525

Applications

- cellular
- PCS

ADE-2+
ADE-2



CASE STYLE: CD542

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



Available Tape and Reel
at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500
13"	500, 1000

Outline Drawing



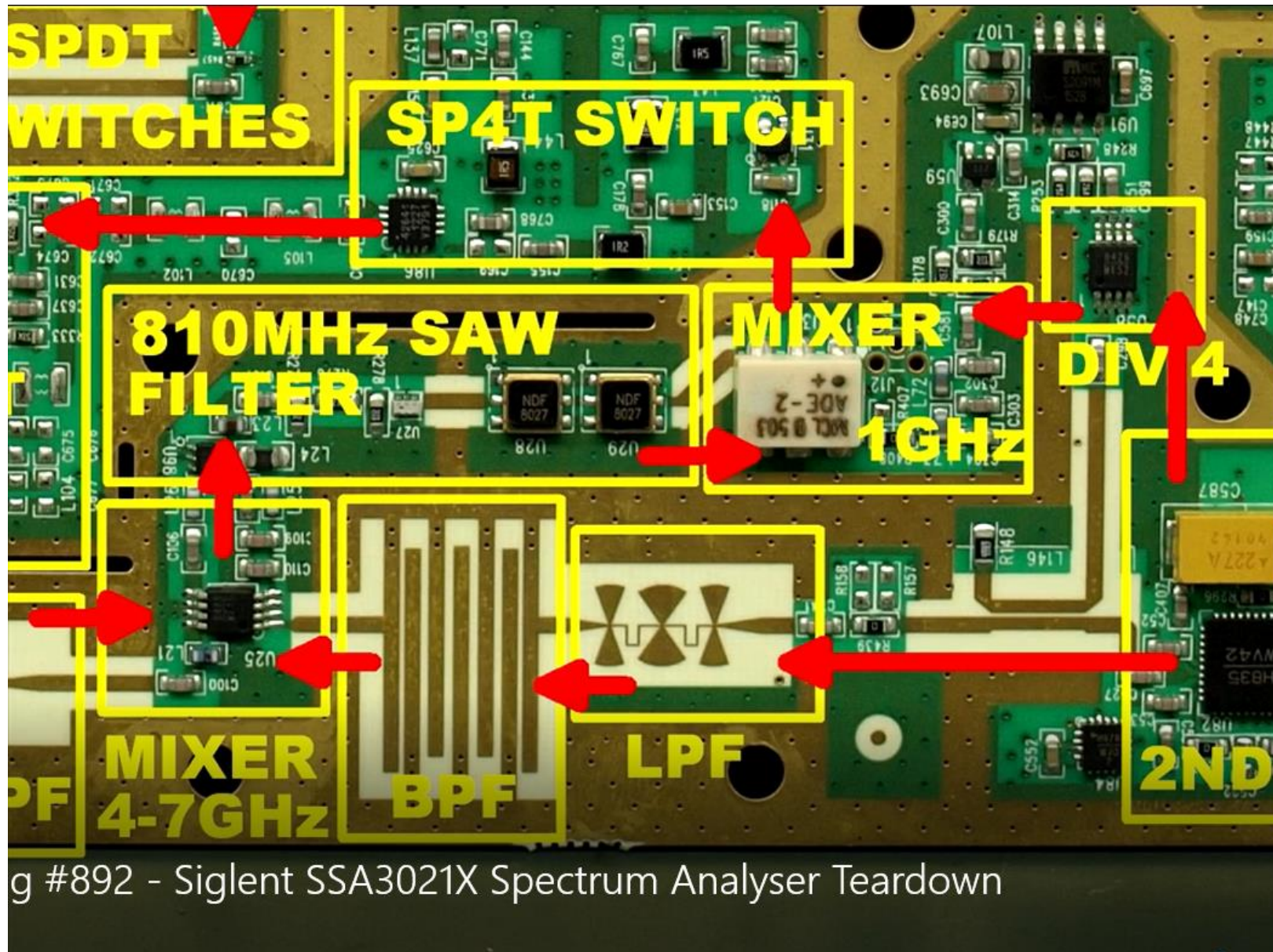
Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)			LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			IP3 at center band (dBm)
LO/RF	IF	Mid-Band m		Total Range	L	M	U	L	M	U	
f_L - f_U		$\bar{X}$	σ	Max.	Typ. Min.	Typ. Min.	Typ. Min.	Typ. Min.	Typ. Min.	Typ. Min.	Typ.
5-1000	DC-1000	6.67	0.26	10	60	40	47	25	32	22	20

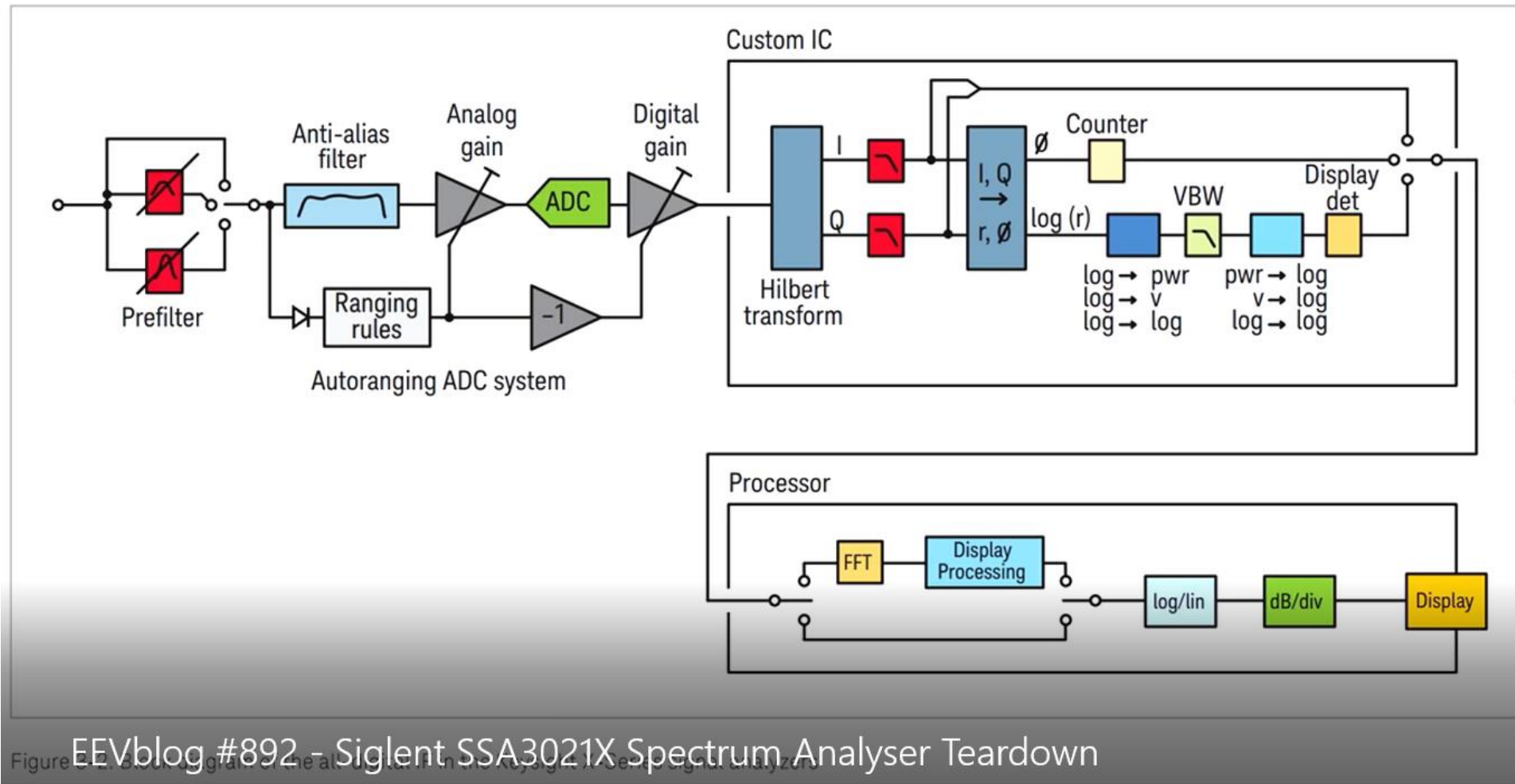
1 dB COMP.: +1 dBm typ.

L = low range [f_L to $10 f_L$] M = mid range [$10 f_L$ to $f_U/2$] U = upper range [$f_U/2$ to f_U]
m= mid band [$2f_L$ to $f_U/2$]

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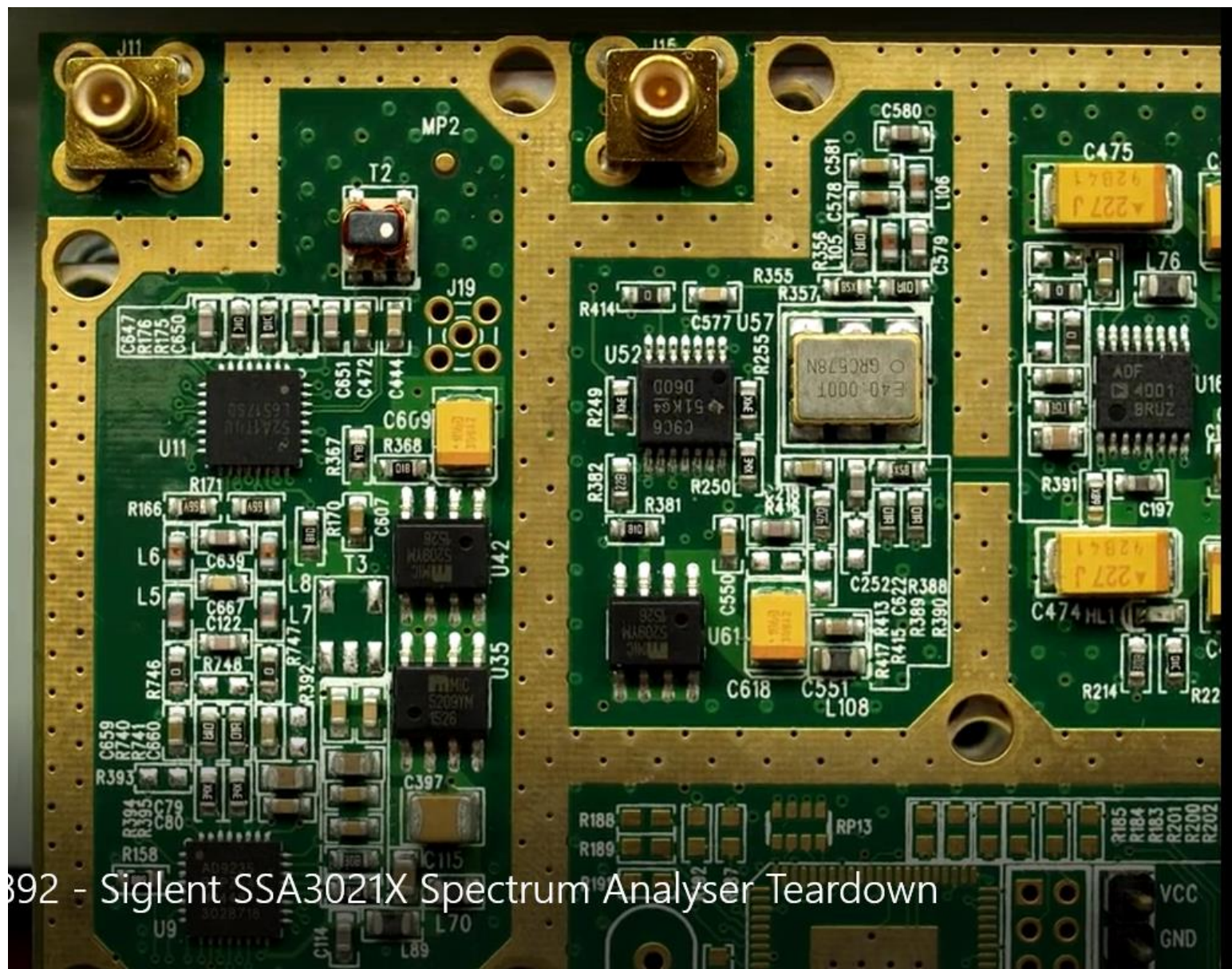


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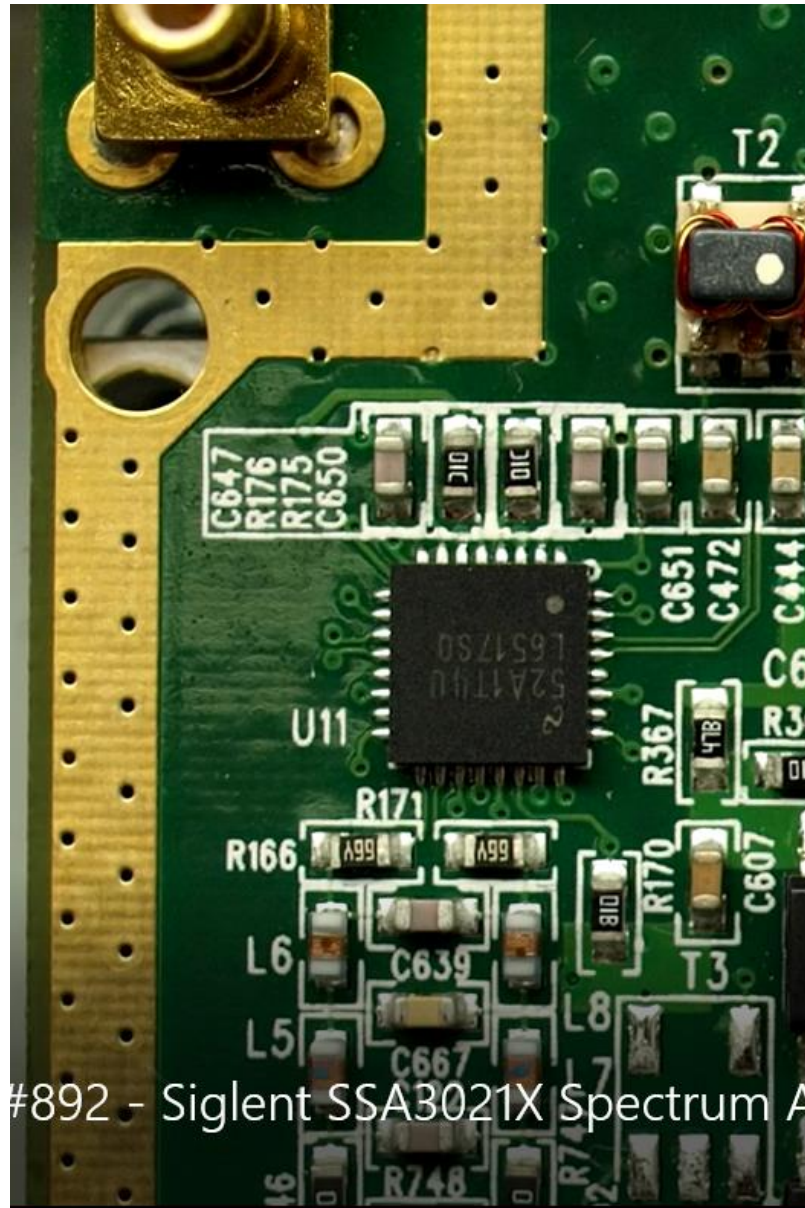


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**TEXAS
INSTRUMENTS**

www.ti.com

LMH6517

SNOSB19K – NOVEMBER 2008 – REVISED MARCH 2013

Low Power, Low Noise, IF and Baseband, Dual 16 bit ADC Driver With Digitally Controlled Gain

Check for Samples: [LMH6517](#)

FEATURES

- Accurate, 0.5dB Gain Steps
- 200Ω Resistive, Differential Input
- Low Impedance, Differential Output
- Disable Function for Each Channel
- Parallel Gain Control
- SPI Compatible Serial Bus
- Two Wire, Pulse Mode Control
- On Chip Register Stores Gain Setting
- Low Sensitivity of Linearity and Phase to Gain Setting
- Single 5V Supply Voltage
- Small Footprint WQFN Package

APPLICATIONS

- Cellular Base Stations
- IF Sampling Receivers
- Instrumentation
- Modems
- Imaging

KEY SPECIFICATIONS

- OIP3: 43dBm @ 200MHz
- Noise figure 5.5dB
- Gain step size of 0.5dB
- Gain step accuracy: 0.05dB
- Frequency Range of 1200 MHz
- Supply current 80mA per channel

DESCRIPTION

The LMH6517 contains two high performance, digitally controlled variable gain amplifiers (DVGA). It has been designed for use in narrowband and broadband IF sampling applications. Typically the LMH6517 drives a high performance ADC in a broad range of mixed signal and digital communication applications such as mobile radio and cellular base stations where automatic gain control (AGC) is required to increase system dynamic range.

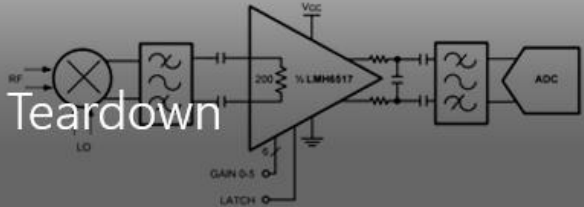
Each channel of LMH6517 has an independent, digitally controlled attenuator and a high linearity, differential output amplifier. Each block has been optimized for low distortion and maximum system design flexibility. Each channel can be individually disabled for power savings.

The LMH6517 digitally controlled attenuator provides precise 0.5dB gain steps over a 31.5dB range. On chip digital latches are provided for local storage of the gain setting. Both serial and parallel programming options are provided. A Pulse mode is also offered where simple up or down commands can change the gain one step at a time.

The output amplifier has a differential output allowing large signal swings on a single 5V supply. The low impedance output provides maximum flexibility when driving filters or analog to digital converters.

The LMH6517 operates over the industrial temperature range of -40°C to +85°C. The LMH6517 is available in a 32-Pin, thermally enhanced, WQFN package.

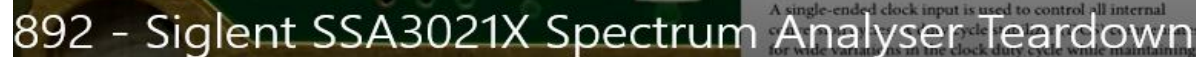
Typical Application: IF Sampling Receiver



#892 – Siglent SSA3021X Spectrum Analyser Teardown

**12-Bit, 20/40/65 MSPS
3 V A/D Converter**

AD9235



Single 3 V supply operation (2.7 V to 3.6 V)
SNR = 70 dBc to Nyquist at 65 MSPS
SFDR = 85 dBc to Nyquist at 65 MSPS
Low power: 300 mW at 65 MSPS
Differential input with 500 MHz bandwidth
On-chip reference and SHA
DNL = ± 0.4 LSB
Flexible analog input: 1 V p-p to 2 V p-p range
Offset binary or twos complement data format
Clock duty cycle stabilizer

Ultrasound equipment
 IF sampling in communications receivers
 IS-95, CDMA-One, IMT-2000
 Battery-powered instruments
 Hand-held scopemeters
 Low cost digital oscilloscopes

The AD9235 is a family of monolithic, single 3 V supply, 12-bit, 20/40/65 MSPS analog-to-digital converters (ADCs). This family features a high-performance sample-and-hold amplifier (SHA) and voltage reference. The AD9235 uses a multistage differential pipelined architecture with output error correction logic to provide 12-bit accuracy at 20/40/65 MSPS data rates and guarantee no missing codes over the full operating temperature range.

The wide bandwidth, truly differential SHA allows a variety of user-selectable input ranges and offsets including single-ended applications. It is suitable for multiplexed systems that switch full-scale voltage levels in successive channels and for sampling single-channel inputs at frequencies well beyond the Nyquist rate. Combined with power and cost savings over previously available ADCs, the AD9235 is suitable for applications in communications, imaging, and medical ultrasound.

Analysing Teardown

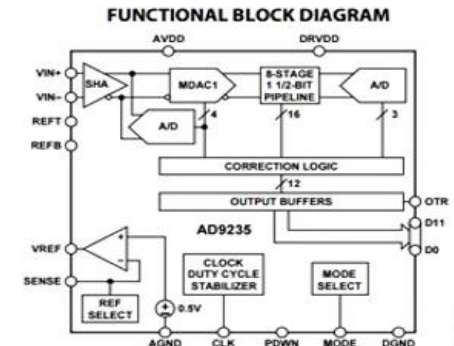


Figure 1.

can be used with the most significant bit to determine low or high overflow.

Fabricated on an advanced CMOS process, the AD9235 is available in a 28-lead TSSOP and a 32-lead LFCSP and is specified over the industrial temperature range (-40°C to $+85^{\circ}\text{C}$).

1. The AD9235 operates from a single 3 V power supply and features a separate digital output driver supply to accommodate 2.5 V and 3.3 V logic families.
2. Operating at 65 MSPS, the AD9235 consumes a low 300 mW.
3. The patented SHA input maintains excellent performance for input frequencies up to 100 MHz and can be configured for single-ended or differential operation.
4. The AD9235 pinout is similar to the AD9214-65, a 10-bit, 65 MSPS ADC. This allows a simplified upgrade path from 10 bits to 12 bits for 65 MSPS systems.
5. The clock DCS maintains overall ADC performance over a wide range of clock pulse widths.
6. The OTR output bit indicates when the signal is beyond the selected input range.