

Power Supply Units Made by SPAUN – guaranteed!

■ SPAUN administration office (front) and production premises (right) in Singen, southwest Germany



Every multi-switch and every amplifier comes with one, and of course every receiver has one, too: a power supply unit which is required to connect the device to the mains. It has become such an everyday component of virtually any electronic device that we have stopped thinking about how it actually works. SPAUN, on the other hand, has given it a great deal of thought and has arrived at a remarkable conclusion. Kevin Spaun is the managing director of SPAUN, one of the most renowned quality manufactures of multi-switches and other accessories for satellite signal distribution. He tells us what it's all about.

■ Kevin Spaun, managing director of SPAUN POWER GmbH





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In the southwesternmost corner of Germany, right on Lake Constance, lies the small town of Singen, which is where SPAUN has been headquartered for more than 40 years. All the experience gained in decades of technological expertise has always been put into making great products even better. Today, the brand name SPAUN is a by-word for high-quality and innovative products in the satellite business and beyond. This has led to SPAUN starting to offer a 5-year complete warranty for its products some years ago.

In the course of all these years, SPAUN founder Friedrich Spaun and his son Kevin, who has meanwhile taken over management of the company, noticed one thing. „Whenever a device was sent in for repair, the one component that was faulty in most cases was the power supply unit,” Kevin Spaun reveals. „And by the way, this diagnosis is true for almost all electronic devices.”

Electrolytic capacitors in these devices are usually to blame for failures. „On the market there are a number of different electrolytic capacitors with differing product lives. Less expensive

models are designed for a total service life of 3,000 operating hours, while more sophisticated types may last for 10,000 hours and more.” Obviously, electrolytic capacitors do not stop working all of a sudden after 3,000 or 10,000 hours – the product life given refers to average hours under maximum operating temperature and maximum power intake. As these extreme conditions only occur in rare situations the capacitors usually exceed these rated operating hours by far.

Like most manufacturers of electronic devices SPAUN used to source its power supply units from third-party suppliers. After all, a company producing multi-switches should not focus on power supply units, right? Well, if the guiding principle is quality and you provide a 5-year extended warranty on all your products, your focus has to be on every single component. „At first we demanded from our supplier to only use top-quality electrolytic capacitors,” Kevin Spaun remembers. But at the end of the day, even this requirement was not enough to guarantee the quality SPAUN demanded.

In addition to quality and reliability, a premium manufacturer also has to look at energy efficiency, and so SPAUN finally realised that its specifications for third-party power supply unit manufacturers had become so complex and demanding that it started making sense to look at in-house production of these components. „Independent manufacturers always have to strike a balance between component cost and component quality in order to offer a competitive pricing arrangement. If we, on the other hand, produce everything ourselves, we have the whole process under our own control and are able to select each individual component so that the final product meets our stringent demands. This is the only way to achieve the quality we expect.”

Once this decision had been made everything went very fast: SPAUN POWER GmbH was founded as a new company and a new production hall was set up as well. „We invested some 2 million EUR,” Kevin Spaun explains while showing us around the new production facilities. The new company has been up and running for two years now. „We’re in a position

■ A display cabinet in the reception area shows a range of SPAUN products. The company does not only produce switch-mode power supply units but also all

kinds of multi-switches as well as DiSEqC switches and components for signal distribution, including fibre-optic transmitters and receivers.



to produce approximately 500,000 power supply units a year," he goes on. "With this number of units we are not only able to equip all of our own products, but also supply third-party companies." As a matter of fact, more than 10% of the annual production are sold to other companies which have come to realise that an initially higher cost for top-quality switch-mode power supply units is more than compensated by extended service life in the long run. Kevin Spaun details the reasoning behind: "Quality always wins. Even if it may sound smart at first from a purely financial point of view to use cheaper components, this cost benefit all but vanishes when components fail after only a short time. Choosing high quality right from the start turns out to be a much wiser decision."

This is of particular importance for products that have a life cycle lasting for many years. "We supply our products for signal distribution systems in hotels or large residential buildings," he continues. "Some of these premises have several thousand users and the electronic equipment has to work reliably for years or even decades without failure." A company such as SPAUN can only meet that quality target with top-quality products. If the power supply units required for that goal are not available on the market, then SPAUN has to resolve to in-house manufacturing.

Yet, quality is not the only attribute that has led SPAUN to set up in-house power supply unit manufacturing. "Our switch-mode power supply units consume up to 25% less energy than conventional components." One thing that should not be underestimated in this regard is the fact that most SPAUN products are turned on all the time and thus constantly require electric power. After all, a multi-switch or amplifier must be running and available at all times. It goes without saying that SPAUN multi-switches have been equipped with an energy-saving standby mode for years, but additional energy savings of close to 30% are a huge benefit even in these scenarios.

"Quite frankly, our new power supply units pay for themselves," Kevin Spaun states and explains the maths. The electricity bill of users will be lower every month "and all our power supply units are designed to take in any voltage between 100 and 240 V, which makes them truly universal," he adds with a hint at the potential for SPAUN products for companies outside Europe as well. "Currently SPAUN POWER employs three highly-specialised engineers and in the near future we will launch a range of switch-mode power supply units

for providing power to LEDs. We expect that to be a significant growth market in the future. Naturally, we are also able to use our extensive expertise for developing and manufacturing customer-specific solutions as well." The new switch-mode power supply units do not only consume less energy, but also use energy much more efficiently than before. "We're looking at an efficiency factor of more than 90%," Kevin Spaun proudly states.

Finally, Kevin Spaun sheds light on a highly advantageous strategy for extending the service life of SPAUN power supply units. "We generally design the power supply units for our products so that they run at approximately 60% capacity." Staying below that threshold greatly reduces the risk of failure during permanent use.

SPAUN has learned all the tricks of the trade in its four decades as a top-notch manufacturer of high-quality products. The decision to also produce power supply units in-house is an additional step in optimising the total manufacturing chain and in further enhancing the company's high-quality and reliable products. It's great to see that a strict focus on quality leads to long-term success and it's pleasing to see that the core focus on price, which seems to be so prevalent these days, is not always the way to lasting success.

SPAUN POWER Switch-mode Power Supplies

Designation	Nominal Power	Voltage
SNT 4019	9 W	13 V
SNT 4025	17 W	13 V, 19 V
SNT 4040	25 W	13 V, 19 V (adjustable)
SNT 4042	55 W	5 V, 13 V, 19 V
SNT 4044	110 W	13 V, 19 V

Note: all types have an efficiency factor of approx. 90%

What is a Switch-mode Power Supply?

Switch-mode power supply (SMPS) converts the mains AC voltage (110-240V, 50/60 Hz) to low DC voltage required by electronic devices of all sorts (TV-sets, satellite receivers, laptops, multiswitches etc.). DC voltage is stabilized what means that it does not change if we draw more or less current from the SMPS.

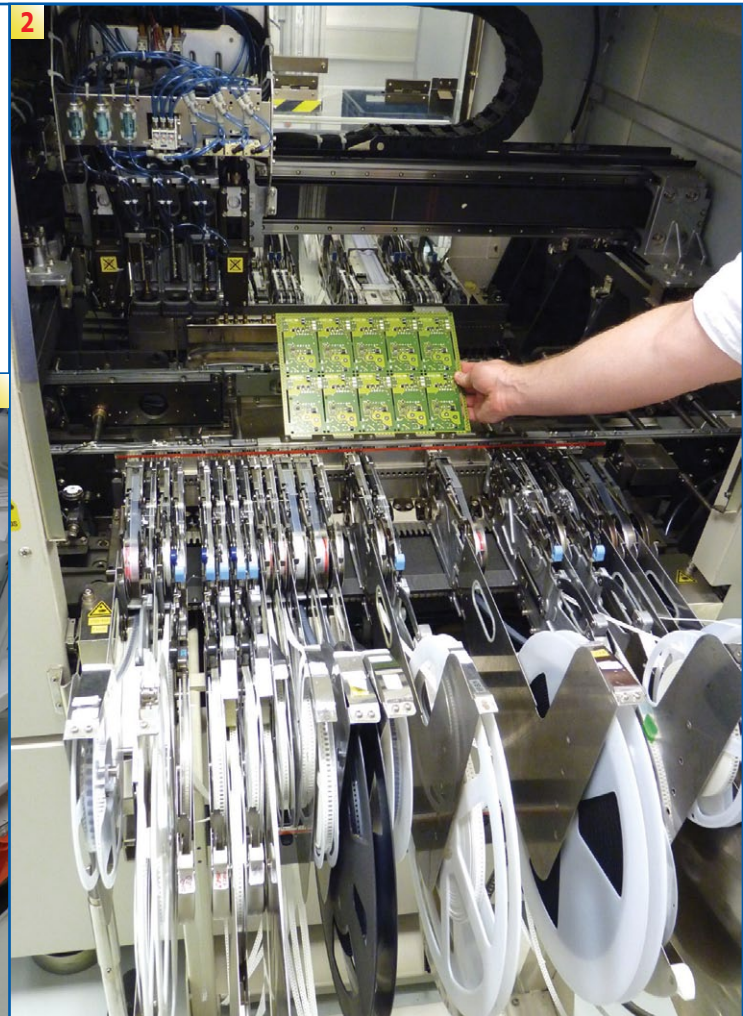
The old type power supply unit (so called "linear power supply unit") requires a big and heavy transformer which converts high AC voltage to low AC voltage as well as a regulating transistor with a heatsink to stabilize DC voltage. Regulating the DC voltage in a linear mode leads to significant power losses what generates undesired heat. Hence the need for a heatsink.

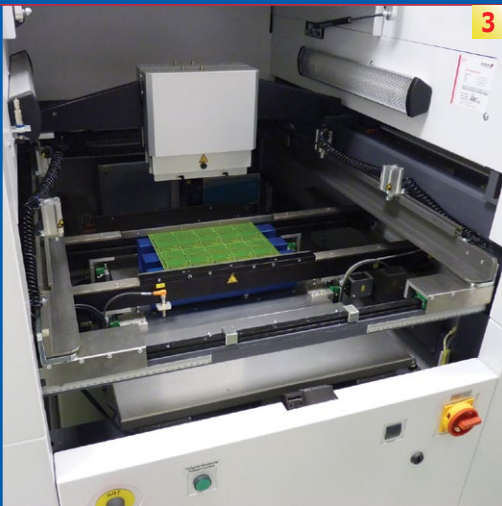
SMPS first converts AC mains voltage to DC voltage and then switches it on and off with high frequency (50 kHz up to 1 MHz) what produces a rectangular waveform. Usually a transformer is still needed but this time it is much smaller because the higher the frequency, the smaller the transformer that is required to handle it. The regulating transistor with a big heatsink is no longer needed because the voltage is regulated by changing the ratio of on/off states.

SMPS is therefore much more compact and lightweight and it is also more energy efficient. These are its main advantages. It is also more complex than traditional linear PSU. Despite that, SMPS are used almost exclusively in today's electronic equipment.

Power Supply Unit Production Process at SPAUN POWER

1. These rolls hold SMD components. Each roll stores 5.000 individual components.
2. Soldering paste is applied to the circuit boards.
3. The SMD insertion machine automatically places the SMD components at the corresponding position on the circuit board. This picture shows 10 circuit boards still attached to each other for the 40/25 power supply unit. This means that ten power supply units are manufactured simultaneously...





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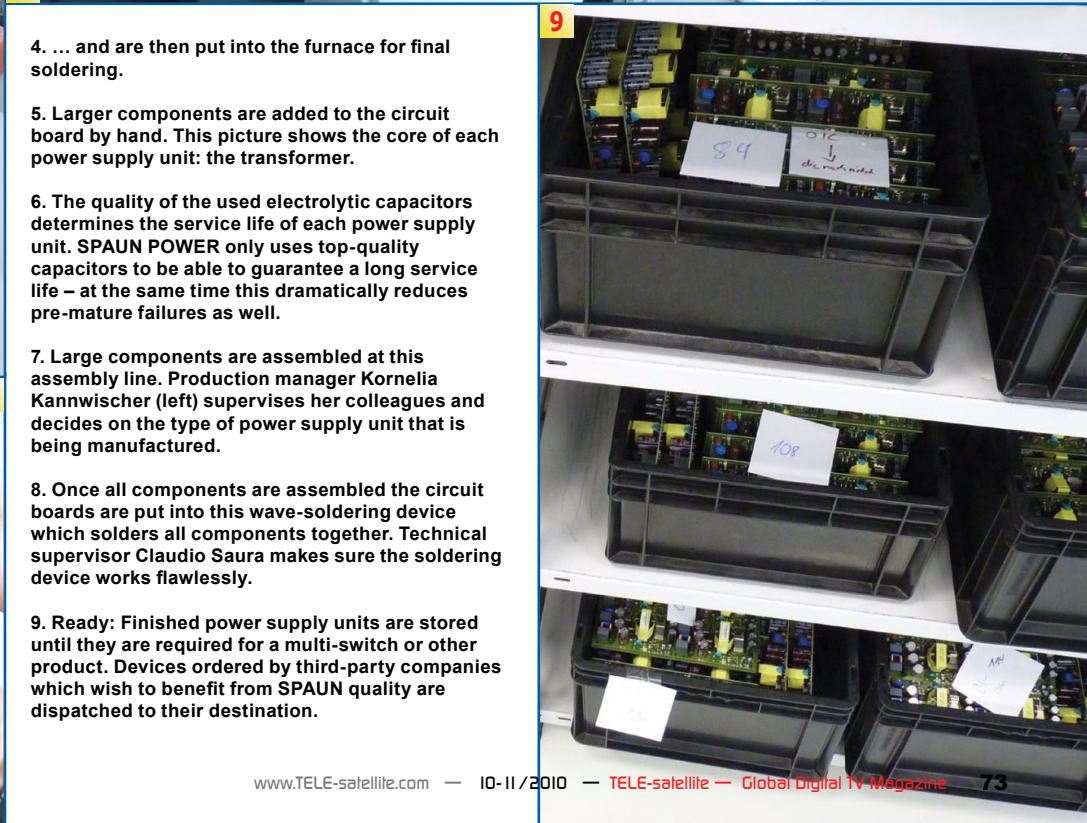
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4. ... and are then put into the furnace for final soldering.

5. Larger components are added to the circuit board by hand. This picture shows the core of each power supply unit: the transformer.

6. The quality of the used electrolytic capacitors determines the service life of each power supply unit. SPAUN POWER only uses top-quality capacitors to be able to guarantee a long service life – at the same time this dramatically reduces pre-mature failures as well.

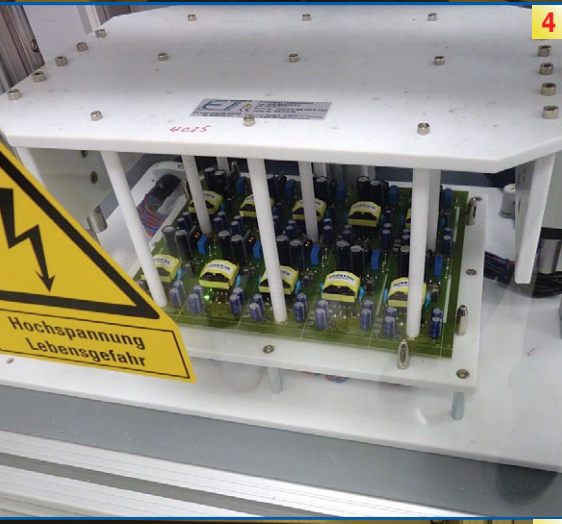
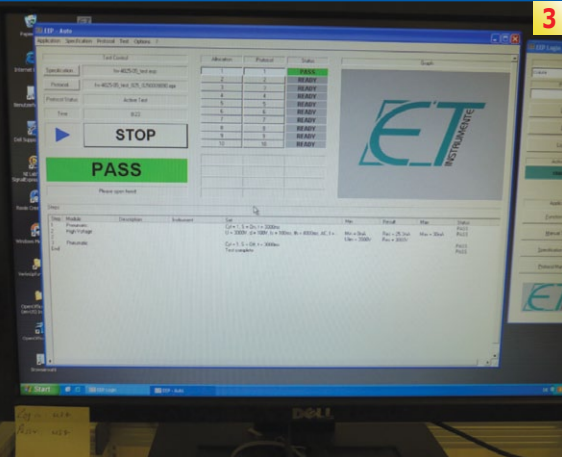
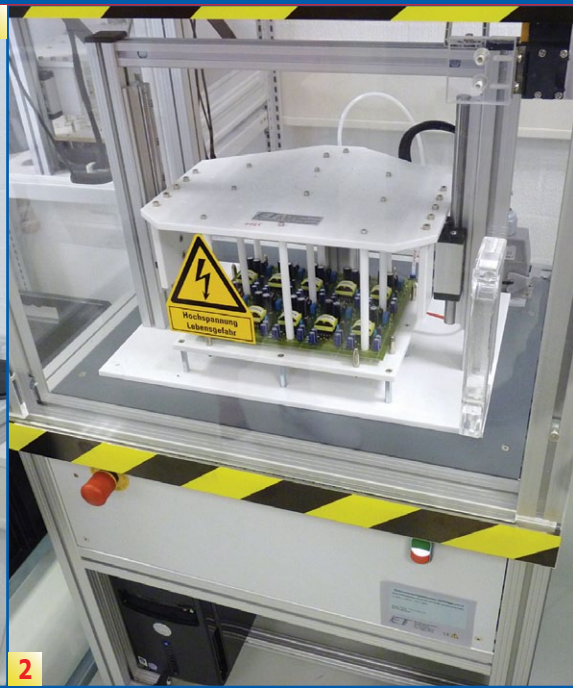
7. Large components are assembled at this assembly line. Production manager Kornelia Kannwischer (left) supervises her colleagues and decides on the type of power supply unit that is being manufactured.

8. Once all components are assembled the circuit boards are put into this wave-soldering device which solders all components together. Technical supervisor Claudio Saura makes sure the soldering device works flawlessly.

9. Ready: Finished power supply units are stored until they are required for a multi-switch or other product. Devices ordered by third-party companies which wish to benefit from SPAUN quality are dispatched to their destination.



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Quality Assurance at SPAUN POWER

1. All SPAUN products are individually tested and checked for technical malfunctions before leaving the premises. Each power supply unit also receives an individual bar code label. When checked the bar code of the first power supply unit in the upper left corner is scanned. The bar code numbers of the nine remaining units can be gathered from the logical sequence (preceding unit plus 1).

2. All ten power supply units are checked one after the other in this high-voltage testing device. More than 3000 V are used to make sure the power supply unit does not pose a threat during lightning, for example.

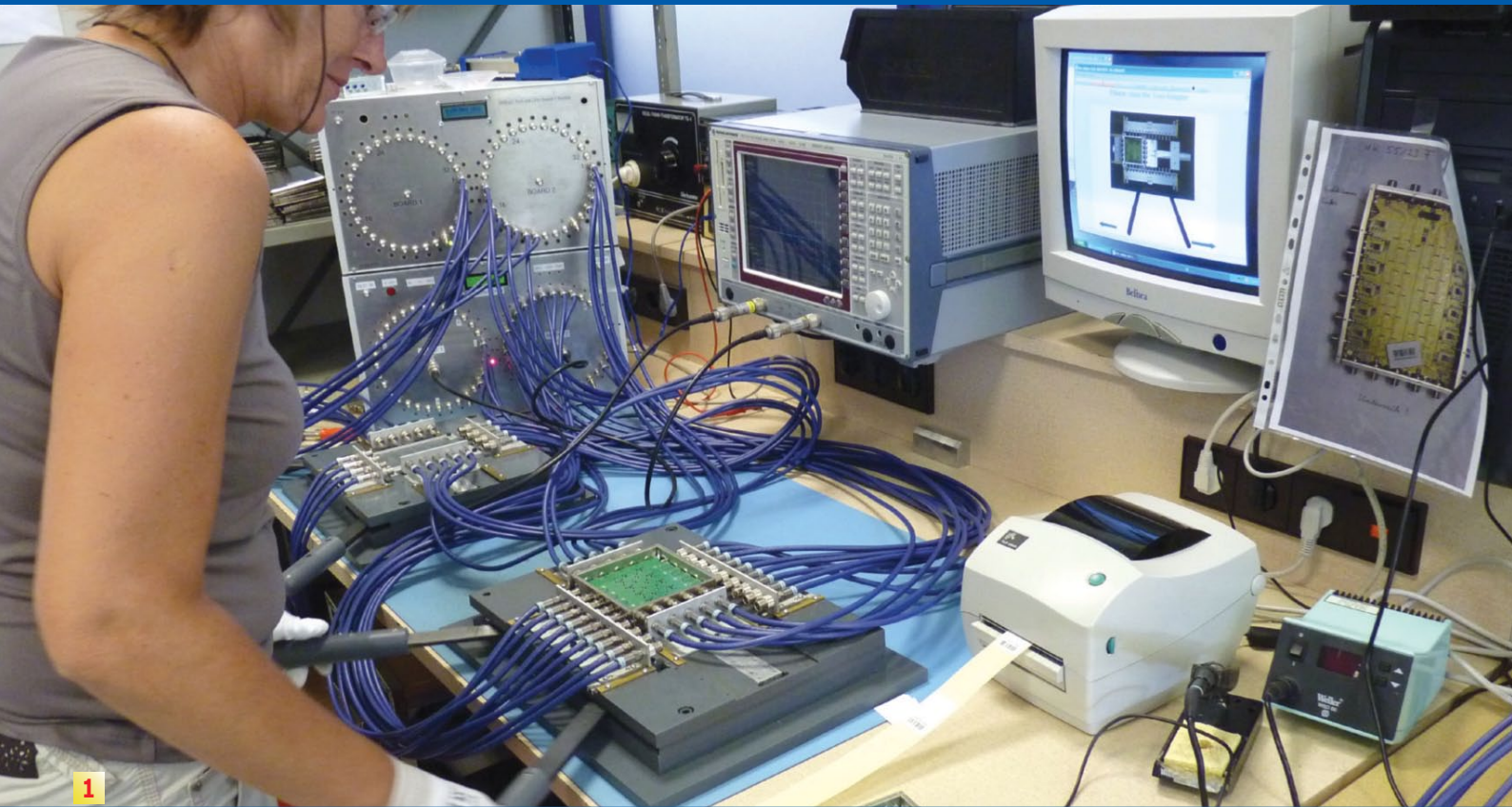
3. The display indicates whether or not the high-voltage test was passed.

4. Next, the circuit board is placed into a measurement device that verifies all functions. Each power supply unit receives actual current for checking the output power. A green LED (second unit in the lower row in this picture) indicates which unit is currently active.

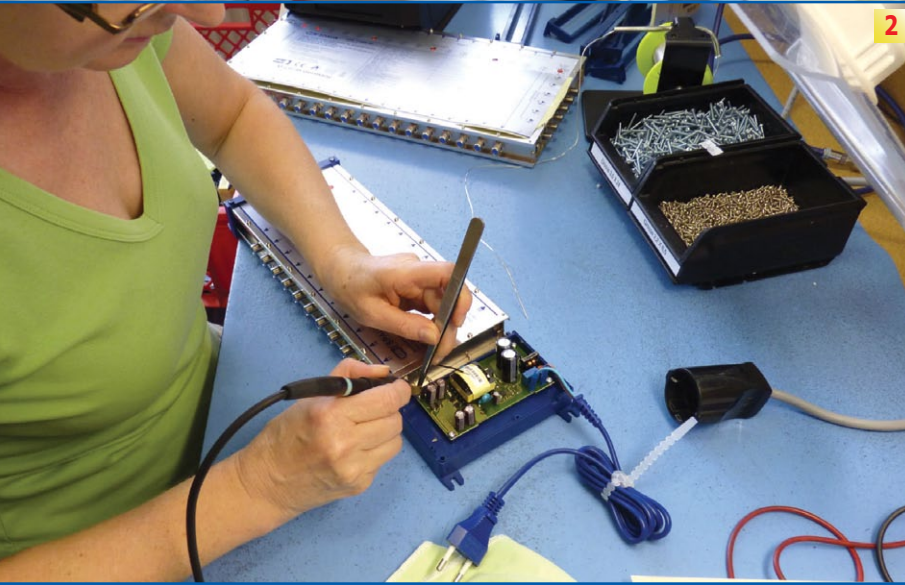
5. A measurement log shows that all units are operating according to specifications. The log is saved in the SPAUN data processing centre and can be retrieved for each individual power supply unit for decades to come.

6. Once all testing and measuring is completed the circuit boards are cut to arrive at ten individual power supply units. All employees working in the SPAUN POWER production floor have to wear antistatic shoes.

7. In addition, the floor is laid out with antistatic material and a warning sign at the entrance urges each visitor to use special caution inside this area.



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A SPAUN Power Supply Unit in a SPAUN Multi-switch

1. An additional function check is performed before a SPAUN power supply unit is integrated into a SPAUN multi-switch. A dedicated log accompanies each check.

2. Only now the SPAUN power supply unit reaches its final destination inside a SPAUN multi-switch. This employee solders the three connection pins (0, 13 and 18 V) of the power supply unit.

3. It's not over until a final electrical surge test is passed: The fully assembled device, with all functions already verified, is connected to the 3000 V testing device once again. Only if this final check is passed will SPAUN release the product for sale.