# USB Products Brochure June 2011

## Telemakus expands our range of USB controlled RF products.

## DESCRIPTION

Many of the common RF control functions are available in a low cost USB controlled package. Functions include Detectors, Sources, Modulators, Frequency Doublers, Switches, Attenuators and Amplifiers. Drivers and interface software is loaded onto internal flash memory for easy installation. Any XP or Vista based PC can be used as the host and with the addition of a USB hub multiple devices can be controlled to build up a complex system of RF functions.

Extensive calibration data is held in the device for correction against frequency, dynamic range and temperature. Custom calibration tables can be downloaded to the device if more accuracy is required over narrow ranges.

Customer specific functions and frequency ranges are available for most models. Contact Telemakus LLC for details.

Software and driver updates available at www.telemakus.com
Email support@telemakus.com

## FUNCTIONS

Available Functions

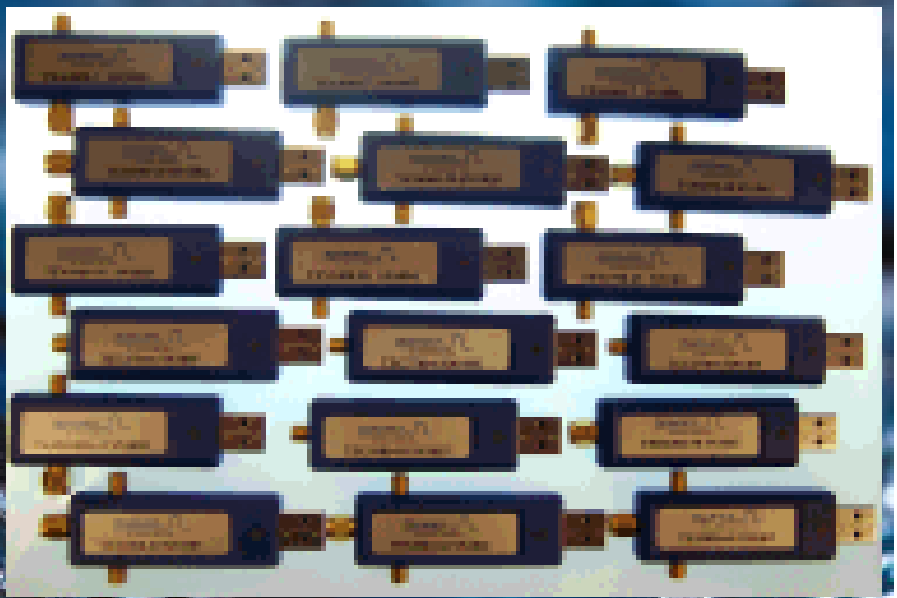
- True RMS Detectors
- Step Attenuators
- Vector Modulators
- Synthesized Sources
- Switches
- Amplifiers
- Frequency Doublers

## BENEFITS

- Common Control Protocol
- Small size (3.4” x 0.875”)
- Ease of Use
- Low Cost

## FEATURES

- Wide Frequency Range 50MHz to 26.5GHz
- Multiple RF Control functions available
- Windows Drivers stored on product for easy install on any XP or Vista PC
- Application Library



TELEMAKUS LLC

RF DESIGN SERVICES

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## RF Switches

Two standard products with complementary performance. The TES3000-60 has 60dB of isolation at 1GHz and is fully terminated at all ports. It also has a both ports isolated state. The TES6000-30 has 30dB of isolation and is unterminated but has 30nS switching speed. This switch also has a built in pulse modulator function with crystal controlled pulse width and a resolution of 125nS. A higher isolation version coming soon.

Battery Power Option available

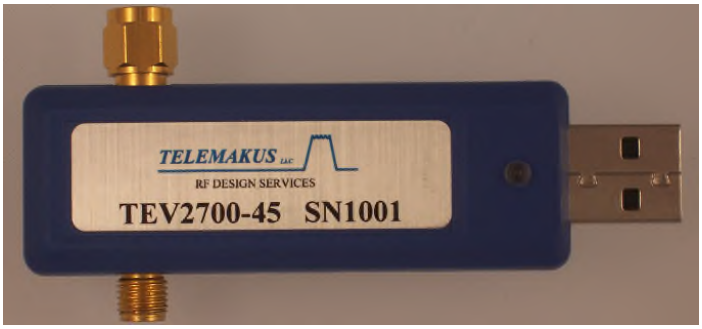

## Synthesized Sources

Standard products cover 140-250MHz, 700-1000MHz, 1.8-2.7GHz and 2.7-3.5GHz with 1KHz resolution and -105dBc phase noise at 100KHz offset. These products can be used in CW or swept modes. They are locked to an internal 10MHz crystal oscillator with a 2.5PPM stability over the full temperature range.

New released products include a 9.2-10.2GHz and our first millimeter wave product TEG26500-5 a 24-26.5GHz synthesized source.

## Digital Step Attenuators

The TEA4000-7 has 31.75dB dynamic range in 0.25dB steps and operates over the range 100MHz to 4GHz. The TEA8000-6 has 31.5dB dynamic range in 0.5dB steps over the range 2.5-8GHz. Both versions have an integrated ramp function. Available API's allow ATE systems to perform power control functions.
A new attenuator will be released in June 2011 with 16bit control resolution giving 30dB dynamic range over 0.1-13GHz


## Vector Modulators

Available Q3 2010

The products cover the ranges 700-1000MHz and 1.8-2.7GHz. They each have 360 degrees of phase control and 45dB amplitude control. Applications include cancelation loops and phase array antenna control. These vector modulators are factory calibrated but can also be calibrated by the user for greater accuracy at specific frequencies.

## Microwave Power Sensors

The TED6000-50 will measure RF power from 50MHz to 6GHz with 0.5dB accuracy over a 50dB dynamic range. The GUI allows averaging, offset power and relative power measurements. The available API allows ATE systems to measure power from multiple sensors creating a very low cost way to monitor multiple points in a system. Narrow band units available at 9.2-10.2GHz and 14-14.5GHz.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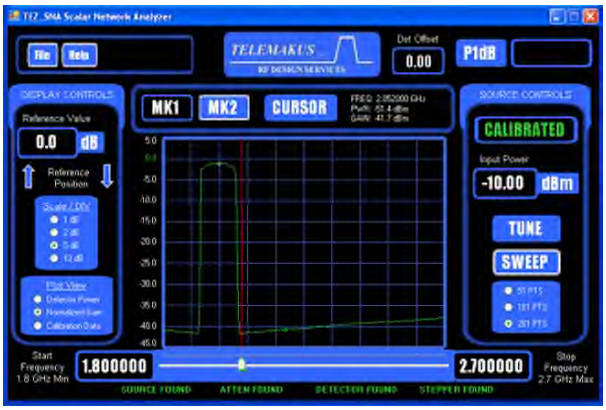
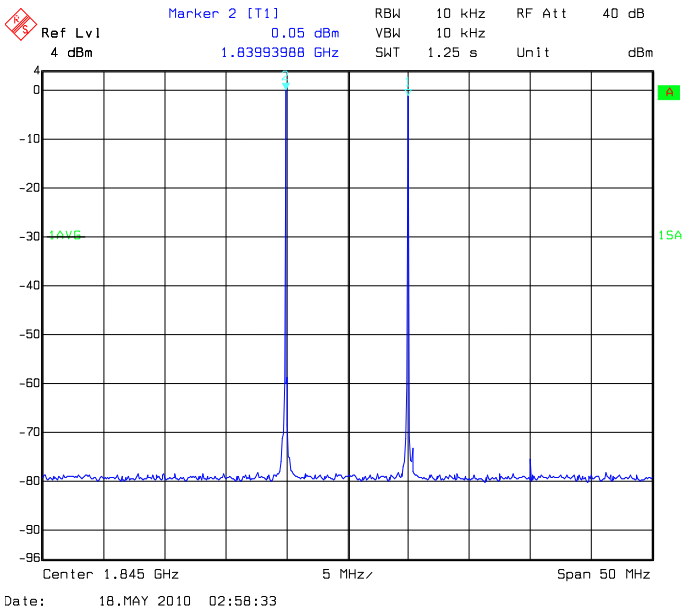
# Application Library June 2011

## Scalar Analyzer TEZ-SNA

By combining a TEG2700-6 source, 2 TEA4000-7 attenuators and a TED6000-50 sensor it is possible to create a very powerful scalar analyzer capable of making gain and power measurements from 1.8-2.7GHz (only limited by range of source). The example here shows a filter's performance measured on the system. Amplifier P1dB can also be measured at the cursor position on every sweep. A wideband version of this software will be available in Q3 of 2011.




## 2-Tone Analyzer

By combining two sources it is possible to create a 2-tone test signal used for measuring IP3 and intermodulation products. The example shows that -80dBc IM3 levels at 0dBm/tone output. More units can be combined to create multi-tone measurements at a very affordable cost.

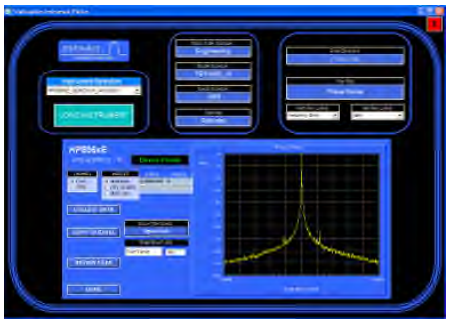
Both frequency and power can be set for each tone independently allowing swept measurements of frequency and power. Software combining control of the sources and a commercially available spectrum analyzer is possible.

## Pulse Power Analyzer

The TES6000-30 and TES7000-50 have a integrated pulse modulators. The pulse is crystal locked and has a 0.125uS resolution. The PC user interface allows both the pulse width and repetition rate. Amplifier pulse performance can be measured with a high degree of accuracy. Utilizing port 2 of the switch provides RF power isolation from the source thereby minimizing the risk of damage to the DUT when the modulation is turned off. Port 1 should be terminated but could be used to observe the inverse of the pulsed waveform. An option of an additional logic level output will be available in Q3 of 2011. This output will allow external circuits to be synchronized or time gated relative to the RF pulse.

## Telegraphics Software

Telemakus is introducing an Instrument Plotter software package. This software allows the recording of test data directly to Excel® from a wide range of test equipment. Customers currently relying on hard copy storage of data can now store it electronically, and thereby simplifying the creation of test reports and reducing the burden of paper filing.



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# USB PRODUCTS

## True RMS Detectors

| Model | Frequency | Frequency Band | Dynamic Range | Accuracy | Release Date |
|---|---|---|---|---|---|
| TED6000-50 | 50-6000MHz | L,S,C | -45 - +10dBm | +/- 0.5dB | |
| TED14500-45 | 14000-14500MHz | Ku | -50 - 0dBm | +/- 0.5dB | |
| TED10200-45 | 9300-10200MHz | X | -50 –0dBm | +/- 0.5dB | |

## Vector Modulators

| Model | Frequency | Phase Range | Gain Range | Resolution |
|---|---|---|---|---|
| TEV1000-50 | 700-1000MHz | 360 deg | -45 to -10dB | 12bit |
| TEV2700-45 | 1800-2700MHz | 360 deg | -45 to -10dB | 12bit |

## Synthesized Signal Generator

| Model | Frequency | Output Power | Phase Noise @100KHz | Spurious | |
|---|---|---|---|---|---|
| TEG250-15 | 140-250MHz | 15dBm | -125dBc/Hz | -80dBc | |
| TEG1000-10 | 700-1000MHz | 10dBm | -105dBc/Hz | -80dBc | |
| TEG2700-6 | 1800-2700MHz | 6dBm | -105dBc/Hz | -80dBc | |
| TEG3500-8 | 2700-3500MHz | 8dBm | -100dBc/Hz | -80dBc | |
| TEG4000-1 | 200-4000MHz | 1dBm | -95dBc/Hz | -80dBc | Q3 2011 |
| TEG10200-1 | 9300-10200MHz | 15dBm | -95dBc/Hz | -80dBc | |
| TEG26500-5 | 24000-26500MHz | 5dBm | -85dBc/Hz | -75dBc | |

## Amplifier/Doublers

| Model | Input Frequency | Output Frequency | Pin | Pout |
|---|---|---|---|---|
| TEX8000-15 | 200-4000MHz | 200-8000MHz | 0dBm +/-3dB | +15dBm |

## Attenuators

| Model | Frequency | Minimum Loss | Attenuation Range | Step Size | |
|---|---|---|---|---|---|
| TEA8000-6 | 2400-8000MHz | -5dB | -31.5 to 0dB | 0.5dB | |
| TEA4000-7 | 50-4000MHz | -2.7dB | -31.75 to 0dB | 0.25dB | |
| TEA13000-12 | 0.1-13GHz | -3dB | -30 to 0dB | 16bit/Analog | Q3 2011 |

## Switches

| Model | Frequency | Loss | Isolation | IP3 | |
|---|---|---|---|---|---|
| TES3000-60 | 100-3000MHz | -1dB | -60dB@1GHz | 50dBm | |
| TES6000-30 | 50-6000MHz | -1dB | -30dB @6GHz | 48dBm | |
| TES7000-50 | 50-7000MHz | -2dB | -50dB @1GHz | 55dBm | Q3 2011 |

## Amplifiers

| Model | Frequency | Gain | Flatness | P1dB | |
|---|---|---|---|---|---|
| TAMP6000-15 | 30-6000MHz | 15dB @3GHz | +/- 2dB | 17dBm | Q3 2011 |

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