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A REVIEW OF THE KEN KP 12A RF SPEECH PROCESSOR

Ken products are produced by the Toyomura Electronics Company of Tokyo, Japan. The Ken name has, of course, become famous in Australia through the KP 202 two metre handi-talki. The KP12a RF Speech Processor is distributed by Sideband Electronics Sales and Engineering of Springwood N.S.W.

The Ken unit differs from most other RF processors in that it is a complete single sideband system within itself. That is, the microphone feeds directly into the unit, the signal converts to 10.7 MHz double sideband then passes through a multi pole crystal filter which removes one sideband. The signal is then clipped and filtered and returned to audio via a product detector. The resultant audio is fed back into the normal microphone input of the transmitter or transceiver.

However, before we look at what the Ken can do in practice, a look at the unit itself is in order. Considering the complexity of circuitry it is an extremely compact package. Overall it measures 60 mm high, 130 mm wide and 150 mm deep, with a weight of 1.2 kg. Appearance is most attractive. The front panel is a brushed aluminium finish similar to that seen on much of the current Hi-Fi equipment. The cabinet is a smooth gloss black.

The Ken has a built-in AC power supply and a VU meter to indicate the correct operating point.

The manufacturers quote the following specifications:

Talk Power: Better than 6dB improvement.

Clipping Threshold: Less than 2mV at 1 kHz.

Band Width: 2200 Hz at 6 dB down.

Frequency Response: Approx. 300-3000 Hz at 12 dB down.

Distortion: Less than 3 per cent at 1 kHz with 20 dB clipping.

Output Level: More than 80 mV at 1 kHz.

Input Impedance: 5K ohms.

Output Impedance: 2K ohms.

Power Requirements: 230 volts AC at 2.3 watts.

Semi-conductors: Four transistors, 4 diodes and three IC's.

CIRCUIT DESCRIPTION

The microphone input is via the front panel gain control to a single transistor amplifier. The gain control actually sets the clipping level. Protection is provided against RF feedback affecting this stage. Audio is now fed to a TA7045M IC balanced modulator stage with carrier injection provided by a separate 10.7015 MHz oscillator stage.

This same oscillator is also used as the carrier re-insertion source for the product detector at the other end of the system. The balanced modulator is fed through the six pole 10.7 MHz filter to a TA7061AP IC which provides 69 dB gain and also symmetrically clips the signal. Harmonics of the clipping process are removed with a double tuned passband filter. A second TA7045M operates as the product detector with the audio output going via the output control to the output socket and also to a single transistor stage to drive the level meter. The power supply employs a full wave rectifier feeding a single transistor regulator with 12 volts DC output.

THE KEN KP12a ON TEST

The following figures were obtained using AWA professional audio test equipment.

Firstly the overall frequency response was measured. In relation to 1 kHz there was a gradual roll off to —7 dB at 300 Hz. At the high end, it was level to 2.5 kHz dropping to —10 dB at 3 kHz. At 4 kHz this had dropped to —32 dB. These figures of course meet the specifications with a little to spare. Measurements of the distortion proved interesting with the highest distortion occurring at the point of no clipping. As the clipping was increased to the 20 dB point the distortion dropped to 3.5 per cent from 7.5 per cent. The 20 dB figure only exceeds the specified figure by .5 per cent. Maximum output was 72 mV, a little down on the rated 80 mV but still more than enough to drive the most insensitive microphone input. In relation to the 72 mV output the noise level was —40 dB.

These are excellent figures with even the highest distortion measurements well below the audible point.

THE KP12a ON THE AIR

Our on-air tests were carried out with a Yaesu FT101B. The 101B microphone plugs directly into the KP12a. Although other Japanese transceivers use these same connectors, they are often wired in a different way, so check the wiring diagram first. An output lead to suit the 101B is also supplied.

The power *On/Off* switch of the Ken connects the microphone directly to the transceiver in the *Off* position; however the input circuitry of the clipper is still in parallel with the microphone. This causes a drop in microphone output of about 6 dB. In the case of the 101B this was no problem but may cause difficulties with other transceivers.

With the power switch *On* the meter is illuminated, albeit somewhat on the dull side.

On air reports received varied according to the signal strength at the other end. All stations reported a marked increase in 'talk power'. With very weak signals under poor conditions, use of the unit often made a marginally readable signal 100 per cent copy. Local stations reported no noticeable increase in band width so long as the transmitter was not driven beyond its normal linear operating point. With the high output of the Ken this is easy to do and the use of an oscilloscope is recommended.

CONCLUSION

The use or otherwise of speech processors appears to be very much a matter of opinion. It is not proposed here to say whether you should have one or not. However, this little unit has excellent specifications which are met in every respect. The instruction book is fairly complete with operating instructions, circuit description, internal calibration information, but no printed circuit layout. The AC power cord is only a two wire type with a two pin American plug. It is recommended that this be changed to a three wire cord with suitable plug. ■