EL-13

CTCSS-Encoder

(KENWOOD TU-7 Encoder replacement)

TR-751 / TR-851 / TM-2530 / TM-2550 / TM-2570 / TW-4100 and more

Operating and functional description

Version 1.0a

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Important! Advices or tips for the correct function of the EL-13.

Caution! The instructions must be strictly observed

1 Introduction

Many radio amateurs still use older 2-meter or 70-cm radios that cannot produce the sub-tones increasingly required for traffic over relay stations, but they don't want to part with them either. We show a variant, how you can make your beloved radio fit for the new operating technology, so that the subtone squelch of relay radio stations can be opened.

For some time now, not only in Switzerland, more and more relay stations are being converted to the sub-tone squelch method (CTCSS, Continuous Tone Coded Squelch System). The reason for this is the increased occurrence of strong interference at relay sites, generated for example by computer cash registers or webcam systems. The carrier-tasked repeaters are constantly kept on the air by them. The CTCSS method avoids those carriers without sub-tone modulation can open the repeaters by the tone transmitted simultaneously to the speech.

Many older devices and those manufactured especially for the European market have only the possibility to emit a 1750 Hz ringing tone. The CTCSS function, which is very common in North America, is often missing.

The original TU-7Tone Module, with which the CTCSS functions can be retrofitted, is no longer available from the manufacturer.

In most cases, it is sufficient to retrofit only the CTCSS encoder function, because this makes it possible to work with CTCSS via a modern relay radio station. The EL-13 is a CTCSS encoder module which can be installed in the radio instead of an TU-7 module. The tone frequencies can be set via the "TONE" function of the radio and stored together with the Rx and Tx frequency in the memory.

The EL-13 module is suitable for the radios e.g. TW-4100 and others from KENWOOD.

2 Function

2.1 Installation and adjustment of the module

For the installation of the EL-13 CTCSS encoder module, I refer to the chapter ("TU-7 CTCSS Tone Unit Installation") in the corresponding manual of the radio. The output level of the CTCSS module is preset with the R2 trim potentiometer, so no adjustment should be necessary.

However, if there are problems, use the R2 trim potentiometer to adjust the CTCSS level so that a maximum deviation of ±300 Hz is obtained. If you do not have a deviation meter at hand, the setting must be found by experimentation. The CTCSS level should only be selected so high that the relay responds reliably!

2.2 Operation

The operation of the EL-13 CTCSS module (encoder only) as a replacement for the TU-7 is described in the operating manual of the radio (under " SUBAUDIBLE TONE FREQUENCY SETTING").

All 37 CTCSS tones can be set via the radio's sub-tone function and stored together with the transmit frequency.

EL-13 Tone Frequencies (Hz)

01	067.0 Hz	09	091.5 Hz	17	123.0 Hz	25	162.2 Hz	33	218.1 Hz
02	071.9 Hz	10	094.8 Hz	18	127.3 Hz	26	167.9 Hz	34	225.7 Hz
03	074.4 Hz	11	100.0 Hz	19	131.8 Hz	27	173.8 Hz	35	233.6 Hz
04	077.0 Hz	12	103.5 Hz	20	136.5 Hz	28	179.9 Hz	36	241.8 Hz
05	079.7 Hz	13	107.2 Hz	21	141.3 Hz	29	186.2 Hz	37	250.3 Hz
06	082.5 Hz	14	110.9 Hz	22	146.2 Hz	30	192.8 Hz		
07	085.4 Hz	15	114.8 Hz	23	151.4 Hz	31	203.5 Hz		
08	088.5 Hz	16	118.8 Hz	24	156.7 Hz	32	210.7 Hz		

Table 1

3 Appendix

3.1 Specifications

Frequency:	67Hz – 250.3Hz (tolerance $\leq$ 1%)
Output level:	~ 200mV
Output impedance:	~ 10kΩ
Supply voltage:	= 5V / 3mA (directly from the transceiver)
Dimensions:	20(L) × 20(W) × 4(H) mm

All specifications can be changed by ELcon without further notice or obligation.