

"KYYNEL" - radio - the effectively safe-guarded secrecy of wartime Finland.

During the wellknown 105 days of the finnish winterwar in 1939-1940 the finnish intelligence service allready played an important part: it allready had long experience in listening foreign communications and code-breaking. The forests of Karelia offered the most suitable terrain for the finnish intelligence & guerilla patrols. Unfortunately the finnish army was generally suffering from lack of equipment and this is why the finnish long distance patrols were unable to make very long vcyages to the enemy territory: they were unable to maintain radio communication with their headquarters. A special radio was under development and later when ready, it was to be regarded as one of the best ones in it' s class. It became known as "KYYNEL" which means Tear in english.

A group of finnish radio experts, all they were radio amateurs too, investigated under the leadership of major Ragnvald Lautkari a german patrol radio during the autum in 1939. It was itself a transmitter only, which weighted about 33 lbs, but was regarded as the best one at that time. Because it was so heavy and it's antenna system so inefficient, the finnish experts regarded it mainly as a toy. The first finnish TX-only patrol radio was called first as "The tear of backwoods spruce" and later simply "Tear" = Kyynel. As far as I know, it was named so due to it's chirpy tone when the transmitter was self excited.

Because the first "Kyynel" was a transmitter only, the guerilla and intelligence patrols us d blind transmission. Later they were provided also with a pocket-sized BC-quality receiver ("Töppö"), which made possible the reception of orders by code-words via broadcasts. At the end of the year 1941 "Kyynel" became completed with a small special receiver. A full transceiver prototype was ready. It was. operating approximately from 3.3 MHz to 4.8 MHz and a half-wave dipol in V-form was used as an antenna. Both equipment covers were of diecast aluminium (2.2" x 6" x 4") and designed to be nearly water tight. Because their secrecy was to be maintained at any price, some models were equipped with a detonator and some  $\frac{1}{2}$  Lbs of trotyl to destroy the set in any possible case of distress. In some models even unauthorized opening of a certain threaded cover caused explosion.

Technically the transceiver with Telefunken steel tubes was very simple. The transmitter was a self excited push-pull oscillator with a double triode DDD11 and the receiver was a 3-tube T.R.F.-receiver, with a pentode DF11 as an aperioidic R.F. stage followed by another DF11 as a regenerative detector. The double triode DDD11 formed an RC-coupled A.F. amplifier feeding the headphones. The transceiver was powered by a 120 volts special anode battery and a 1.5 volts heater battery was needed too. The weight of the whole system with batteries was some 12 Lbs only. The output power of the transmitter was about 0.3- 0.5 watts. The whole set was packed to a small suitcase of hard board with steel reinforcements in the corners and edges.

Because "Kyymel" used HF-frequencies, the distance obtained was a function of the frequency and of the day and night time. The dead zone extended to some 30-40 miles causing uncertain communication at short distances. Reliable communication was possible to maintain at distances from 40 miles up to 430 miles. Therefore several fixed stations located at different places in Finland were used simultaneously to listen to the weak transmissions of the "Kyynel" radios moving in the forests of enemy territory.

The finnish intelligence & guerilla patrols extended their voyages 60-200 miles to the enemy territory between the Polar sea and Laatokka lake. They often travelled without any vechiles, later they were transported at least in one direction to the desert lakes by seaplanes (Heinkel HE-115). Quite often the the patrols were ordered to break the Muurmansk railway at several points to give trouble to the transportation of the allied military material shipped to Muurmansk or Arkangel. Some intelligence patrols made calculations of the soviet air traffic around the most important airfields.

The latest model of "Kyynel" set was designed before the war ended in 1944. It was a complete transceiver in one diecast aluminium cover (3.5 Lbs). There was one locable tuning knob for the transmitter and two knobs for the receiver, one being the geared RX-tuning and the other one was the sensitivity or regeneration control. The receiver was very sensitive and stabil and easy to tune due to the succesfull feedback control arrangement. A double glass pentode DLL21 was used in the transmitter. As far as I know, only a few of the latest units had been modified to be crystal controlled when necessary. In this case there was an insertion hole on the diecast cover which allowed the insertion of a crystal from outside. The insertion of the crystal broke the grid

circuit and the crystal became as a series filter in the grid circuit, so giving "Kyynel" a "Crystal tone". As far as I know, the only manufacturer of crystals in Finland during the war was a private amateur T.I. Leiviskä, OH2NV. The crystals in these sets too bore his name.

The antenna system of the "Kyynel" was a V-dipole and therefore the carrying case contained 2 coils of thin copper wire covered by a cotton sleeve, the wires being about 66 ft long each. The both sections had the shorting points marked with red colour to the cotton sleeve. There was a brass-made "riding block" with a tip-screw on each section allowing the short connection of the coiled end of each section when using higher end of the frequency band (the tip-screw penetrated through the cotton sleeve preventing the coiled parts from mistuning the sections). There was a tuning chart following each radio, because the tuning knobs were not calibrated in frequency. The same tuning chart gave also the shorting points for the antenna. The antenna sections were hoisted to the branches of woods by a couple of fishing wire coils and throw-weights following each radio set.

The intelligence operations on enemy territory were put into operation directly by the Auxiliary Battalion 4, which was in direct connection with the army headquarters since 1943.

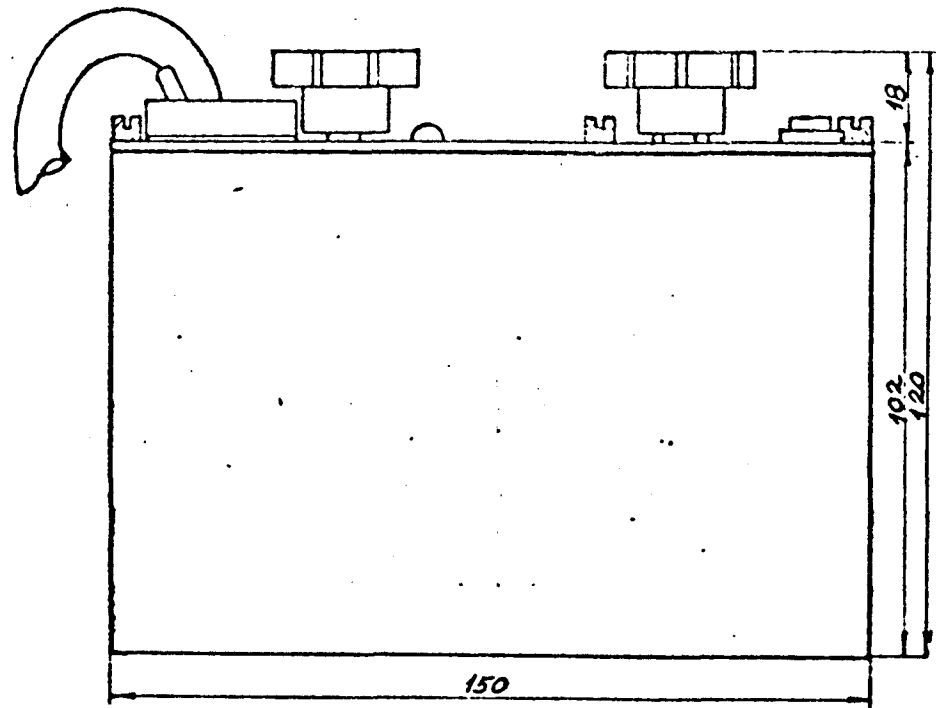
The Finnish "Kyynel" radio was regarded as excellent by a group of German experts paying a visit to the modest construction works during the war. The German army had no similar units during the first war years.

The Finnish intelligence headquarters succeeded in keeping the "Kyynel" in secrecy for several years. In 1943 the Soviet army was able to capture the first Finnish patrol radio. According to the Soviet literature, they did not have similar units of their own at all, they used the few captured Finnish sets for their most exacting intelligence operations.

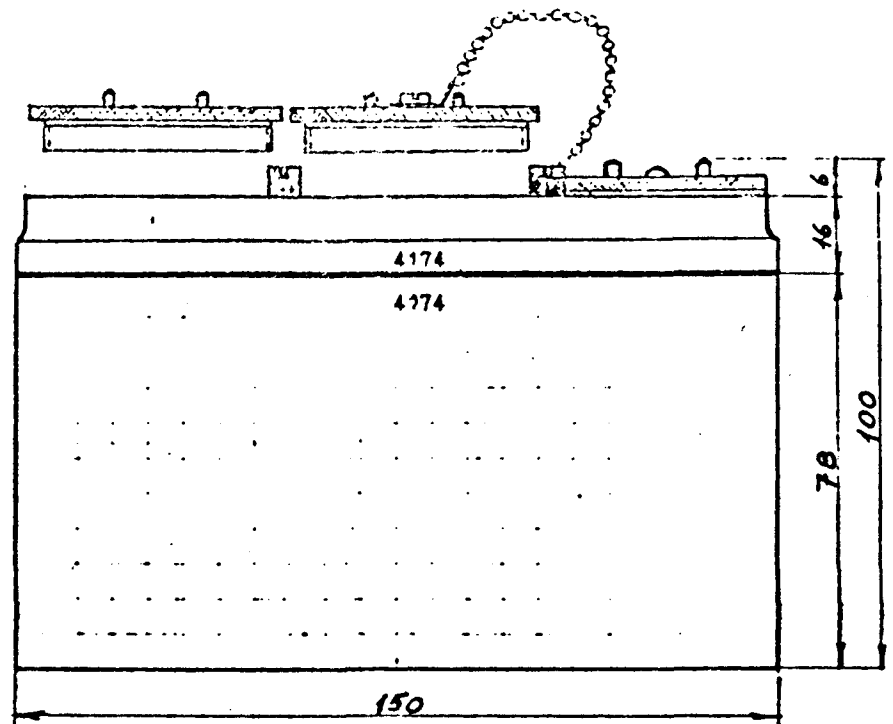
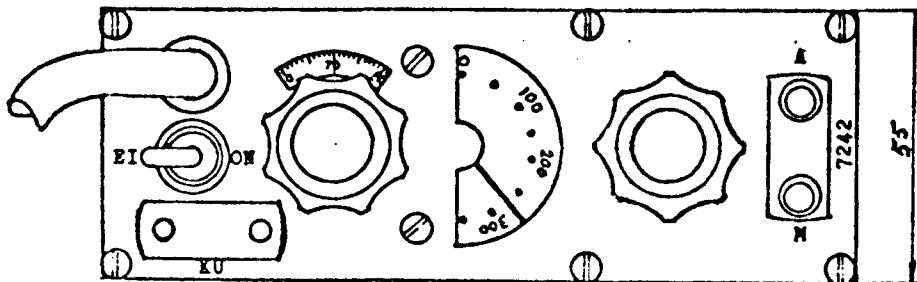
According to literature, before the end of war in 1944 it had been agreed with certain Swedish officials during July, that so called "Stella-Polaris" operation should be put into effect in the case of cease of fire. Four ships were ready for this operation beforehand. The operation "Stella-Polaris" was carried out in September 1944. Over 300 cases of intelligence files and radiomaterial was transported to Sweden in order to maintain the work by a few specialists joining the Swedish FRA. At the same time over 600 persons moved to Sweden (including the families). The construction of the "Tour" sets was intended to be continued in Sweden.

After the cease of hostilities in 1944 it was agreed with the Soviets, that the Finnish army should attend to the withdrawal of the German forces of some 220 000 men from the northern Finland. A few weeks was of course too short a time for the withdrawal of so big army. At the same time the Finnish headquarters had arranged a secret radio network to Norway by using "Kyynel" sets to control the German army movements.

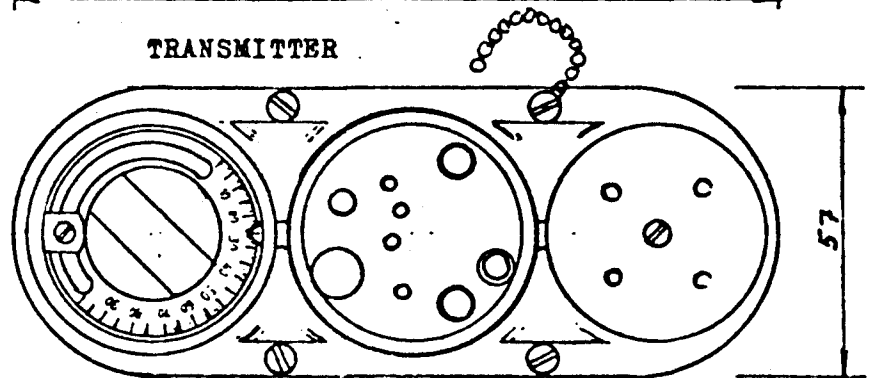
It is told, that just after the war when the Soviet custody commission arrived in Helsinki, they sent immediately two officers to Mikkeli, where the army headquarters were located. They were ordered to investigate the army shack village belonging to the intelligence service. The officers wondered the silence, all the buildings were nearly empty. Also the room of the leader of the intelligence service was empty, there was only a locked strong box of steel standing on the floor. The officers wanted the strong box to be opened: there was only one book left on one of its empty shelves. The officers asked for some documents and they were told that everything had been destroyed as useless, because final friendship had been declared between the two nations. The other Soviet officer took the book from the strong box to look at its cover: its name was: "The Tales of thousand and one nights", Illustrated Print.



RECEIVER



TRANSMITTER

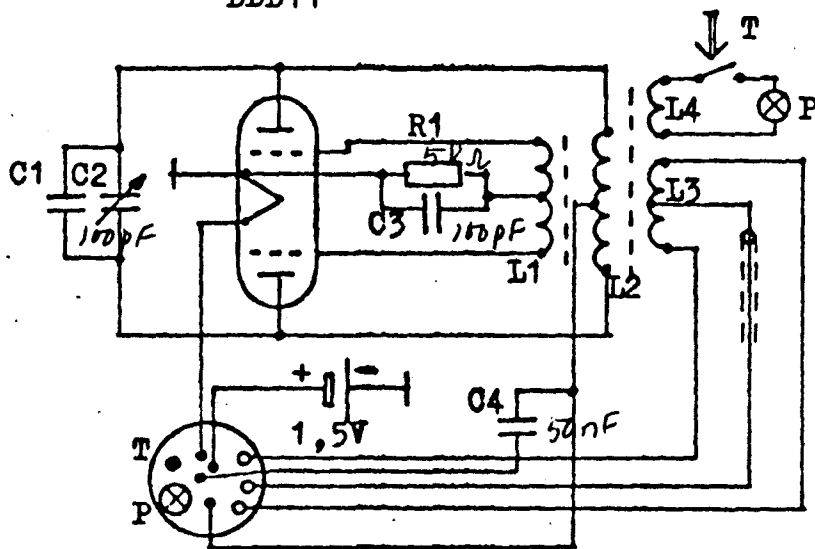


PINNISCH GUERRILLA PATROL  
RADIO "KYYNEL" ("TEAR")

1939-1945

18.2.1981 OH3UR

DDD11



DDD11

- C1 100 pF  $\pm 2,5\%$  capacitor
- C2 " variable capacitor
- C3 "
- C4 50 nF 1500V= capacitor
- R1 5 kohm
- P 2/0,08
- L1 coil
- L2 "
- L3 "
- L4 "

DDD11 Telefunken steel tube

**OH2DZ**

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OL 13.2.1981