INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

S-E-C-R-E-T

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Comments: 25X1

1. 25X1

2. On page 2 read Lieut. Aleksandr Arkadyevich Bavykin for Lieut. Alexander Arkadevich Bavigen.

3. The obscured name of a colonel mentioned on page 2 may be a certain Mailikovskiy, who has previously been reported at this installation. 25X1

4. Read Marfino for Mafino throughout the report.

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STATE	X	ARMY	#X	NAVY	X	AIR	#X	FBI		AEC		OSINV	X		

(Note: Washington distribution indicated by "X"; Field distribution by "#".)

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(iii) Comment

The present report deals with work at KUCHINO in the Test Gear Laboratory (No. 5)

PART II - REPORT

1. MGB Institute - KUCHINO.

The Institute bore the name Signals Research Institute of the Ministry for State Security; MOSCOW - KUCHINO. The village of KUCHINO lies some 35 km. from the centre of MOSCOW on the railway to GORKIY. The Institute itself is situated in a wood north of the railway and about 1 km. from the village. The grounds of the Institute are surrounded by a stone wall with watch-towers. The Institute consists essentially of a manufacturing section and a design and development section. The manufacturing side is housed in a series of 2-storey buildings laid out in the form of a horseshoe. Some ancillary buildings of 1-storey are nearby i.e. storehouses, garages, etc. The laboratories are in four large, 4-storey buildings. Also inside the walls is a 'special prison' for housing the 500 prisoners. the number of prisoners at KUCHINO progressively decreased after 1951 and in November 1953 they only numbered 200. In 1950 and early 1951, Institute KUCHINO worked in closest relationship with MAFINO, and was administered by the same higher formation. The immediate head of both KUCHINO and MAFINO was Colonel Famo Famovitch ZHELEZOV.

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2. Organisation

Head of KUCHINO	- Colonel fnu BERGELSON
Deputy Head and Chief Engineer	- Lieut.-Colonel fnu DOBROZHANSKIY

Organisation of the laboratories was as follows:-

(i) General Physics Laboratory, under Lieut.-Colonel fnu ISRAELEV, was sub-divided as follows:-

(a) A department for development of ceramics and plastics.

(b) Development of special valves and semi-conductors.

(c) Quartz crystal production and frequency standards.

(d) Development of chemical testing processes.

(e) Mechanical Workshop.

(f) Television department, engaged in the building and repair of TV sets for MGB officials.

(ii) Laboratory for Development of Miniaturised Equipment - Lieut.-Colonel Andre Ivanovich KOVALOV

Main task being the development of KOMET set (See Appendix "A" of this report).

(iii) 2nd Radio Technical Laboratory
Development of Miniature Radios for fitting into Motor Vehicles.

[redacted] the frequency used was about 100 m/cs and that the equipments were frequency modulated. 25X1

(iv) 3rd Radio Technical Laboratory - Lieut.-Colonel fnu KHAZIN
Development of Air Navigational Equipment and Monitoring Equipment.

Main task was for development of KRUG (See Appendix "B" of this report), and TYPHOON.

(v) Test Gear Laboratory - Lieut. Alexander Arkadevitch BAVIGEN.
Maintenance and development of new test gear.

[redacted] all the test gear in use was of U.S., U.K. or German manufacture. 25X1

(vi) Tape Recorder Laboratory

Development of recorders for special tasks, such as monitoring telephone conversations.

(vii) Border Guard Laboratory

Development of Border protection devices.

(viii) Medico-Chemical Laboratory - Colonel fnu MAIRONOVSKIY

Electro-medical tasks and development work on purely chemical problems.

(ix) Miniature Motor Laboratory -
Development of small motors.

3. Details of Two-way Radio KOMET (See Appendix "A")

(i) First production type:-

Tranceiver was two-way working.
Two-spot working frequencies between 80 and 120 m/cs.
Quantity 6 miniature valves, types 1K 1P and 2P 1P for battery operation.
Output approximately 0.75 watt, operative range 5 kms,
Two-stage transmitter with grid-modulated output stage.
Super-regenerative receiver with 1 RF and 2 IF stages.
The LF amplifier of the receiver serves as microphone amplifier or 1000 c/s tone generator and modulation stage during transmission.

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(ii) Second production type:-

Technical specification as for the First type, but of smaller physical dimensions because sub-miniature types were used. The general lines being developed for the KOMET were laid down by the requirement for a transmitter-receiver of the smallest possible dimensions, which would have an operative range of 5 kms.
It was to be capable of being carried unobtrusively under normal clothing.

[redacted] these stipulations were decisive in determining the size of the set, the type of circuit employed and the choice of operating frequency. It is a simple matter to build a super-regenerative receiver of good sensitivity with 1 RF stage. The type of receiver circuit influenced the choice of operating frequency which had to be fairly high in order to combat the inherently low selectivity of the receiver. The band 80 - 120 m/cs. was chosen for this reason, and as giving a convenient length for a half-wave dipole to be sewn into the operator's clothing. The manipulation of the set was effected from the pocket of the operator over a thin multi-core cable by a telephone-type dialling switch. By means of this switch the following modes of operation could be selected:- 25X1

(a) receive

(b) transmit speech

(c) transmit 1000 c/s. done (the mode (c) was for use when mode (b) was not practicable)

Receiver telephone was a miniature crystal telephone similar to those used in deaf aids. Power was nickel-iron accumulator for LT and a miniature dry battery of 100 v. for HT. The set and batteries were to be slung around the body in a leather belt and connected to the dipole over a short co-axial cable.

4. Details of KRUG - DF Set with direct bearing indication (See App. "B")

The apparatus functions by a group-sampling and phase comparison of a circular array of aerials. The basic feature of the system is an array of 40 aerials which are arranged at equal intervals around a circle of 500 metres diameter. The circular diameter was chosen to be large in comparison to the operating wave-length. By means of an electronic switch the aerials are fed to the input of the receiver in groups of seven and the phase comparison gives a criterion for the signal direction. The equipment contains the following component sections:

(a) aerial system

(b) cable connectors

(c) electronic switch

(d) control unit

(e) receiver

(f) indicator

(i) Aerial system consists of 40 steel masts in a circular array. Masts are 25 metres high, of lattice construction and stayed with guys. They stand on porcelain insulators. An inner concentric ring of earthed screening masts eliminate the need for special sense-determining arrangements in the receiver proper.

[redacted] 25X1

(ii) Cable Connections. Cables are co-axial and are buried some 1.5 metres deep. Electrical lengths are carefully matched.

(iii) Electronic switch consists of 40 identical stages each containing a valve type 6 AG 5 which is biassed off in the non-receiving condition. These stages are wide-band. The anodes of all stages go to a common anode load, which gives the imput voltage for the receiver. In operation there are always seven consecutive stages operative e.g. 5, 6, 7, 8, 9, 10 and 11. When stage 5 closes, stage 12 opens.

(iv) Control unit contains a delay line for determining the keying rate of the switch in (iii). The line contains 16- elements with a total delay of 5 m/s, and is fed with pulses of 875 /μ seconds from a stable multi-vibrator through a cathode-follower. The delay line is tapped at every fourth element (on 125 /μ seconds) and a lead taken to the switch, thus a pulse of 875 /μ seconds ensures that at any one time seven aerials imputs are going into the receiver. The output pulse of the line is fed back to the multi-vibrator to trigger the next pulse; the line delay being 5 milli-seconds a PRF of 200 ps is obtained.

(v) Receiver. A sensitive double superhet for the band 2 - 20 mc/s. The IF after the first mixer stage is 1.2 mc/s and after the second 270 kc/s. The receiver stages are in the following sequence:

RF, first mixer-cacillator, two IF (1.2 mc/s.)

second mixer-oscillator, two IF (270 kc/s.)

detector and AVC, two IF; following on the output of the last IF stage is a cathode-follower separator and limiter for separating the IF voltage for tube deflection and the tube 'brightup' voltage. The AVC circuit must have a time constant considerably larger than the period of the sampling switch.

(vi) Indicator. The tube is calibrated in degrees around the periphery. Operation is as follows: Each pair of plates is fed by a push-pull modulator in which the IF voltage of the receiver is modulated by a 200 c/s sine voltage from the control unit. The sine voltage for one pair of plates is displaced 90° to produce a circular trace, assuming [illegible] IF output. The tube 'brightup' is only at the angle of maximum reception and sense ambiguity is avoided.

5. TYPHOON

General

[redacted] this apparatus was developed in Laboratory No. 4, 25X1
known as 3rd Radio Technical Laboratory, under Lieut.-Colonel KHASIN. [redacted] 25X1
no German [redacted] worked on the project. The principle is that a ground radar 25X1
station emits pulses which are picked up on the receiver in an aircraft, and after a set delay retransmitted to the ground station. The ground station can measure the range of the aircraft, and it was further intended to transmit intelligence to the aircraft by phase-coding the pulses. The frequency band was 9 - 20 mc/s., and a working range up to 15,000 km. was envisaged. During tests it was discovered that even when, due to atmospheric disturbances, individual pulses were blotted out at the aircraft end, the overall pulse train was received back on the ground with virtually undisturbed phase relations. This observation led the Soviets to undertake experiments with PPM, but the success or otherwise of this aspect is not known [redacted] 25X1

(i) Transmitter consists of a quartz-controlled oscillator and an output stage with two LS.50s. The output stage is keyed with pulses of 200 /u seconds and a switchable PRF of 20 or 40 PS. Pulse output is 2.5 kw. The ground transmitter is contained in two transportable boxes; one box containing the power pack for mains operation from 110 - 250 v.A.C; the second box contains the transmitter and pulse unit. The receiver for 9 - 20 mc/s. is in a separate container. [redacted] aircraft transmitter [redacted] was housed in a metal cylinder and located in the tail of the aircraft. The aircraft receiver was said to lay forward and was under the direct control of the radio operator. 25X1 25X1

(ii) Pulse Arrangements. It was realised that over the long operating distances envisaged there would arise the problem of stray random pulses. An effective gating circuit was therefore built into the aircraft's receiver, which provided a good, cleaned up, direct pulse. The pulse was then used to synchronise an R-C sine wave generator of frequency 20 or 40 c/s, the phase of the R-C generator pulse faithfully following the synchronising phase. The task of the R-C generator is to provide a continuous pulse train in the presence of atmospheric disturbances - thunder, etc. The R-C generator pulses are now squared, put through a 600 /u second delay and used to key the aircraft transmitter. [redacted] the receiver is blocked at the instant of transmission. 25X1

6. Dr. POLSTER's Group

[redacted] 25X1

In May 1947 POLSTER was in the Soviet prison at HOHENSCHÖNHAUSEN, near BERLIN. He had been arrested in DRESDEN in 1946. After considerable ill-treatment and 'persuasion' he had agreed to go to the Soviet Union and continue his electro-medical researches into the treatment of cancer. In the field of electro-medicine POLSTER appears to have acquired at that time, justifiably or not, some slight reputation. He was obliged to write a letter to his family to the effect that he was proceeding to the U.S.S.R. voluntarily, and would need all his equipment and books. His family was supposed to join him later. POLSTER compiled a list of Germans whom he would require to assist him in his work, and a certain Lieut.-Colonel fnu ZODIKOV was sent to the ROZ to comb the camps at SACHSENHAUSEN, BAUTZEN and BUCHENWALD for the people. On 16.12.47 those who had been collected, in all 32, assembled at the LICHTENBERG Prison and on 17.12.47 were despatched by rail to MOSCOW. After some days in the BUTYRSKIY Prison, MOSCOW, they arrived in KUCHINO. POLSTER's equipment had, in the meantime, arrived by air but was in an unusable condition; his group was therefore, split up and the personnel put to work in other laboratories. After a time a certain amount of equipment was rendered serviceable and POLSTER set to work with three colleagues. The problems which he had, under pressure, declared himself capable of resolving were as follows:-

(i) Development and production of an apparatus for healing cancer by electro-medical means.

(ii) Development of an electronic device for producing unconsciousness at a distance i.e. without the physical application of electrodes.

(iii) Development of an apparatus for portraying the thoughts and mental inclinations of an individual, and for influencing them.

(Note: It is perhaps noteworthy that the Soviets took this latter project quite seriously and spent considerable sums of money to purchase equipment for the project. Also, at regular intervals [redacted] highly-placed scientists visited POLSTER and inquired after the progress of the work). 25X1

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An electro-cardiograph and an electro-encephalograph were constructed during the first six months, but did not work satisfactorily. POLSTER maintained that this was because the Soviets would not supply him with a FARADAY Cage. A machine for producing absence of consciousness remotely was also developed at this time but it was discovered that this device did not have the desired effect, even when electrodes were applied directly to a persons head. All the above difficulties caused the Soviets considerable displeasure and the result was that POLSTER was sentenced to 21 days solitary confinement and then packed off to VORKUTA. The members of his group were given other employment in KUCHINO

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7. Production

The Institute produced the following articles on a series basis for its own needs and those of the MGB Development Institute at MAFINO, SVERDLOVSK and SPIRIDONOVKA:

Valve holders,
Switches,
Control knobs,
Relays,
Miltiple connectors,
Coil formers,
Small variable condensers, and
bakelite pressings

The following were produced for use in the 'field':-

Tape recorders (miniature and normal sizes)
Teleprinter equipment for operation from batteries,
A Two-way communication set KOMET,
Crystal microphones, and
Crystal-type headphones.

8. General

Library facilities were remarkably good, and the latest Soviet and foreign technical periodicals were at the disposal of everyone, including the Germans. Informant believes that approximately 500 prisoners (including Soviet prisoners) and 800 to 1,000 free individuals formed the staff of the Institute.

PART IV. Appendices

Appendix 'A' - Block diagram of KOMET.

" 'B' - " " " KRUG.

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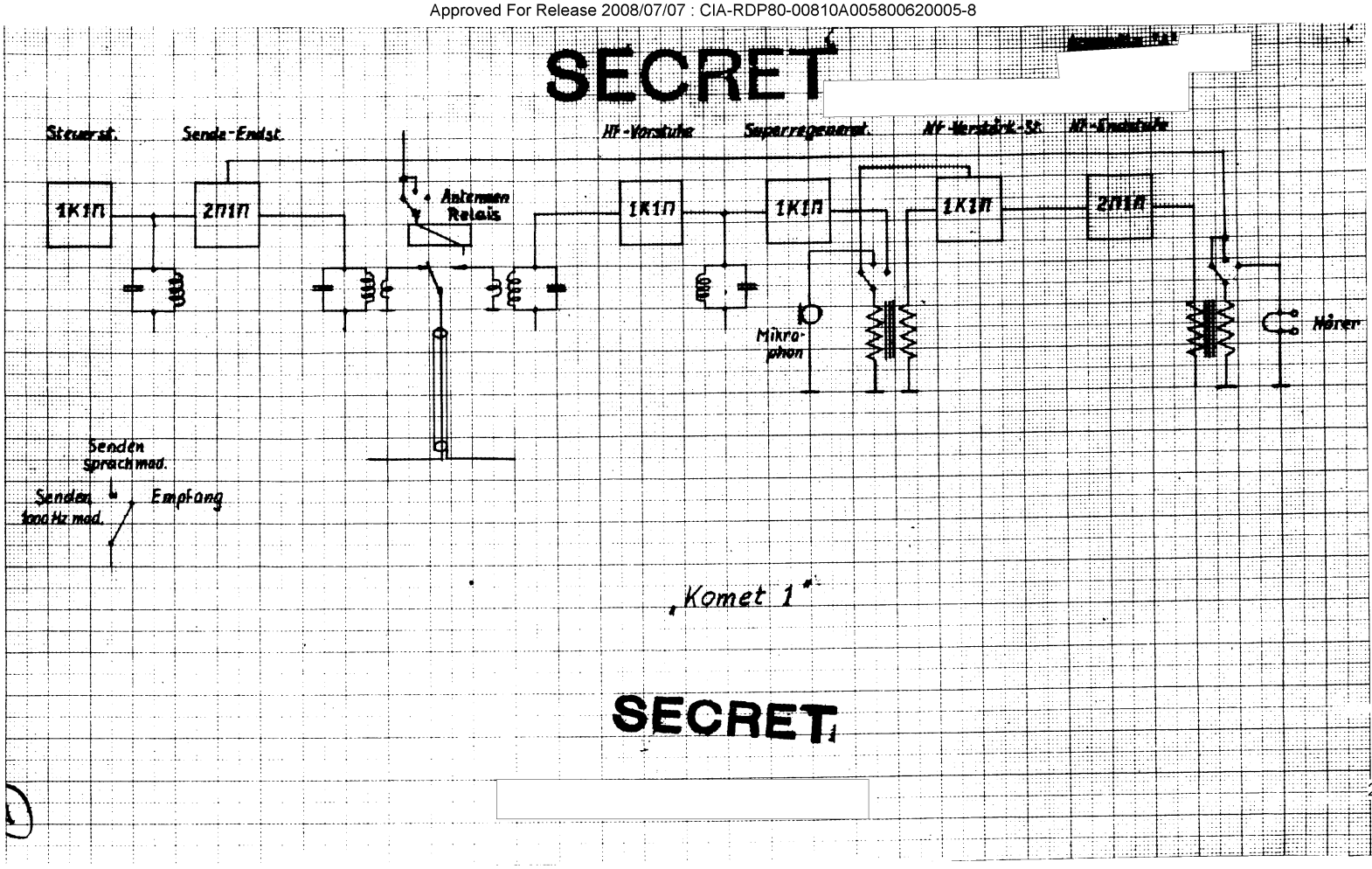
SECRET



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Appendix 'B'

Blockschaltbild „Krug"

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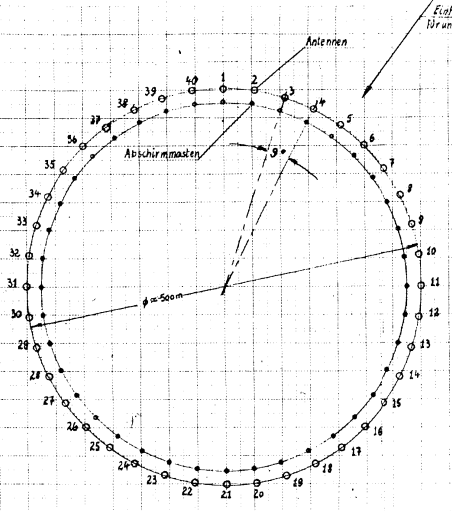
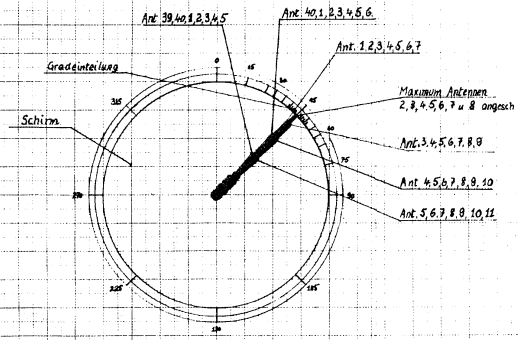


Anordnung der Antennen und Abschirmmasten



Form der Anzeige auf dem Kathodenstrahlrohr

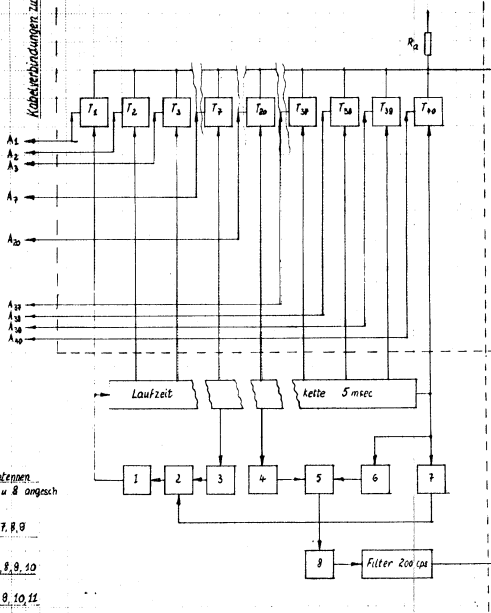
(Einfallsrichtung der Sendewelle siehe oben)

Kabelverbindungen zu den Antennen

Elektronenschalter

$T_1 - T_{40}$ = Taststufen 40 × 6AG5

R_a = gemeinsamer Anodenwiderstand der Taststufen



Steuergerät

1 = Cathode-follower ½ 6SN7
2 = Bistabiler Multivibrator 1 6SN7
3 = Verstärker ½ 6SN7
4 = Verstärker ½ 6SN7
5 = Bistabiler Multivibrator 1 6SN7
6 = Verstärker ½ 6SN7
7 = Verstärker ½ 6SN7
8 = Cathode-follower ½ 6SN7

Empfänger

1 - Hochfrequenz-Vorstufe
2 - Misch- u. Oszillatorstufe
3 - 1. Zwischenfrequenz-Verstärkerstufe 12 kcps
4 - 2 — " — — " — — " —
5 - 2. Misch- u. Oszillatorstufe
6 - 3. Zwischenfrequenz-Verstärkerstufe 2 kcps
7 - 4. — " — — " — — " —
8 - Demodulator u. Regelspannungsgleichr.
9 - Niederfrequenzvorverstärker
10 - Niederfrequenz-Endstufe
11 - Lautsprecher bezw. Kopfhörer
12 - Cathode-follower - Trennstufe
13 - 1. Begrenzerstufe
14 - 2 — " —

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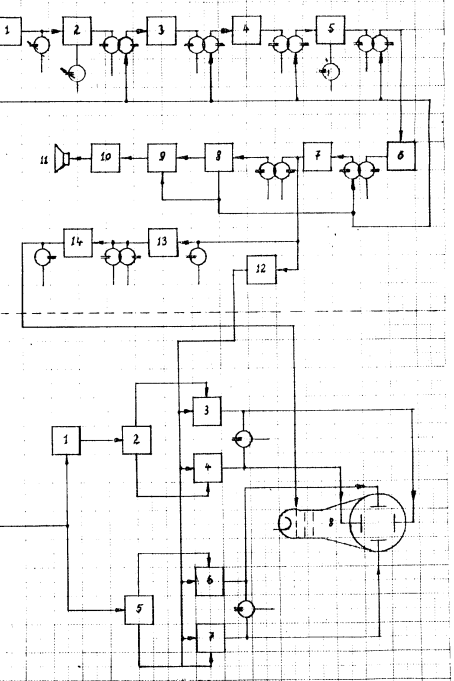

Anzeigegerät

1: Phasenschieber 90° für 200 cps
2: Phaseninverter für 200 cps 90°
3 u. 4: Modulator 1
5: Phaseninverter für 200 cps 0°
6 u. 7: Modulator 2
8: Kathodenstrahlrohr zur Anzeige

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SECRET

A 2 420 × 594 mm