

UNITED STATES GOVERNMENT

Memorandum

CIA HISTORICAL REVIEW PROGRAM
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TO : Chief, IS/T
THRU : Chief, CRA
FROM : Acting Chief,

DATE: 16 August 1971

SUBJECT: Comments on Licensing Applications
for Chemical Spray Etchers

1. Attached are comments on the current licensing applications for the export of chemical spray etchers to the USSR. The essence of these comments has already been submitted orally to the Operating Committee (OC) of ACEP on 12 August 1. We are submitting the comments now, in written form, at the request of the Chairman of the OC.

Attachment:
as stated

Comments on Licensing Applications
for Chemical Spray Etchers

1. According to OC Doc. 3992, 23 spray etchers are being purchased by the USSR to produce printed circuit (PC) boards for use in "radios and televisions". This end-use does not appear to be reasonable or credible, for two reasons: First, chemical spray etchers of the type ordered are used to produce glass epoxy type PC boards. In the US glass epoxy boards are used in computers and complex types of electronic equipment both military and civil. Glass epoxy boards are used in these applications because of their superior qualities and temperature characteristics and because they can be assembled into multi-layer configurations. Multi-layer configurations provide for vastly greater electronic circuit complexities than single plane PC boards. Second, glass epoxy boards are several times more expensive than paper phenolic types. Hence, in the US, for reasons of cost, paper phenolic type PC boards are normally used in radio and television sets and other consumer applications. The Soviets also use paper phenolics in transistorized radios and televisions. As far as can be determined, there is no shortage of paper phenolics in the USSR, several million units of radios and televisions have been produced annually using them, and they are perfectly adequate in that application. It would be an extraordinary turnabout, and wholly inconsistent with Soviet manufacturing practices generally, to suddenly shift over to the use of a more expensive board, in an application where it is not needed. It is much more likely, in our judgement, that the Soviets will use the spray etchers in question to manufacture high quality glass epoxy boards for computers, and probably military end-items as well.

2. The Soviets do now produce some glass epoxy boards. However, it is believed that they are not mass produced. Moreover, the quality of Soviet glass epoxy boards is poor by US standards. Information on the quality of Soviet boards is available from two sources: 1) some of these boards have been acquired and submitted to close technical inspection by US agents. It was found that some of the holes were not completely etched through and in several other aspects the boards were judged to be

inferior by US standards; 2) Soviet official seeking PC technology from a Western firm has admitted that the Soviets are "far behind" the West in the technology of manufacturing single plane PC's, that the USSR does not have the chemical technology to plate or resist plate the interiors of holes in PC boards (which could vitally affect operational reliability), and that the USSR does not now have the technology to produce multi-layer boards.

3. Spray etchers are, of course, only one element in the chain of technology required to manufacture high quality glass epoxy PC's. Other items of the photolithographic process are needed for associated PC board manufacturing processes. And, for the assembly of PC's into multi-layer configuration, laminating presses and NC drilling machinery are also required. Probably the Soviets will seek these items from the West also. Requests for these items have already shown up in licensing applications for export to Eastern Europe.

4. The current Soviet drive to acquire a large amount of precision spray etching machinery is seen as part of an overall strategy aimed at the development of a full range of supportive technology for the Soviet computer industry during the 9th Five Year Plan (1971-75). The Soviets hope to produce third-generation computers in the current Five Year Plan, and will need large scale production of glass epoxy PC's to support this effort.

5. It is also likely that the Soviets will use glass epoxy PC's (when IC's become available) to make military electronic equipment. In the US advanced PC boards (multi-layer) are extensively used in military equipment including ground and airborne types. Should the Soviets acquire the capability to manufacture miniaturized computers based on multi-layer PC technology and integrated circuits, it is likely that the Soviet military/space establishment would be a prime beneficiary. The lack of miniaturized computers for airborne applications, reportedly, has retarded Soviet manned space development and probably advanced in military technology as well.