

SECRETNATIONAL SECURITY AGENCY
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CANADIAN SENIOR LIAISON OFFICER, WASHINGTON

SUBJECT: TSEC/KL-7 Canadian User Report After First
Year of Operation (U)REFERENCES: (a) CANCOMSLO (W) Memorandum for Director
of Communications Security, Subject
as above, dated 24 Mar 58.
(b) CANCOMSLO (W) Memorandum for Director
of Communications Security, Subject
as above, dated 11 Mar 59.

1. The inclosure to reference (a), TSEC/KL-7 Canadian User Report After First Year of Operation, has been reviewed by the National Security Agency (NSA). Comments to this report, requested by reference (b), are contained in Inclosure No. 1. Photographs and drawings supporting these comments are included as Inclosure Nos. 2, 3, 4, 5 and 6.

2. The information contained in this report has been very helpful in evaluating the operational performance of the TSEC/KL-7 equipments and in improving the reliability of the equipments. Cooperation of the CANCOMSLO in forwarding this and other similar information is greatly appreciated.

FOR THE DIRECTOR OF COMMUNICATIONS SECURITY:

JOHN M. ORIDER
Captain, USN
Deputy Director of
Communications Security.

6 Incls:

1. Comments
2. Photos, P/L operation for TSEC/KL-7
3. Drawing, Tapered keyboard arrangement
4. Photos, 8 inch tape holders
5. Drawing, Cover, right hand end plate
6. Drawing, Test base assembly

CSEC information declassified and
approved for release on 28 April 2011,
CSEC ATIP Case #A-2010-00015

NSA information declassified and
approved for release on 21 April
2011. FOIA Case # 64246

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SECRETComments on "CANADIAN USERS REPORT AFTER FIRST YEAR OF OPERATION"

1. The following comments are furnished with respect to operators' criticisms of specific features of the TSEC/KL-7, as listed in paragraph 2 of the Canadian report:

- a. Criticism: The lack of a P/L tape on encryption (i.e., monitor copy). Reasons given are that a P/L tape would provide a checking medium and aid operators resuming encryption after interruptions.

Comment: It is impracticable to modify the existing TSEC/KL-7 equipment to provide for a P/L tape output from the TSEC/KL-7 itself. However, a P/L decipher tape can be obtained concurrent with an encipher tape through the use of a KLX-1/TSEC Input Output Adapter. The adapter provides tandem (back-to-back) operation of two TSEC/KL-7 equipments, one being a "master" which produces an encipher tape and the other being a "slave" which produces a P/L decipher tape. The adapter also provides a means by which a TSEC/HL-1B can be connected to the TSEC/KL-7 equipments (either single or in tandem) to allow automatic conversion from a teletypewriter code system to the TSEC/KL-7 literal system.

Four photographs which show various views of a developmental model of the KLX-1/TSEC are enclosed. The KLX-1/TSEC is now being Service tested. (Inclosure No. 2)

- b. Criticism: The keyboard is cramped and the keys are flat. This objection tends to disappear as operators become more experienced in operating the machine.

Comment: No change has been made or is planned to improve the cramped keyboard. However, the handle of the selector lever was shortened and was offset slightly to the left to allow more room for operators' fingers. Also, a snap-on cover was added to the front of the printer unit to eliminate the possibility of injury to operators' fingers by the rotating print wheel should they overreach the "Q" or "W" keys. As for the flatness of the keyboard, in 1953 several methods intended to provide the optional use of a tapered keyboard arrangement were examined, but the estimated tooling and manufacturing costs were prohibitive. As an example, one method required replacing the upper two rows with keytops of increased heights, thereby providing a stepped arrangement. However, this would necessitate the purchase of a new keytop molds, and it was estimated that the cost of the keytop molds would approximate \$3,500 each. The entire tooling cost would have been approximately \$70,000.

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Since the cost was prohibitive, it was decided that no further action should be taken. However, because of recent inquiries by the U.S. Air Force, indicating that a larger quantity of the stepped keys may be required, plans are being made to re-investigate the feasibility shortly after mid-1959. A partial solution to this problem may be realized by stacking extra key caps on the second and third rows of keys, giving each row a slight stair-step configuration. Drawings of this arrangement are contained in Inclosure No. 3.

- c. Criticism: Some operators commented that the paper tape roll was too small, and recommended that an adapter for a larger roll of tape be adopted.

Comment: In Jan 1956 an interim device was designed to provide use of an eight inch roll of tape with the TSEC/KL-7. A simple pin was fitted into the rear hole at the top of the left side rail. A nine inch metal disc having the center hole correspond with the pin diameter was placed on the pin in a horizontal position. A roll of tape was placed over the pin in such a manner that the tape would unwind in a clockwise direction. The end of the tape was then passed through the right bracket at the rear support and around the front bar. This afforded a direct alignment with the tape chute at the first stage of the feed-print mechanism. Operation was easily accomplished (i.e., all printing keys, space bar, and indicator lamp were accessible and rotor alignment was easily read through the cipher unit viewing window). The individual rotor set keys were also readily accessible, though not with the same convenience as is found when four inch rolls are used. Although this device was usable, it was never finalized and never promulgated for general use, because of insufficient requirements. If eight inch tape holders are required, recommend they be fabricated locally. Photographs similar to a holder described in this comment are contained in Inclosure No. 4.

- d. Criticism: The copy holder for static operation is unsuitable.

Comment: Comments from U.S. users were to the effect that the copy holder, which is mounted in the cover of the carrying case, did not prevent the paper from blowing back into the cover during operations under field conditions. To alleviate this problem a metal strip was pinned to each end of the copy holder in such a way that both strips could be pivoted down to provide a backing support for the paper during operation of the machine and could be pivoted up out of the way when the carrying case was closed. No other action is planned to further improve this holder.

- e. Criticism: Assembly of rotors considered slow.

Comment: Changing of wiring inside the rotors is still a relatively slow process. However, improvements have been made on the rotors to eliminate the older need to disassemble the rotors into notch rings, alphabet rings, retaining rings, and bodies in order to change patterns. On the latest rotors, patterns can be changed by simple depression-rotation-release actions on either the alphabet rings or notch rings.

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2. The following comments are furnished with respect to specific instances of deficiencies encountered during the early stages of operation, as listed in paragraph 3 of the Canadian report:

- a. Deficiency: Faulty pulse generators. This defect has been under investigation for some time, but instances appear to have been restricted to the early stage of operation.

Comment: Various holders of the TSEC/KL-7 equipments have reported the deficiency of the pulse generators, and, as a result, extensive investigations have been performed. Recently, a method for solving the users' problems of the faulty pulse generators has been formulated. All users who have experienced the fault will be notified in separate correspondence by 1 June 1959, of the courses of action they should take to obtain good pulse generators.

- b. Deficiency: Right hand plate and contact assembly. Several instances of breakage of this part have been reported.

Comment: Other users reported the same deficiency on early TSEC/KL-7 equipments. After investigation, it was determined that the basic problem was that the end plate, due primarily to moisture absorption and problems in the molding process, was too large and fitted very tightly in the cipher unit shell. As a result, operators were required to exert too much force in removing the right hand end plate from the cipher unit with resultant breakage. Corrective measures taken were: (1) utilization of improved molding process, (2) reduction of the peripheral dimensions of the end plate, and (3) the cover for the right hand end plate was changed from bakelite to aluminum.

- c. Deficiency: Several cases of unserviceability of the cipher unit end plate latch have been reported. Due to its light construction it does not stand up to continued use.

Comment: Other users reported the same deficiency on early TSEC/KL-7 equipments. Corrective action was taken to change the latch from a pivoted, spring-steel catch to a stronger and more positive-locking, sliding-type latch. (A print of a manufacturing drawing of the right hand end plate CE11105 is enclosed to illustrate the design of the latest type of latch). (Inclosure No. 5).

- d. Deficiency: End play between KLB-7/TSEC (base of machine) and KLB-7/TSEC (cipher unit). This was also an early fault in the machine which was remedied through fitting a specially designed plastic wedge between the two parts.

Comment: There is still a slight rocking motion of the Cipher Unit during rotor stepping operations; however, the slight motion does not impair the functioning of the TSEC/KL-7. Early in production it was found that accumulative tolerances of parts could cause interference which could possibly result in non-interchangeability of cipher units and stepping units on TSEC/KL-7 equipments. To prevent this, the re-entry circuits terminal blocks in the Stepping Units were shortened.

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Comment: This alone would have allowed increased rocking motion; however, at the same time, the curved depression in the Stepping Unit (into which the Stepping Unit fits) was milled down to allow the Stepping Unit to seat closer to the base panel, and the cipher unit latches were modified to provide a firmer hold-down for the cipher unit. The specially designed plastic wedge mentioned above was evaluated and was approved for local fabrication and optional use.

3. The following comments are furnished with respect to the recommendations for Canadian users, as listed in paragraph 5 of the Canadian report:

- a. Recommendation: A modification of the base, which would allow checking of circuits with the power on, would facilitate electrical fault finding.

Comment: A cut out base was not considered structurally sound enough for permanent installation and normal usage. Figure 58 in AMSP 512 (A), Repair and Maintenance Instructions for TSEC/KL-7, (AFSAM-7), shows the location of terminals (top center of the figure) which are accessible from the top side of the contact panel after removal of the KLA-7/TSEC Stepping Unit. Many troubles can be located through the use of those terminals as test points. If extensive voltage checks throughout the machine are required, the use of the special test base CE 87052, which contains cutouts to facilitate troubleshooting of electrical circuits, is recommended. The special test base is included in the list of recommended tools for the TSEC/KL-7 (see page 12-1 of AMSP 512 (A)). A print of the manufacturing drawing for the special test base is inclosed with these comments for further information. (Inclosure No. 6)

- b. Recommendation: Paragraph 525 (a) of AMSP 507 (A) states that an eraser is to be used to clean flat head contacts and Quietone spread on with fingers. It has been found that immediate removal of this Quietone with twill/jean cloth has been very satisfactory in operation.

Comment: AMSP 507 (B) has recently been put into effect and supersedes AMSP 507 (A). Paragraph 527 (a) of AMSP 507 (B), which corresponds to paragraph 525 (a) of AMSP 507 (A), provides a slightly different procedure for cleaning and lubricating flat head contacts. However, the new procedure does not incorporate the above recommendation that the cleaner-lubricant be removed immediately. Investigations of various types of cleaner-lubricants and methods of application are still continuing.

- c. Recommendation: It is considered that the warning lamp indicating upper case should be replaced with a brighter lamp as the present lamp is difficult to observe.

Comment: Early-produced TSEC/KL-7 equipments had clear plastic domes over the figures indicator neon lamps, and the lamps were fairly bright. However, because the TSEC/KL-7 was basically

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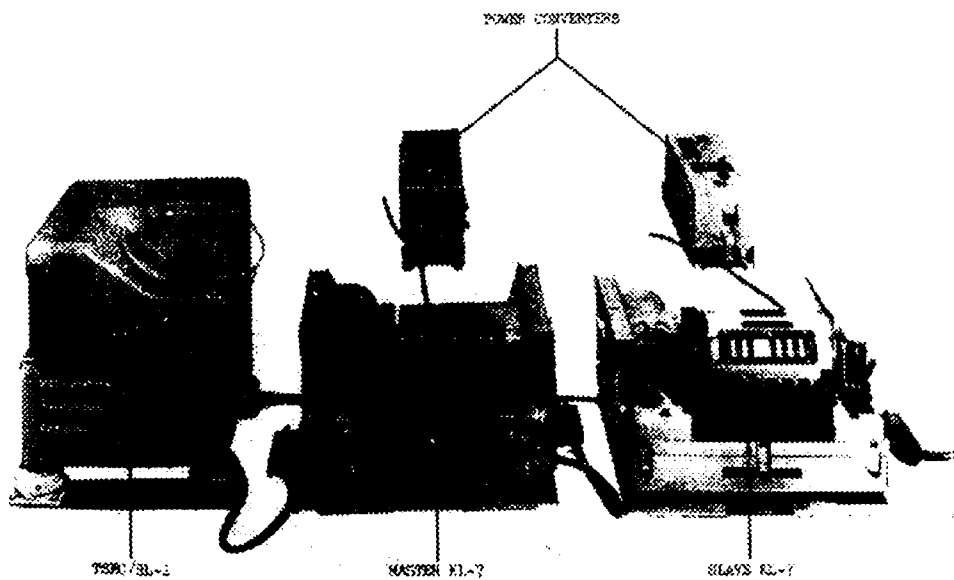
designed for field combat conditions and because the light could easily reveal communications and headquarters locations under those conditions, a change was made to the equipment to purposely reduce the brightness of the indicator; the dome was painted black except for a small clear slit. Recognition of upper case condition can be improved on equipments being used in offices by the removal of the plastic domes.

- d. Recommendation: Some operators recommend that a larger size paper roll and holder be incorporated. (It is considered that this modification might not be practical).
- Comment: Same as comment given in paragraph 1.c. above.
- e. Recommendation: It is recommended that the registration plates be placed in more easily observed locations.
- Comment: It is recognized that observations of cipher unit and stepping unit nameplates are somewhat difficult when the TSEC/KL-7 is in its carrying case. However, changes during production to effect easier observation of nameplates would have been too costly. Since production has been completed, such a change would be prohibitive; therefore, no change will be made.
- f. Recommendation: A stronger metal clip should be designed to hold the removable end plate of the cipher unit in place. It might prove more practicable to scrap the existing type of clip and to incorporate an improved type of fastener to hold this end plate in place.
- Comment: Same comment as given in paragraph 2.c. above.
- g. Recommendation: Molding for the right hand end plate and contact assembly should be made of more durable material.
- Comment: Same comment as given in paragraph 2.b. above.

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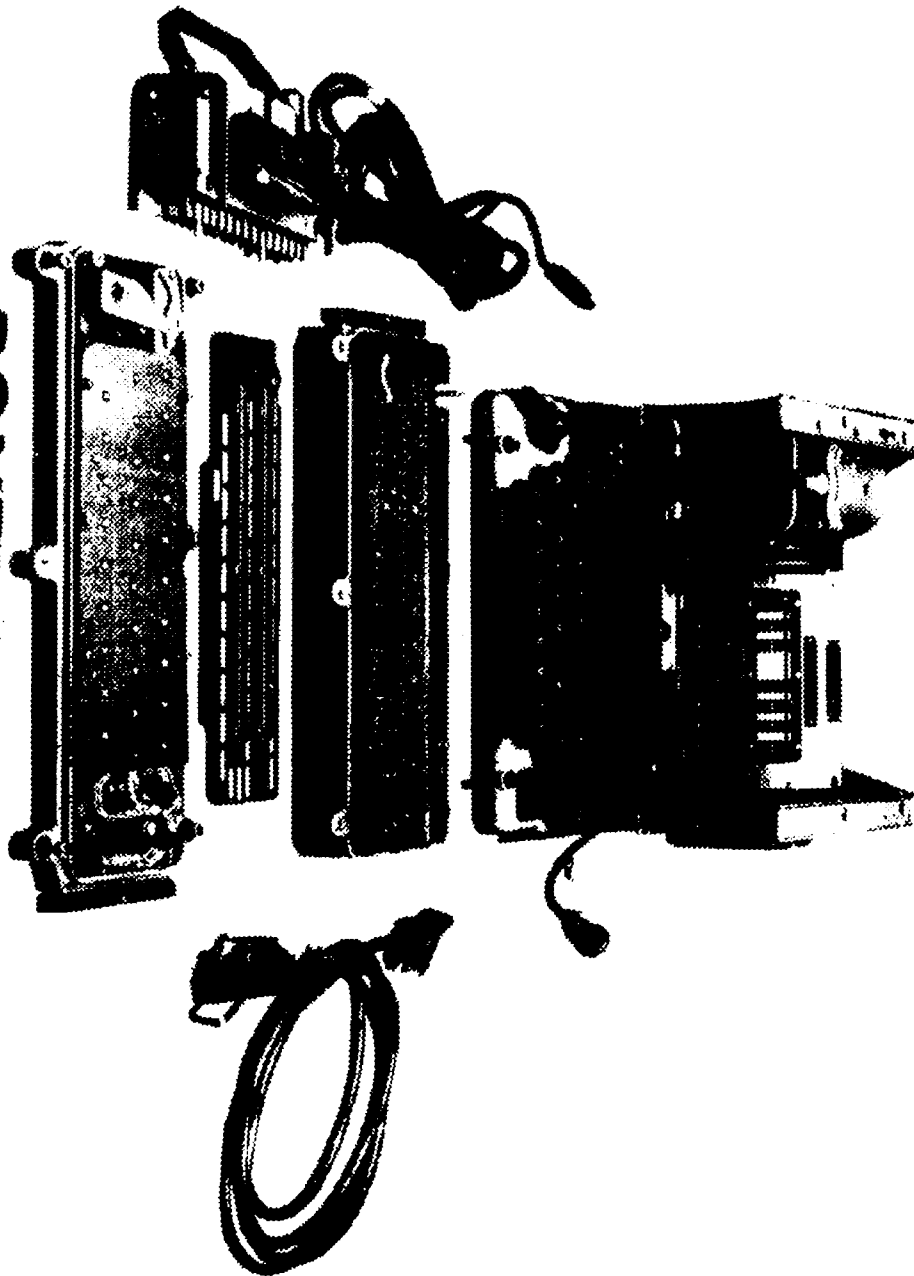
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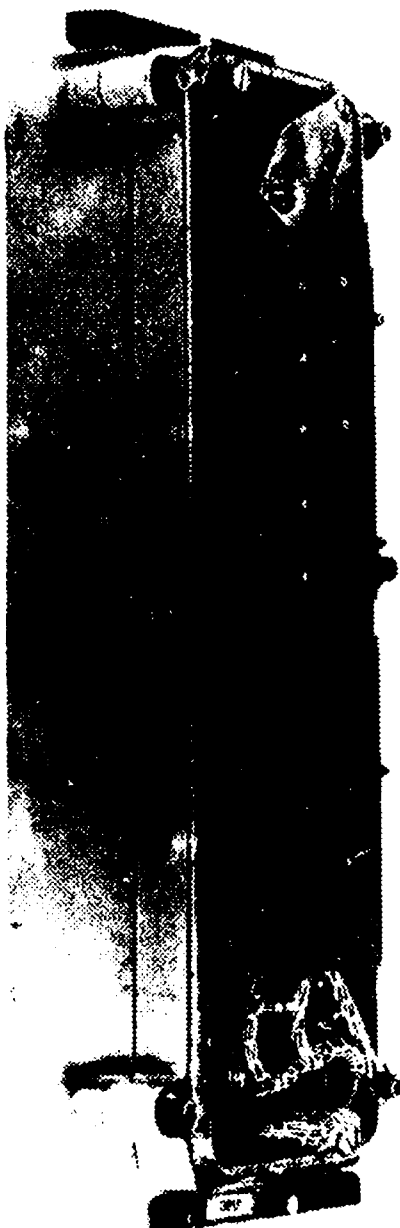


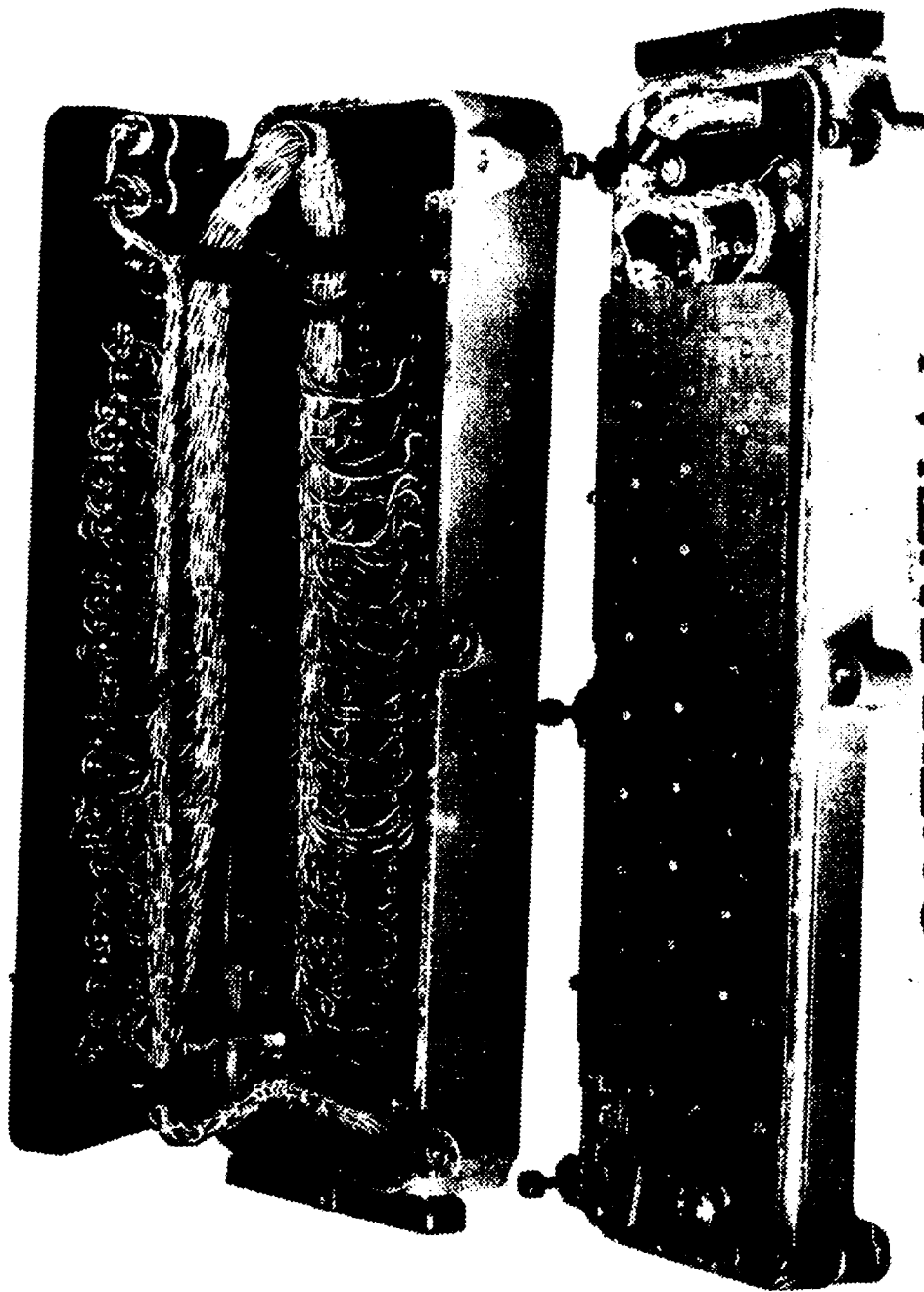
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PROCEDURE TO MODIFY KEYTOPS OF THREE TSEC/KL-7 EQUIPMENTS AND PROVIDE TAPERED KEYBOARD ARRANGEMENT

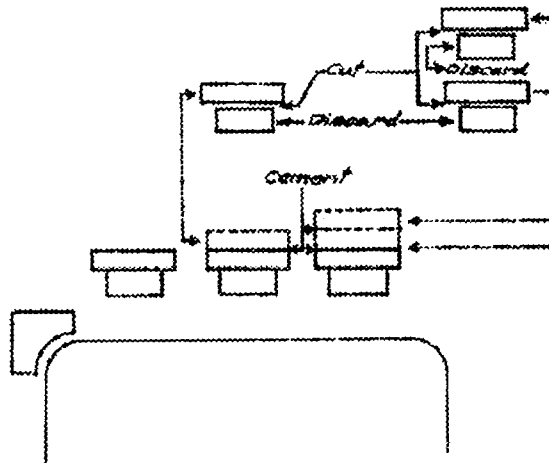
1. Procure the following items in the quantity indicated from replacement spare parts:

Part No.	Keytop Designator	Quantity	Part No.	Keytop Designator	Quantity
CE 11167	"A"	3 each	CE 11507	"Q-1"	6 each
CE 11499	"S"	3 each	CE 11508	"W-2"	6 each
CE 11356	"D"	3 each	CE 11509	"E-3"	6 each
CE 11486	"F"	3 each	CE 11510	"R-4"	6 each
CE 11487	"G"	3 each	CE 11511	"T-5"	6 each
CE 11488	"H"	3 each	CE 11512	"Y-6"	6 each
CE 11490	"J"	3 each	CE 11513	"U-7"	6 each
CE 11491	"K"	3 each	CE 11514	"I-8"	6 each
CE 11492	"L"	3 each	CE 11515	"O-9"	6 each
CE 11172	"RPT"	3 each	CE 11516	"P-0"	6 each

2. Remove the shank portion of the keytops listed above without cutting into the upper portion (refer to sketch given below). This can be done with a saw or by lathes.

3. Cement one each of the modified keytops to the keytops of the middle row, matching the character designation with its counterpart presently on the equipment.

4. Cement two each of the modified keytops to the keytops of the upper row, matching the character designations with their counterpart presently on the equipment.



Inclosure #3

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Using a conventional TSEC/XL-7, a 9" diameter cardboard disc, or any rigid material capable of supporting the roll of tape, was placed in a horizontal position over the rear hole at the top of the left side bracket. The disc, containing a center hole to correspond with the size of bolt, two nuts, two flat washers, and one lockwasher. The bolt extends approximately $\frac{1}{2}$ " above the disc to provide a pivot support for the tape roll. A roll of tape is placed over the bolt in such a manner that the tape will unwind in a clock-wise direction. A wooden spool, or equivalent, can be devised for use with rolls containing 2" cores.



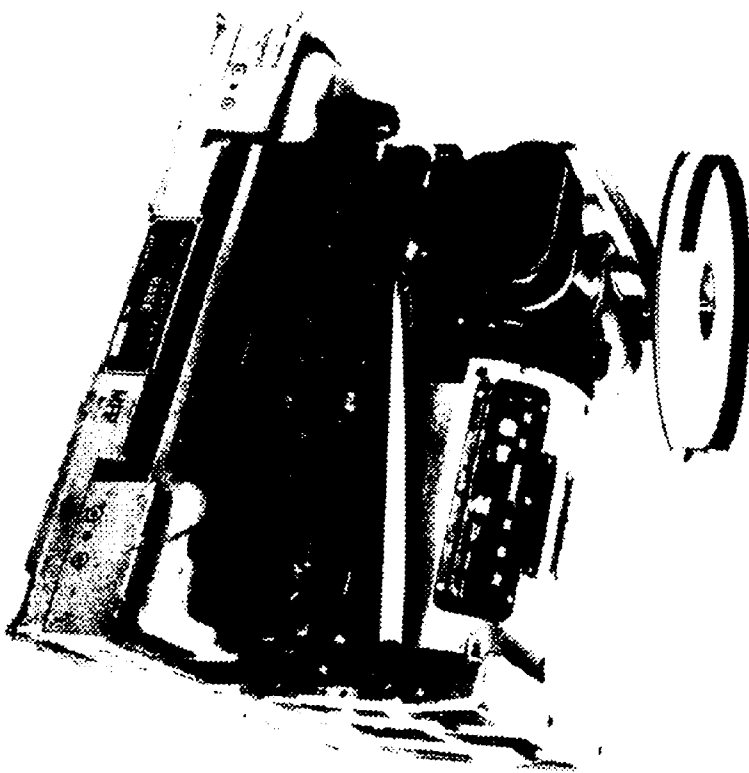
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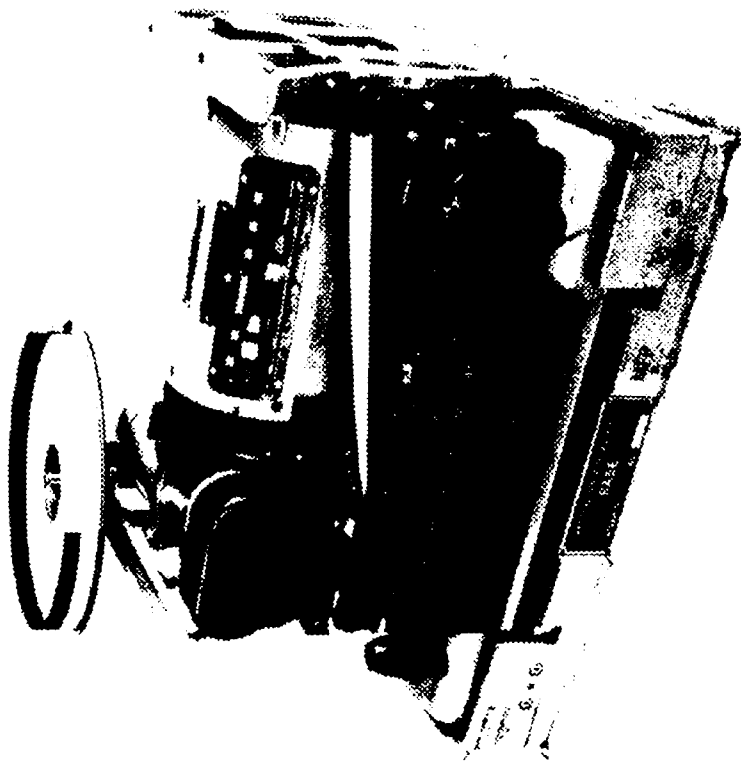
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