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DATE: 31 May 1957

TO : The Files (R&D Branch)

FROM :

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SUBJECT: Defects of the Modified AN/UGT-1 (PAMM Perforator and Keyer)

REF : Memo - Chief, R&D/EP to Chief, R&D/IP dated 1 May 1957

1. In response to the above referenced memo the AN/UGT-1 PAMM Perforator TH-24 #3 and Keyer KY-200 #1 were examined by the Mechanical Section, R&D Laboratory, to determine the causes of defective operation and faulty keying. The following is a resume of the mechanical inspection and repair, and the operational testing of the units.

2. Perforator TH-24 #3

- (a) The unit failed to operate correctly due to the excessive lubrication of parts and the failure to clean the chad box of excess slugs. These conditions caused the waste chad to adhere to the oily metal surfaces of the tape slot and dies, thus fouling operation of the unit. The operating handbook for the Perforator, Set, Tape, Telegraph AN/UGT-1 underscores a word of caution and states: "DO NOT LUBRICATE -- To do so will foul operation of the unit".
- (b) The Perforator was disassembled, cleaned, and re-assembled.

3. Operational Test Perforator TH-24 #3

- (a) The Perforator correctly punched and spaced all characters of International Morse Code on 1/4 inch mylar magnetic recording tape.
- (b) Control of the word and letter spacing is provided by a variable eccentric pawl adjustment located between the punch and die assembly and the indexing clutch. This control was not found on a unit (Serial #4) which was previously tested and was found to key at 50 wpm. This control provides a spacing range of 3 to 6 baud spaces for letters and 7 to 12 baud spaces for words.
- (c) The variation between letters punched on the tape averaged +1 baud.

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- (d) The variation between words averaged ± 1.5 bauds.
- (e) The Character Selector Dial of Perforator #3 fails to align the selected character with the index mark on the case. Since the dial stops between two characters, this condition causes operator confusion when selecting characters to be punched. The Mechanical Section, R&D Laboratory, cannot suggest an immediate remedy for this defect. It is considered to be due to mechanical tolerances not being held close enough during the manufacture of the perforator components. It is further noted that this defect may not be representative of similar units.

4. Keyer KY-201 #1

- (a) The unit was found to be defective due to missing pins in the speed-change gears, a loose gear, dirty capstan threads, and fouled keying contacts. The take-up reel is missing.
- (b) The unit was repaired and placed in operating condition.
- (c) The primary cause of defective keying has been determined to be due to the four wire spring contact falling out of alignment during continued usage of the keyer. It has been observed in similar keyers that the four wire spring contact rotates or twists on its mounting shaft so that the wire springs hook each other and become fouled.

Since the four wire spring contact is hand-made, considerable care is required to assure that the springs are equally separated and securely positioned on the mounting shaft. Also, the wire springs must be similar in every respect so that the contacting ends of the springs do not foul each other.

5. Operational Test Keyer KY-201 #1

An operational test of the keyer unit provided the following information:

- (a) An RT-3 transmitter was keyed by the keyer unit #1. The transmissions were monitored by an SP-600 receiver, and recorded on link paper tape using a McElroy RAPC recorder amplifier.

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- (b) During all transmissions perfect copy tapes were received and recorded.
- (c) The low keying speed of keyer #1 was measured to be 24 wpm \pm 0.5 wpm.
- (d) The high keying speed of keyer #1 was measured to be 60 wpm \pm 1 wpm.
- (e) The word spacing on the transmitted messages was set for standard spacing (5 bauds \pm 1 baud).

6. Recommendations

The following recommendations are based on test results.

- (a) Spare keying contacts should be made available for easy replacement of worn or fouled keying contacts in current models of the keyer units.
- (b) The practicality of the development of precision machined keying contacts, rather than hand made contacts, should be investigated.



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