INSTRUCTIONS FOR INSTALLING PAPER TAPE VERIFIER
KIT 312406 ON MODEL 35 AUTOMATED COMMUNICA-
TION SETS

1.   GENERAL

1.01   Modification kit 312406 assures the accuracy of keyboarded data from Model 35
       Automated Communication Set (ACS).

1.02   The modification kit permits the ACS to compare keyboarded data with information
       in a previously prepared tape, and introduces most of the formatting decisions auto-
matically.   In addition, use of the kit restricts introduction of erroneous keyboarded data
and prevents premature form advance.

1.03   Model 35 ACS, when equipped with modification kit 312406, provides verification
       of all data which must be entered on a final document from the keyboard.   This
verification is made by comparing each character generated from the keyboard with that
which appears on in a previously prepared tape in the verifier tape reader (rear).

1.04   The original tape contains only information which must be verified.   Data entered
       from input devices other than the keyboard need not be verified.   Each field entry
in the originally prepared tape in the verifier reader is separated by a field separator.   This
field separator, a predetermined code permutation, switches the operation to the program
tape reader (front); thus, printer positioning and input device control information is provided
automatically.

1.05   Use of the modification kit results in quicker data processing by avoiding the storage
       of erroneous information, and reduces formatting errors by introducing mechanical
decisions automatically.

1.06   The manual controls for the tape verifier are housed in a separate container which is
       affixed to the right side of the ACS cabinet.   These controls consist of five momen-
tary pushbuttons:

   (a)   The VERIF ON (verifier on) pushbutton switch enables the verifier logic.   A lamp
         housed within the key indicates when the feature is enabled.

   (b)   The DELETE pushbutton key provides two functions.   Extraneous characters in the
         original byproduct tape are purged from the new tape if the pushbutton is depressed
   when an error is indicated.   The second function is to permit DELETE code permutations
   in the original byproduct tape to be eliminated from the new tape.   A lamp housed within
   the key indicates whenever the DELETE code permutation is sensed in the original tape by
   the verifier reader.

(c) The CORR (correct) pushbutton permits erroneous characters in the original tape to be corrected in the verified byproduct tape when an error is indicated. A lamp housed within the key indicates when this course of corrective action has been selected by the attendant.

(d) The ADD pushbutton permits an omitted character to be inserted into the new byproduct tape when an error is indicated. A lamp housed within the key indicates that this course of action has been selected.

(e) The KBD ERROR pushbutton permits the error logic to be reset for re-entry of the questionable character by the attendant. A lamp housed within the key indicates when an error has been detected.

1.07   Modification kit 312406 consists of the following:

1	2191	Lockwasher	1	151723	Screw
1	3598	Nut	4	153017	Nut, speed
2	7002	Washer, flat	4	165103	Screw
3 ft	31784RM	Solid wire	1	312407	Verifier control module
2	98642	Washer	1	312408	Cable assembly, ACS
2	119647	Ring, retainer	1	312409	Cable assembly, main
2	121243	Clamp, cable	1	312410	Cable assembly, LESU
1	121245	Clamp, cable	1	312411	Switch assembly, keyset
1	151606	Screw	1	319930	Bail
1	151632	Screw			

2. THEORY OF OPERATION

2.01   The previously prepared byproduct tape, containing only that information which must be verified, is inserted into the verifier reader (rear) and the VERIF ON pushbutton is depressed. The reader automatically steps the paper tape through the first code permutation. This code permutation is then stored in the verifier logic, associated with the reader, and waits for the first entry by the attendant.

2.02   The attendant then enters, from the keyboard, the first character of the data appearing on the source document. The code permutation is stored in the verifier logic associated with the keyboard. The two code permutations, reader and keyboard, are then compared and result in the set being placed in one of two states. If the comparison is valid, the code permutation is distributed, sequentially, to the monitoring punch and printer. The logic associated with the reader is reset, and the reader steps the tape to the subsequent code permutation which is stored in the logic. If the comparison is not in agreement, a visual alarm provides an indication to the attendant of the error condition. The output of the distributor is blinded to prevent the character from being recorded in the new byproduct tape. The reader is prevented from stepping the original tape to the next character until corrective action has been taken by the attendant.

2.03   Since the character rate at which verification may be accomplished is of main con-
          cern, the process is not limited by the verifier logic but rather by the operating
speed of the set or the attendant.   All entries from the keyboard are assumed valid and,
therefore distributed in the normal time frame.   With respect to time "0", the distri-
bution of the code permutation commences after the specific time interval, which is
necessary due to energization of the distributor clutch trip magnets through a contact
sequence in the 35 ACS.   It is during this time interval that the verifier makes the
comparison and initiates any action necessary.   The code permutation is either accepted
and permitted to be distributed, or rejected and blinded from the monitoring units.   Once
the character has been accepted, the logic associated with the reader is cleared and the
subsequent code permutation is inserted.   Thus, the stepping of the tape ar.d loading of the
reader storage is accomplished during the distribution of the character.

2.04   As stated previously, the reader advances the tape once for every valid comparison.
          If the comparison is not valid, an alarm condition exists and the KBD ERROR lamp
is lit to alert the attendant.   Any subsequent operation of the keyboard during this
condition is rejected by the verifier logic.   The attendant must now examine the cause and
perform corrective action.

(a)   Correction of errors as a result of entering data out of sequence, from the keyboard,
          requires that the KBD ERROR pushbutton is depressed.   The error logic is reset
extinguishing the KBD ERROR lamp, and the attendant may then enter the proper
character.   The reader steps the tape to the next character.

(b)   If the original byproduct tape indicates an omission of a character, the ADD push-
          button is depressed.   The KBD ERROR lamp is extinguished and the ADD lamp is
lit indicating that the next permutation generated from the keyboard will be inserted
into the new tape.   The ADD lamp is extinguished after the code permutation is
distributed.   During the entire sequence the reader memory logic retains the character
previously stored and the reader step logic is disabled.

(c)   Correction of an erroneous character in the original tape is accomplished by
          depressing the CORR pushbutton.   The KBD ERROR lamp is extinguished and the
CORR lamp is lit indicating that the proper character may be entered into the new
tape by the attendant.   During the distribution of the permutation the reader is
permitted to advance the original tape to the next character and the CORR lamp is
extinguished.

(d)   An extraneous character in the original tape may be eliminated in the new tape by
          depressing the DELETE pushbutton.   The reader is momentarily energized to permit
the tape to be advanced to the following character.   The KBD ERROR lamp is
extinguished and the attendant may enter the next character from the keyboard.

(e) Recognition of the DELETE code permutation by the verifier logic, associated with the reader, results in the DELETE lamp being lit. If the perforation of the code permutation in the verified tape is not desired, the DELETE pushbutton is depressed. The reader advances the original tape until a code permutation other than DELETE is detected. The DELETE permutation is not generated to the monitoring units. After this specific code permutation has been completely stepped through the reader, the DELETE lamp is extinguished and the attendant may continue verifying.

2.05   The error logic provides a safeguard against adding, correcting or deleting characters when an alarm condition does not exist. Should the attendant depress any one of these three pushbuttons when an error is not indicated, the logic prevents any action being taken which would result in incorrect verifier operation. In addition, operation of the ADD, CORR, or DELETE pushbutton during an error condition resets the error logic. This means only one character may be added, corrected, or deleted for each occurence of an error.

2.06   Depressing the ADD or CORR pushbutton, when an error is indicated, causes the logic to lock in the state chosen until the attendant initiates action by entering the proper character from the keyboard. As a result the attendant, if the ADD pushbutton were erroneously depressed, may change the course of action to correcting the character by simply depressing the CORR pushbutton or vice-versa.

2.07   The attendant is prevented from manually starting the verifier reader at any time that the verifier is on. Thus, it is assured that the data in the original byproduct tape has been verified and not merely inserted into the new tape.

2.08   During the verification process it is desirable to be able to enter permanent or semipermanent information into the new tape from external input devices (card reader, auxiliary tape reader, etc) without verifying the data. This is accomplished by the paper tape program located in the front reader. Whenever the program switches to any other input device except the verifier reader, the verifier is electrically disabled and the information is inserted into the byproduct tape without verification. The program may also permit entry of data from the keyboard without verifying, if it is desired.

2.09   To permit the switching function to occur during the vertification of data, logic within the control module is continually monitoring the code permutations in the original tape for the switch code CONTROL A. When this permutation is sensed, the input is automatically switched to the program (front) tape reader. Therefore, positioning from one field to the next is automatic, eliminating any decision on the part of the attendant.

2.10   The modification kit, in addition to being used to verify all text in a byproduct
        tape, may be used effectively during the preparation of formatted documents.
Since the program reader in the ACS now functions as a verifier reader, the programming
is accomplished from the front reader. The following information indicates the variations
in the operation of the ACS when the verifier is on. C/indicates a control code.

(a) C/P, C/E, or C/P, C/F: Switching to an external input device from the pro-
     gram (data) tape reader is the same as in the standard operation of the set. The
internal code controlling the external device must be preceded by the code com-
bination DC_0 (CONTROL P).

> Note: CONTROL P must precede the control code permutations E or F which
> controls the logic, only in those cases where the set would otherwise respond to
> the control code as ASCII. If the set had been conditioned to respond to control
> codes as internal by the program previously, it is not necessary to precede these
> control codes with CONTROL P.

(b) C/P, C/A: Switching back to the program from the external input device is
     accomplished by this code sequence. The new positioning information is therefore
entered into the byproduct tape and the set is switched to the next input automatically.

(c) C/P, C/S: This sequence permits data to be entered from the keyboard without
     verification when the set is functioning from the program or external devices. The
input device stops and permits the operator to input data from the keyboard. After the
data has been entered, the program reader or external device, depending upon which
had been previously selected, may be manually started by depressing the START key.

(d) C/P, C/A (External input device) C/P, C/Q, C/P, (C/E or C/F program):
     During the process of inputting information from an external device, it is desirable
to enter verified data from the keyboard. The first sequence generated from the external
device switches the input from the external device back to the program. The second
sequence C/P, C/Q generated from the program, enables the verifier and permits data
to be generated from the keyboard. When the last character has been verified the set
is switched, automatically, back to the program; and subsequently to the external
device by the sequence C/P, C/E, or C/P, C/F.

(e) C/P, C/U, C/Q: Vertified data may be recorded only by the punch and not the
     page printer. This code sequence, generated from the program, places the set
in automatic print suppress before enabling the verifier. This mode of operation is
desirable when the page copy is verification of shipment, ordering, etc where price codes,
etc types of data are not pertinent.

2.11   The original byproduct tape to be verified, when used in the preparation of
            formatted documents, must contain control codes to automatically switch to the
program.   The applique is continually monitoring the byproduct tape for the switch
code C/A. Thus, anytime it is necessary to switch to the program (data) reader for new
instructions, the C/A code permutation must be entered into the tape. This is the only
control code which is necessary in the preparation of the original byproduct tape.

(a)   C/A TEXT C/A (verifier tape): The first C/A in the original tape switches the input
        to the program tape reader. This permits the program to select the receiving
devices, punch or printer, and position the form in proper regimentation for the first
entry. The TEXT represents the keyboarded entry after which recognition of the second
C/A by the verifier logic again switches the input to the program for the next instruction.

2.12   The control module, located on the relay rack in the bottom of the ACS cabinet,
            contains:

(a)   Eighteen (18) relays which provide the reader and keyboard storage, the ER
        recognition, the reader stepping logic, and the character correction circuits.

(b)   The CONTROL A character recognition circuit.

(c)   The 48 volt dc power supply.

2.13   The cable assemblies provide interconnection of the control module with the main
            ACS control panel, the electrical service unit, and the rear tape reader. The use
of connectors between the various units permits easy disassembly for replacement of a
specific unit within the set.

2.14   A new bail is provided with the modification kit to assist the attendant in determining
            the code permutation in the storage associated with the reader. The printed
characters, which are visible, indicate the one being verified and the two subsequent
characters to be verified. The line on the bail indicates the next character to be
sensed by the reader.

Note: The following descriptions follow the specific operation of the ACS when the set
is functioning as a verifier. When the operation varies, each difference is discussed
before continuing with the sequence.

2.15   VERIFIER ON Circuits:

(a)   Depression of the VERIF ON pushbutton, with the original tape in the verifier
        reader, permits the VERIF ON relay to energize. Ground is connected to one
side of the relay coil through the keyboard break contact 7-8, the verifier reader tape-
out contact and the VERIF ON switch make contact. After the relay is energized, it
is locked in this state through the VERIF ON-9 make contact, verifier reader tape-out
contact and the keyboard break contact 7-8 to ground.

(b) The VERIF ON-4 break contact opens resulting in the NON-VERIF relay, which is energized whenever power is on and the verifier is off, to de-energize.

(c) The VERIF ON-2 make contact provides ground to the verifier reader clutch trip magnets through diode A-CR9, DA-8 break contact, OAT-8 break contact, and the verifier reader tight-tape contact. The reader commences its cycle permitting the reading pins to sense the code permutation and close the associated code reading contacts. The verifier reader auxiliary contact closes providing ground to the TIM' relay through the VERIF ON-3 make contact and the OAT-12 break contact. The auxiliary contact provides ground to the OAT relay through the VERIF ON-3 make contact and diode A-CR10.

(d) The code permutation in the original tape is now stored in the V relays. The TIM' relay make contact closes, providing ground to the V relays associated with the closed code reading contacts through the VERIF ON 10, 11, and 12 make contacts and the NON-VERIF 2, 3, 4, 5, 6, and 10 break contacts. The V relays which are energized are locked in this state by the associated 11-13 make contacts to ground through the TIM' break contact. The TIM' relay, which contains make-before-break contacts, de-energizes prior to the opening of the reader code reading contacts; therefore, the energized V relays are prevented from releasing before the hold circuit is closed.

(e) When the OAT relay energizes, the OAT-8 break contact opens the ground circuit to the reader clutch trip magnets. Thus, the reader steps the tape through only the first character. The OAT relay remains energized through the OAT-8 make contact, DA-8 break contact, diode A-CR9, and VERIF ON-2 make contact to ground.

(f) The reader code reading contacts are adjusted to remain closed during the time interval that the reader auxiliary contact is closed. However, maladjusted contacts, which may open just prior to the opening of the auxiliary contact can cause the logic to store an erroneous code permutation. This failure is prevented by the OAT-12 break contact which permits the TIM' relay to release before the reader auxiliary contact opens. Thus, the bit relays (V) which are energized remain energized through the TIM' break contact and are not affected by maladjusted code reading contacts.

(g) The first character in the original tape is automatically stored and the attendant may enter the first character from the keyboard.

2.16 Character Comparison Circuits:

(a) Depression of a key on the keyboard permits the associated code reading contacts to close priming the B and K relay operate circuit. The keyboard auxiliary contact then closes providing ground to the TIM' relay and distributor clutch trip magnet through diode T-CR1. When the TIM' relay energizes, the make contact provides ground to the B and K relays through the associated code reading contacts. The B relays are locked in

the operate state by their associated 11-13 make contacts to ground through the TIM' relay break contact. The TIM' relay releases before the code reading contacts, therefore, preventing the operated B relays from de-energizing before the hold circuit is closed. The K relays, which are used in the error detection logic are energized only during the interval that the TIM' relay make contact is closed.

(b)   The TIM' relay make contact also provides ground to the ED (error detection) relay through the NON-VERIF-7 break contact and VERIF ON-1 make contact. When the ED relay energizes the error detection logic may compare the two code permutations from the reader and the keyboard.

Error Detection Circuits

2. 17   Valid Comparison:

(a)   Ground is provided to the load resistors B-R16 to B-R23 when both the TIM'relay 1-3 and ED-4 make contacts are closed. If the energized V relays correspond to the same code permutation as the energized K relays, the ER (error) relay is prevented from energizing. The K 12-14 and V 6-8 make contacts, which are in series, provide -48 volts dc to the opposite side of the load resistors through K12-13 (22-23, etc) and V 2-4 make contacts which are in parallel. Thus, the current flow from ground is through the load resistor, K 12-13 or V 2-4 make contacts and K12-14 and V 6-8 make contacts to the negative supply. The ER relay is not permitted to energize and the code permutation is verified as being valid.

(b)   The K relays are energized only while the TIM' relay is energized. For this reason the TIM' relay make contact controls the interval during which ground is provided to the ER relay. Therefore, premature de-energizing of any K relay before ground is removed from the ER relay, which would cause an erroneous error indication, is eliminated.

2. 18   Invalid Comparison: If the energized V relays do not correspond to the same code permutation as the energized K relays, the ER relay is permitted to energize. Since at least one code level is in disagreement, -48 volts dc is not provided through the K 12-14 and V 6-8 make contacts as only one of the contacts is closed. Thus, the current flow from ground is through the load resistor, V 2-4 or K 12-13 (22, 23, etc) of the code level in disagreement, the associated A-CR13 to A-CR20 diode, to one side of the ER relay. The ER relay energizes and is held in this state until corrective action has been taken, through DA-9 break contact, DELETE-3 break contact, ER10-12 make contact, ERROR switch break contact, VERIF ON-9 make contact, the verifier reader tape-out contact and the keyboard break contact 7-8 to ground.

Reader Step and Character Distribution Circuits

2.19   Valid Comparison:

(a) Closure of the keyboard auxiliary contact provided ground to the distributor clutch
     trip magnets. Since the comparison is valid the code permutation stored in the B
bit relay is generated to the monitoring punch and printer.

(b) During the interval of time that the ED relay is energized, ED-2 make contact pro-
     vides ground to the DA relay. The DA relay operates and the DA-8 break contact
opens the hold circuit for the OAT relay. The OAT relay releases and its 8 break con-
tact closes. When the DA relay releases, ground is provided to the verifier reader clutch
trip magnet. The tape is stepped and the subsequent code permutation is stored in the
logic as described in Paragraphs 2.15 (c), (d), and (e).

2.20   Invalid Comparison:

(a) Closure of the keyboard auxiliary contact provides ground to the distributor clutch
     trip magnets. Since the comparison is not valid, the code permutation being gen-
erated by the distributor must be blinded from the monitoring punch and printer. This is
accomplished by the ER 3-5 make contact which electrically shunts the distributor con-
tacts. The actual shunting occurs before the distributor can commence to generate the
START pulse.

(b) The reader must now be prevented from stepping the original tape to the subsequent
     character. When the ER relay energizes, the ER 6-8 make contact provides an al-
ternate holding path through diode A-CR11 for the OAT relay. Thus, when the DA relay
operates, the opening of the DA-8 break contact does not result in the OAT relay re-
leasing. (The release of the OAT relay permits the reader to step the tape after the DA
relay de-energizes.) Corrective action must be taken by the attendant.

Character Correction Circuits

2.21   Error Indication: An invalid comparison detected by the logic results in a visual in-
        dication being given to the attendant. This indication is provided by the KBD ERROR
lamp which is lit when an error occurs. Ground is provided to the lamp through ER 6-8 make
contact, diode A-CR21, ADD-8 break contact, NON-VERIF-11 break contact and CORR-4
break contact. This indication remains until the attendant initiates corrective action.

2.22   Keyboard Error: The attendant may enter a character out of sequence resulting in an
        error and lighting of the KBD ERROR lamp. The corrective action which must be
taken is to reset the error logic which will permit the attendant to enter the proper character.
This is accomplished by depressing the KBD ERROR pushbutton which opens the hold circuit
for the ER relay. The lamp is extinguished and the distributor blind is removed.

2.23   ADD Character:

(a)   Examination of the original tape by the attendant may indicate an omission of a
      character. The corrective action which must be taken is to insert the proper charac-
ter without stepping the original tape to the subsequent character. This is accomplished
by depressing the ADD pushbutton. Ground is applied to the ADD relay and associated
lamp through ER 6-8 make contact, diode A-CR21 and the ADD switch make contact
resulting in the relay energizing and the lamp lighting. Once energized, the ADD relay
and lamp are latched in this state by the ground circuit through ER 6-8 make contact,
diode A-CR21, ADD-8 make contact and CORR-3 break contact. Opening of the ADD-8
break contact permits the KBD ERROR lamp to extinguish.

(b)   Since the error detection logic functions when the attendant enters the proper
      character, ADD-9 break contact opens the ER relay operate circuit allowing the
code permutation to be inserted into the verified tape. The ADD-11 break contact opens
the blind circuit across the distributor contacts allowing the character to be generated.

(c)   The ADD-10 make contact provides an alternate holding circuit for the OAT relay.
      When the attendant enters the proper character, the DA relay energizes and the
following occurs:

   (1)   The DA-9 break contact opens the ER relay hold circuit allowing the ER relay to
         de-energize.

   (2)   The DA-10 make contact closes, providing an alternate hold circuit for the ADD
         relay. Thus, the ADD relay is permitted to remain energized after the initial
   hold circuit is opened by the ER 6-8 contact.

   (3)   The DA-8 break contact opens the OAT relay holding circuit. However, the OAT
         relay remains energized through the ADD-10 make contact and the reader clutch
   is not permitted to energize when the DA-8 break contact closes.

   (4)   The ADD relay does not release or the ADD lamp extinguish until the DA-10 make
         contact opens. Since the OAT relay may not release as long as the ADD relay is
   energized, the initial holding circuit for the OAT relay through DA-8 break contact
   will be closed before the alternate holding circuit through the ADD-10 make contact
   is opened. This sequence ensures that the reader will not step the tape when the at-
   tendant selects ADD.

2.24   CORRECT Character:

(a)   Examination of the original tape, by the attendant, may indicate an erroneous
      character is present. The action which must be taken is to correct the character and
step the original tape over the error. This is accomplished by depressing the CORR push-
button. Ground is applied to the CORR relay and the associated lamp through ER 6-8

make contact, diode A-CR21, and the CORR switch make contact resulting in the relay energizing and the lamp lighting. Once energized, the CORR relay and lamp are latched in this state by the ground circuit through ER 6-8 make contact, diode A-CR21, ADD-8 break contact, and CORR-1 make contact. Opening of the CORR-4 break contact permits the KBD ERROR lamp to extinguish.

(b) Since the error detection logic functions when the attendant enters the proper character, CORR-2 break contact opens the ER relay operate circuit allowing the code permutation to be inserted into the verified tape without being compared. The CORR-5 break contact opens the blind circuit across the distributor circuit allowing the character to be generated to the monitoring units.

(c) When the attendant enters the proper character, the DA relay energizes and the following occurs:

(1) The DA-9 break contact opens the ER relay hold circuit allowing the ER relay to de-energize.

(2) The DA-10 make contact closes, providing an alternate hold circuit for the CORR relay. Thus, the CORR relay is permitted to remain energized after the initial hold circuit is opened by the ER 6-8 contact; thereby preventing premature release of the CORR relay which would result in an error being registered.

(3) The DA-8 break contact opens, permitting the OAT relay to de-energize. When the DA relay releases and the DA-8 break contact is again closed, ground is applied to the reader clutch trip magnets and the tape is advanced to the next character.

(4) The release of the DA relay results in the holding circuit of the CORR relay being opened through the DA-10 make contact. The relay releases and the lamp is extinguished.

2.25 DELETE Character:

(a) Examination of the original tape may indicate that an additional character was initially entered in the tape. The action which must be taken is to advance the tape to the subsequent character. This is accomplished by depressing the DELETE pushbutton. Ground is applied to the reader clutch trip magnets through the keyboard break contact 7-8, verifier reader tape-out contact, VERIF ON-9 make contact, DELETE switch make contact, ER 11-13 make contact, and the reader tight-tape contact. The reader steps the tape to the next character.

(b) Since the attendant may hold the pushbutton depressed for a time interval exceeding one character in length, the logic prevents the reader from advancing the tape more than one character. The sequence is as follows:

(1) Depressing the DELETE pushbutton causes the reader clutch trip magnets to energize.

(2) The reader auxiliary contact closes providing ground to the DELETE relay through the NON-VERIF-1 break contact, VERIF ON-3 make contact, ED-6 break contact, and ER 7-9 make contact.

(3) The DELETE-3 break contact opens the hold circuit to the ER relay allowing it to de-energize. Thus, the operate circuit for the reader clutch trip magnets through the ER 11-13 make contact is opened and the magnets de-energize. In addition the DELETE relay is permitted to de-energize when the ER 7-9 contact opens.

2.26   DELETE Character Circuit:

(a) During the preparation of the original tape it may be desirable to overpunch incorrect character(s) with DELETE and then proceed with the correct information. When the data in the tape is being verified it is not desirable to verify these DELETE code permutations nor is it desirable to enter an error just to permit the character to be purged from the verified tape through the use of the DELETE pushbutton.

(b) When a DELETE permutation is sensed in the original tape, the series wired 3-5 make contacts of the V1 through V8 relays provide ground to the DELETE lamp. The visual alarm indicates to the attendant that the permutation in the reader storage logic is DELETE. If the attendant decides to eliminate this particular code permutation from the verified tape, the DELETE pushbutton is depressed. The operating sequence is as follows:

(1) The DELETE relay energizes through the DELETE switch make contacts, V1 through V8 3-5 make contacts and VERIF ON-2 make contact to ground. The relay is locked in this state through the DELETE-1 make contact in parallel with the DELETE switch.

(2) The DELETE-2 make contact closes, providing ground to the reader clutch trip magnets.

(3) As the reader advances the tape, the logic must sample each permutation for the first character following the DELETE permutation. Since the OAT relay does not de-energize during the delete sequence, the TIM' relay now is energized through the DELETE-5 make contact.

(4) When a permutation, other than DELETE is sensed, one or more of the V1 through V8 3-5 contacts open allowing the DELETE relay to de-energize and the DELETE lamp to extinguish. The DELETE-2 make contact opens, removing ground from the reader clutch trip magnets.

2.27   Character Recognition Circuit:

(a)   Automatic switching from the verifier reader to the program reader is accomplished
       by separating each field of data in the original tape by the code permutation CON-
TROL A. The character recognition circuit continuously monitors the code permutations
in the original tape for the switch code.

(b)   If bit levels other than just the first level are marking, current to the CONTROL A
       character recognition relay is shunted past the relay to ground through the 7-9 con-
tacts of the V2 through V7 relays, diode A-CR12 and VERIF ON-2 make contact. If only
the first intelligence level is marking, the relay is allowed to energize through V1 7-9
make contact, diode A-CR12 and VERIF ON-2 make contact to ground.

(c)   The output of the character recognition logic, a make contact on the relay, permits:

   (1)   The DATA (program) TAPE READER CONTROL relay to energize through diode
          C-CR3.

   (2)   The RUN relay to energize through diode C-CR4.

   (3)   The NON-VERIF relay to energize through diode C-CR3 and VERIF ON-4 make
          contact.

       The operation of these three relays permits the program reader to automatically start
and enter data while the verifying function is held inoperative.

3.   INSTALLATION

3.01   Remove the 192158 panel (cover) on the cabinet pedestal by depressing the pushbut-
        ton fasteners at the top of the panel. Depress the spring retainer and lift the panel
from the pedestal mounting screws.

3.02   Remove the four 192289 screws and the 2846 flat washers which hold the 192138 re-
        lay panel mounting rack to the pedestal. Pull the rack out of the pedestal.

3.03   Mount the 312407 tape verifier module assembly to the 192138 relay panel mounting
        rack with four 165103 screws and four 153017 speed nuts. The 50-pin connector is
toward the top of the relay rack.

ACS Control Panel (Refer to 6909WD)

3.04   Remove the four 151345 screws, 7002 flat washers and 2191 lockwashers which secure
        the wiring field to its mounting posts. Cut two 15-inch lengths from the 31784RM
solid wire which is provided, and strip both ends of each piece approximately 1-1/2 inches.
Wire as follows:

(a) Pin 18 of the N card receptacle to the wire wrap terminal 1R on the wiring field.

(b) Pin 28 of the N card receptacle to the wire wrap terminal 1S on the wiring field.

3.05 Secure the wiring field, except the upper left corner, to its mounting posts with the same hardware which was removed.

3.06 The 312408 cable assembly may now be connected to the ACS wiring field as follows:

(a) Connect the black lead to terminal 1R.

(b) Connect the yellow lead to terminal 7R.

(c) Connect the white lead to terminal 1S.

(d) Connect the orange lead to terminal 7S.

(e) Connect the blue lead to terminal 6T.

3.07 Secure the 312408 cable assembly to the upper left corner of the wiring field with a 121243 cable clamp (3/16 inch), one 7002 flat washer, and the hardware which was removed.

Verifier Module

3.08 Connect the other end of the 312408 cable assembly to the wiring field on the 312407 tape verifier module as follows:

(a) Connect the white lead to terminal 2C.

(b) Connect the black lead to terminal 3C.

(c) Connect the blue lead to terminal 1D.

(d) Connect the orange lead to terminal 2D.

(e) Connect the yellow lead to terminal 2E.

3.09 Mate the Y 50-pin receptacle on the 312409 cable assembly with the plug on the 312407 module. Route the remaining two 50-pin and one 6-pin connectors which break out of the cable at the same end, through the opening on the left side in the rear of the cabinet pan. (These will interconnect with the electrical service unit and the rear reader.) Route the black ground strap through the opening.

3.10   Route the 15-pin plug on the 312411 cable assembly through the large opening in the side of the lower cover, and down through the opening at the right rear of the cabinet pan.   Mate it with the receptacle on the verifier module.

3.11   Replace the relay panel mounting rack in the pedestal and secure with the four 192289 screws and 2846 flat washers which were previously removed.   Replace the 192158 panel.

Electrical Service Unit   (LESU)   (Refer to 6901 WD)

3.12   Disconnect the cables at the printer and keyboard which lead to the LESU.   Loosen the 151724 screw, 35826 flat washer and 3639 lockwasher which secure the left side of the LESU.   Slide the unit to the right to disengage the container from the right mounting screw, and remove.

3.13   Route the 312410 cable assembly through the left side of the LESU container and up through the wiring field slot.   Secure the cable to the front of the container, at the left side, with a 121243 cable clamp (3/16 inch) and mounting hardware 151632 screw (6-40 x 3/8 hex), 7002 flat washer, 2191 lockwasher, and 3598 nut (6-40 hex).

3.14   Turn the container over and make the following cable connections on the wiring field:

   (a)   Connect the white-orange-green lead to terminal 5E.

   (b)   Connect the brown-yellow lead to terminal 2F.

   (c)   Connect the purple lead to terminal 4H.

   (d)   Connect the white-red-green lead to terminal 3K.

   (e)   Connect the slate lead to terminal 5S.

3.15   Replace the LESU and secure with the hardware which was loosened.

Reader

3.16   Disassemble the reader base from the pedestal by removing the four 199653 retaining rings, 192242 flat washers and 192168 vibration rings.   Remove the base from the set, disconnecting the cables from the electrical service unit (LESU) and the ACS control panel.

3.17   Disassemble the rear reader from the base by removing the three 193974 screws, 2669 lockwashers, and 35826 flat washers.   Remove the two 119647 retaining rings and the 163991 shaft which secure the 163997 bail (tight-tape).   Install the 319930 bail, included in the modification kit, using the 163991 shaft which was removed and the two 119647 retaining rings which have been supplied with the kit.

3.18　Assemble the reader to its base with the associated hardware. Interconnect the two 50-pin connectors on the 312409 cable assembly between the rear reader and its mating LESU connector. Reconnect the LESU cable to the front reader. Replace the reader base on the pedestal mounting studs and secure with the hardware which was removed.

3.19　Connect the black ground strap, leading from the tape verifier module, to the quick connect terminal located on the cabinet pan to the right of the reader base.

3.20　Interconnect the 6-pin plug on the 312409 cable assembly with its mating receptacle on the 312410 cable assembly from the LESU. Reconnect the printer and keyboard cables from the LESU.

Switch Assembly

3.21　Using the template shown in Figure 1 or accurately locating the center of the mounting holes, drill two 0.196 diameter holes and a 1.250 diameter hole in the right side of the lower cover.

3.22　Mount the front of the switch assembly using the 151606 screw and one 98642 lockwasher. Secure the cable with the 121245 cable clamp, 151723 screw, and 98642 lockwasher to the rear mounting hole in the switch assembly.

Check List of Operation

3.23　The operation as specified in Bulletin 280B should be checked out up to the programming portion of the check.

3.24　Place the first sample program tape in the rear reader and the first sample data tape in the front reader. Turn the PROGRAM CONTROL switch on and manually start the rear reader by depressing the START pushbuttons. The coding of the tapes and the responses are shown in Table 1. These tapes check out the standard features of the set.

3.25　Place the sample tape to be verified in the rear reader and the second sample program tape in the front reader. With the PROGRAM CONTROL switch on, depress the VERIF ON pushbutton. The coding of the two tapes and responses are shown in Table 2. These tapes check out the verifier modification kit.

4.　SERVICING AND TROUBLESHOOTING

General

4.01　Failures of the equipment can be traced functionally by means of the troubleshooting chart. A step-by-step analysis of the behavior of the equipment in response to the tabulated checks indicates the area of trouble in which to apply remedial measures outlined

below and referenced in the chart. Since, in most cases, each check step is conditioned by the procedure in the preceding steps, examine the condition of all controls, before rechecking any step or otherwise performing any troubleshooting check out of sequence.

4.02 Comprehensive electrical analysis of the equipment is not generally required in troubleshooting. Reference to an open condition is to a circuit through which current will not flow, due either to a break, a poor connection or a poor or dirty contact mechanism. References to a closed condition is to a normally or intermittently closed circuit through which current will flow, either due to a short or to a sticky, dirty, or poorly adjusted contact mechanism.

4.03 Blind is a condition in which a unit is turned off or otherwise disconnected to assure nonresponse to various signal inputs.

Note: If troubleshooting checks indicate abnormal electrical conditions, refer to the schematic wiring diagram. If the trouble appears to be mechanical, isolate the unit and refer to the associated engineering specification or maintenance manual.

Procedure

4.04 The troubleshooting information presented in this section consists of operational and electrical checks designed to lead maintenance personnel to the area that is causing the trouble in the equipment. A thorough knowledge of the sequence of operation for each functioning element is of fundamental importance. Because the modification kit is an assemblage of components, the first step in troubleshooting, if the trouble is not obvious, is to sectionalize the trouble to a particular component, then determine what specific mechanism or electrical part is faulty.

4.05 Make a visual inspection of the equipment to determine if the trouble is caused by power connections or improperly set switches.

4.06 Arrange the equipment to operate on a test circuit and perform the procedures given in the Installation Section (Section 3) to sectionalize the trouble. These procedures are primarily performed after initial installation.

4.07 Localizing Electrical Troubles: Most electrical troubles are found at the various contacts in the equipment which include switch contacts, plug-in connector and pin contacts, wiring field terminals, soldered contacts (including spliced wires), and chassis ground contacts. Electrical circuits in the teletypewriter set have terminal connections at the points where test must be made. Do not disturb the wiring more than necessary when testing or inspecting. Maintenance personnel must be thoroughly familiar with the schematic and actual wiring diagrams and use them while making point-to-point checks of the circuits.

4.08   Power Supply Checks: To be sure that proper operating conditions exist, check the
        input dc power circuits before making other tests. These checks will, of necessity,
include normal operation of the parts in these circuits and the requirements of all adjustments
which would affect the indicated trouble as related to the parts. When check of an adjust-
ment is indicated, care should be exercised not to disturb the adjustment or related adjust-
ments.

(a)   Continuity: The continuity check is used to locate suspected open circuits. In mak-
       ing continuity checks, be sure that parallel current paths are disconnected. Make
the tests by checking the continuity through the circuit suspected to be faulty by con-
necting the test leads so that the current can go only through the suspected circuit. Be
sure no other part of the circuit is shunting the circuit being tested. If necessary, dis-
connect certain leads. Check all likely circuits in this manner. If, after checking all
possible causes, the fault cannot be located, make a continuity test of the entire circuit.
If continuity is indicated, test half of the circuit. Continue subdividing the circuit un-
til the open point is definitely located.

(b)   Resistance: The resistance check is used to located suspected open or shorted coil
       windings, transformer windings, motor windings, fixed resistors, and inductors. In
making resistance checks, follow the same general procedures as those described for con-
tinuity checks.

(c)   Capacitor: The capacitor check is used to locate shorted or leaking elements. To
       test, discharge the suspected capacitor with an insulated shorting jumper. Then dis-
connect one lead and connect the capacitor to an ohmmeter. Use the highest reading
scale. A good capacitor will be indicated by the ohmmeter pointer first moving up the
scale rapidly then returning more slowing to the infinity mark. A capacitor which is open
will give a reading of infinite ohms. A shorted capacitor will give a reading of constant
value between zero and infinity, depending upon the resistance of the short.

    WARNING: BE EXTREMELY CAREFUL WHEN HANDLING CHARGED CAPACITORS.
    A SEVERE ELECTRICAL SHOCK MAY BE RECEIVED FROM THE CAPACITOR OR
    LEADS CONNECTED TO A POWER SUPPLY IN OPERATION.

4.09   Check for external interruptions to the 115 volt ac power supply by checking the
        power cord connections on the terminal board located at the right rear of the electri-
cal service unit.

(a)   Check for open fuses located in the LESU on the basic facilities and SMD assemblies.
       If the power fuse is open, rotate the associated motor by hand and check for exces-
sive mechanical load before replacing the fuse. If a replaced fuse burns out immediately
upon installation, check for shorted wiring in the motor, selector magnets, or the copy-
light transformer.

(b)   Refer to troubleshooting charts for a more complete tabulation.

(c)   For unit wiring diagrams, refer to standard ACS units.

4.10   Troubleshooting Chart

(1)   Trouble: VERIFIER ON relay does not energize when VERIF ON pushbutton is depressed.

     Check: Manual operation of the VERIFIER ON relay. Relay should remain energized. If not, check continuity through hold contact 9. (Tape must be in verifier reader and a break condition must not be present.)

     Check: Continuity to ground through the VERIF ON pushbutton if relay can be manually operated.

     Check: Continuity to +48 v dc through resistor R15 on the B circuit card.

(2)   Trouble: VERIFIER ON relay energizes but lamp does not light.

     Check: Continuity to ground through the VERIFIER ON -9 contact when the relay is energized.

     Check: Continuity to -48 v dc through resistor R11 on the B circuit card.

(3)   Trouble: VERIFIER ON relay energizes when pushbutton is depressed; however, verifier reader does not advance the tape one character.

     Check: Continuity to ground from the verifier reader clutch trip magnets through the tight-tape contact, OAT-8 break contact, DA-8 break contact, diode A-CR9 and VERIFIER ON-2 make contact.

     Check: Continuity between the reader trip magnets and -48 v dc through resistor R14 on the B circuit card.

(4)   Trouble: Reader advance tape but does not stop.

     Check: Visually to see if OAT relay is energized. If relay is energized, the wiring of OAT-8 break contact is incorrect or the contacts may be shunted together. If the relay is not energized, follow the remainder of the troubleshooting procedure.

     Check: Continuity between the verifier reader auxiliary contact and the OAT relay coil through VERIFIER ON-3 make contact and diode CR11 on the A circuit card.

Check: Continuity to ground from the opposite side of the reader auxilairy contact.

Check: Continuity to -48 v dc from the OAT relay coil through resistor R13 on the B circuit card.

(5) Trouble: OAT relay operates but is not latched in an energized state.

Check: Continuity between the DA-8 break contact and OAT relay coil through OAT-8 make contact when the relay is manually operated.

(6) Trouble: Reader steps the tape; however, the code permutation is not stored in the V relay. (All, one or two relays remain de-energized.)

Check: NON-VERIFY relay should be de-energized. If energized, check wiring between the relay coil and ground through VERIFIER ON-4 break contact. If wiring is correct, remove circuit card A and refer to section 4.008.

Check: Continuity between pin 8 of the TIM' relay socket and VERIFIER ON-3 contact. (OAT relay de-energized.) If an open is indicated, check wiring between pin 8 and OAT-12, and OAT-12 break contact and VERIFIER ON-3.

Check: Continuity to -48 v dc from pin 6 of the TIM' relay socket.

Check: Continuity between pin 3 of the TIM' relay socket and ground.

Check: Continuity between the V1 to V8 relay coils to -48 v dc through the respective R3 to R10 resistors on the B circuit card.

Check: V relay operation by apply ground to NON-VERIF-5 contact and manually tripping reader. If relays energize, apply ground to NON-VERIFY-5 break contact and manually trip reader. Check for open contact on NON-VERIFY relay if V relay remains de-energized.

Check: Continuity between pin 3 on the TIM' relay socket and NON-VERIFY-5 break contact. If continuity exists the TIM' relay should be replaced.

(7) Trouble: V relays energize but are not latched in the operate state.

Check: Diodes CR1 through CR8 (CR1 associated with V1, etc) for open.

Check: Continuity between pin 14 of the V relays and pin 5 of the TIM' relay socket through the V 11-13 make contacts and the associated diodes CR1 to CR8. Continuity indicates either the reader code contacts are maladjusted to permit ground to be removed before the TIM' relay is de-energized, or the TIM' relay contacts are not make-before-break. The latter condition requires that the TIM' relay be replaced.

(8) Trouble: Reader steps tape; however, the distributor clutch magnets are energized.

     Check: The ground circuit between the verifier reader auxiliary contact and the distributor clutch magnets should be opened by the NON-VERIFY-1 make contact and the VERIFIER ON-6 break contact.

(9) Trouble: Invalid characters generated from the keyboard do not result in an error being indicated.

     Check: Operation of ED relay when key is depressed on keyboard. If relay does not energize check continuity between LESU wiring field terminal 3K and ED relay coil by manually operating the VERIFIER ON relay.

     Check: Diodes CR13 to CR20 on the A circuit card for open condition.

     Check: Continuity between pin 36 of the A circuit card and terminal 14 of the ER relay through CORR-2 and ADD-9 break contacts.

     Check: Continuity between pin 36 of the B circuit card and pin 1 of the TIM' relay socket (on ACS panel) when the ED relay is manually operated.

(10) Trouble: Valid characters generated from the keyboard result in an error being indicated.

     Check: Operation of K relays by monitoring the voltage at terminal 15 of K1, 25 of K2, etc with respect to ground. The voltage must change from -48 v dc to ground when a key is depressed on the keyboard.

     Check: Diodes CR13 to CR20 on the A circuit card for short condition.

     Check: Continuity between pin 8 of the V relays and the associated pins 14, 24, 34, etc of the S relays.

     Check: TIM' relay which should de-energize before the keyboard code reading contacts open.

(11) Trouble: ER relay operates; however, it is not latched in the energized state.

     Check: Continuity between terminals 10 and 14 of the ER relay through DA-9 and DELETE-3 break contacts.

     Check: Continuity between terminal 12 of the ER relay and ground when the VERIFIER ON relay is manually operated.

(12) Trouble: ER relay energized; however, reader steps tape.

   Check: OAT relay which should not de-energize when key on keyboard is depressed.

   Check: Diode CR11 on the A circuit card for open.

   Check: Continuity from ER-6 to ground and ER-8 to the OAT relay coil.

(13) Trouble: ER relay energized; however, characters generated from the keyboard are recorded on the monitoring devices.

   Check: Distributor blind logic composed of ER 3-5 make contact in series with CORR-5 and ADD-11 break contacts across terminals 7R and 7S of the ACS control panel wiring field.

(14) Trouble: ADD relay does not energize when ADD pushbutton is depressed and KBD ERROR lamp is lit, or energizes but is not held in this state when the push-button is released.

   Check: The following if relay does not energize:

     Diode CR21 on the A circuit card for open.
     Continuity between pin 26 of the A circuit card and ER-8 terminal.
     Continuity between pin 26 of the A circuit card and the ADD relay coil with the ADD pushbutton depressed.

   Check: The following if relay energizes and does not remain energized:

     Continuity between pin 26 of the A circuit card and the relay coil through ADD-8 make contact and CORR-3 break contact when ADD relay is manually operated.

(15) Trouble: ADD lamp does not light.

   Check: Continuity between ADD switch contact and lamp.

   Check: Diode CR2 on the switch assembly for an open condition.

   Check: Continuity between the lamp and -48 v dc.

(16) Trouble: The reader advances the tape when the character to be "added" is generated from the keyboard.

Check: Continuity between ground and the OAT relay coil through ADD-1 make contact when the ADD relay is energized.

Check: Continuity between ground and the ADD relay coil through DA-10 make contact when the DA and ADD relays are manually energized simultaneously. Failure of continuity results in the ADD relay de-energizing prematurely and the reader advancing the tape.

(17) Trouble: CORR relay does not energize when CORR pushbutton is depressed and KBD ERROR lamp is lit.

Check: Continuity between pin 26 of the A circuit card and the CORR relay coil when the CORR pushbutton is depressed.

Check: Continuity between the relay coil and -48 v dc.

(18) Trouble: CORR relay operates but does not remain latched in this state.

Check: Continuity between ADD-8 contact and the CORR relay coil through CORR-1 make contact. The relay must be manually operated.

(19) Trouble: CORR lamp does not light.

Check: Diode CR1 on the switch assembly for an open condition.

Check: Continuity between CORR switch contact and lamp.

Check: Continuity between the lamp and -48 v dc.

(20) Trouble: Reader does not step when DELETE pushbutton is depressed and KBD ERROR lamp is lit.

Check: Operate circuit by applying ground to terminal 11 of the ER relay.

Check: Operate circuit by applying ground to pin 5 of the control panel connector (VR).

Check: Continuity between VERIFIER ON-9 make contact and pin 5 of the panel connector.

(21) Trouble: Reader advances tape more than one character when the DELETE pushbutton is depressed.

Check: Visually the momentary operation of the DELETE relay when the DELETE pushbutton is depressed.

Check: Potential at terminal 9 of the ER relay if DELETE relay does not operate. Should be ground when DELETE pushbutton is depressed and reader starts to cycle.

Check: Continuity between terminal 7 of the ER relay and VERIFIER ON-3 make contact if potential is not ground. If ground, the circuit is not continuous between ER-9 and the DELETE relay coil or the -48 v dc potential is not present at the other side of the relay coil.

(22) Trouble: DELETE lamp does not light when the DELETE code permutation in the tape is sensed by the reader contacts.

Check: Potential at lamp. It should be -48 v dc.

Check: Potential at VERIFIER ON-2 make contact. It should be ground. Potential at V8-3 should be ground. Proceed to V7-3, V6-3, etc until potential is -48 v dc which indicates open.

(23) Trouble: Lamp lights but DELETE relay does not energize and/or remain energized.

Check: Continuity between V1-3 and relay coil with DELETE pushbutton depressed if relay does not energize.

Check: Continuity between V1-3 and relay coil through DELETE-1 make contact if relay does not remain energized. DELETE relay must be operated manually for checking.

(24) Trouble: Reader does not advance tape when DELETE relay is energized.

Check: Continuity between VERIFIER ON-2 make contact and OAT-8 break contact through DELETE-2 make contact.

(25) Trouble: Reader does not stop stepping tape after all DELETE permutations have been advanced through the reader.

Check: Continuity between pin 8 on the TIM' relay socket and VERIFIER ON-3 make contact through DELETE-5 make contact. TIM' relay must be operated to change the code permutation stored in the V relays.

(26) Trouble: Reader stops before all DELETE code permutations are advanced through the reader, and DELETE lamp may or may not be extinguished.

Check: Strobing requirements between reader auxiliary contact and code reading contacts per adjustment bulletin.

(27) Trouble: Set operation is not reverted to the program reader when the CONTROL A code permutation is detected in the tape by the verifier reader.

Check: CONTROL A relay operate circuit by applying ground to terminal 7 and 14 of the V1 relay, making sure V2 to V7 relays are de-energized. Ground should appear at pins 4, 12, and 13 of the C circuit card if the relay is energized.

Check: Diodes CR3 and CR4 on the C card for an open circuit.

Check: Continuity between pin 4 of the C card and terminal 2F of the LESU wiring field. Continuity between pin 13 of the C card and terminal 1R of the ACS control panel wiring field.

(28) Trouble: Set operation does not revert to the verifier reader when CONTROL Q permutation is detected in the program tape.

Check: Diode CR2 on the C card for open condition.

Check: Continuity between pin 5 on the B card and terminal 5E on the LESU wiring field.

TABLE 1

PROGRAM TAPE	DATA TAPE	PAGE COPY (Text in program tape or data tape)	BYPRODUCT TAPE
Text, CR, LF Text, CR, LF LF Text, CR, LF Text, CR, LF Text, CR, LF LF Control P Control A		The pair of tapes in these readers will be used to check the functions of this set with the instructions appearing on the page. This first paragraph should be sent from the data (front) reader (rear) to the LP. After the asterisk at the end of this paragraph the data reader (front) should send.*	
	Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF LF Control R	The LP should be copying text from the data (front) reader. Next test automatic return to normal code as data reader is called in by reading internal code PUNCH ON which should be ignored.	
	Text, CR, LF Text, CR, LF Text, CR, LF LF Control Q	The printer alone should now be copying. After the asterisk at the end of this paragraph, transmission should resume from the program reader.*	
Text, CR, LF Text, CR, LF LF Control P Control R		Text should now be sent from the program reader to the LP only. The next function will be the unblinding of the LPR.	
Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF LF DBDBDBDBDB Control G Control S		Both units should now be copying. The next function will be data bypass. During this mode, both LP and LPR will be blinded while DBDBDBDBDB in the tape pass thru the program reader. Operator should depress data BYPASS key as soon as unit stops sending. See that lamps light in DATA BYPASS and START keys. When set stops after DATA BYPASS, operator should depress START key.	Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF

TABLE 1 (cont'd)

PROGRAM TAPE	DATA TAPE	PAGE COPY (Text in program tape or data tape)	BYPRODUCT TAPE
Text, CR, LF		LP and LPR should be copying.	Text, CR, LF
Text, CR, LF		The next test is data bypass with maintain	Text, CR, LF
Text, CR, LF		format whereby both the LP and LPR will	Text, CR, LF
Text, CR, LF		be blinded to text, but should function	Text, CR, LF
Text, CR, LF		and perforate three CAR RET, LINE FEED	Text, CR, LF
Text, CR, LF		combinations. Operator should depress	Text, CR, LF
Text, CR, LF		DATA BYPASS key as soon as unit stops	Text, CR, LF
Text, CR, LF		sending.	Text, CR, LF
Control V		When set stops after DATA BYPASS, oper-	
Control S		ator should depress START key.	CR, LF
DBWF, CR, LF			CR, LF
DBWF, CR, LF			CR, LF
DBWF, CR, LF			
Control G			
Control S			
Text, CR, LF		Both the LP and LPR should be copying.	Text, CR, LF
Text, CR, LF		Operator should now test manual blind-	Text, CR, LF
Text, CR, LF		ing of LP by depressing PRINT SUPPRESS	Text, CR, LF
Text, CR, LF		as soon as unit stops sending. When set	Text, CR, LF
Control S		stops after PRINT SUPPRESS operation,	
PSPS PSPS PS		operator should depress START key.	PSPS PSPS PS
Control S			
LF			
Text, CR, LF		The next test will be automatic print	Text, CR, LF
Text, CR, LF		suppression with MAINTAIN FORMAT.	Text, CR, LF
Text, CR, LF		The LP will be blinded to text but will	Text, CR, LF
Text, CR, LF		respond to three CAR RET, LINE FEED	Text, CR, LF
Text, CR, LF		combinations.	Text, CR, LF
Control V			
Control U			
PSMF, CR, LF			PSMF, CR, LF
PSMF, CR, LF			PSMF, CR, LF
PSMF, CR, LF			PSMF, CR, LF
Control G			
Control T			

TABLE 1 (cont'd)

PROGRAM TAPE	DATA TAPE	PAGE COPY (Text in program tape or data tape)	BYPRODUCT TAPE
Text, CR, LF		The LP alone should now be copying.	
Text, CR, LF		When the unit stops depress the STEP	
Text, CR, LF		key, then depress the START key now.	
Control L		The STEP key should cause one character to be read.	
Text, CR, LF		The set will now be switched to the normal code during which it should not	
Text, CR, LF			
Text, CR, LF		recognize internal codes. This will be	
Control D		shown by ringing signal bell.	
Control G			
Control G			
Control G			

TABLE 2

VERIFIER TAPE	PROGRAM TAPE	PAGE COPY (Text in program tape or entered from keyboard)	BYPRODUCT TAPE
C/A	Text, CR, LF	Depress the VERIF ON key NOW.	
RUBOUT	Text, CR, LF	The set is now conditioned to func-	
	Text, CR, LF	tion as a tape verifier. When the	
	Text, CR, LF	unit stops, try to manually start	
	Text, CR, LF	the verifier reader by depressing the	
VERIFIED	Text, CR, LF	START, DATA BYPASS or PRINT	
	Text, CR, LF	SUPPRESS pushbutton. The reader	
	Text, CR, LF	should not run; however, the lamp VERIFIED	
	Text, CR, LF	associated with the pushbutton should	
	Text, CR, LF	light. Depress the STOP pushbutton	
	Text, CR, LF	to extinguish the lamp. Enter the	
	Text, CR, LF	following sequence of characters	
	Text, CR, LF	VERIFIED. When the D is entered	
	LF, C/P, C/R, C/Q	the operation of the set should be	
		resumed from the program tape. The	
		word VERIFIED should be recorded on	
		the page copy and the byproduct tape.	
C/A			
	C/T, Text, CR, LF	The next function is to check out the	
	Text, CR, LF	"add" feature of the verifier. When	
	Text, CR, LF	the unit stops, enter the sequence	
OMITTE (SPACE)	Text, CR, LF	OMITTED CHARACTERS. There are	
CHARACER	Text, CR, LF	two characters, the D in "omitted"	
	Text, CR, LF	and the T in "characters", missing in	
	Text, CR, LF	the original tape. When the D is OMITTED	
	Text, CR, LF	generated from the keyboard, the CHARACTER	
	Text, CR, LF	KBD ERROR lamp lights and any sub-	
	Text, CR, LF	sequent characters generated from the	
	Text, CR, LF	keyboard are blinded. Depress the ADD	
	Text, CR, LF	pushbutton which lights the ADD lamp	
	Text, CR, LF	and extinguishes the KBD ERROR lamp.	
	Text, CR, LF	Enter the D and continue until the T	
	Text, CR, LF	when the ADD pushbutton must again be	
	Text, CR, LF	depressed. Enter the T and the remaining	
	Text, CR, LF	characters in the sequence. When the last	
	LF, C/R, C/Q	permutation is keyboarded the operation	
		of the set should be resumed from the pro-	
		gram tape. The words OMITTED CHARAC-	
		TERS should be recorded on the page copy	
		and the byproduct tape.	

TABLE 2 (cont'd)

VERIFIER TAPE	PROGRAM TAPE	PAGE COPY (Text in program tape or entered from keyboard)	BYPRODUCT TAPE
C/A			
	C/T, Text, CR, LF	The next function is to check the	
	Text, CR, LF	"correct" feature of the verifier.	
	Text, CR, LF	When the unit stops, enter the se-	
	Text, CR, LF	quence ERRONEOUS CODE PER-	ERRONEOUS
	Text, CR, LF	MUTATION. There are two char-	CODE
ERROMEOUS	Text, CR, LF	acters, the N in "erroneous" and	PERMUTATION
(SPACE)	Text, CR, LF	M in "permutation", which are	
CODE (SPACE)	Text, CR, LF	incorrect in the original tape.	
PERNUTATION	Text, CR, LF	When the N is generated from the	
	Text, CR, LF	keyboard, the KBD ERROR lamp	
	Text, CR, LF	lights and any subsequent charac-	
	Text, CR, LF	ters generated from the keyboard	
	Text, CR, LF	are blinded. Depress the CORR	
	LF, C/R, C/Q	pushbutton which lights the CORR	
		lamp and extinguishes the KBD ER-	
		ROR lamp. Enter the N and	
		continue with the sequence until	
		the M is keyboarded. Depress	
		the CORR key again and enter the	
		correct character and the remainder	
		of the sequence. After the last	
		character, the operation of the set	
		should be resumed from the program	
		tape.	
C/A			
	C/T, Text, CR, LF	The "delete" feature is the next func-	
	Text, CR, LF	tion of the verifier to be checked.	
	Text, CR, LF	When the unit stops, enter the se-	
	Text, CR, LF	quence EXTRANEOUS CHARACTERS.	
EXTARANEOUS	Text, CR, LF	There is one additional character	EXTRANEOUS
(7) DELETES	Text, CR, LF	in the original tape, the A follow-	CHARACTERS
(SPACE)	Text, CR, LF	ing T in "extraneous". When the	
CHARACTERS	Text, CR, LF	"R" in "extraneous" is keyboarded,	
	Text, CR, LF	the KBD ERROR lamp lights. De-	
	Text, CR, LF	press the DELETE pushbutton which	
	Text, CR, LF	permits the reader to advance the	
	Text, CR, LF	tape one character and extinguishes	
	Text, CR, LF	the KBD ERROR lamp. When the S	
	Text, CR, LF	in "extraneous" is keyboarded, the	

TABLE 2 (cont'd)

VERIFIER TAPE	PROGRAM TAPE	PAGE COPY (Text in program tape or entered from keyboard)	BYPRODUCT TAPE
	Text, CR, LF LF, C/R, C/Q	DELETE lamp lights indicating "delete" code permutations in the original tape. Depress the DELETE pushbutton which permits the reader to advance the tape until a code permutation other than "delete" is sensed. Enter the remainder of the sequence from the keyboard. The operation of the set should be resumed from the program tape after the last character generated.	
C/A	C/T, Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF Text, CR, LF LF, C/R, C/S	The final feature to be checked is entering information from the keyboard without verifying. When the program reader stops enter any sequence from the keyboard. The tape in the verifier reader should not advance as the data is generated from the keyboard.	Data entered from keyboard

FASTEN TEMPLATE TO COVER,
CENTER PUNCH AND DRILL
0.213 DIA HOLE
(2 PLACES)

1.750"

0.875"

+0.010"
−1.500"

DRILL 1.250" DIA HOLE

+0.015"
−1.500"

CUT

+0.015"
−3.250"

+0.010"
−3.500"

CUT

ALIGN FRONT AND BOTTOM EDGE
WITH SAME ON COVER

Figure 1 – Template for Switch Assembly

SPECIFICATION 50454S