2B PROCESSOR

TAPE DATA FACILITY

OPERATING PROCEDURES

NO. 2B ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section describes the operating procedures of the tape data controller (TDC) unit as used in No. 2B Electronic Switching Systems (ESS) offices. The TDC (Fig. 1) is installed in the maintenance frame which is a part of the control complex in No. 2B ESS offices.

1.02 This is the initial issue of this section.

1.03 Detailed descriptions of teletypewriter (TTY) input and output messages are given in input manual IM-2H200 and output manual OM-2H200.

1.04 Lettered steps a, b, c, etc., added to a step number in Parts 4 and 5 of this section indicate an action which may or may not be required depending on equipment state or local conditions. Where a condition does not apply all steps designated by that letter should be omitted.

1.05 Under certain conditions verification messages will contain maintenance or diagnostic messages other than those listed. The appearance of these messages is due to variations in timing of the transmission and execution of orders within the ESS. Since these messages are not consistently present in the verification messages, they are not included in this section.

2. TAPE CHANGE REQUIREMENTS

2.01 Tape cartridges are changed or rotated due to high tape writing activity, high error rates, or for maintenance purposes. An office should not have less than four backup tapes.

2.02 When the recent change area of the memory is used to approximately 81 percent of its capacity, recent change update procedures should be implemented. See Section 232-304-301. The recent change update procedure overwrites the translation area of the tapes. Backup tapes should be produced prior to a recent change update unless performed within the previous week.

2.03 When high tape error rates are experienced the tape cartridge should be changed. For occasional errors, correctable by retensioning or rewriting a track or block, the tape may remain

ABBREVIATIONS

BUF—BUFFER
BT—BUS TERMINATOR
CTT—CARTRIDGE TAPE TRANSPORT
CTTC—CARTRIDGE TAPE TRANSPORT CONTROLLER
SDSC—SYNCHRONOUS DATA SET CONTROLLER
SPI—SERIAL PERIPHERAL INTERFACE
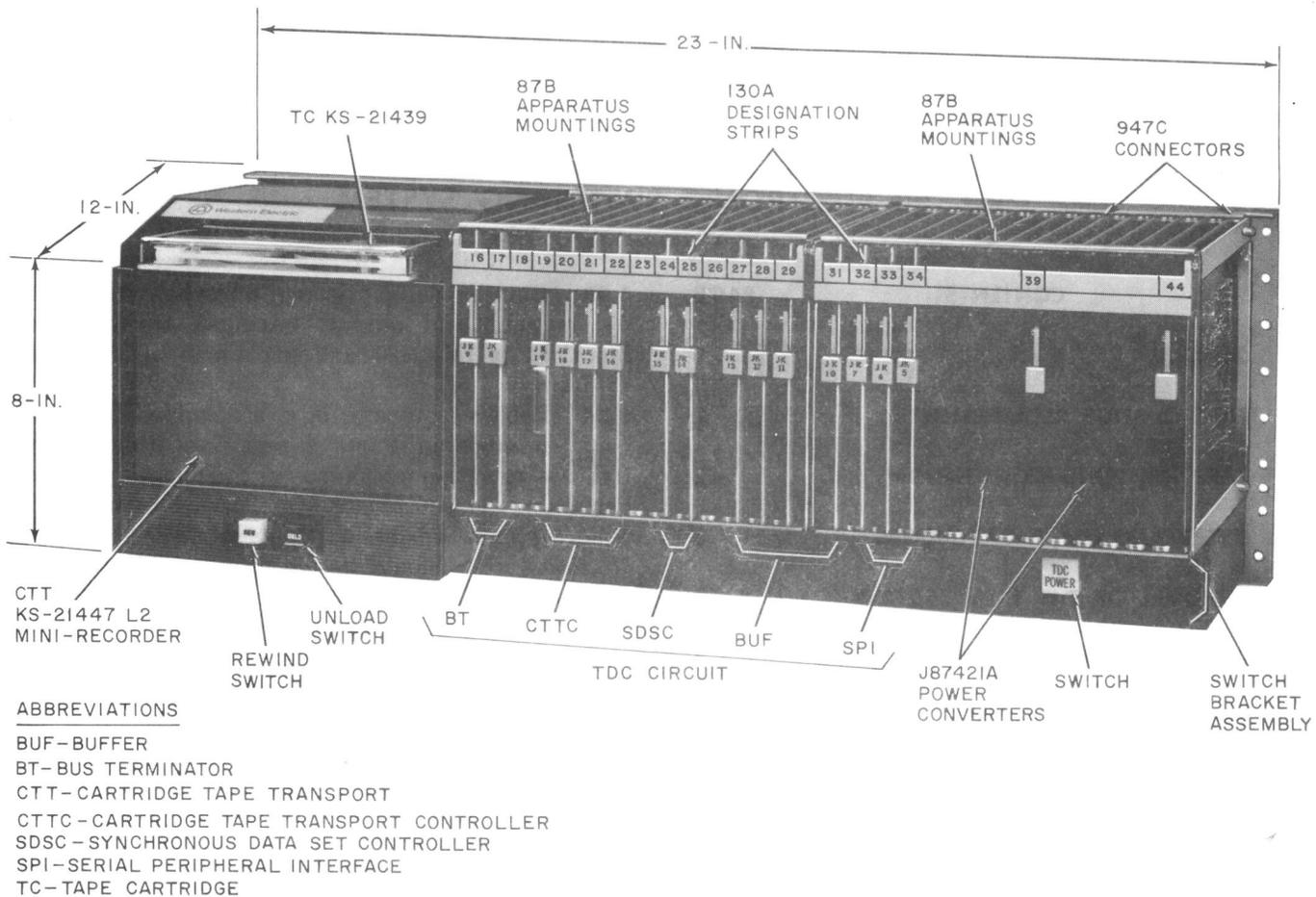TC—TAPE CARTRIDGE

Fig. 1—Tape Data Controller Unit 0 or 1-Front View-J1C053A

in the cartridge tape transport or it may be changed. For errors that are not correctable, the tape must be retired from service.

2.04 The tape cartridge may be removed or changed during maintenance procedures given in Section 232-309-705.

2.05 When rotating the tape cartridges, the currently active cartridges will be placed at the bottom of the rotational cycle. These tapes will be accessed first should some catastrophic failure occur to the active tapes. These tape cartridges should be easily accessible, but stored so they will not be affected by the same conditions that may ruin the new active cartridges. No more than four backup cartridges with the same generic information should be in the rotational cycle to avoid excessive bookkeeping.

3. TAPE HANDLING CONVENTIONS

3.01 The following TDC and tape cartridge handling conventions should be observed.

(a) An office should not be left unattended if a TDC is known to be out of service.

(b) Mated TDC's should not be out of service simultaneously, nor should any TDC be out of service for a prolonged period.

(c) A tape cartridge should not be allowed to remain in a TDC if it is write protected by the use of the safe key in the upper left corner of the tape cartridge case.

(d) A tape cartridge should not be left in service unless it is an exact copy of its mate or it

is in service as a part of a maintenance or test procedure.

(e) New tapes or any tapes not used for a period longer than one day should be retensioned before any tape operation is performed.

(f) All manual procedures requiring tape writing should be preceded by tape diagnostics.

4. LIST 1 AND LIST 2 TAPE CARTRIDGES

4.01 The list 2 tape cartridge can be obtained from a Western Electric cartridge writing facility to replace an old or worn office tape. List 2 cartridges must be brought up to list 1 status as soon as possible. List 1 and list 2 cartridges are defined as follows.

4.02 *List 1 cartridge*—A list 1 cartridge is the most complete data base produced for a specific office. This tape cartridge contains the following:

- A copy of the generic program.

- Label information specifying the generic program and the office for which the tape cartridge is prepared.

- Translations derived for or supplied by an operating company for a specific central office.

- Patches applied to the tape cartridge.

- All supporting files defined and spare allocated for each.

The only items a list 1 cartridge may lack are the most recent generic overwrites or translation modifications. These will be due to changes that occur during the time lag between ordering, writing, and shipping the tape cartridges.

4.03 *List 2 cartridge*—A list 2 cartridge contains an incomplete central office data base. Its primary function is to provide a backup generic program for the ESS. It must have its data updated by copying from a currently active tape before it can be used in an active ESS. List 2 tape cartridges contain the following:

- The latest version of the generic program.

- Magnetic labeling specifying its generic version.

- Fully blocked data (Fig. 2) on all four tracks.

- Defined files for the tape cartridge.

5. REMOVAL OF THE TAPE CARTRIDGE

5.01 The following procedure must be used in removing the tape cartridge.

Warning: Extraction of the tape cartridge without observing the following procedure will result in a major alarm. Failure to perform tape cartridge removal in the proper sequence may endanger the data recorded on the tape.

STEP	ACTION	VERIFICATION
1	At the SYSTEM STATUS AND CONTROL PANEL— Observe that the system is normal.	MAS, ATI, TDC, MISC and MANUAL FORCED lamps are extinguished.
2	At maintenance TTY— Type in: RMV:TAPE a! a = tape to be removed from service (0 or 1) *Note 1:* If the RMV:TAPE a! TTY message is typed while the tape is moving, an emergency stop will be generated by the tape software.	At cartridge tape transport— REW and UNLD keys enabled. At maintenance TTY— Output message: OK At the SYSTEM STATUS AND CONTROL section of system status panel— TDC light emitting diode lighted.

STEP	ACTION	VERIFICATION
	This sets a maintenance state which prevents enabling of the REW and UNLD keys. Recovery from this state is accomplished by performing Step 3a.	

1

STEP	ACTION	VERIFICATION
3a	If the RMV:TAPE a! message is typed while the tape is moving, at maintenance TTY— Type in: INIT:TAPE!	Output message: IP INIT TAPE COMPL
	Caution: If Step 3a is required, do not proceed unless the specified response is given.	
4	At cartridge tape transport— Depress REW key.	Tape rewinds to its beginning-of-tape (BOT) mark and then moves in its forward direction to its load point.
5	Depress UNLD key.	Tape rewinds to its BOT mark.
6	After tape movement ceases remove tape cartridge.	

6. INSERTION OF THE TAPE CARTRIDGE

6.01 Before a tape cartridge is inserted, the following conditions must exist:

- At the TDC—the TDC POWER lamp must be lighted.

- At the SYSTEM STATUS AND CONTROL SECTION of system status panel—the TDC light emitting diode must be lighted.

6.02 Insert the tape cartridge per the following procedure:

STEP	ACTION	VERIFICATION
1	Obtain the tape cartridge from the top of the rotational stack, or a new list 2 cartridge and insert it into the cartridge tape transport.	
2	Type in: INIT:TAPE!	At cartridge tape transport— Observe movement of the tape. At the maintenance TTY— Output message: IP INIT TAPE COMPL
	Note: Repeat Step 2 four times to restore proper tape tension. Inactive tape cartridges tend to lose tape tension which will increase error rates.	
3	At the maintenance TTY— Type in: DGN:TAPE a!	Output message: DGN TAPE ATP

Handwritten annotations: "any time you put in a different tape"; "a = Tape Being changed"; "iNiT:Tape Compl +"; "wait for this about 5 min"

↓ 5. ~~(AUDIT:TAPE(0,1), TRK 2; CORR!~~
~~To be used for [illegible] Dump~~)
NOT APPLICABLE FOR EF2

STEP **ACTION** **VERIFICATION**

913- [illegible] 4932

NOTE 4
REVERSE DIRECTION OF TAPE
NOTE 4
FORWARD DIRECTION OF TAPE
PHYSICAL END OF TAPE
LOGICAL END OF TAPE
OXIDE SIDE OF TAPE SHOWN
LOGICAL BOT
PHYSICAL BEGINING OF TAPE
18"±3"
18"±3"
18"±3"
48"±3"
300' ±10'
36"±3"
18"±3"
18"±3"
18"±3"
.246" ±.002"
END OF TAPE MARKS (EOT)
EARLY WARNING (EW)
LOAD POINT (LP)
BEGINING OF TAPE MARKS (BOT)
THIS EDGE OF TAPE IS CLOSEST TO THE ALUMINUM BASE PLATE OF THE TAPE CARTRIDGE
BLOCK N
IBG
DATA BLOCK
BLOCK 1
IBG
DATA BLOCK
BLOCK 0
IBG
DATA BLOCK
INITIAL INTERBLOCK GAP
TRACK 3
TRACK 2
TRACK 1
TRACK 4
NOTE 5
2.6"
4.15"
1.55"
2.6"
4.15"
1.55"
2.6"
4.15"
36"±3"
300'±10' -0

NOTES:

1. THERE IS A MINIMUM OF 825 BLOCKS PER TRACK.
2. BLOCK 0 EXISTS ONLY IN TRACK 1.
3. TAPE MARKS ARE ALSO REFERRED TO AS TAPE HOLES AND ARE LOCATED BETWEEN TRACKS 1 AND 4, 2 AND 3.
4. FACING THE TAPE AS POSITIONED IN FIG. 7 (FRONT OF CARTRIDGE)
5. LAST IBG ON TAPE IS OF VARIABLE LENGTH TO FILL REMAINING TAPE LENGTH

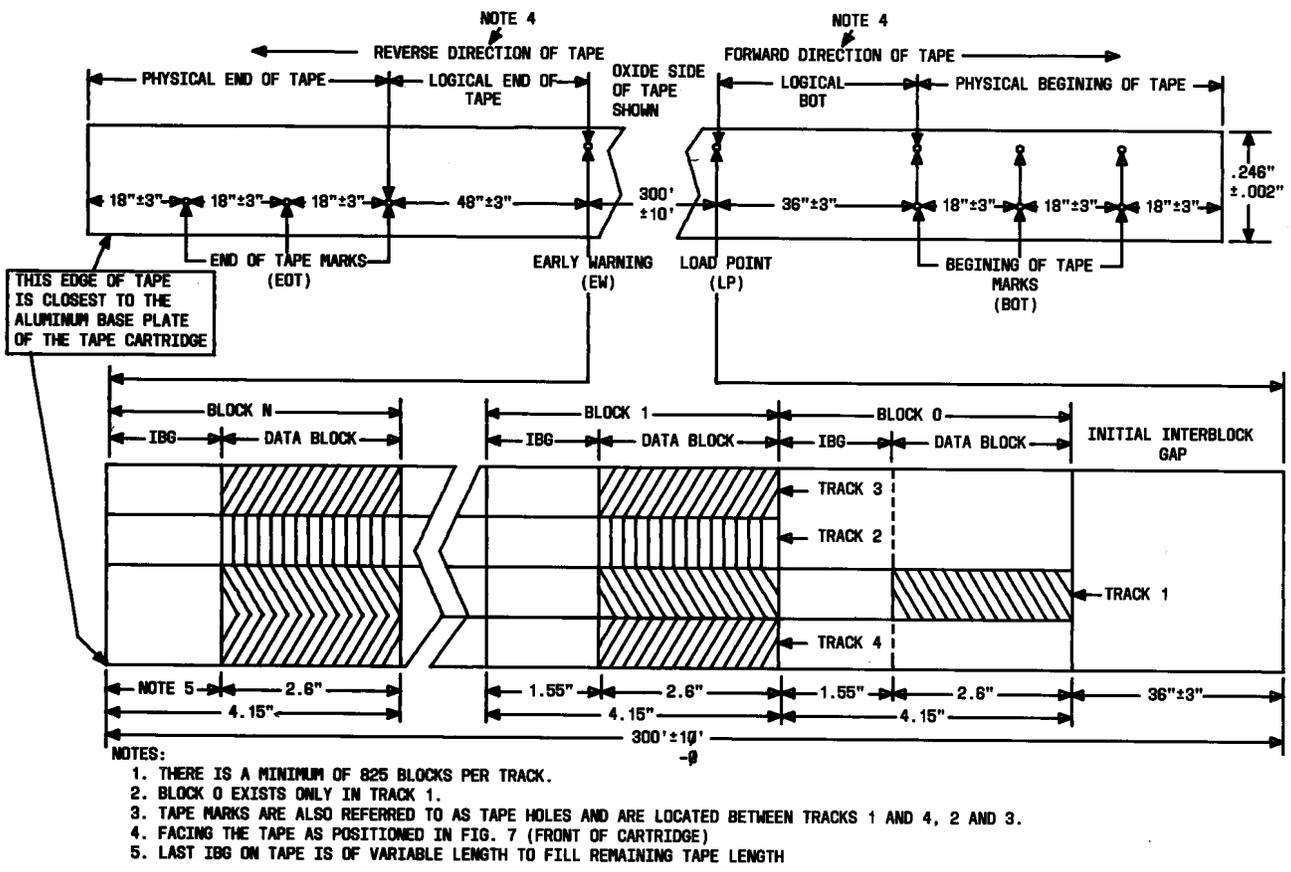

Fig. 2—Tape Cartridge—Tape Hole Pattern and Division of Blocks

***Caution:* Do not proceed unless an ATP response is given.**

(4) Type in:
pg. 823 ALW:TAPEUTIL! no wait

Output message:
ALW TAPEUTIL COMPL
At the SYSTEM STATUS AND CONTROL section of the system status panel—~~ATI~~ TDC light emitting diode lighted.

See IM for EF2

takes ~~45~~ 65 to ~~80~~ 70 min per tape!

5 Type in: (no spaces)
~~AUDIT:TAPE (aa,bb); CORR!~~
See Above.
0 aa = tape used for comparison (master)
1 bb = tape being audited or updated pg. 829
CORR = correct mismatches
AUDIT:TAPE;CORR!

If the audit passes, the following output messages are printed:
AUDIT TAPE MATCH 0
TAPEUTIL STOPPED 7 01 4477 10 06 77 40

about 1 hr 10 min

***Caution:* Do not perform procedures that require tape reading unless the**

Copy from 0 to 1 in all cases!

* step 7c

STEP	ACTION	VERIFICATION

AUDIT TAPE MATCH 0 response is given.

6   At the maintenance TTY—
    Type in—
    RST:TAPE a! ; UC L be
    a = TDC to be restored to service (0 or 1).

Output message:
OK
At the SYSTEM STATUS AND CONTROL
section of system staus panel—
TDC light emitting diode extinguished.

7c   If tape in mate TDC is to be changed—
     Repeat Steps 1 through 6 for other tape.

6.03   If during the tape changing procedure the system experiences a problem so severe that it needs to use the tape for system recovery, remove the off-line tape cartridge and replace it with the last active tape cartridge.

7. EMERGENCY PROCEDURES

GENERAL

7.01   A condition may present itself that requires immediate restoration of the TDC, or it may be known that the tape cartridge to be inserted is an exact copy of its mate. In this case an emergency restore is provided. Emergency restoration bypasses the system defenses that require time consuming diagnostics of the TDC and audits of the tape.

EMERGENCY REMOVAL OF TAPE CARTRIDGE

7.02   The tape cartridge should be removed from the cartridge tape transport immediately

without performing the tape cartridge removal procedures outlined in 5.01 upon discovery of any of the following conditions:

- A broken tape.

- Movement of the tape into regions beyond the end of tape (EOT) and before the beginning of tape (BOT) marks (Fig. 2).

- Jamming of the tape within the tape cartridge.

When the tape cartridge is removed due to any of these conditions, it should be retired from service.

EMERGENCY INSERTION OF THE TAPE CARTRIDGE

7.03   If an emergency occurs that requires immediate restoration of the TDC, the last active tape cartridge should be used. Restore the TDC as follows:

STEP	ACTION	VERIFICATION

1   Obtain the tape cartridge from the bottom of the rotational stack, or obtain the one that was last active and insert it into the cartridge tape transport.

   Caution: An office must not be left unmanned if both tapes in the tape transports are not identical.

2   At the maintenance TTY—
    Type in:
    RST:TAPE a; UCL!
    a = tape to be restored to service (0 or 1).
    UCL = unconditional, an action option that

Output message:
OK

ISS 1, SECTION 232-309-305

STEP	ACTION	VERIFICATION

will restore the tape independant of TDC diagnostics or tape audits.

7.04 Depending on the condition of the TDC and what originally removed it from service, the system may immediately remove it from service again. If this occurs, perform Step 2 of 6.02. Upon completion of this step perform Step 2 of 7.03 again.

cartridge to its off-line mate. Track 1 of the tape is write protected, and therefore this track must be an exact copy before starting. While performing the tape copy procedure, if the copy attempt aborts, replace the off line tape cartridge with the last active tape. The tape copy procedure is initiated as follows:

8. TAPE COPY PROCEDURE

8.01 The tape copy procedure will update all writable tracks (2, 3, & 4) in-service tape

STEP	ACTION	VERIFICATION
1	Remove tape from tape transport 1 per 5 (REMOVAL OF THE TAPE CARTRIDGE).	
2	Insert and audit a list 2 or old tape in transport 1 using AUDIT:TAPE (0, 1); CØRR! per 6 (INSERTION OF TAPE CARTRIDGE).	
3	Remove tape 1 per 5 (REMOVAL OF THE TAPE CARTRIDGE).	
4	Date and label the removed tape as a current copy of the system tapes.	
5	Reinsert the tape removed in step 1 into tape transport 1 per 6 (INSERTION OF TAPE CARTRIDGE).	

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