PROCESSOR TAPE HANDLING

CONVENTIONS AND PRECAUTIONS

NO. 2B ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section describes the preferred method of handling and maintaining office tape cartridges and associated tape data controllers (TDCs) used in the No. 2B Electronic Switching System (ESS).

1.02 Whenever this section is reissued, the reason for reissue will be given in this paragraph.

1.03 All procedural information concerning tape handling and maintenance is included in Task Oriented Practices (TOP) Section 232-090-004. Detailed descriptions of teletypewriter (TTY) input and output messages are given in Input Message Manual (IM-2H200) and Output Message Manual (OM-2H200).

1.04 Refer to Section 232-162-130 for a detailed description of tape operations and software subsystem for the No. 2B ESS. For a functional description of the tape data facility, refer to Section 232-309-105.

2. TAPE HANDLING

A. Primary Tapes

2.01 Six to eight tape cartridges should be on-site for each No. 2B ESS office. Two tape cartridges are designated as primary tapes and located in the tape data controllers. These on-line tapes must match exactly during normal office operation.

2.02 The primary tape in tape data controller 0 (TDC 0) is referred to as the master tape. This master tape should remain in service at all times during normal office operation, because the No. 2B ESS will use TDC 0 for its paging operations.

2.03 There is no periodic or scheduled rotation of the master tape cartridge. It will remain in TDC 0 until it becomes worn or damaged.

2.04 If the master tape has been determined to be bad and no hardware faults are suspected, it should be replaced with the primary tape cartridge located in TDC 1. A replacement tape cartridge is then inserted in TDC 1 and designated the new pri-

mary tape after it has been audit corrected and has passed diagnostics. This method will ensure that the most current translation data will be preserved.

2.05 If the master tape has been damaged and hardware faults are suspected, the remaining primary tape should not be inserted in TDC 0. After attempted clearing of the hardware fault, a replacement tape should be inserted in TDC 0 and tested. This method will prevent the destruction of the remaining primary tape due to uncorrected hardware trouble.

B. Backup Tapes

2.06 Two tape cartridges are designated as backup tapes and kept in a backup rotational stack. These tapes should be used when routine backup tape procedures are performed.

2.07 When updating a backup tape, the primary tape in TDC 1 is removed and placed at the bottom of the backup rotational stack. This tape then becomes the most up-to-date backup tape (Fig. 1). The tape at the top of the stack is inserted into TDC 1, diagnosed, audit corrected, and restored to service. This tape remains in TDC 1 until another backup tape is updated. This arrangement ensures that several different copies of previous office data (translations) will be available when problems occur.

2.08 Only one backup tape need be updated at a time. Before making the backup tape, verifica-

tion of off-line bootstrap capability should have been performed at least once since the last tape change was made. This will ensure the integrity of the primary tapes before an old backup tape is updated.

2.09 Backup tapes normally should not be updated more often than once a week nor less often than once a month, unless a tape failure occurs. Backup tapes should be made according to the following schedule:

- Prior to Office Data Administration (ODA) update

- Prior to translation overwrite

- After two or three recent change (RC) updates.

C. Replacement Tapes

2.10 Two to four tape cartridges are designated as replacement tapes and kept in a file cabinet or drawer. These tapes should be used to replace office tapes (other than the master) when they become worn or contain uncorrectable data.

2.11 When additional replacement tape cartridges are needed, they should be ordered from the Warrenville Data Center, allowing from 3 to 6 weeks for delivery. To avoid an emergency situation due to
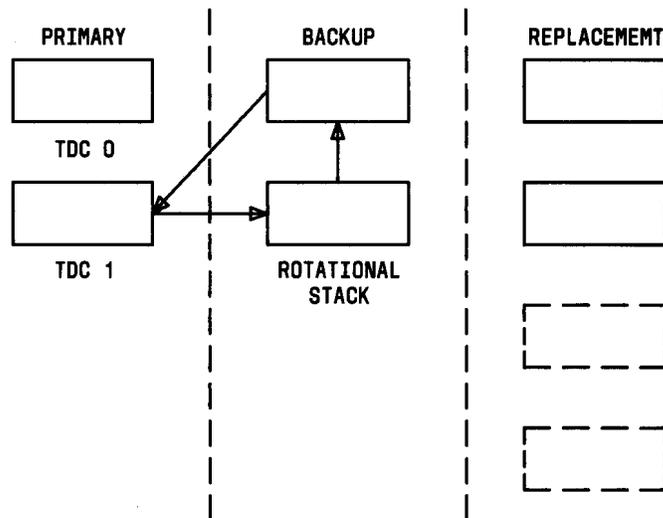

Fig. 1—Tape Rotational Sequence When Updating Backup Tapes

tape shortage, it is recommended that a replacement tape be ordered as soon as an office tape becomes defective.

2.12 When ordering replacement tapes, specify the proper J-specification drawing number and the correct list number(s). Ordering information for office tapes is found in the following J-specifications:

- J2H101A-1 for 2B-EF-1 generic

- J2H101B-1 for 2B-EF-2 generic

- J2H101C-1 for 2BE3 generic.

New replacement tapes will be locked in the **SAFE** position to prevent tape operation (Fig. 2). This switch must be rotated 180 degrees prior to tape insertion.

2.13 When a new replacement tape cartridge is received, it should be audit corrected before being placed in the replacement stack.

2.14 The audit correct procedure is preferred over the tape copy procedure because a tape copy

will write tracks two, three, and four; but will not read track one. If the wrong generic or issue tape is used when duplicating tapes using the tape copy procedure, a tape mismatch could occur even though a copy tape complete output message will be received. An audit correct will read and compare all four tracks.

2.15 To prevent accidental use of mismatched or damaged tapes, carefully mark all good tape cartridges and destroy any that are defective.

D. Emergency Backup Tapes

2.16 The Switching Control Center (SCC) should keep a set of identical tape cartridges for each No. 2B ESS office under its control. These tapes are for emergency backup and should only be used when all other tapes are considered unreliable.

2.17 These emergency tapes and half of the replacement tapes in each office should be updated approximately every 6 months. The tapes should not be updated for at least 3 months after an
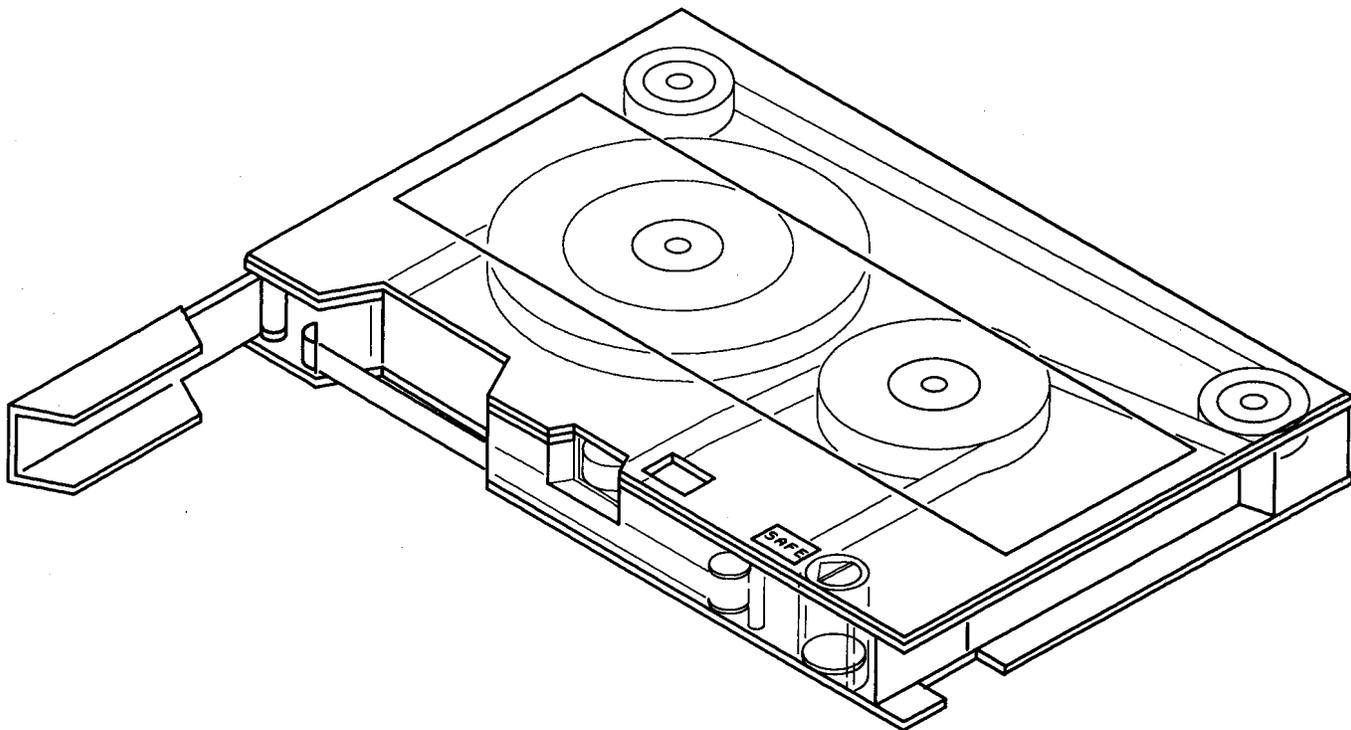

Fig. 2 — Tape Cartridge Locked in SAFE Position

ODA update, unless an additional ODA update is scheduled within that period.

2.18 If emergency backup tapes are to be stored at the Central Office, they **must not** be stored with the regular office tapes. Emergency tapes should be kept in a location where access is limited to avoid accidental use.

E. Stand-Alone Tapes

2.19 Each Technical Assistance Center (TAC), Electronic Systems Assistance Center (ESAC), Switching Control Center (SCC), or WE Region should maintain at least two stand-alone tapes per generic issue. The 2BE3 generic tapes have a stand-alone feature included in the generic.

2.20 These tapes should be verified in an installing office upon receipt.

2.21 Stand-alone tapes should be available 24 hours a day in case of an emergency. Appropriate people to contact in the event the stand-alone tapes are needed should be posted in each office and the SCC.

2.22 The stand-alone tapes or stand-alone features are **not** to be used on an in-service office without the direct assistance of **WE Product Engineering Control Center (PECC)** or **BTL**. Stand-alone tapes **must** be stored separately from the regular office tapes. The ordering information for stand-alone tapes for the No. 2B ESS is found in the following J-specifications:

- J2H101A-1 for 2B-EF-1 generic

- J2H101B-1 for 2B-EF-2 generic

F. Disposition of Used Tapes

2.23 Over a period of time, tape cartridges will become unusable due to wear or become damaged and unsuitable for use. The information may also become obsolete due to generic restarts or retrofits. Although used tapes are perfectly acceptable for furnishing office data dumps to WE, the system will not utilize used tapes to record new generic and office data tapes.

2.24 Therefore, surplus tapes and damaged tapes are not to be returned to WE. However, these tapes contain proprietary information and must be disposed of properly.

2.25 Dispose of tape cartridges per local procedures or proceed as follows:

(1) Remove tape from cartridge

(2) Cut up tape

(3) Dispose of tape and cartridge.

3.   TAPE DATA CONTROLLER MAINTENANCE

3.01 The TDC houses the cartridge tape transport and provides an asynchronous interface between the 3A CC, administrative data link, and tape. For increased reliability, the TDC is duplicated and operated in a mate arrangement.

3.02 There is no routine maintenance of the TDC. The components replaceable by maintenance personnel are the cartridge tape transport, circuit packs, and the lamp in the TDC POWER switch (Fig. 3).

3.03 A tape diagnostic failure message will indicate the need for circuit pack or cartridge tape transport replacement. These procedures are included in TOP Section 232-090-004.

> *Caution: Tape damage may result if TDC power is removed or restored while a tape is physically located in the TDC.*

3.04 When a tape fails (falt/read or falt/writ), the TDC should be cleaned and checked using TOP Section 232-090-004. If cleaning does not clear the trouble, attempt to copy the bad portion of the failing tape. If a tape copy fails, attempt to isolate the problem to the TDC hardware or a defective tape cartridge.

> *Note:* The tape head and drive capstan should be cleaned each time a tape is removed from a TDC.

3.05 Mated TDCs should not be out of service simultaneously, nor should a TDC be out of service for a prolonged period. An office with an out-of-service TDC should not be left unattended.

4.   OFF-LINE BOOTSTRAP VERIFICATION

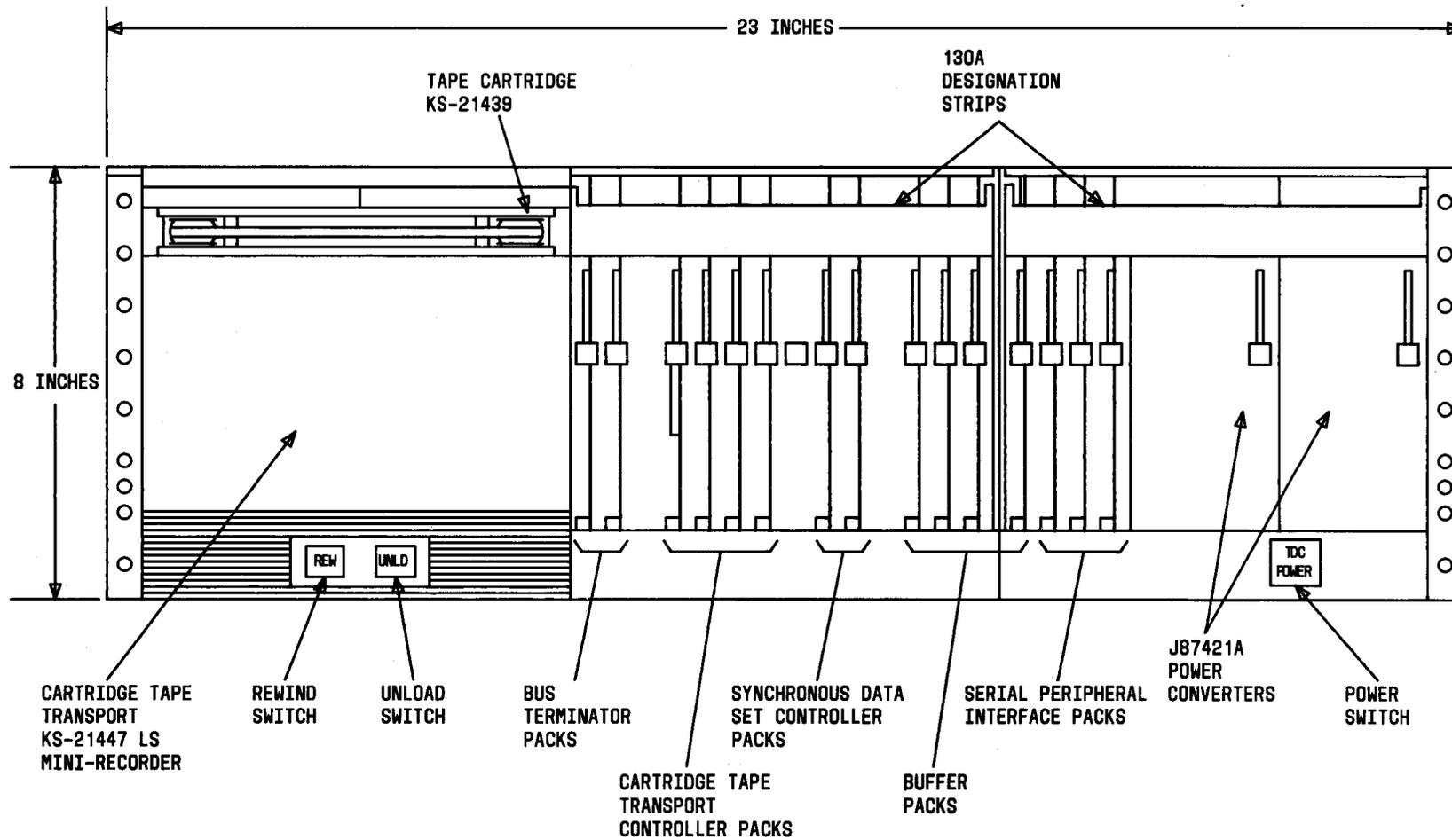**4.01** Performing the off-line bootstrap will ensure that the primary tapes are bootable and the

Fig. 3—Tape Data Controller Unit 0

generic is reasonably current and error free. For 2B-EF-1 and 2B-EF-2 generics, off-line bootstrap verification is performed using TOP Section 232-090-004. For 2BE3 generic, verification is performed automatically as part of the nightly routine.

4.02 It is recommended that the off-line bootstrap be performed prior to any tape change activity such as updating backup tapes or following replacement of a primary tape. For 2B-EF-1 or 2B-EF-2 generics, the off-line bootstrap should be performed a minimum of once per month, if no such activity has occurred.

4.03 Destruction of off-line main store data is necessary to obtain proper verification of off-line bootstrap capability. Prior to 2B-EF-2 Issue 3A generics, data is destroyed by manually removing power from the off-line control unit (CU).

4.04 An erase option has been added for 2B-EF-2, Issue 3A and later generics. This option provides a means of completely destroying the off-line store prior to a bootstrap without removing power from the off-line CU.

4.05 The erase option turns off the refresh cycle for approximately 45 seconds to destroy all data in the off-line store. Then the off-line bootstrap will continue by generating the fast count in the display buffer and proceed to the bouncing balls display. LOD:OMAS;BOOT:ERASE message is similar to LOD:OMAS;BOOT:FULL message, except there will be a 45-second delay before the off-line bootstrap sequence begins.

4.06 The off-line boot message with erase option will be accepted by earlier issues of 2B-EF-2, but the erase option will not function.

5. PATCH FILE UPDATE

5.01 Generic overwrites specified by the Software Change Administration and Notification System (SCANS) may be applied by updating the patch file. This method may be used instead of manual insertion or use of paper tapes for the latest issue of 2B-EF-2 and 2BE3 generics.

5.02 The patch file update procedure is located in TOP Section 232-090-022. This procedure involves the copying of the patch and pagemon files from an up-to-date (source) tape to the primary office tapes. These newly copied patches are loaded into the off-line CU via the off-line bootstrap. This will enable the office to run on the patches by switching CUs to the newly loaded data.

5.03 Patch file data may be obtained using two methods. A source tape may be manually obtained or data link facilities may be used. When using the administrative data link, the master tape in the sending office will be used to update the patch and pagemon files of the receiving office. The receiving office is responsible for the accuracy of the information received via data link.

> *Caution: A service outage of indefinite length may result if master tape and source tape are not the same generic and issue.*

5.04 No active translation overwrites should exist on the primary office tapes or the source tape. If translation overwrites exist for the office wanting to copy the patch file, a recent change update must be performed and overwrites cancelled prior to updating the patch file. If temporary Bell Laboratories or WE PECC patches are applied, contact PECC before updating the patch file.

> *Note:* The patch file update procedure is intended only for copying of patch and pagemon files. It may not be substituted for any ODA update and/or generic restart procedures.